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Preface

The capacity to learn computer science, programming, and coding is now available to children of elementary school age. This not only enables them to acquire the ability to think analytically and creatively, but it also enables them to effectively solve problems. By acquiring these skills during their time in elementary school, students are able to continue to broaden and deepen their knowledge as they progress through their academic careers.

When children are younger, they are more likely to like learning new things; therefore, it is preferable to begin teaching them at an earlier age rather than later in life. This gives them the opportunity to broaden their experiences. If students in elementary school are given the opportunity to learn about computer science at an early age, it will help them develop a passion for the subject as they grow older, which will enable them to enroll in classes with more experienced students when they enter middle school, high school, and even college.

Building a pipeline for the field of computer science

One of the reasons why education in computer science is so important is because it helps to construct an appropriate computer science pipeline.

There are severe consequences that result from a lack of available personnel in the field of computer science. These consequences include a slowdown in economic growth, stagnation in corporate processes, challenges to national security, and unrealized potential earnings throughout a career.

However, the fact that incomes in the field of computer science are more than twice as high as the average for the country is arguably the most significant. It is impossible for students to take advantage of these higher paid employment if they do not have access to learning opportunities that encourage them to pursue a career in computer science.

2. Enhancing the Students' Capacity to Prepare for Future Careers

What does it mean to be "future ready" in terms of careers? Stacy Lane, the Director of Coding Programs at the Marquette Tech District, provided the following explanation in an interview with equip: "Being future ready means having the critical thinking and problem-solving skills that are necessary to be successful at whatever jobs develop so that today's students can support themselves and their families with dignity in the workplace someday."

The study of computer science improves students' chances of finding employment and their prospective earnings over the course of their lives, giving them the ability to encourage and provide for their families. These earnings therefore serve to drive the economy and have the potential to even inspire technological investment in communities that were previously disregarded.

In the field of computer science, promoting equity

While we are discussing the process of constructing a sufficient pipeline of students to fill open positions in the field of computer science, it is also essential to place an emphasis on the cultivation of equity within the pipeline.

The percentage of women who acquire degrees in computer science is currently 18 percent, and it is anticipated that by the year 2025, women will only hold 20 percent of all positions in the field of computer science employment. In addition, minority groups are underrepresented in computer science majors, with only ten percent of all degrees going to students of African descent and twelve percent going to students of Latinx descent, respectively. Furthermore, in the field, the percentage of Black and Latinx workers is only 12 percent and 16 percent, respectively.

In spite of the fact that there is no one factor that is responsible for this pattern, a survey that was commissioned by Google found that women, people of color, and Latinos are more likely to be underrepresented in the field of computer science. Additionally, these groups are confronted with long-standing societal obstacles that influence their self-perception and whether or not they have a sense of belonging in the area. As a result, their interest and advancement are sometimes halted on those occasions.

What are the Implications of Representation?

From a purely numerical perspective, the lack of an adequate computer science pipeline can be mitigated by increasing the number of students who are exposed to and encouraged to pursue a career in the field of computer science.

Accessibility of Technology: The design and functionality of technology are skewed toward people who are responsible for doing the development. Speech recognition software that is equipped with smart speakers, for instance, has a greater chance of understanding men than it does women, and the same is true for those who speak with accents that are not American. An further illustration is the fact that facial recognition software frequently fails to recognize people of color and women. This, once again, is a result of the gender and ethnicity of the individuals who are responsible for its development.

Finally, increased fairness in the workforce of the computer science industry will help to narrow wealth inequalities between people of different races and genders. This will be accomplished by providing these groups with the opportunity to access better earnings that empower them, their families, and their communities.

It is imperative that people begin their education in computer science at a young age in order to bridge these gaps. According to research conducted by the College Board, the likelihood of women majoring in computer science improves by a factor of 10 when they are enrolled in Advanced Placement (AP) Computer Science. Additionally, the likelihood of Black and Latin x students majoring in computer science increases by a factor of seven when they have registered in advanced high school courses.

Furthermore, it is vital for students to attain these more advanced computer science courses that serve as a launchpad into higher education in the field of computer science. This can be accomplished by providing students with early, continuous, and intentional exposure.

In order to accomplish this, schools need to find a way to overcome the middle school cliff, which is the point at which both minority and female students frequently withdraw from STEM classes. For the purpose of dismantling these prejudices and assisting students in overcoming this infamous obstacle that hinders them from delving into more advanced subjects and developing skills in computer science, instruction must begin at a young age.

4.Improving One's Capabilities in Computer Science

Education in computer science is required for a variety of reasons, not the least of which is to guide students toward earning degrees in computer science. In addition, the ability to apply one's knowledge of computer science to a wide range of fields that are not directly related to computer science is an essential component of future preparation.

The five job categories that are expected to expand the fastest and offer the greatest salaries were evaluated by Burning Glass Technologies, and the results showed that 62 percent of these job domains are related to computer science. However, only 18 percent of these job domains require a degree in computer science. Programming, web development, robotics, and data analysis are some of the abilities that are relevant in these areas of expertise.

In order to determine which talents are now in the highest demand, researchers at LinkedIn evaluated job ads. According to their findings, having a strong understanding of computer science and digital skills is essential for being prepared for a profession outside of the field of computer science. Some of the most important abilities include the ability to use applications with flexibility, the ability to design and produce digital content, computing, data analysis, digital security, and media literacy.

Additionally, this pattern was validated by a second research study conducted by Mckinsey & Company. The study discovered that digital skills are the most rapidly increasing job ready skills that will be required between the years of now and 2030. The research indicates that there would be a 55 percent increase in the demand for individuals who possess technology skills. Taking all of these studies into consideration, it is clear that even in positions that are not directly related to computer science, employers anticipate their employees to have both prior expertise with computer science and a high level of digital proficiency.

Due to the fact that computer science is becoming increasingly inseparable from our work, this skill set is vital to career preparedness across a wide variety of industries and job roles. Students are more competitive in the job market for high-paying and rapidly expanding job categories if they have developed skills in computer science and digital technology to a high level.

5. Developing the Resilience to Adapt

The ability to continually re-skill and up-skill in order to stay up with change is another component of future readiness that was brought about by rapid technological advancements.

For instance, a survey by Dell Technology discovered that 85 percent of the employment that were anticipated to be available in the year 2030 have not yet been created. This is primarily due to the rapid expansion of technology. In a similar vein, a report by Deloitte reveals that the half-life of skills has already reached five years, and as a result, businesses will be required to make investments in ongoing professional development for their employees.

The implication of this is that pupils are getting ready for careers that have not yet been conceived of. Once they have completed their education, they need to be aware of how to develop into the positions that are open to them. Skills that are currently considered to be future-ready include the ability to learn, adapt, and embrace change and uncertainty, particularly in light of the improvements that have been made in technology. The field of computer science is essential for addressing this issue.

There is more to computer science than just a collection of digital abilities; it is a mindset that is predicated on the ability to solve problems, think critically and creatively, and engage in metacognition. Students learn how to think, learn, and develop through the study of computer science.

Students have a better understanding of technology and its adaptations and developments, as well as how to design, troubleshoot, upgrade, and use it, when they have a working grasp of how programming languages function, how computer systems function, and how networks drive communication. Foundational computer science abilities are essential for kids to have in order to continuously develop and adapt throughout their lives, regardless of whether they are at home, at school, or in the workplace.

Content

- Intra-subject and inter-subject communication in the process of teaching computer science in primary school, the development of students' logical thinking. Educational issues in the process of teaching computer science in elementary school.
- Forms and methods of teaching computer science
- Repetition of educational material in computer science lessons
- Testing and assessing students' knowledge in informatics classes

Methods of teaching computer science in elementary school: general issues. The subject of teaching computer science in primary school. Goals and objectives of the introduction of the subject of informatics in elementary school.

The common concerns of the various approaches to teaching computer science in elementary schools Strategies for teaching computer science that are supported by research:

1. Make visuals available. Providing students with visual examples, instructions, and explanations might help them better understand the material. Begin by providing a significant amount of scaffolding, then as pupils make progress, progressively reduce it.

Download EiE's free Coding Block Reference Sheet for Scratch, which is designed for use in classroom learning environments. Make use of this visual resource to assist all students, particularly those who are learning English as a second language, in resolving problems, working together, and acquiring new computer science jargon.

Students should be encouraged. There is a correlation between pupils having more interest in learning computer science and receiving support from a teacher or a parent, according to studies. One way to accomplish this is to just remark something like, "You would be good at computer science."

In order to demonstrate that everyone is capable of learning computer science, it is important to utilize various forms of media in the classroom. Encouragement can also be provided in the form of movies, articles, or posters that show students how people who are similar to them are working in the field of computer science. Be sure to offer appreciation to all of the students by saying things such, "I admire how you used critical thinking to find a solution to that problem" or "You really persevered to identify and fix bugs in your algorithm!"

3. Get the code deciphered. A method for examining Scratch projects that is based on reading comprehension skills was developed by researchers from the University of Chicago using Scratch. Students are able to make meticulous observations with the assistance of this strategy, which helps them avoid becoming overwhelmed by complex code. This strategy scaffolds the student approach as they browse through example programs. When it came to issues about computer science, the students who utilized this method did significantly better than the control group.

In the classroom, it is recommended to initiate the implementation of the TIPP&SEE technique while instructing computational thinking. For instance, in the Computer Science EssentialsTM grade 2 unit titled "Creating Animations," problem solvers are taught about computer animations through a series of exercises, debates, and readings that are designed to make the concepts of computer science relatable. Encourage students to apply the TIPP&SEE method while they are reading the epilogue to the unit and while they are studying the algorithms that they have created for the animations.

Fourth, make use of support from other pupils. The students who are working in groups should be given duties. It is possible for kids with learning difficulties to achieve greater success through the use of individual accountability and group rewards. To get kids ready for working together, it is important to teach them specific skills and vocabulary that will allow them to ask their classmates for assistance and provide support.

The classroom application involves assigning students the role of 'Tech Support'. It is the responsibility of this function to provide assistance with logging in, to ask questions that have been set by the teacher in order to guide investigation, or to give their solutions as a demonstration.

5. Establish a connection to the real world. It is essential for problems to have a meaningful connection to values in order to achieve the highest possible level of student engagement. Increasing students' enthusiasm and perseverance in STEM subjects can be accomplished by making these links in the classroom. In order to recruit students from groups that are currently underrepresented in STEM professions, it is important to demonstrate that abilities in STEM can assist in the resolution of real-world problems in their communities.

The Engineering and Computer Science EssentialsTM: An Integrated Program is a classroom application that aims to integrate engineering, science, computer science, and mathematics. Through the use of global locations, people that are approachable, and concepts that are appropriate for the grade level, our program creates a universe in which students are able to transition from engineering to computer science modules without any difficulty.

6. Engage in cooperation and share. It is a strong tactic, whether it is a gallery stroll or a class presentation, to suggest to students that they look at the projects that their classmates have created. When pupils see the work of other students, it serves as a reminder that there are other approaches to solving an issue. Students are also able to feel included and proud of their work as a result of this. It is also helpful to celebrate and normalize debugging by displaying actual bugs that are present in projects.

Students should be given the opportunity to record and narrate their digital artifacts as part of the classroom application. Instruct them to provide an example of the areas in which they required to perform debugging.

Develop a growth mentality as a seventh step. Develop a setting in which kids are at ease asking questions about science, technology, engineering, and mathematics (STEM) and computer science. Learning entails taking advantage of chances that present us with a challenge to our thinking and provide us with the chance to grow further. It is possible to assist students in overcoming feelings of uncertainty and apprehension when they are confronted with failures by encouraging them to adopt a growth attitude. If you want to foster growth mindsets in your classroom, you should place more of an emphasis on and reward the process of learning rather than the results.

This classroom application aims to strengthen mental habits by utilizing EiE's Computer Science Essentials: Integrated Program, which is designed for students in grades 1 through 5.

2. The instruction of computer science to elementary school students as a topic.

Computer science is the study of computers and the systems that are used to do computations. Computer scientists, in contrast to electrical and computer engineers, focus primarily on software and software systems. This encompasses the conceptualization, design, development, and implementation of software and software systems.

Artificial intelligence, computer systems and networks, security, database systems, human computer interaction, vision and graphics, numerical analysis, programming languages, software engineering, bioinformatics, and theory of computing are some of the primary fields of study that fall under the umbrella of computer science.

The ability to write computer programs is a fundamental component of the discipline of computer science; yet, it is only one of many components that make up the field. In addition to studying the performance of computer hardware and software, computer scientists are responsible for the invention and analysis of algorithms that are used to solve programs. The challenges that computer scientists face range from the intangible to the tangible. For example, they must design applications that are easy to use, perform well on handheld devices, and adhere to security measures. In addition, they must determine what problems can be solved with computers and the complexity of the algorithms that are used to solve them.

It can be difficult to figure out how to educate children the fundamentals of computers because technology is such a significant part of our lives, but it is also changing at a rapid pace. Is a phone considered a computer system? What about assistants that allow you to speak to them? When should you take the time to sit down with a youngster and teach them how to use a real computer?

Because of technological advancements, it is highly likely that your child is already familiar with a greater variety of computers than the ones that you have used. The ever-evolving nature of computers means that a laptop or desktop computer is no longer the first computer that children are exposed to for the first time. If you have ever given your phone to a young child or if your child has ever asked Alexa to play a video, then they have had the opportunity to engage with a computer.

Nevertheless, there is a significant benefit to instructing children in the usage of a traditional computer with a keyboard and mouse; they will be required to know how to use it for their homework. There are certain tasks that are simpler to complete on traditional computers, such as taking an online lesson in a programming language.

So when is the best time to start teaching children about computers? And what are some fundamental computing abilities that children absolutely need to have? Continue reading to learn some essential computer tips for children.

WHAT IS THE APPROPRIATE TIME TO PRESENT YOUR CHILD WITH THE COMPUTER?

It is possible that every family will have a somewhat different response to this issue because of the way they live their lives and how they interact with technology.

Because they have witnessed their parents using computers, some infants will already be familiar with personal computers. Some people won't interact with a computer until they are much older. However, there are a few common standards that should be followed. You should consider teaching children how to use computers when:

• They are old enough to understand at least what a computer is (the majority of children under the age of three will just see the light and noise) • They are, at some point, old enough to begin using computers at school • You are present so that you can monitor them

Children under the age of three should not be exposed to any kind of screen, according to the recommendations of a number of experts. However, the ultimate choice is with the parents, and there are a variety of ways to go about making that decision.

To be more specific, this indicates that your child can be exposed to computers within the age range of three to six years old.

Educative programs or games that include the whole family working together could be a good place to start for your youngster.

Everything that you do, on the other hand, ought to be introduced while you are present. It is not appropriate for children under the age of 12 to use a computer or to learn online without adult supervision.

How to educate your chıld ın the workıngs of the computer

When it comes to teaching your child how to use a computer, the most effective method is to begin with a desktop or laptop computer in the family rather than a tablet or a mobile phone.

How come? This prevents the child from having access to the computer and gives you the opportunity to instruct them in fundamentals, such as how to turn the computer on and off and how to open and close software programs.

First, however, you can demonstrate to them that the majority of the artifacts they engage with on a regular basis are also computers. They are going to be more inclined to study about the topic once they come to the realization that even the candy machine that they appreciate so much at the strip center that is closest to them is actually a computer. They will come to the realization that computers are much more than just a fun application of algorithms, and that they require it in order to operate practically anything that they get their hands on.

Since it is possible that children will use traditional computers with keyboards at school, it is also necessary for them to acquire the skills necessary to utilize these computers. Through the usage of a physical computer, they will be able to improve their typing and mouse abilities, as well as gain a better understanding of the fundamentals of both hardware and software. Touchscreens are unable to accomplish these things. You may also think about presenting your child with a film or website that provides information about the history of computers for children. This will allow them to have a better grasp of what computers are and how they have evolved over the years.

At this stage, you should also be teaching children fundamental computer hygiene, such as that they should wash their hands (and make sure they are completely dry) before using the computer, that they should use gentle hands, and that they should keep food and liquids away from the keyboard. The foundation that your child will have for learning on computers at school and completing homework will be strengthened as a result of this.

WHAT ARE SOME OF THE WORTHIEST COMPUTER SKILLS THAT KIDS SHOULD HAVE?

All children, regardless of how much interest they have in computers, require the same degree of computer abilities in order to be successful in school. It is important to remember that the majority of their schoolwork and assignments will be accomplished on a computer. Furthermore, as kids become older, it is possible that they will be obliged to have an email address or use particular social media accounts.

Being a Typist

When youngsters are learning at school, having a strong command of the keyboard is really necessary. It has been demonstrated through research that touch typing improves both the accuracy and speed with which children can type. Because children are able to pick up skills more quickly than adults, it is preferable to teach children how to type at a young age. For this reason, it is best to teach children how to type as soon as possible.

E-mail

It is possible that your child will require an email address for school or that they will beg for one in order to maintain communication with their pals as they get older.

It is possible that this will occur as early as the second or third grade, when they are of an age where they are able to read and write effectively (and before they join social media networks). In spite of this, they will require the leadership of an adult, and you will be responsible for monitoring both their inbox and their outbox, in addition to their spam.

Instead of utilizing a web-based account, you might want to think about using an application like Outlook, which allows you to download messages to your computer. While your child is still young, this will prevent them from accessing the open Internet and will also allow you to download communications in advance, allowing you to read through them before your child encounters them.

The act of opening an email account for your children when they are still relatively young is a pleasant activity that you may perform to expose them to the concept of email. Send them emails, tell them stories about their days, share some feelings with them, and let them know how you felt when they took their very first steps, among other things. You should give them the password to that email account and allow them to take ownership of it when they reach the age of 12 or 13, which is when they are mature enough to appreciate such a gift.

The realization that there is always a human on the other side of the screen is something that they should have by the time they have learned how to code. This is something that will allow them to develop meaningful technology solutions in the future. There is no point in utilizing technology that does not connect with people and work for and with them. Let them take the initiative to shape the future, let them be the ones to invent, and let them make this world a better place.

Doing research online

As your child gets older, they will begin to use the Internet to seek for material for school tasks. Like any other activity, they will want assistance from an adult in order to be successful. In spite of the fact that your child will most likely be old enough to use a computer on their own when they are given reports that involve research (usually between the ages of 8 and 12), you should still assist them with their initial research projects and teach them how to utilize search engines.

To conduct research, it is not enough to simply type a term into a search field. Although you are undoubtedly well aware of this fact, your child is still in the process of learning, and not all websites can be trusted.

Make certain that they acquire fundamental search abilities. Your children will need to be aware of where they may acquire reliable information, which websites should be avoided whenever possible, and they will also need to be monitored in the event that they stray from the path and find themselves in a different part of the internet.

It may be helpful in setting up parental controls that restrict the amount of time they can spend browsing. As soon as youngsters realize how to conduct research online and are able to work independently, it is important to remain close by while they are learning so that you can monitor them and respond to any queries that may arise.

Do you remember when we were their age and we would take multiple volumes and versions of the Encyclopedia in order to find the answer to a simple question?

The same thing takes place on the internet. In order to ensure that our children are safe while using the internet, it is important for them to understand that the many different sources that they can connect with will provide them the opportunity to form their own opinions on a number of topics.

The time has come to give our children the ability to form their own thoughts and perspectives on a variety of subjects, and conducting research online, under the supervision and direction of an adult who is responsible for their actions, can be an excellent way to accomplish this goal.

A coding system

For a variety of reasons, learning how to code is an important ability for children to acquire. There is the fact that it is a language, and the acquisition of new languages is beneficial to the growth of the brain.

Additionally, children will be better able to comprehend the technology that penetrates their environments and will be able to transition from being consumers of technology to being creators of it if they acquire the ability to code. In addition, in the process of experimenting with programming, such as in a robotics class, children can learn patience and critical thinking through the process of coding. Empathy can be taught to children by having them focus on the user experience when they are designing mobile applications.

Coding, on the other hand, can be seen as the process of going well beyond the realm of pure programming.

Young students can benefit from learning to code by developing their own software, boosting their self-esteem, gaining a better understanding of how to build strong relationships with their peers, and having the ability to express themselves boldly.

This occurs for a variety of reasons, one of which is that children learn through coding that any concept they might have, regardless of how outlandish it may sound, is feasible and can be carried out.

Taking all of this into consideration, we can draw the conclusion that teaching your children to code will, in fact, assist them in developing their ability to plan, to find solutions to issues, and to improve their ability to think strategically. In situations where everything needs to have objectives, goals, and a strategy, creativity tends to increase. The phrase "just coding" was the beginning of everything. What could possibly be more perfect than this?

CHILDREN'S SAFETY ON THE INTERNET

The internet is a vast realm, and a significant portion of it shouldn't be accessed by children of any age. So, how can you ensure that your children are secure when they are using the internet?

When it comes to fundamental internet safety, the first thing you should do is investigate the parental controls offered by your internet service provider. By doing so, you will be able to ban the websites and words that are the most offensive to you. Nevertheless, that is not sufficient.

You will need to take an active role in ensuring the safety of your child by teaching them how to behave responsibly when using the internet and monitoring their behaviors while using the internet. When children are first exposed to the computer, it may be beneficial to establish some fundamental guidelines for them to follow.

This will educate them on the concept of privacy. Just one example:

• Refrain from posting all of your private photographs. • Refrain from disclosing any of your private information on the internet, including your name, address, the school you attend, or your passwords.

Whenever you meet someone online, you should never agree to see them in person.

You are not allowed to respond to threats or bullying, and you are not allowed to post threats or bully anybody else.

• If you come across or receive anything that frightens, worries, or otherwise makes you feel uncomfortable, you should immediately inform a parent or adult by calling them.

This is also a good moment to describe additional strategies and tools that are aimed to gather personal information, such as spam, phishing, malware, and other similar methods. As their usage of technology increases, they will need to acquire the ability to avoid these.

When it comes to teaching internet safety to older children and teenagers, when they frequently have their own devices and desire more privacy, the situation becomes more challenging. Even though you have hopefully established a strong basis for safety with these children, you should still be on the lookout for any indications of potential danger.

It may be time to monitor your teen's messages, their search history, and limit their internet access if they spend the entire night online, if they receive messages from strangers or gifts that they did not ask for, if they refuse to talk to you about their conduct online, or if they turn off their phone or computer as you enter the room. In order to accomplish this, parents have access to a variety of resources. Several of these involve having conversations with your children about the things they do online.

Contemplate the possibility of co-viewing or co-creating with them on occasion. Ensure that you are aware of the websites and applications that your youngster enjoys using the most. Gain an understanding of how they function and what they anticipate from them. Give them the impression that you are genuinely interested in the things that they are interested in. Being present, on the other hand, is the most effective thing you can do.

Don't leave them behind. Spend time together utilizing applications and playing games online so that you can teach your child how to behave in a healthy manner while using the internet. In order to keep an eye on your child's computer use, monitor their video watching, and listen to your child if they have worries about something that occurred online, you should make sure that your child's computer use takes place in a common area of the house.

One of the most widespread advantages of STEM education is that it helps students build abilities that are applicable beyond the confines of the classroom and into everyday life.

1. The Capability to Think Critically

Children are naturally inquisitive and interested in the world around them, and they like asking questions. STEM education provides them with the assistance they need to accomplish this and further develop these talents. Every single one of the STEM fields is connected by a single thing: the urge to explore new possibilities.

Because of this, education of this kind offers a channel through which one can investigate ideas and find solutions to issues. In a paradoxical manner, education in the STEM fields fosters creative thinking and the ability to think "outside the box." It is possible for children of any age to apply these talents to situations that occur in the real world and come up with creative solutions to the challenges they are confronted with.

To a similar extent, the implementation of fundamental scientific procedures has the potential to boost children's confidence in their ability to follow instructions. A straightforward scientific experiment that involves a magnet and iron filings can be all that is required to motivate a youngster to not only carry out the steps that are being instructed to them but also to consider the reasons behind their actions.

Once a youngster has acquired this skill, it can be utilized to assist them in following a recipe or some instructions for constructing brick structures. At first glance, these may appear to be unimportant skills; yet, they are actually the foundation upon which one may build their creative thinking abilities, which is one of the most sought-after skills in the current employment scene.

2. Working Together and Working Together

Take a moment to reflect on your own elementary school years and think about the lesson or project that you enjoyed the most. There is a good chance that this is something that involves your classmates in some way. Children are able to have a good time and produce work that they can all take ownership of when they are working together in a group setting. On the other hand, youngsters develop a great deal of life-long learning skills when they participate in group projects.

Take into consideration the following setting: the students in a class are divided into groups of four and given one hour to complete their assignments. It is requested of them that they construct a poster of the solar system that is A3 in size and includes three information about each planet. As a result of participating in this activity, the children are gaining the ability to communicate with one another in an efficient manner and to accept the views and perspectives of each individual. When it comes to effectively expressing oneself in day-to-day life, these interpersonal skills are absolutely necessary.

The nature of the labor that must be done in order to accomplish the objective brings about an automatic development of these skills. By way of illustration, a child will acquire knowledge regarding self-regulation and timekeeping. They also learn how to control their team and ensure that they remain focused on the task at hand. Not only do they acquire research abilities, but they also learn how to effectively convey their discoveries to others.

Because of the nature of STEM disciplines, open discussions are conducive to their study. Because of this, it happens to be the ideal discipline for cultivating an environment that is both inclusive and cooperative. Because they are open to listen to the ideas and viewpoints of other people, children who possess these talents contribute to the enrichment of their experiences throughout their daily lives. The ability to demonstrate such talents is also highly valued by employers and university admissions committees.

Problem-Solving Abilities

Problem-solving may be one of the most valuable and interesting abilities to acquire, despite the fact that the curriculum in schools makes it sound like a tedious skill that can be learnt from a textbook. In order to involve their students in the process of acquiring this talent, educators all around the world are increasingly turning to STEM pedagogy. The ability to find a solution to a problem is at the core of every work that falls under the purview of STEM education, which makes it ideally suited for such endeavors.

During STEM activities, children are encouraged to recognize issues, formulate hypotheses about how to resolve them, and then put those hypotheses to the test. The development of 'hard' problem-solving skills, as well as perseverance and resilience, are both fostered by this activity. The ability to learn how to deal with challenges is something that a child may take with them into their adult life and use to their advantage. On the surface, a tiny scientific experiment and life decisions appear to have nothing in common; but, in order to find a solution, both require the same core problem-solving skills.

4. Literacy in technological matters

Both traditional literacy and technical literacy have emerged as essential components of knowledge in today's society characterized by rapid technological advancement. To ensure that a child is able to make the most of their time spent in school, it is becoming increasingly important for them to have access to educational materials through the use of technology. Teachers are able to introduce their students to the fundamentals of technology and offer them with an outlet that enables the children to develop their technical literacy at their own speed when they teach any subject that falls under the STEM umbrella.

Activities that are both artistic and practical in nature and are tied to technology, such as coding and robotics, are also utilized by some educational institutions. Because of this, children are encouraged to become responsible digital citizens, which includes adding another level to the concept of technical literacy. Through gaining a grasp of how technology operates, individuals are given the ability to become active creators in the digital world, rather than only active consumers. Having this knowledge instills confidence in their own digital capabilities and gives them the ability to adjust to the ever-changing technological landscape as they enter adulthood.

The cultivation of a passion for education

Curiosity and investigation are fostered through STEM education, which in turn inspires a passion of learning that lasts a lifetime. The fields of science, technology, engineering, and mathematics (STEM) become more interesting and applicable when children are involved in hands-on experiments, projects, and applications that are relevant to the real world. As a result of the hands-on nature of STEM education, youngsters are more likely to develop a passion for discovery. They are inspired to inquire, and it assists them in gaining a better understanding of the world that surrounds them. STEM education helps students develop a passion of learning at a young age, which paves the way for them to achieve academic achievement and personal development in the future.

The subject of teaching computer science in primary school

Various fields of activity mean almost all types of activity and business activity of a modern person - from the daily work of a secretary-typist, librarian, design engineer to the use of atomic energy and space exploration. The principles of computer science are used both in scientific work and in everyday life. The task of any science is to collect information, analyze it and study it in order to establish connections and patterns and obtain new information based on the study - research results.

Various fields of activity mean almost all types of activity and business activity of a modern person - from the daily work of a secretary-typist, librarian, design engineer to the use of atomic energy and space exploration. The principles of computer science are used both in scientific work and in everyday life. The task of any science is to collect information, analyze it and study it in order to establish connections and patterns and obtain new information based on the study - research results.

The computer (from the English computer - computing device) has become a reliable tool and an indispensable assistant in human life and activity.

The main areas of computer use:

-accumulation, storage and processing of large volumes of information, quick search for the required data;

-performing scientific, economic and design calculations;

-office work (writing letters and paperwork);

-training and acquisition of professional skills;

-publishing (creation of color and black-and-white magazines and newspapers, scientific and fiction literature);

-constructing drawings, diagrams, creating drawings and paintings, cartoons and video clips;

-communication between people located in different cities and countries;

-imitation of the work of a human expert in a certain subject area;

-games and entertainment.

Despite the variety of tasks solved with the help of a computer, the principle of its application in each case is the same: information entering the computer is processed in order to obtain the required results.

It is no coincidence that the computer science course in the USA and Great Britain is called Computer Science.

Informatics is concerned with processing information using a computer.

At the end of the 16th century, Gian Domenico Campanella wrote the book "The City of the Sun". Each of the four unanimously elected main "rulers of the city of the Sun" had a library of only one book called "Wisdom", where all sciences are presented in a surprisingly concise and accessible manner.

How simple: open the "Book of Wisdom" and you will find an answer to any question. The author of the utopian novel understood the unreality of such ideas. But he deeply believed in the power of the human mind, which is capable of opening the best ways of bringing people to knowledge in the future, no matter how great their reserve may be.

Domenico Campanella was not mistaken in his hopes. The imagination of the writer acquires visible demons. The man created the "Book of Wisdom" - electronic computing machines (EBM).

Abbreviation EBM firmly entered our speech, although this term does not accurately convey its essence. The ability to perform calculations is far from the main purpose of modern computers. A variety of information processing tasks are solved with their help. Only the internal physical processes of informational and logical transformations in EVM have a computational character.

This is also reflected in the concept of "computer" (eng. computer - I think, I calculate). The popularity of this term is due to its convenience for the formation of new concepts: computerization, computer literacy, etc.

In the modern sense, a computer is an information machine, a universal electronic tool for various information processing - data processing, text editing, providing a dialog mode of communication with a person, etc.

The rapid development and wide spread of computing technology served as prerequisites for the emergence of a new branch of science called informatics. This word appeared in the early 60s in French to denote automated information processing in society.

Informatics (from French information - information and futomafiogue - automation) - a branch of science that studies the structure and general properties of scientific information, as well as issues related to its collection, storage, search, processing, transformation, distribution and use in various spheres of human activity.

However, since the mid-70s, the term "informatics" has become used as a synonym for the English phrase computer science (science of calculations) to denote a scientific discipline related to processing information of any nature with the help of EBM.

Today, computer science is not only a scientific and academic discipline. It turned into a dynamically developing industry of the national economy.

The most important goal of elementary education is to create a solid foundation for the next one:

-It implies not only the acquisition of basic knowledge and skills, but also the development of abilities

-cooperation and reflection.

Informatics is considered in the general secondary school and in the primary school particularly in two aspects.

- from the position of forming the whole and system

-ideas about the world of information, about the community of information processes in living nature,

-society, technology. From this point of view, schoolchildren should be at the propaedeutic stage of education

-get the necessary preliminary views about the information activity of the person.

The second aspect of the propaedeutic course of informatics — mastering methods and means of obtaining,

-processing, transmission, storage and use of information, solving tasks with the help of

-computer and other means of information and communication technologies. This aspect

-connected, first of all, with the preparation of elementary school students to the continuation of education, к

-active use of educational information resources: sound library, video library,

-multimedia training programs, electronic reference books and encyclopedias among others

-educational subjects, when performing creative and other project works.

The computer science course in elementary school has a complex character. According to the first The aspect of informatics is carried out theoretically and practically computer-free preparation, which includes the formation of primary concepts about the information activity of a person, about the organization of publicly significant information resources (libraries,

-archives and etc.), about moral and ethical norms of work with information. According to

The second aspect of computer science is carried out by practical user training —

-formation of primary ideas about the computer, including preparation of schoolchildren to

-educational electronic, zebigan with executive information and commentarytechnologies on other subjects.

Thus, the most important result of studying computer science at school is development

-such personal qualities that meet the requirements of the information society, in particular,

-acquisition of students' informational and communication competence (IKTkompetentnosti).

The computer science course program for elementary school is developed in accordance with the requirements of FGOS for primary general education are aimed at ensuring the realization of three group of educational results: personal, meta subject and subject.

Since the experimental introduction of computer science in primary school, significant experience has been accumulated in teaching computer science to primary school students.

Teaching computer science in primary school is aimed at developing primary school students' initial understandings about the properties of information, ways of working with it, in particular using a computer. It should be noted that the computer science course in primary school makes a significant contribution to the formation and development of the information component of universal educational activities, the formation of which is one of the priorities of primary general education. Moreover, computer science as an academic - subject in which skills and abilities for working with information are purposefully formed,

-can be one of the leading subjects in the formation of universal educational activities (general educational skills and abilities).

An important problem in the implementation of a continuous computer science course is the continuity of its teaching at different educational levels.

Any course of study should have an internal unity, which is manifested in the content and methods of teaching at all stages of training. The structure of the course, its main content lines should ensure this integrity.

Therefore, it is assumed that the content lines of teaching computer science in elementary school correspond to the content lines of studying the subject in secondary school, but are implemented at the propaedeutic level. Upon completion of training, students must demonstrate the formed skills and abilities in working with information and apply them in practical activities and everyday life.

The authors make an attempt to build a multi-level structure of the subject "Computer Science", which would be considered as a systematic course that continuously develops the knowledge of schoolchildren in the field of computer science and information and communication technologies.

The authors emphasize the need for schoolchildren to receive at the earliest stages of training ideas about the essence of information processes. Information processes are considered using examples of transmission, storage and processing of information in human information activity, wildlife, technology. In the process of studying computer science in primary school, the skills of classifying information, identifying the general and the specific, establishing connections, comparing, drawing analogies, etc. are formed.

This helps the child to meaningfully see the world around him, navigate it more successfully, and form the foundations of a scientific worldview.

The proposed propaedeutic course in computer science is based on the fundamental principles of general didactics: integrity and continuity, scientific nature combined with accessibility, practice-oriented nature combined with developmental learning. In terms of solving the priority task of primary education — the formation of UUD (general educational skills) — the skills of constructing models of the problem being solved and solving non-standard problems are formed.

The development of the creative potential of each child occurs during the formation of planning skills in the course of solving various problems. In the second grade, children learn to see the surrounding reality from the point of view of the information approach. In the process of learning, computer science terms (source/receiver of information, communication channel, data, etc.) are gradually introduced into the thinking and speech of students. Schoolchildren study the structure of a computer, learn to work with electronic documents. In the third grade, schoolchildren study the presentation and coding of information, its storage on information carriers.

The concept of an object, its properties and actions with it is introduced. An idea of a computer as a system is given. Children master information technologies:

-technology of creating an electronic document, technology of editing it, receiving/transmitting it,

-searching for information on the Internet. Students get acquainted with modern tools

-for working with information (mobile phone, e-book, camera, computer, etc.), at the same time learn to use them in their educational activities. Concepts are introduced as needed, so that the child can reason about his information activities, talk about what he does, distinguishing and calling elementary technological operations by their proper names.

In the fourth grade, the topics "World of Concepts" and "World of Models" are considered, students' ideas about working with various scientific concepts are formed, and the concept of an information model, including a computer one, is introduced. The concepts of an executor and an action algorithm, and the forms of recording algorithms are considered.

Children master the concept of managing themselves, other people, technical devices (tools for working with information), associating themselves with the controlling object and realizing that there is an object of management, realizing the goal and means of management.

Schoolchildren learn to understand that the means of management affect the expected result, and that sometimes the result obtained does not correspond to the goal and expectations. In the process of consciously managing their educational activities and the computer, schoolchildren master the corresponding terminology and correctly construct their speech.

They learn to recognize the management processes in the surrounding reality, describe them in terms of computer science, and give examples from their lives. Schoolchildren learn to see and understand in the surrounding reality not only its individual objects, but also their connections and relationships with each other, to understand that management is a special, active way of relationships between objects.

Seeing the relationships between objects of the system is the first active step towards a systemic view of the world.

And this, in turn, contributes to the development of systemic thinking in primary school students, which is so necessary in modern life along with logical and algorithmic thinking.

Logical and algorithmic thinking are also the subject of targeted formation and development in the fourth grade with the help of appropriate tasks and exercises.

A modern child is immersed in a new subject and information environment. However, it is impossible to bring up a specialist in the field of information technology or a programmer if you do not begin teaching computer science in elementary grades.

Unlike in the past, the reality surrounding a modern child is filled with countless man-made electronic devices. Among them are a computer, mobile phones, a digital camera, digital video cameras, players, decoders, etc. In these conditions, computer science in elementary school is no less necessary than the Russian language and mathematics.

In computer science lessons, schoolchildren consciously and purposefully learn to work with information (search for it, analyze, classify, etc.), distinguish form from content, i.e. meaning, recognize and call objects of the surrounding reality by their names in computer science terms. The study of computer science within the subject area "Mathematics and computer science" is aimed at developing figurative and logical thinking, imagination, mathematical speech, the formation of subject skills and abilities necessary for the successful solution of educational and practical problems and continuing education.

A special place for training in computer science is given in the subject "Technology". Within the framework of this subject, close attention should be paid to ensuring initial ideas about computer literacy of students.

The study of the integrated subject "World Around Us" is aimed at "understanding the child's personal experience of communication with nature and people; understanding one's place in nature and society." Computer science, by teaching how to use a universal tool for searching and processing information (a computer), expands children's opportunities to learn about the world around them and promotes their independence and creativity in the process of learning.

The study of subjects of the aesthetic cycle (fine art and music) is aimed at developing "the ability for emotional-value perception of works of fine and musical art, expressing in creative works one's attitude to the world around them." Mastering a graphic editor in computer science lessons gives a younger schoolchild the opportunity to create an image in a fundamentally different technique, developing his logical thinking in close connection with the emotional-value perception of the surrounding reality.

The study of Russian and the native language in primary school is aimed at developing speech, thinking, imagination of schoolchildren, the ability to choose language tools in accordance with the conditions of communication - all this is taught by computer science, awakening both a cognitive interest in words and the desire to improve one's speech in the process of mastering a powerful tool for working with information and its software, in particular - a text editor, an electronic notepad, an electronic book.

In computer science lessons, when typing texts in a text editor, students master the skills of writing correctly (since all errors the computer highlights in red and offers a correctly written word), participate in a dialogue (orally via Skype or in writing using the chat mode). Learning to work on a computer, children compose written texts-descriptions and narratives of a small volume, master the basics of business writing (writing a note, address, letter).

Based on the fact that talking to children about numbers, information and data, methods and tools for storing and processing them cannot take place on a purely abstract level, both mathematics and computer science are directly related to the content of other disciplines of primary education.

In particular, with a foreign language. A foreign language in primary school is studied from the 1st grade. It forms "elementary communicative skills in speaking, listening, reading and writing; develops speech abilities, attention, thinking, memory and imagination of a primary school student." Computer science, on the one hand, uses the knowledge

obtained in foreign language lessons (the English alphabet, for example), on the other hand,

develops communicative skills, since it introduces new terms into schoolchildren's speech and teaches

to communicate using modern ICT tools (e-mail, Skype, etc.). Thus, computer science in primary school performs an integrating function, forming knowledge and skills in the computer science course and motivating 1C students to actively use the acquired knowledge and skills when studying other disciplines in the information educational environment of the school.

Taking into account the specifics of integrating the subject into the educational plan, the goals of the selected course "Computer Science" are specified within the framework of a particular educational area in order to achieve personal, meta-subject and subject results.

1st group requirements: (personal results)

These requirements are achieved under the influence of the application of the teaching methodology and special relations "teacher - student":

1.1) readiness and ability for self-development, formation of motivation for learning and knowledge;

1.2) value-semantic attitudes of students, reflecting their

individual-personal positions;

1.3) social competencies;

1.4) personal qualities.

2nd group requirements (meta-subject results)

These requirements are achieved under the influence of the application of the teaching methodology and special relations "teacher - student":

2.1) readiness and ability for self-development, formation of motivation for learning and knowledge;

2.2) value-semantic attitudes of students, reflecting their

individual-personal positions;

2.3) social competencies;

2.4) personal qualities.

3rd group requirements: (subject results)

These requirements are achieved by mastering the theoretical content of the course, solving educational problems in a workbook and on a computer, and completing assignments and projects outside of class time.

In terms of achieving the planned learning outcomes, the most valuable competencies reflected in the course content are:

• observe objects in the surrounding world; detect changes occurring with an object, and learn to describe objects orally and in writing based on the results of observations, experiments, and work with information;

• correlate the results of observation with the goal, correlate the results of an experiment with the goal,i.e. get an answer to the question "Did you manage to achieve the set goal?";

• present information about the observed object orally and in writing, i.e. create a text or graphic model of the observed object using a computer with the use of a text or graphic editor;

• understand that mastering information technologies (text and graphic editors) is not an end in itself, but a way of activity in the integrative process of cognition and description (description means the creation of an information model of a text, drawing, etc.);

• identify individual features characteristic of the objects being compared; in the process of information modeling and comparison of objects, analyze the results of the comparison (answers to the questions "How are they similar?", "How are they not similar?"); combine objects by a common feature (what is superfluous, who is superfluous, the same as..., the same as...), distinguish between the whole and the part.

The creation of an information model can be accompanied by the implementation of simple measurements in different ways. In the process of learning the properties of the objects being studied, complex mental activity is carried out using ready-made subject, symbolic and graphic models;

-solve creative problems at the level of combinations, transformation, analysis of information when doing exercises on the computer and computer projects;

• independently draw up an action plan (concept), demonstrate originality when solving a creative design problem, create creative works (messages, short essays, graphic works), act out imaginary situations, creating the simplest multimedia objects and presentations, apply the simplest logical expressions such as:

"... and/or...", "if... then...", "not only, but also..." and give an elementary justification for the expressed judgment;

• master the initial skills of transmission, search, transformation, storage of information, use of a computer, when performing interactive computer tasks and developmental exercises -

search (check) for the necessary information in an interactive computer dictionary, an electronic library catalog. At the same time, various methods of presenting information are mastered, including in tabular form, organizing information alphabetically and by numerical parameters (ascending and descending);

-gain experience in organizing one's activities by completing interactive tasks specially developed for this purpose. These tasks require following instructions, precisely following a sample and simple algorithms, independently establishing a sequence of actions when completing an interactive learning task when an answer is required to the question "In what sequence should this be done to achieve the goal?";

• gain experience in reflective activity by completing a special class of exercises and interactive tasks. This occurs when determining methods for monitoring and evaluating one's own activity (answers to the questions "Is this the result obtained?", "Am I doing this correctly?"), finding errors during the exercise and correcting them;

• gain experience in cooperation when completing group computer projects: being able to agree, distribute work among group members, evaluate one's personal contribution and the overall result of the activity.

From the point of view of achieving the planned learning outcomes, the most valuable

competencies reflected in the course content are:

• observe objects of the surrounding world; detect changes occurring with an object and learn to describe objects orally and in writing based on the results of observations, experiments, and work with information,

• correlate the results of observation with the goal, correlate the results of an experiment with the goal, i.e., get an answer to the question “Did you manage to achieve your goal?”;

• present information about the observed object orally and in writing, i.e., create a text or graphic model of the observed object using a computer using a text or graphic editor; understand that mastering information technologies (text and graphic editors) is not an end in itself, but a way of activity in the integrative process of cognition and description (description is understood as the creation of an information model of a text, drawing, etc.);

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The creation of an information model can be accompanied by taking simple measurements in different ways. In the process of cognizing the properties of the objects under study, complex mental activity is carried out using ready-made subject, symbolic and graphic models;

• solve creative problems at the level of combinations, transformation, analysis of information when doing exercises on a computer and computer projects;

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• master the initial skills of transmitting, searching, transforming, storing information, using a computer; when performing interactive computer tasks and developmental exercises - searching (checking) the necessary information in an interactive computer dictionary, an electronic library catalog. At the same time, there is mastery of various methods of presenting information, including in tabular form, organizing information alphabetically and by numerical parameters (ascending and descending);

• gain experience in organizing one's activities by performing specially developed interactive tasks. These are tasks that involve following instructions, precisely following a sample and simple algorithms, independently establishing a sequence of actions when performing an interactive learning task, when an answer to the question "In what sequence should this be done to achieve the goal?" is required;

• gain experience in reflective activity by performing a special class of exercises and interactive tasks. This occurs when determining methods for monitoring and evaluating one's own activity (answers to the questions "Is this the result obtained?", "Am I doing this correctly?"), finding errors during the exercise and correcting them; gain experience of cooperation in the implementation of group computer projects: be able to agree, distribute work among group members, evaluate their personal contribution and the overall result of the activity.

Correspondence to the age characteristics of students was achieved:

- taking into account the individual intellectual differences of students in the educational process through a combination of typologically oriented forms of presentation of the content of educational materials in all components of the teaching and methodological kit;

- an optimal combination of verbal (verbal-semantic), figurative (visual-spatial) and formal (symbolic) ways of presenting educational materials without violating the unity and integrity of the presentation of the educational topic;

- taking into account the diversity of students' cognitive styles through providing the necessary educational material for all possible types of educational activity.

In addition, compliance with the age characteristics of students was achieved through the development of the operational-activity component of textbooks, including tasks that form research and project skills. In particular, the formation and development of skills is carried out:

- observe and describe objects;

- analyze data on objects (items, processes and phenomena);

. highlight the properties of objects;

- generalize the necessary data;

- formulate a problem;

- put forward and test a hypothesis;

- synthesize the acquired knowledge in the form of mathematical and information models;

- independently plan and forecast their practical actions, etc.

As a result of all of the above, a system of universal learning activities is developed, which, according to the Federal State Educational Standard, are the basis for creating training courses.

All components of the teaching and methodological kit represent a single system that ensures continuity of studying the subject in full. This consistency is achieved:

1. Reliance on through content lines:

• information, types of information (by method of perception, by method of presentation, by method of organization);

• information objects (text, image, audio recording, video recording);

• information sources (living and inanimate nature, human creations);

• work with information (exchange, search, transformation, storage, use);

• information technology tools (telephone, computer, radio, television, multimedia devices);

• organization of information and data (table of contents, indexes, catalogues, notebooks, etc.).

2. Using the general semantic structure of textbooks, which allows for the implementation of the said continuity. The components of this structure are built in accordance with the main stages of cognitive activity:

• the "Repeat" section - updating of knowledge. Contains interesting and significant information about the surrounding world, nature, man and society, helps students establish a connection between the goal of educational activity and its motive (personally significant information).

The examples chosen by the authors may be familiar and habitual at first glance, thereby provoking surprise at their informational nature and significance from the point of view of vital interests;

• the content of the paragraph is presented through the components of the activity series: "Goal", "Understand", "Do", "The Main Thing", "Know", "Be Able" - new knowledge.

This achieves the most rational sequence of actions for studying new material: from understanding to practical application, including the development of creative activity;

• sections "We understood", "We learned" - reflection.

Organization of repetition of previously acquired knowledge, skills, abilities. Use of means of stimulating students to independent work (or in preparation for a test);

• "Words and terms for memorization" - generalizing knowledge. Generalization and classification;

• practical tasks, including tasks in workbooks and EOR. Formation and development of skills to use the acquired theoretical knowledge in computer science, skills to structure the content of texts and the process of setting and solving educational problems (culture of thinking, culture of problem solving, culture of project and research activities);

-formation and development of skills to plan, organize, control, regulate and analyze one's own educational activities, the ability to independently and consciously make one's own choice of values and be responsible for this choice (self-management and self-determination); formation and development of skills to find, process and use information to solve educational problems, as well as skills to organize cooperation with elders and peers, to organize joint activities with different people, and achieve mutual understanding with them.

Thus, the very structure of the presentation of material in textbooks reflects the purposefulness of the formation of general educational skills, abilities and methods of activity (UUD), which are formed and developed within the framework of cognitive, organizational and reflective activities. This achieves full mastery of all components of educational activity, which include:

• educational motivation;

• educational goal;

• educational task;

•educational actions and operations (orientation, transformation of material, control and assessment);

• meta-subject educational actions (mental actions of students aimed at analysis and management of their cognitive activity).

The authors sought to optimally combine scientific and methodological aspects in constructing the course of the academic subject, therefore the content of the components of the teaching and methodological kit is based on the historical logic of the development of science. The teaching and methodological kit provides an optimal combination of scientific content and methods of organizing training. In particular, it is recommended to use the following lesson structure.

The study of the computer science course in the second grade begins with the topic "Man and Information", during the study of which the child's attention is drawn to the phenomenon of information, emphasizing its role in human life. Then the types of information are distinguished according to the way in which a person perceives it, the concepts of the source and receiver of information are introduced using simple examples, and the computer as a tool that helps a person work with information is discussed.

The content of the second chapter naturally follows as a "link" between information and the computer. The content of the third chapter forms the understanding and ideas of school children that the computer does not process information (information is processed by a person), but data, i.e.

-encoded information. An idea of the types of data (encoded information) is given, which is very important for younger schoolchildren to understand why there are different application programs: text and graphic editors, spreadsheets, etc.

-the corresponding programs are required to process different types of data.

This chapter begins a serious conversation about binary coding. The content of the fourth chapter is aimed at the formation and development of the concept of a document, at the methods of its creation, since the understanding of what data is for a second-grader is not yet very relevant.

But the concept of a document is relevant in all senses, since children already constantly deal with various paper and electronic documents (with a birth certificate, applications, certificates, files, etc.). In the third grade, there is a repetition and development of the educational material covered in the second grade. Chapter two is about actions with information. Schoolchildren, through a conversation about actions with information, prepare to understand the concept of an information process.

The culmination of the content in the third grade is the concept of an object. An idea of an object as a subject of our attention is formed, i.e. an object is understood to mean not only objects, but also properties of objects, processes, events, concepts, judgments, relations, etc.

This approach will allow already in primary school to seriously consider such objects as "algorithm", "program", "algorithm executor", "model", "control" and other abstract concepts. This methodological approach allows a junior schoolchild to reason about the properties of an algorithm, the properties of the "algorithm executor", the properties of the control process, and so on, which constitutes the content of the course in the fourth grade.

Already in the third grade, a serious conversation begins about a computer as a system, about information systems. The content of the fourth grade is what informatics should be studied in school for, and, in particular, in primary school: for the formation and development of concepts of modeling, model and control process. The topic of management is the most important from the point of view of the second generation Federal State Educational Standard, since in primary school it is necessary to teach children to manage not only the computer and their time, but also themselves.

The content of the computer science course in primary school by grade is given below in the tables. The main types of educational activities of students are presented in two versions: in the form of analytical and practical activities.

What a computer science teacher needs to know and be able to do

To work effectively as a computer science teacher, it is important for a teacher to:

-Know the educational standards and requirements for teaching the discipline "Computer Science and ICT";

-Know the psychological aspects of teaching schoolchildren of different ages;

-Understand the specifics of preparing students for the Unified State Exam and the Basic State Exam;

-Know the methods of organizing lessons (individual and group);

-Be able to draw up a program and lesson plan for computer science;

-Be able to apply modern technologies in teaching computer science;

Constantly update your knowledge to keep abreast of all trends in the field.

Computer science teachers earn different amounts of money, their income depends on their place of work, education, and experience. On average, the salary of computer science teachers in Russia ranges from 45,000 to 70,000 rubles. In the capital regions, the median salary of computer science teachers is higher and can reach 100,000 rubles. Computer science teachers in private schools and in specialized organizations for preparing for the Unified State Exam and the Basic State Exam also receive higher salaries. Computer science teachers have access to various ways to increase their income: for example, they can conduct private classes - prepare schoolchildren for Olympiads and exams or simply explain material that causes difficulties.

What are the requirements for computer science teachers in schools?

In accordance with the Unified Qualification Requirements (EQR) for teachers of the subject "Informatics and ICT", school management has the right to hire people with higher or secondary vocational education in a pedagogical or related field, regardless of their experience.

Also, computer science training classes in schools can be conducted by people who do not have an education in a specialized university or secondary vocational educational institution, but who have completed additional pedagogical training in this discipline.

People who want to become computer science teachers can choose one of two options: either get a second pedagogical education in full-time or part-time form, which usually takes several years, or take a professional retraining program for a computer science teacher, which allows you to get an education in a shorter period of time.

A computer science teacher must have a wide range of knowledge and skills to effectively teach students digital technologies. Here are some important aspects that a computer science teacher should have:

Deep knowledge of computer science

The teacher must have good knowledge of programming, algorithms, databases, computer networks and other key topics of computer science.

Understanding regulatory requirements for teaching

The teacher needs to understand the requirements of the Federal State Educational Standards (FSES) in order to teach the subject in accordance with them: know how educational and methodological programs are developed, how work is organized in lessons, how the work of students is assessed.

Preparing students for the Unified State Exam and the Basic State Exam is an important part of the work of a computer science teacher, so he needs to understand all the intricacies of preparing students, the variety of exam tasks and the assessment system.

Ability to teach different age groups

An IT teacher must be able to adapt lessons and teaching methods for different age groups, from primary school students to high school students.

Update your knowledge

The rapidly changing technological environment requires an IT teacher to constantly update their knowledge and be aware of the latest trends in the field of information technology.

Ability to motivate and engage students

It is important for a teacher to be able to inspire students and interest them, showing how computer science can be useful for their future.

Patience and communication skills

A teacher must be patient and have good communication skills in order to effectively explain complex topics and help students develop skills in the field of computer science and ICT.

A computer science teacher must have a wide range of knowledge and skills to effectively teach students digital technologies. Here are some important aspects that a computer science teacher should have:

Deep knowledge of computer science

The teacher must have good knowledge of programming, algorithms, databases, computer networks and other key topics of computer science.

Understanding regulatory requirements for teaching

The teacher needs to understand the requirements of the Federal State Educational Standards (FSES) in order to teach the subject in accordance with them:

-know how educational

- methodological programs are developed, how work is organized in lessons, how the The students' work is assessed.

Preparing students for the Unified State Exam and the Basic State Exam is an important part of the work of a computer science teacher, so he needs to understand all the intricacies of preparing students, the variety of exam tasks and the assessment system.

Ability to teach different age groups

An IT teacher must be able to adapt lessons and teaching methods for different age groups, from primary school students to high school students.

Update your knowledge

The rapidly changing technological environment requires an IT teacher to constantly update their knowledge and be aware of the latest trends in the field of information technology.

Ability to motivate and engage students

It is important for a teacher to be able to inspire students and interest them, showing how computer science can be useful for their future.

Patience and communication skills

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Computer science is a very young science - its emergence and formation dates back to the second half of the 20th century. The term "computer science" in Russian literature has been used relatively recently and its interpretation still cannot be considered established and generally accepted. This is due to the terminological and conceptual difficulties in introducing the concept of "computer science" and its derivative concepts.

The explanatory dictionary of computer science defines it as follows: "Scientific, technical and technological discipline; deals with issues of collecting, storing, processing, transmitting data, including using computer technology" The origins of computer science are closely related to mathematics and cybernetics. A special role in this was played by mathematical logic and cybernetics, which created the theoretical prerequisites for the creation of computers. The father of cybernetics is generally recognized to be the American scientist Norbert Wiener, who in 1948 published the book

"Cybernetics, or Control and Communication in the Animal and the Machine". In relation to cybernetics, the most serious mistakes and distortions were made in our country by the state and the ideological organs of the Communist Party.

Cybernetics was declared a "bourgeois pseudoscience", a "whore of imperialism" (this is a cliché of newspapers and magazines of those times). As early as 1954, the "Brief Philosophical Dictionary" characterized cybernetics as a "reactionary pseudoscience that arose in the United States after the Second World War and became widespread in other capitalist countries; a form of modern mechanism."

Gross mistakes due to such an incorrect ideological assessment caused serious harm to science, slowed down its development in our country for many years, led to a significant lag in the development of domestic electronic computers.

We feel this lag to this day. Only the enormous needs for machine calculations for the creation of atomic weapons and rocket technology forced to push aside ideological dogmas, prevented the defeat of cybernetic science in our country, and allowed the development of domestic computers

Cybernetics and informatics have much in common, based on the concept of management. Cybernetics studies the general laws of information flow in arbitrary systems, in particular, in those aspects that relate to management processes. Informatics studies the general patterns of information flow in nature and in social systems.

If cybernetic principles do not depend on particular real systems, then the principles of informatics are always in close connection with the functioning of real systems.

The term "computer science" itself is of French origin and was introduced into wide circulation in the 60-70s of the 20th century as a combination of two French words "informatione" (information) and "avtomatique" (automation). In the USSR in the mid-20th century, the term "computer science" was associated with the processing of scientific and technical information. However, since the mid-1970s, the term has received a different interpretation in the works of academician A.P. Ershov "... as the name of a fundamental natural science that studies the processes of transmission and processing of information"

Recently, some scientists and methodologists have proposed to introduce a new term for school computer science - "computer science", which partially corresponds to the translation from English of the term "Computer Science". However, it has not gained popularity. The structure of school informatics is divided into 4 sections:

1) Software or mathematical support, which includes programming tools for designing and supporting information, educational and control systems of secondary schools

2) Technical support, which includes determining the parameters of equipment of typical school computer rooms, substantiation of economically feasible choice of computer tools for supporting the educational process

3) Educational and methodological support includes issues of developing educational programs, teaching aids, textbooks for the school course of informatics, as well as related subjects using information and communication technologies

The subject of ITM in primary school.

The course "Methodology of Teaching Computer Science" appeared in the curricula of pedagogical universities in the mid-80s of the last century almost simultaneously with the introduction of the subject

Fundamentals of Informatics and Computer Engineering in school in 1985. Approximately since the mid-90s, the methodology of teaching computer science in elementary grades began to develop in connection with the fact that some advanced, elite schools in Russia began to teach computer science in grades 1-4.

The methodology of teaching computer science Teaching methods of computer science in primary school is an integral part of the methodological system of computer science as a school discipline and is currently going through the formation stage. This is due to the fact that computer science is a very dynamic discipline, changes occur quickly, the content is replenished with new knowledge, as a result of which the methodological system of this discipline also changes.

This will continue until computer science is finally formed as a science and as a school subject. Teaching methods of computer science is aimed at developing such methods and techniques that will allow the teacher to achieve the maximum result in a minimum period of time.

Teaching methods of computer science is a part of pedagogy, therefore, the teacher can rely on the pedagogical techniques already known to him in the lesson. But it is necessary to take into account the specificity of the subject of computer science.

For example, in relation to computer science, the classical class-lesson system of Ya. A. Kamensky raises doubts. And the presence or absence of computers in school gives rise to the problem of two-variant training: machine and non-machine learning.

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For example, in relation to computer science, the classical class-lesson system of Ya. A. Kamensky is questionable. And the presence or absence of computers in school gives rise to the problem of two options for training: machine and non-machine learning.

Therefore, it seems natural that MPI is unthinkable without psychological and pedagogical research, which should include the development of theoretical and practical foundations for constructing educational activities taking into account machine and non-machine options.

There is a problem of "rejuvenation" of computer science. If earlier computer science was taught only in high school, now computer science is taught in elementary grades.

. Acquiring computer literacy (CL) is the formation of a qualitatively new generation. Considering that a person receives the overwhelming share of his abilities and skills in childhood, that preschool and primary school students more easily perceive new styles and forms of thinking, the formation of CL should be started as early as possible. The central argument in favor of introducing a CL course for primary school students is the principle of equal access to education. How to teach kids computer science?

The methodological system of teaching any subject consists of five parts:

- goals,
- content,
- methods,
- means,
- organizational means of teaching.

We will consider all these issues as the subject of MPI in elementary grades.

The subject of teaching methods of computer science is traditionally divided into two parts:

1) issues of general methodology;

2) study of private methodological systems (specific methods).

The term "methodology" comes from the Greek word methodos - path, study of theory, teaching, way to achieve a goal.

If, in general, the result of teaching computer science should be good knowledge of the subject, then (2) the main goals of the propaedeutic course of computer science in the junior grades are: - formation of the basics of computer literacy;

- development of logical thinking;

- development of algorithmic skills and systemic approaches to solving problems;

- formation of basic computer skills.

What is needed for this?

1) Availability of a concept for teaching computer science.

2) Availability of a curriculum for the subject, developed in accordance with the concept.

3) Good professional training of the teacher - knowledge of general, practical computer science, as well as knowledge of mathematics, physiology, psychology and pedagogy.

4) Availability of a computer lab.

5) Availability of electronic training programs in primary school subjects.

6) Availability of methodological materials.

Let us highlight (4) the main goals of the MPI:

1) development of concepts for teaching computer science:

2) development of educational programs in computer science, with some programs having to correspond to the actual level of computerization in the region, while others may include items taking into account the development and implementation of new information technologies;

3) equipping the computer science teacher with knowledge, skills, and abilities necessary for rational and creative teaching;

4) focusing the computer science teacher on solving educational, upbringing and developmental tasks.

(5) Requirements for a computer science teacher in elementary grades.

1. Knowledge of general, practical computer science; sections of mathematics: "Sets. Operations on sets", "Elements of mathematical logic", MPI.

2. Knowledge of physiology, psychology, pedagogy.

3. Possession of user skills in working with a computer.

4. Knowledge of various private methods and programs for studying computer science in primary grades, both in machine and non-machine versions.

5. Using the most effective traditional methods and techniques and new pedagogical and information technologies in teaching computer science.

6. Constantly improving your theoretical and practical knowledge and skills in computer science, using specialized literature, periodicals on computer science, as well as attending seminars, conferences, courses for teachers, the Internet.

7. Conduct targeted work to implement educational, upbringing and developmental learning goals in each computer science lesson and in extracurricular work.

8. Form an interest in computer science and arouse students' desire to master a computer.

9. Analyzing and improving your teaching of computer science based on any program, strive to develop your own concept and program for teaching computer science in elementary grades.

Goals and objectives of introducing the subject of computer science in primary school.

Goals and objectives of teaching computer science at school, pedagogical functions of the computer science course

Computer literacy as the initial goal of introducing the computer science course at school and information culture as a promising goal of teaching computer science at school

The goals of education in general, as well as general school education, in particular, are the prerogative of the state, which, on the basis of the current legislative framework, forms the general principles of its pedagogical policy. According to the Law of the

Republic of Kazakhstan "On Education", among such principles, the first place is "... the humanistic nature of education, the priority of universal values, life and human health, free development of the individual; education of citizenship and love for the Motherland." Education in Kazakhstan aims to develop an independent, free, cultural, moral personality, aware of responsibility to the family, society and the state, respecting the rights and freedoms of other citizens.

The Constitution and laws, capable of mutual understanding between people, nations, different racial, national, ethnic, religious, social groups. On this basis, the main tasks of the comprehensive school are formulated:

• ensuring that students master the system of knowledge determined by social and production needs;

• forming a scientific worldview, political, economic, legal culture, humanistic values and ideals, creative thinking, independence in replenishing knowledge;

• satisfying the national and cultural needs of the population, raising a physically and morally healthy generation;

• developing in young people a conscious civic position, human dignity, the desire to participate in democratic self-government, responsibility for their actions.

"Secondary school is a general education and general developmental school, laying the foundation for comprehensive development, initial professional training, the ability to continuous education and mastering any profession for each child."

The projected results of the educational and upbringing activities of the school described above can be grouped into three main general goals that are set for the system of general school education: educational and developmental goals; practical goals; educational goals.

General goals of teaching computer science are determined taking into account the characteristics of computer science as a science, its role and place in the system of sciences, in the life of modern society.

Let us consider how the main goals characteristic of the school as a whole can be attributed to the education of schoolchildren in the field of computer science. The educational and developmental goal of teaching computer science at school is to give each student basic fundamental knowledge of the basics of computer science, including ideas about the processes of transformation, transmission and use of information, and on this basis to reveal to students the importance of information processes in the formation of a modern scientific picture of the world, as well as the role of information technology and computing in the development of modern society. Studying the school course in computer science is also intended to equip students with those basic skills and abilities that are necessary for a solid and conscious assimilation of this knowledge, as well as the basics of other sciences studied at school.

Assimilation of knowledge from the field of computer science, as well as the acquisition of relevant skills and abilities, is intended to significantly influence the formation of such personality traits as the general mental development of students, the development of their thinking and creativity. The practical goal of the school course in computer science is to contribute to the labor and technological training of students, i.e. to equip them with the knowledge, skills and abilities that could ensure preparation for labor activity after graduation.

This means that the school computer science course should not only introduce the basic concepts of computer science, which certainly develop the mind and enrich the child's inner world, but also be practically oriented - teach the student to work on a computer and use new information technologies.

For career guidance purposes, the computer science course should provide students with information about professions directly related to computers and computer science, as well as various applications of the sciences studied at school, based on the use of computers.

The educational goal of the school computer science course is ensured, first of all, by the powerful ideological impact on the student, which is exerted by the awareness of the possibilities and role of computing technology and information technology in the development of society and civilization as a whole.

The contribution of the school computer science course to the scientific worldview of schoolchildren is determined by the formation of an idea of information as one of the three fundamental concepts of science: matter, energy and information, which underlie the structure of the modern scientific picture of the world. In addition, when studying computer science at a qualitatively new level, a culture of mental work is formed and such important universal characteristics as the ability to plan your work, rationally perform it, critically correlate the initial work plan with the real process of its implementation. The study of computer science, in particular, the construction of algorithms and programs, their implementation on a computer, requiring from students mental and volitional efforts, concentration, logicality and developed imagination, should contribute to the development of such valuable personal qualities as persistence and determination, creative activity and independence, responsibility and hard work, discipline and critical thinking, the ability to argue their views and "beliefs.

The school subject of computer science, like no other, imposes a special standard of requirements for the clarity and conciseness of thinking and actions, because the accuracy of thinking, presentation and writing is the most important component of working with a computer.

It is well known how difficult it is sometimes to lead a student to a guess how to solve a problem. In the computer science course, it is not only a matter of guessing, it must be clearly and meticulously implemented in an algorithm for a computer, absolutely accurately write this algorithm on paper and / or enter it from the keyboard without errors.

When studying a new course, schoolchildren should gradually develop a negative attitude towards any vagueness, lack of specificity, vagueness, etc. It would be naive to believe that these important personality traits are formed by themselves when studying the subject of computer science.

This requires painstaking work of the teacher, and it is necessary to immediately take into account these features of computer science and not condone the negligence of students, even if in some specific case it does not entail immediate trouble.

None of the above-mentioned main goals of teaching computer science can be achieved in isolation from each other, they are closely interconnected. It is impossible to obtain the educational effect of the subject of computer science without ensuring that schoolchildren receive the basics of general education in this area, just as it is impossible to achieve the latter by ignoring the practical, applied aspects of the content of education.

General goals of school education in the field of computer science. as a triad of basic goals, remaining in their general didactic essence very vague (although quite stable), when imposed on the real educational sphere are transformed into specific learning goals. And here it turns out that the formulation of specific learning goals for the subject of computer science is a very difficult onto didactic task (and all the previous – although not so great - experience of setting the subject of computer science in school confirms this).

This situation occurs not only in relation to school computer science and there is a well-known explanation for it. Let us turn to the general philosophical interpretation of the concept of a goal: "A goal is an ideal, mental anticipation of the result of an activity. As a direct motive, a goal directs and regulates human activity.

The content of a goal depends on the objective laws of reality, the real possibilities of the subject and the means used." As an ideal (non-material) product, the goal itself is very mobile, dynamic, since it is generated by the consciousness of an active person, constantly interacting with a changing world and constantly changing himself. This means that, being objective in its origin, the goal is subjective. It is not for nothing that, according to the Latins, "when two people say the same thing, it is not the same thing."

The wisdom and insight of the ancients can be vividly illustrated by the judgments of many modern computer science teachers, who often use the same concepts, but put significantly different content into these concepts. And yet, what are the goals of school education in the field of computer science made up of and what influences the formation of them? It is obvious that the projection of specific goals of the school subject of computer science should be based primarily on the analysis of the fundamental foundations of computer science, its position among other sciences and the role it plays in society at the modern stage of its development. Here it is immediately necessary to note that the fundamental foundations of computer science continue to be in a state of formation and development, which leads to controversial and ambiguous assessments of them, still accompanied by discussions.

The formation of specific goals for teaching school subjects is also influenced by the development of the educational paradigm itself, in particular, the formation and stabilization of approaches to the standards of general secondary education, which also gives rise to the intersection of various, sometimes frankly subjective views and judgments.

General didactic approaches to determining the content of the computer science course

The educational standard for "Computer Science" formulates the objectives of studying the subject, which are divided into primary, basic and high school. In basic school, the study of computer science is aimed at achieving the following objectives:

• mastering the knowledge that forms the basis of scientific ideas about information, information processes, systems, technologies and models;

• mastering the skills of working with various types of information using a computer and other means of information and communication technologies (ICT);

• developing cognitive interests, intellectual and creative abilities by means of ICT;

• cultivating a responsible attitude to information, taking into account the legal and ethical aspects of its dissemination; selective attitude to the information received;

• developing skills in using ICT in everyday life, when implementing individual and collective projects, in educational activities, further mastering professions in demand on the labor market.

In high school, the following goals are set at the basic level:

• mastering a system of basic knowledge reflecting the contribution of computer science to the formation of a modern scientific picture of the world, the role of information processes in society, biological and technical systems;

• mastering the skills to apply, analyze, transform information models of real objects and processes, using information and communication technologies, including when studying other school disciplines;

• developing cognitive interests, intellectual and creative abilities by mastering and using computer science methods and ICT tools when studying various academic subjects;

• cultivating a responsible attitude to compliance with ethical and legal standards of information activities;

• acquiring experience in using information technologies in individual and collective educational and cognitive, including project activities.

In high school, the following goals are set at the profile level:

• mastering and systematizing knowledge related to: mathematical objects of computer science; to constructing descriptions of objects and processes that allow their computer modeling; to modeling tools; to information processes in biological, technological and social systems;

• mastering the skills of constructing mathematical objects of informatics, including logical formulas and programs in a formal language that satisfy a given description; creating programs in a programming language based on their description; using general-purpose tools and customizing them for the needs of the user;

• developing algorithmic thinking, formalization abilities, elements of systemic thinking;

• cultivating a sense of responsibility for the results of one's work; forming an attitude toward positive social activity in the information society, toward the inadmissibility of actions that violate legal and ethical norms of working with information;

Advanced training (teacher)

• gaining experience in project activities, creating, editing, designing, storing, transferring information objects of various types with the help of modern software; building computer models, collective implementation of information projects, information activities in various areas in demand on the labor market.

The listed goals of the school course in computer science and ICT can be grouped into three main general goals: educational, practical and upbringing. These general goals of training are determined taking into account the place of computer science in the system of sciences and the life of modern society.

The educational goal of teaching computer science is to give each schoolchild initial fundamental knowledge of the basics of computer science, including ideas about the processes of transformation, transmission and use of information, and on this basis to reveal the significance of information processes in the formation of a scientific picture of the world, the role of information technologies and computers in the development of modern society. It is necessary to equip students with basic skills and abilities for a solid assimilation of this knowledge and the basics of other sciences.

The implementation of the educational goal in accordance with the laws of didactics promotes the general mental development of students, the development of their thinking and creative abilities.

Practical goal - involves contributing to the labor and technological training of students, equipping them with the knowledge, skills and abilities necessary for subsequent labor activity. Students should not only be introduced to the theoretical foundations of computer science, but also taught to work on a computer and use modern information technology tools; introduced to professions directly related to computers.

The educational goal is realized by the ideological influence on the student by making him aware of the importance of computing and information technology for the development of civilization and society. It is important to form an idea of information as one of the three fundamental concepts of science: matter, energy and information. The use of modern information technology in teaching forms a culture of mental work. The study of computer science requires from students certain mental and volitional efforts, concentration, logic and imagination. In the computer science course, the student should learn to clearly and meticulously implement the algorithm of his actions, be able to write it down on paper with absolute precision and enter it into the computer without errors. This gradually weans students from inaccuracy, fuzzy, vague, vague, careless, etc. Of course, all three of these goals are interconnected and cannot be implemented in isolation from each other. It is impossible to achieve an educational effect by ignoring the practical side of the content of training.

General goals in the real educational process are transformed into specific goals of training. However, this turns out to be a difficult task, which is confirmed by many years of experience in teaching computer science at school. The formulation of specific goals is influenced by the fact that computer science itself is in the stage of intensive development. In addition, a change in the paradigm of education, in particular its standards, gives rise to a change in the content of these goals, increases the share of subjectivity in their definition.

When the OIVT course was first introduced in 1985, the strategic goal put forward was "...comprehensive and deep mastery of computing technology by young people", which at that time was considered an important factor in accelerating scientific and technological progress in our country and eliminating the emerging gap with the advanced industrial countries of the West. The main goals of the course then were:

• forming students' understanding of the basic rules and methods for implementing problem solving on a computer;

• mastering basic skills in using microcomputers to solve problems;

• familiarization with the role of computers in modern production.

Scientists and methodologists then believed that the introduction of a computer science course would create opportunities for studying school subjects at a qualitatively new level due to increased visibility, the ability to model complex objects and processes on a computer, would make the assimilation of educational material more accessible, would expand the educational opportunities of schoolchildren, activate their cognitive activity.

Computer literacy of students was set as a specific goal.

The concept of computer literacy quickly became one of the new concepts of didactics. The following components were gradually identified, determining the content of computer literacy of school children

• the concept of an algorithm, its properties, means and methods of description, the concept of a

program as a form of presentation of an algorithm for a computer;

• the basics of programming in one of the languages;

• practical skills in using a computer;

• the principle of operation and structure of a computer;

• the use and role of computers in production and other areas of human activity.

As can be seen from the content, computer literacy (CL) is an expansion of the concept of students' algorithmic culture (SC) by adding some "machine" components. This natural continuity has always been emphasized, and methodologists even set the task of "completing the formation of the leading components of schoolchildren's algorithmic culture as the basis for the formation of computer literacy", which can be represented by the diagram:

SC -> CL

The following content can be distinguished in the components of students' computer literacy:

1. Ability to work on a computer. This skill is a skill at the user level, and includes: the ability to turn on and off the computer, keyboard skills, the ability to enter numerical and text data, correct them, and run programs. This also includes the ability to work with application programs: a text editor, a graphics editor, a spreadsheet, game and educational programs. In terms of their content, these skills are available to primary school children and even preschoolers.

2. The ability to write programs for a computer. Most methodologists believe that training programmers cannot be the goal of a comprehensive school, however, understanding the principles of programming should be included in the content of education in computer science. This process should be extended in time and begin with developing the ability to write simple programs, including the organization of branches and cycles. Such programs can be written using simple and visual "pre-language" tools.

In senior classes, in the context of specialized education, it is possible to study one of the programming languages. In this case, it is not so much the study of the language that is important, but rather the formation of a solid knowledge of the fundamental rules for compiling algorithms and programs.

3. Concepts of the structure and operating principles of a computer. The school physics course covers various physical phenomena underlying the operation of a computer, and the mathematics course covers the most general provisions related to the principles of organizing computing on a computer. In the computer science course, students must master information that allows them to navigate the capabilities of individual computers and their characteristics. This component of computer literacy has an important career guidance and ideological significance.

4. Concepts of the use and role of computers in production and other areas of human activity, as well as the social consequences of computerization. This component should be formed not only in computer science lessons - it is necessary that the school computer be used by students when studying all academic subjects. The implementation of projects by schoolchildren and solving problems on a computer should cover various areas of application of computing equipment and information technology.

Computer literacy components can be represented by four key words: communication, programming, device, application. In teaching schoolchildren, it is unacceptable to focus on any one component, since this will lead to a significant imbalance in achieving the final goals of teaching computer science.

For example, if the communication component dominates, then the computer science course becomes predominantly user-oriented and aimed at mastering computer technologies. If the emphasis is on programming, then the goals of the course will be reduced to training programmers.

The first program of the OIVT course in 1985 was quickly supplemented by a second version, which expanded the goals of the course and in which a new concept of "information culture of students" appeared. The requirements of this version of the program, taken in a minimum volume, set the task of achieving the first level of computer literacy, and taken in a maximum volume - the development of the information culture of students. The content of the information culture (IC) was formed by some expansion of the previous components of computer literacy and the addition of new ones. This evolution of the goals of schoolchildren's education in computer science is presented in the diagram:

AC — KG — IC ?

As can be seen from the diagram, a question mark is placed at the end of the chain of goals, which is explained by the dynamism of the goals of education, the need to correspond to the modern level of development of science and practice. For example, now there is a need to include in the content of the concept of IC ideas about information and communication technologies, the possession of which is becoming an obligatory element of the general culture of a modern person. Some methodologists suggest forming an information technology culture of schoolchildren. The information culture of a schoolchild includes the following components:

1. Skills in correctly setting problems for solution with the help of a computer.

2. Skills in formalized description of the tasks, elementary knowledge of methods of mathematical modeling and the ability to build simple mathematical models of the tasks.

3. Knowledge of the main algorithmic structures and the ability to apply this knowledge to build algorithms for solving problems based on their mathematical models.

4. Understanding the structure and functioning of a computer, basic skills in composing computer programs according to a constructed algorithm in one of the high-level programming languages.

5. **Skills in the qualified use of the main** types of modern information and communication systems to solve practical problems with their help, understanding the basic principles underlying the functioning of these systems.

6. **The ability to correctly interpret the results** of solving practical problems with the help of a computer and apply these results in practical activities.

At the same time, in the real conditions of school, the formation of information culture in all its aspects seems problematic. The point here is not only that not all schools are sufficiently provided with modern computer equipment and trained teachers. The use of multi-variant programs, in particular, proprietary ones, led to the fact that not only the content, but also the goals of schoolchildren's education in the field of computer science in the 1990s began to be interpreted differently.

They began to be formulated extremely vaguely, vaguely and even indefinitely, therefore, by the decision of the board of the Ministry of Education of Russia dated 22.02.1995, it was proposed to use a 3-stage structure of the secondary school computer science course with distributed target settings]:

• The first stage (1-6 grades) - propaedeutic. At this stage, initial acquaintance with the computer occurs, the first elements of information culture are formed in the process of using educational game programs, simple computer simulators in mathematics, Russian language and other subjects.

• The second stage (7-9 grades) is a basic course that provides a mandatory general educational minimum of training in computer science. It is aimed at mastering the methods and means of information technology for solving problems, developing skills in the conscious and rational use of computers in their educational and then professional activities.

• The third stage (10-11 grades) is continuing education in the field of computer science as specialized training, differentiated in volume and content depending on the interests and focus of pre-professional training of schoolchildren.

The proposal of a three-stage course structure was a definite step forward, helped to overcome confusion and hesitation in defining goals, and made it possible to make the study of computer science in school continuous. The new basic curriculum of 2004 and the educational standard in computer science secured such a course structure. Earlier study of computer science makes it possible for students to systematically use information and communication technologies in the study of all school subjects.

Further development of the computer science course should be associated with strengthening its general educational function, with the possibilities of solving general problems of teaching, developing and educating schoolchildren.

Most domestic methodologists are inclined to believe that the future of the school subject of computer science lies in the development of the fundamental component, and not in "immersion" in the field of information technology. Computer science offers a new way of thinking and human activity, allows for the formation of a holistic worldview and a scientific picture of the world, and this should be used in teaching schoolchildren.

In developed Western countries, the goals of studying computer science at school are mainly of an applied nature and consist of preparing schoolchildren for various types of activities related to information processing, mastering information technology and information technology, which is considered the key to successful economic development of society.

Questions for self-control

1. Provide a definition of computer science. When did it originate and on what basis?

2. What do cybernetics and computer science have in common?

3. Provide and describe the structure of computer science as a science.

4. What is the subject and object of computer science?

5. Provide a definition of the term "School computer science".

6. Provide the structure of school computer science.

7. Provide the date of introduction of the subject OIVT in secondary schools.

8. Describe the stages in the history of teaching computer science in Russian schools.

9. When did computer science electives appear in the school curriculum and what were they called?

10. List the main components of students' algorithmic culture.

11. Since what year did domestic computer classes begin to be introduced to schools?

12. List the components that make up the content of schoolchildren's computer literacy.

13. List the components of information culture.

14. List the 3-stage structure of the computer science course recommended by the Ministry of Education in 1995.

Initial goals and objectives of the school course of OIVT. The concept of computer literacy of students

The strategic goal of introducing the subject "Fundamentals of Informatics and computer engineering" to school, as it was announced in the first program of the new curriculum introduced to school, was "... comprehensive deep mastery of computing technology by young people", which was considered an important factor in accelerating scientific and technological progress in the country. This was explained by the widespread dissemination of personal computers in various spheres of human activity, which had emerged by that time, which led to an avalanche-like growth in the number of users working in the mode of direct contact with the computer.

The main goal of the course "Fundamentals of Informatics and computer engineering" was to form ideas about the basic rules and methods for implementing a solution to a problem on a computer and elementary skills in using microcomputers to solve problems; in familiarizing students with the role of computers in modern social production and the prospects for the development of computing technology. It was assumed that the introduction of the course:

OIVT will create the prerequisites for studying a number of natural science subjects at a qualitatively different level, since the ability of students to use computers in lessons should significantly increase the visibility of learning; modeling complex objects and processes on a computer will make the assimilation of educational material more accessible, significantly expand the cognitive capabilities of schoolchildren, and significantly activate their independent learning activities.

As an initial characteristic of specific goals of teaching computer science in secondary educational institutions, already in the first program of the OIVT course, computer literacy of students was announced. The concept of computer literacy was formed along with the introduction of the subject "Fundamentals of Computer Science and Computer Engineering" to school and immediately became one of the new concepts of school didactics.

An attempt to formulate the requirements for computer literacy of students was already made in the explanatory note to the first program, however, in a more systematic presentation, the components of computer literacy are described in the first methodological guide for teaching the OIVT course in school addressed to the teacher; here the following groups of components were distinguished, making up the content of computer literacy of schoolchildren:

• the concept of an algorithm, its properties, means and methods of describing algorithms, a program as a form of representing an algorithm for a computer; the basics of programming in one of the programming languages;

• practical skills in handling a computer;

• the principle of operation and structure of a computer and its main elements;

• the use and role of computers in production and other areas of human activity.

The analysis of the listed components shows that the emergence of the concept of computer literacy (CL) was the result of expanding the concept of algorithmic culture (AC) of students (see subsection

1.1) by adding such "machine" components as the ability to handle (or, in the jargon of computer scientists - to communicate) with a computer, knowledge of the structure and operating principles of a computer, as well as the role of a computer in modern society. This natural succession of the concept of CL with the concept of AC was clearly emphasized both in the explanatory note to the program of the new course, one of the tasks of which was declared as "systematization and completion of the algorithmic line of the eight-year school algebra course", and in the methodological recommendations addressed to the teacher, which defined as the first methodological task of the OIVT course the task "to complete the formation of the leading components of the algorithmic culture of schoolchildren as the basis for the formation of computer literacy".

Let us denote this evolutionary transition by the formula:

AK->KG.

Below is the concept of "computer literacy", which later became quite stable and was formed in the interpretations of specialists and teachers soon after the appearance of the first OIVT course program, trial teaching aids for students and methodological manuals for teachers.

1. The ability to "communicate" with a computer. Communication with a PC at the "user level" is mainly the ability to prepare a computer for work, start and stop it, the ability to work at the display, i.e. master the keyboard, be able to enter numbers and variables, correct entered data, enter, debug and run a program.

This may also include skills in working with simple utility programs, such as a text editor, a graphics editor, a spreadsheet, various game programs, as well as working with a computer in a dialogue mode (in particular, a training one, including outside the computer science course). It is noteworthy that by their nature this knowledge, skills and abilities can be accessible to primary school children and even preschoolers.

2. **Compiling simple computer programs.** Training programmers is not the goal of a comprehensive school, but understanding the basic principles of computer programming should be part of the general education system. This process can be gradual and extended in time.

The initial skills of compiling independent programs, including the organization of branches and cycles, are based on the components of algorithmic culture, which can be formed using simple and visual "pre-programmer" tools. In the senior stages of education, it is possible to become familiar with several different programming languages (at least in the context of in-depth study of the subject).

At this level, however, the choice of the language in which the programs will be written is not as important as the strength of the fundamental knowledge necessary for developing the algorithms underlying them.

3. **Understanding the structure and operating principles of a** computer. This component of computer literacy includes two main components:

a) the structure of a PC and the functions of its main devices;

b) the physical foundations and operating principles of the main elements of a computer.

This component is of the utmost ideological significance, although it is difficult for students to master. Initially, it was believed that "information about this, included in the course, should be of an applied nature, focused primarily on the needs of the user, helping him to evaluate the capabilities of an individual machine or compare different computers.

This does not exclude, of course, the fact that in a physics course, various physical phenomena underlying the functioning of a computer can be considered in detail, and in a mathematics course or in the fundamental sections of a computer science course - the most general and abstract provisions related to the principles of its operation."

4. **Concepts of the areas of application and capabilities of computers, social consequences of computerization**. Formation of

this component of computer literacy is also not the task of the computer science course only and goes beyond it.

It is advisable to disclose to students the areas of application and the role of computers in increasing labor efficiency in the process of practical use of a computer to solve various problems in a number of academic subjects. At the same time, it is necessary that the set of these tasks, if possible, cover all the main areas of computer application.

A school computer can be used by students for computational work in courses on mathematics, physics, chemistry, data analysis of an educational experiment and the search for patterns in laboratory work, study of functions in a course on algebra, construction and analysis of mathematical models, physical, chemical, biological and other phenomena and processes. In a course on geography, history and a number of other humanitarian subjects, a personal computer can be used by schoolchildren as an information system, a data bank, an automated reference book.

Having originated at the first stage of introducing the subject to school, the concept of CG is still actively "working" in the methodological literature. In short, the four-component structure of computer literacy described above can be designated by a combination of four key words: communication, programming, device, application. It is easy to see that even with the preservation of all components of computer literacy, increased emphasis on one or another of them can lead to a significant change in the ultimate goal of teaching computer science.

If, for example, the communication component begins to dominate, then the course becomes predominantly user-oriented, aimed, in particular, at mastering computer technologies. With the dominant programming component, the goals of the course will be reduced to training programmers, etc. Computer literacy and information culture of students

Along with the already known concept of "computer literacy", a new concept of "information culture of students" appears. According to the explanatory note to the competition program, the designed updated OIVT course "... should develop in students:

• skills in correctly setting problems that arise in practical activities, for solving them using a computer;

• skills in formalized description of the tasks, basic knowledge of methods of mathematical modeling and the ability to build simple mathematical models of the tasks;

• knowledge of the main algorithmic structures and the ability to apply this knowledge to build algorithms for solving problems based on their mathematical models; understanding of the structure and functioning of a computer and basic skills in writing programs for a computer based on the constructed algorithm in one of the programming languages of a high: level;

• skills in the qualified use of the main types of modern information systems for solving practical problems with their help and understanding the basic principles underlying the functioning of these systems;

• the ability to correctly interpret the results of solving practical problems with the help of a computer and apply these results of practical activity.

These requirements, taken in their minimum volume, constitute the task of achieving the first level of computer literacy, taken in their maximum volume - the development of students' information culture." The above explanation shows that the concept "information culture" (IC) is formed by adding new some expansion of the previous components of computer literacy, and almost all new inclusions in the concept "information culture" relate to issues of applying the method of mathematical modeling to solve problems with the help of: a computer (or, as they often say, computer mathematical modeling).

Information culture of students: the formation of the concept

Several new versions of computer science textbooks for secondary schools that appeared after the competition, as well as the state of multi variance of curricula recognized by that time by the official education authorities as normal, recommending the use of several different curricula for the computer science course in schools) led to the fact that not only the content, but also the goals of educating schoolchildren in the field of computer science in some of their parts began to be interpreted differently.

For example, in the explanatory note to the program, the authors of the manual reported that "the main goal of teaching computer science in a comprehensive secondary school is the development of operational (algorithmic) thinking of students", and that "from the above it follows that the central concept of the course is algorithms, and the main content of educational activity is the creation and analysis of algorithms." At the same time, the authors of another textbook in their program simply explained that "the main goal of the course is teaching schoolchildren to solve life problems with the help of a computer."

An equally extravagant interpretation of the goals of teaching computer science is given in relation to the manual, which, as explained in - "is the ability to work with information on a computer: to read and write, to count and draw, to search for and accumulate information and to work with computer programs" (it seems that the ability to write, the ability to draw, as well as the ability to read and count, is not only the ability to press the right buttons on the keyboard).

It is not difficult to imagine a situation that was quite typical for that time: the compiler of the "author's" program is a computer science teacher specialist with an engineering education, who has a very vague idea that there are programs developed by scientific and pedagogical teams and recommended by the Ministry of Education, and that these programs contain quite meaningful basic general educational guidelines and goals, which it is unacceptable to ignore "from the outset". All this led to the fact that the general state of the subject of OIVT became cause anxiety. This state at some point became extremely uncertain because the goals, objectives, and even the composition and content of the basic concepts of the course began to be interpreted in a highly free, if not to say arbitrarily, manner.

There arose an excessive diversity of specific curricula, in most cases one-sided, far from reflecting the state of informatics as a science that studies all aspects of obtaining, storing, converting, transmitting, and using information. In the most widespread case, the content of training was usually reduced to practical programming (BASIC, Pascal, C, etc.), to an excessive passion for the technological aspects of informatics and oblivion of the original focus on developing its fundamental, general educational foundations.

However, the problem was not limited to the crisis situation described above, which was explained by very short-term organizational costs and was overcome over time. The instability (and "incompleteness") of the initial goals of teaching computer science to schoolchildren were based on much deeper and difficult-to-eliminate contradictions.

It is known that the decision taken at the very beginning to place the OIVT course introduced into school in two senior classes of school was not based on the convictions of the authors of the school computer science concept, but solely on the practical circumstances that were characteristic of that time and dictated the tactics of action: the actual lack of a material base for schools, the unpreparedness of teaching staff, as well as the general unpreparedness for the "deep" inclusion of computer science in the school curriculum.

However, already by the mid-1990s, the inexpediency of teaching OIVT only at the senior level became blatantly obvious, so that this paradigm itself could no longer serve as an official strategy. The turning point here was the decision of the Ministry, which declared in a recommendatory form the idea of "reducing" the teaching of computer science at the lower levels of education and building a continuous computer science course for secondary schools.

To implement the new understanding of the goals of teaching computer science in 11-year schools, the aforementioned document set out a three-stage course structure with distributed target settings:

•**The first stage** (I-VI grades) is propaedeutic. At this stage, schoolchildren are initially introduced to computers, the first elements of information culture are formed in the process of using educational game programs, simple computer simulators, etc. in mathematics,

•**The second stage** (VII-IX grades) is a basic course that provides a mandatory general educational minimum for training schoolchildren in computer science. It is aimed at mastering the methods and means of information technology for solving problems, developing the skills of conscious and rational use of a computer in their educational and then professional activities.

• **The third stage** (10th-11th grades) is the continuation of education in the field of computer science as specialized training, differentiated in volume and content depending on the interests and aimed at pre-professional training of schoolchildren.

Obviously, due to the earlier study of computer science by schoolchildren, the possibility of systematically using the methods and means of new information technology in studying all school subjects becomes real. It is this factor, in essence, that determined the problem of redistribution of the goals of education of students in the field of computer science, since with the beginning of "... the use of computers in teaching all academic disciplines, starting from the lower grades, the skills that make up the "computer literacy" of schoolchildren acquire the character of general educational and are formed in all school subjects, and not only in the computer science course.

This means that when the computer science course is reduced, many components of the computer science course begin to form earlier, and through other school subjects, so that the computer science course itself can no longer be considered as a "single and indivisible" goal associated only with the computer science course. This approach forced us to take a fresh look at the goals of the computer science school course, in relation to which the relevance of the task of identifying the fundamental, general educational foundations was more clearly revealed, making its position as an independent school discipline more durable and long-lasting.

The distributed (panoramic) nature of the goals of developing computer literacy and information culture in school education also required an updated approach to creating a system of educational and methodological support.

Computer science as an independent subject with a clearly expressed fundamental component is what the school should be guided by, but this requires an active continuation of scientific research, a rethinking of the general educational role of this subject as part of fundamental education. Below a full description of the projected objectives of teaching computer science in a comprehensive school as a result of applying the above approach is given:

"1. Formation of the foundations of a scientific worldview. In this case, we are talking primarily about the formation of ideas about information (information processes) as one of the three fundamental concepts of science: matter, energy, information, on the basis of which the modern scientific picture of the world is built; the unity of the information principles of the structure and functioning of self-governing systems of various natures.

2. Formation of general educational and general cultural skills for working with information.

This means the ability to competently use information sources, assess the reliability of information, correlate information and knowledge, the ability to correctly organize the information process, assess information security.

3. Preparing schoolchildren for subsequent professional activities. In connection with the change in the dominant professional activity and the increase in the share of the information sector in the economy, it is necessary to prepare schoolchildren for various types of activity related to information processing. This includes, in particular, mastering the means of informatization and information technology. Particularly important is the importance of initial training in management. As is known, many technologically advanced countries (Great Britain, Germany, etc.) see this as a guarantee of successful state And economic development.

4. **Mastering information and communication technologies** as a necessary condition for the transition to a system of continuous education.

The role of studying computer science in the formation of such a worldview is difficult to overestimate. That is why the formation of a scientific picture of the world is now becoming a priority task in the system of tasks for studying computer science at school.

Requirements for the mandatory (minimum) level of training of students at the senior stage of a social and humanitarian school

Students should know:

- the latest software;

- the procedure and rules for installing software on computers;

- elements of text document design;

- purpose and capabilities of automatic settings of word processors;

- desktop publishing systems, their capabilities, software;

- tools for processing raster and vector graphics;

- basics of organizing animation and cartoons;

- concept of computer presentation;

- technology of creating computer presentations;

- concept of search engines on the Internet;

- concepts of creating Web pages.

Students should be able to:

- install and configure the operating system;

- install application software on the computer;

- configure text editor parameters;

- use the graphic and font capabilities of text editors;

- process graphic images;

- produce layout and layout of publications using a text editor;

- produce layout and layout of publications using a publishing system;

- work with document recognition systems; work with text verification and

correction systems; create machine graphics objects and sound files;

- create presentations using special presentation tools;

- work with technical means of a modern office;

- search and view information on the Internet;

- create Web pages, design Web pages.

Requirements for the mandatory (minimum) level of training of students at the senior stage of school in the natural sciences and mathematics direction

Students should know:

- differences in programming systems;

- about structural, modular, object-oriented programming;

- basics of organizing animation and cartoons;

- principles of developing training, monitoring, and gaming programs;

- procedure and rules for installing software on computers;

- tools for processing raster and vector graphics;

- computer presentation;

- rules for creating a presentation;

- organizing the processing of large amounts of information;

- technology for developing information-logical models;

- purpose of relational models;

- concept of information systems:

- concept of search engines on the Internet;

- concepts for creating Web pages.

Students should be able to:

- create computer graphics objects and sound files;

- program graphic objects and their movement;

- create training, monitoring, and gaming programs;

- install and configure the operating system;

- install application software on a computer;

- create presentations using specialized software;

- create information-logical models in a given subject area;

- make corrections to information, search for information using a template,

sort information in databases;

- create a database in a given subject area;

- work with information systems;

- search for and view information on the Internet;

- work on the Internet and with e-mail;

- create Web pages, design Web pages.

Objective: To develop the ability to compare and classify objects by various characteristics: length, width, color, shape; the ability to build reasoning, to choose argumentation.

Tasks:

• continue to develop the skill of counting;

• provide an opportunity to independently discover new mathematical knowledge, including program material;

• adapt children to school and motivate their desire to learn;

• promote the development of logical thinking, imagination, memory, speech of students

• maintain and deepen interest in mathematics; the desire to use mathematical knowledge in everyday life.

Equipment for the lesson: typesetting canvas, a set of cards with numbers, with pictures; a computer at the teacher's workplace, a media projector, a screen.

Organizational moment, including:

• setting the goal that must be achieved by students

at this stage of the lesson (what must be done by students so that their further work in the lesson is effective);

• defining the goals and objectives that the person being assessed wants to achieve at this stage of the lesson;

• describing the methods of organizing students' work at the initial stage of the lesson, setting the students' minds up for the learning activity, the subject and topic of the lesson (taking into account the real characteristics of the class with which the person being assessed works).

Objective: to create conditions for further effectiveness of work in the lesson.

Tasks: to organize the student's workplace; to attract the attention of students to the upcoming learning activity;

What lesson are you prepared for? (children: for the mathematics lesson)

Check if you have everything ready for the lesson: textbook, notebook, pencil case, handouts.

What tasks do you like to do most in a math lesson?

Today we will continue our journey into the amazing world of mathematics. Survey of students on the material assigned for homework, including:

• defining the goals that the person being assessed sets for the students at this stage

Goal: to develop students' interest in the subject.

Objectives: to attract students' attention to the subject; to demonstrate to students the lesson (what result should be achieved by the students);

• defining the goals and objectives that the person being assessed wants to achieve at this stage of the lesson;

• describing the methods that facilitate the solution of the set goals and objectives;

• describing the criteria for achieving the goals and objectives of this stage of the lesson;

• defining the possible actions of the person being assessed if he or the students fail to achieve the set goals;

• description of methods of organizing and joint activities

of students taking into account the characteristics

of the class with which the person being assessed works;

• description of methods of motivating (stimulating) students' educational activity during the survey;

• description of methods and criteria for evaluating students' answers during the survey. the possibility of using the acquired knowledge in practice.

The following methods are used: verbal, visual and practical work methods.

-**What did you learn in the last lesson?**

-Let's count the objects, remember the work in the last lesson.

On the typesetting canvas there are pictures: two balls, one butterfly, three cubes.

-How many balls? (two) Find and show the corresponding number.

-How many butterflies? (one) Find and show the corresponding number.

-How many cubes? (three) Find and show the corresponding number.

That's right, you can count objects and find the corresponding numbers.

-Solve the problems in verse:

The hedgehog brought three apples from the garden.

He gave the rosiest one to the squirrel.

The squirrel happily received the gift.

Count the apples on the hedgehog's plate? (Two.)

The animals sat on the swing, on the swing at the zoo.

Two spotted leopards smile at the sun

And have fun riding with the good old lion.

Count quickly, how many animals are there in total? (Three.)

- Well done, guys! You quickly solved the problems, you can quickly count objects and designate the number of objects with a number.

- Do you think it is possible to compare objects?

How? By what features?

Study of new educational material. This stage involves:

• setting a specific educational goal for students (what result should be achieved by students at this stage of the lesson);

• defining the goals and objectives that the person being assessed sets for himself at this stage of the lesson;

• presenting the main provisions of the new educational material that should be mastered by students;

• describing the forms and methods of presenting (presenting) the new educational material;

• describing the main forms and methods of organizing individual and group activities of students, taking into account the characteristics of the class in which the person being assessed works;

• describing the criteria for determining the level of attention and interest of students in the educational material presented by the person being assessed;

• description of methods of motivating (stimulating) students' learning activity during the process of mastering new educational material

Objective: developing the ability to compare and classify objects by different features: by length, width, color, shape; ability to build reasoning, choose argumentation.

Tasks: to provide an opportunity to independently discover new mathematical knowledge; teach to plan, control and evaluate learning activities in accordance with the set task and the conditions for its implementation; promote the development of logical thinking, imagination, memory, speech of students.

Used: problem-based presentation of knowledge; activity-based method; differentiated learning method; group work method.

1). Setting an educational goal for students.

A HIGH multi-story house, Like a giant - big and important. A squat and LOW house In comparison with a giant - a gnome.

- What features are mentioned in the poem?

- Who guessed by what features we will compare objects?

- Guys, what is the poem about?

- Let's build a house together. And the house is unusual, a princess lives in it. Where do princesses live?

- Builders are erecting columns for the palace. One column is missing.

2). practical work of students, establishing the interrelationship of objects according to certain features;

Task 1. Find the missing column for the palace.

A model of a palace is made on the board from a triangle and rectangular strips. One column is missing. The strips are of different

thickness, height and color.

Help the builders. Which column is suitable for building a palace?

-By what criteria should you select a column? How to do it correctly and accurately. (children go to the board one by one, select columns, comment on the task: 1 - suitable in length, 2 - not suitable in length, 3 - wider than the other columns, 4 - red, and all the columns should be white)

-What will happen to the palace if you put a high or low column?

Conclusion:

-By what criteria did you compare the columns? (by color, size).

Task 2. Here are two strips. Tell me, are they the same height (length) or different?

Can you say this for sure? And how can you tell, are they the same length or not?

Each student has several strips of colored paper on their desks. The children choose two strips of the same length

Show me how I should hold the strips so that it can be seen that they are the same or not the same length

The strips are placed next to each other so that the ends are aligned.

-What can you say about these strips? Are they the same color?

(No, they are the same length. They are different colors.)

-Who of you can tell me again what Anna discovered?

(The strips are the same length.)

-Who can tell me how she found out? What did she do with the stripes?

- Can they be compared by width?

Task 3.

Who can tell me how to lay the stripes so that it can be seen whether they are the same width or not?

Children: you need to match the edges of the stripes.

Task 4: Work in pairs

- And tell me, why didn't column № 4 fit? After all, it is the same as these columns in height and width. What's the matter?

Children: it doesn't fit in color.

- Ah, that's what! So, you can also match objects by color. Well, everything is clear here:

-need a white column, and this one is red.

Who will say whether these objects are the same color or not?

- Who thinks that they are the same? Why? Explain.

- Who thinks that these objects are different in color?

Why? Explain.

- Who is right?

Children: we need to move them closer.

Now we can say for sure whether they are the same color or not? (the figures are different colors).

- How were you able to determine this for sure? (Moved the figures close to each other)

- Well done, you compared the objects correctly by color.

Consolidation of educational material, which involves:

• setting a specific educational goal for students (what result should be achieved by students at this stage of the lesson);

• defining the goals and objectives that the person being assessed sets for themselves at this stage of the lesson;

• describing the forms and methods of achieving the set

Goal: using mathematical knowledge in everyday life.

Objectives: use knowledge of the characteristics of objects to describe the surrounding reality; determine the most effective ways to achieve the result;

Used: verbal, visual and practical, group work methods; work on classmates: in the mode of the eLearning Class V6.0 network program.

1. Setting a specific goal for students.

- Who has learned to accurately compare objects? goals during the consolidation of new educational material, taking into account the individual characteristics of the students with whom the person being assessed works.

• description of the criteria that allow to determine the degree of assimilation of new educational material by students;

• description of possible ways and methods of responding to situations when the person being assessed determines that some students have not mastered the new educational material. (on the teacher's desk: blue pencil, student ruler, book, magazine, pencil case, strips of paper, blue pen)

- Kolya, find an object the same length as my strip. (The student chooses a blue pencil)

- I think Kolya made a mistake. My strip is red, made of paper, he chose a blue pencil. (Kolya did it right. Since you need to choose an object of the same length, the other features are not important.)

Nina, find me an object the same color as this pencil. What color is it? (Nina chooses a blue pen) Valya, find me an object the same width as my strip.

- Very good, you have already learned to compare objects by the specified features. (Valya selects a ruler, placing the ruler and the strip next to each other, aligning the edges)

2. Completing the task from the textbook (group work) Open the textbook to page 7. Find the task

3. What shapes are shown? (Squares, circles, triangles.)

Compare the shapes drawn on each card. Use the words "shape", "color", "size".

-By what features can we compare objects? (by shape, color, size.) Guys, you are great, use the words "shape", "color", "size" correctly.

3**. Independent work with self-checking using** a model or standard. Using knowledgeof features of objects to describe the surrounding reality;

1) **Work on student laptops using the "e-**Learning" system of the educational and methodological kit

"Primary School" Lessons of Cyril and Methodius.

Lesson 01 "Shape. Color. Size".

- Children, open classmate, prepare it for work.

- Complete exercise

1. Check your work.

2). Game. Complete the exercises "Sets" or "Take the ball"

A lesson is used according to the method of professor

A.V. Beloshistaya. "Teaching mathematics to younger students".

The purpose of the exercise: teaching the child to take into account two features when comparing (color and shape - red ball)

- Well done, you know how to check your work.

Homework, including:

• setting goals for independent work for students (what students should do in the course of completing

Reflection of educational activity in the lesson.

Guess the riddle: In the spring it cheers, in the summer it nourishes, in the winter it warms. (Tree.)

There is a poster with a picture of a tree on the board. On the teacher's desk there are leaves of different colors.

Was everything clear in the lesson? When completing which task did you experience difficulties?

Using the leaves, show on the tree how you evaluate your work in the lesson.

• red - I coped with all the tasks

• yellow - I was not able to complete all the tasks correctly

• green - I do not understand how to compare objects.

The children come to the table, take a sheet of the right color and attach it to the tree.

- Well done! You worked well in the lesson. Look at the tree. How beautiful it turned out - autumnal! Not all the leaves have turned yellow yet, but in the next lesson we will continue working on comparing objects. I think everyone will choose orange or red leaves

Objective: use of knowledge of the characteristics of objects to describe the surrounding reality

Tasks: prepare the student to purposefully use knowledge in learning an everyday life to study the mathematical essence of object (color, shape, size); develop attentiveness, memory, thinking

Applied: verbal, visual and practical methods of work.

- By what characteristics can objects be compared?

- How can objects be compared?

Well done, you know how to compare objects by length, height, color and shape. Setting the goal of independent work for students.

- At home, find girls: objects that are the same in length (height), but different in color; boys: objects that are the same in color, but different in length (height).

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Curriculum in Informatics (Grade I)

Curriculum in the educational system, a document defining the content and scope of knowledge, skills, and abilities that must be mastered in each academic discipline, as well as the content of sections and topics with their distribution by years of study.

The curriculum is sometimes accompanied by an explanatory note, which reveals the objectives of teaching a given subject, the sequence of studying the material, the features of the methods and organizational forms of teaching, the connection with the teaching of other subjects, etc.

The main principles of constructing the curriculum: compliance of the content with modern achievements of science, technology and culture, the social goals of educating students and developing their creative abilities; continuity between the studied and previously studied materials; the relationship between academic subjects, reflecting the natural connections between the corresponding phenomena of the objective world.

The curriculum is a document created within the framework of the educational system that defines the content and quantity of knowledge, skills and abilities intended for mandatory acquisition in a particular academic discipline, their distribution by topics, sections and periods of study.

In addition to the full text, the curriculum may be accompanied by an explanatory note briefly disclosing the objectives of teaching a given subject, describing the sequence of studying the material, listing the most essential methods and organizational forms, establishing a connection with the teaching of other subjects.

Basic principles of constructing a curriculum

• attention to modern achievements of science, technology and culture

• compliance with social goals of educating students

• development of students' creative abilities

• continuity - from previously studied material to the current and subsequent;

• mutual connections between subjects corresponding to natural connections between the studied phenomena.

The content of education determined by the curriculum is specified in textbooks, teaching aids and methodological instructions.

Curricula can be standard, variable, working, school, author's, and individual. There are two ways of constructing a curriculum: concentric (when individual parts of the educational material are repeated at an ever-expanding and in-depth level) and linear (individual parts of the educational material form a continuous sequence of closely related links, the content of knowledge is transmitted once in a certain logic).

Working curriculum — a curriculum developed on the basis of a model (typical) curriculum applicable to a specific educational institution, taking into account the national-regional component of the standard. Working curricula are developed by educational institutions. The procedure for developing working curricula is established by regional education authorities, which are responsible for implementing the federal component of the standard.

The most significant challenges encountered in the field of informatics in elementary education are as follows: curriculum; integration; teacher education and assistance; content development; research;

Aim of the research is to investigate the patterns of informatics education in primary schools, as well as to analyze and discuss the experiences of Lithuanian schools on the implementation of an informatics curriculum in primary schools and the preparation of teachers.

The curricula of general education institutions for the 2021-2022 academic year have been approved. The corresponding order was signed by the Minister of Education of Azerbaijan Emin Amrullayev. According to it, the curricula and "Appendices to the curricula" for the 2021-2022 academic year have been approved for general education institutions of the Republic of Azerbaijan, where instruction is conducted in the Azerbaijani language and other languages.

Goals of studying the computer science course in primary school The most important goal of primary education is to create a solid foundation for subsequent education, to develop the ability to independently manage their educational activities.

This involves not only the acquisition of basic knowledge and skills, but also the development of the ability to cooperate and reflection. Computer science is considered in a general education school in general and in a primary school in particular in two aspects. The first is from the position of forming a holistic and systemic idea of the world of information, the commonality of information processes in wildlife, society, and technology.

From this point of view, at the propaedeutic stage of training, schoolchildren should receive the necessary primary ideas about human information activity. The second aspect of the propaedeutic course in computer science is mastering the methods and means of obtaining, processing, transmitting, storing and using information, solving problems using a computer and other means of information and communication technologies.

This aspect is associated, first of all, with preparing primary school students for continuing their education, for the active use of educational information resources: music libraries, video libraries, multimedia educational programs, electronic

Sample work program 3 reference books and encyclopedias in other subjects, when performing creative and other project work. The computer science course in primary school is of a comprehensive nature. In accordance with the first aspect of computer science, theoretical and practical non-computer training is carried out, which includes the formation of primary concepts of human information activity, the organization of socially significant information resources (libraries, archives, etc.), and moral and ethical standards for working with information.

In accordance with the second aspect of computer science, practical user training is carried out - the formation of primary ideas about a computer, including the preparation of schoolchildren for educational activities related to the use of information and communication technologies in other subjects.

Thus, the most important result of studying computer science at school is the development of such personal qualities that meet the requirements of the information society, in particular the acquisition of information and communication competence (ICT competence) by students. The program of the computer science course for primary school has been developed in accordance with the requirements of primary general education and is aimed at ensuring the implementation of three groups of educational results: personal, meta-subject and subject.

General characteristics of the curriculum "Computer Science" in primary school Since the experimental introduction of computer science in primary school, significant experience has been accumulated in teaching computer science to primary school students. Teaching computer science in primary school is aimed at forming in primary school students initial ideas about the properties of information, ways of working with it, in particular, using a computer.

It should be noted that the computer science course in primary school makes a significant contribution to the formation and development of the information component 4 Computer Science. Grades 2–4 of universal educational activities, the formation of which is one of the priorities of primary general education.

In the process of learning, computer science terms (information source/receiver, communication channel, data, etc.) are gradually introduced into the students' thinking and speech. Schoolchildren study the structure of a computer and learn to work with electronic documents. In the third grade, schoolchildren study the presentation and coding of information, its storage on information carriers. The concept of an object, its properties, and actions with it is introduced.

An idea of a computer as a system is given. Children master information technologies: the technology of creating an electronic document, the technology of editing it, receiving/transmitting it, searching for information on the Internet. Students become familiar with modern tools for working with information (mobile phone, e-book, camera, computer, etc.), and simultaneously learn to use them in their educational activities.

Concepts are introduced as needed so that the child can reason about his information activity, talk about what he does, distinguishing and calling elementary technological operations by their proper names. In the fourth grade, the topics "World of Concepts" and "World of Models" are considered, students' ideas about working with various scientific concepts are formed, and the concept of an information model, including a computer one, is introduced. The concepts of an executor and an algorithm of actions, and forms of recording algorithms are considered. Children master the concept of controlling themselves, other people, technical devices (tools for working with in- 6 Computer Science. Grades 2–4 formation), associating themselves with the control object and realizing that there is an object of control, realizing the goal and means of control.

Schoolchildren learn to understand that the means of control affect the expected result, and that sometimes the obtained result does not correspond to the goal and expectations. In the process of consciously managing their educational activities and the computer, schoolchildren master the corresponding terminology and correctly construct their speech. They learn to recognize control processes in the surrounding reality, describe them in terms of computer science, and give examples from their lives.

Schoolchildren learn to see and understand in the surrounding reality not only its individual objects, but also their connections and relationships with each other, to understand that management is a special, active way of relations between objects. Seeing the relationships between objects of the system is the first active step towards a systemic view of the world. And this, in turn, contributes to the development of systemic thinking in primary school students, which is so necessary in modern life along with logical and algorithmic thinking. Logical and algorithmic thinking are also subject of targeted formation and development in the fourth grade with the help of relevant assignments and exercises.

DESCRIPTION OF THE PLACE OF INFORMATICS IN THE CURRICULUM

The main educational program of primary general education provides the school with broad opportunities for including informatics in the part of the curriculum formed by the participants of educational relations.

The time allocated to this part within the maximum permissible classroom academic load can be used to increase the hours for studying individual subjects of the invariant part, to organize courses in which the student, parent, teacher, educational 16 Computer Science.

Grades 2–4 organization, constituent entity of the Russian Federation are interested. In the first grade, in accordance with the system of hygienic requirements determining the maximum permissible workload of students, the part of the curriculum formed by the participants in educational relations is missing. The extracurricular activity plan will allow for the full implementation of the requirements of the federal state educational standard of primary general education.

Due to the hours for extracurricular activities, the general education organization achieves the planned results of mastering the main educational program, ensures the child's adaptation, and creates favorable conditions for his or her development. The educational organization independently determines the forms of organizing extracurricular activities. Among the forms of extracurricular activities are online communities, conferences,

Olympiads, scientific research and other forms in accordance with the choice of the participants of educational relations. It is very effective to conduct extracurricular classes in computer science in the form of clubs for mastering information technologies, as well as in the form of group classes on creating integrated projects. Classes can be conducted by a primary school teacher, a computer science teacher or a teacher of additional education.

Hours allocated for extracurricular activities are not taken into account when determining the mandatory permissible workload of students, but are mandatory for financing. Within the framework of the part of the curriculum formed by the participants of educational relations, as well as within the framework of extracurricular activities, it is possible to create various programs of computer science courses

Moreover, computer science as a course in which the skills and abilities of working with information are purposefully formed, can be one of the leading ones in the formation of universal educational activities (general educational skills and abilities).

An important problem of implementing a continuous course in computer science is the continuity of its teaching at different educational levels. Any course of study should have an internal unity, which is manifested in the content and methods of teaching at all stages of education.

The structure of the course, its main content lines should ensure this integrity. Therefore, it is assumed that the content lines of teaching computer science in primary school correspond to the content lines of its study in secondary school, but are implemented at the propaedeutic level.

Upon completion of training, students should demonstrate the formed skills and abilities in working with information and apply them in practical activities and everyday life. The authors make an attempt to build a multi-level structure of the course "Computer Science", which would be considered as a systematic course, continuously developing the knowledge of schoolchildren in the field of computer science and information and communication technologies.

The authors emphasize the need for schoolchildren to receive an understanding of the essence of information processes at the earliest stages of training. Information processes are considered using examples of transmission, storage and processing of information in human information activities, living nature, technology.

In the process of studying computer science in primary school, the skills of classifying information, distinguishing between the general and the specific, establishing connections, comparing, drawing analogies, etc. are developed.

This helps the child to see the world around him meaningfully, navigate it more successfully, and form the foundations of a scientific worldview. The proposed propaedeutic course of computer science is based on the fundamental principles of general didactics: integrity and continuity, scientific nature combined with accessibility, practice-oriented ness combined with developmental learning.

In terms of solving the priority task of primary education - the formation of UUD (general educational skills) - the skills of building models of the problem being solved, solving non-standard problems are developed.

The development of the creative potential of each child occurs during the formation of planning skills in the course of solving various problems. In the second grade, children learn to see the surrounding reality from the point of view of the information approach.

It is advisable to allocate an invariant component of the hourly workload for the computer science course in primary school in the amount of 34 hours per year, a total of 105 hours for the course of grades 1–4, taking into account reserve hours. The invariant component can consist of 17-hour modules (two modules per year), a 17-hour module and 17-hour project activities per year, as well as a course within the academic plan in the amount of 34 hours per year or an extracurricular activity course in the amount of 34 hours.

Sample work program the variable component of the course is aimed at strengthening the students' practical work with a computer and activating project activities. It is from 18 to 68 hours per year in addition to the existing invariant workload.

In total, the computer science course can be studied from 34 to 102 hours per year, taking into account both the invariant and variable components, as well as depending on the division of the class into groups or work in the computer science lesson by the whole class and on the information education environment.

A description of the electronic software support for the course is presented below by three types: minimum / basic / extended model of electronic software. The table below shows various options for planning the computer science course within one year for the invariant and variable components of the course, which can be combined for grades 2–4, taking into account possible integration within the framework of the mathematics and technology courses.

Computer Science Curriculum (Grade 1)

The pedagogical expediency of the study is to form in the younger generation new competencies necessary in a society using modern information technologies; will ensure the dynamic development of the child's personality, his moral formation; to form a holistic perception of the world, people and oneself, to develop the intellectual and creative abilities of the child at an optimal age.

The main goal of the educational program is: to prepare students for the effective use of information technology in educational and practical activities, to develop the creative potential of students, to prepare for project activities, as well as to master the knowledge that constitutes the beginnings of ideas about the information picture of the world, information processes and information culture; to master the ability to use computer technology as a practical tool for working with information in educational activities and everyday life; to cultivate interest in information and communication activities, ethical standards for working with information; to cultivate a careful attitude to technical devices.

The main objectives of the general educational process:

• development of general educational skills: logical, figurative and algorithmic thinking, development of attention and memory, instilling self-study skills, communication skills and elements of information culture, skills to navigate in the spatial relationships of objects, skills to work with information (transfer, store, transform and search);

• development of the ability to identify the characteristics of one object, identify and generalize the characteristics inherent in objects of a group, identify an extra object from a group of objects, identify patterns in the arrangement of objects, use the rotation of a figure when solving educational problems, divide a figure into specified parts and construct a figure from specified parts according to the imagination;

• development of concepts of essential characteristics of an object and a group of objects; the concept of part and whole; geometric transformation of rotation;

• developing the ability to present information in various ways (in the form of numbers, text, pictures, tables, diagrams), to organize information alphabetically and by numerical values (ascending and descending), to construct simple logical expressions using the links "and", "or", "not", "will be found", "for all";

• developing the concepts of "team", "performer", "algorithm" and the ability to create algorithms for educational performers;

• instilling in students the necessary skills in using modern

computer and information technologies to solve educational and practical problems.

The course is built on specially selected material and is based on the following principles:

• systematicity;

• humanization;

• interdisciplinary integration;

• differentiation;

• additional motivation through play;

The approximate structure of the lesson:

1. Organizational moment (1 min.).

2. Warm-up. Short logical, mathematical problems and problems to develop attention (3-4 min).

3. Explanation of new material or frontal work on solving new problems, work in notebooks (8-10 min).

4. Physical education minute (2 min)

5. Relaxation (1 min)

6. Summing up (2 min).

Form of study - full-time.

2. Results of mastering the course of extracurricular activities.

Personal results.

The personal results of mastering information and communication technologies as a tool in studies and everyday life include:

- a critical attitude to information and selectivity of its perception;

- respect for information about the private life and information results of other people;

- understanding the motives of one's actions when completing tasks with life situations;

- the beginning of professional self-determination, familiarization with the world of professions related to information and communication technologies.

Meta-subject results.

Regulatory universal learning activities:

- planning the sequence of steps of the algorithm to achieve the goal;

- searching for errors in the action plan and making changes to it.

Cognitive universal learning activities:

- modeling - transforming an object from a sensory form into a model, where the essential characteristics of the object are highlighted (spatially graphic or sign-symbolic);

- analysis of objects in order to highlight features (essential, inessential);

- synthesis - composing a whole from parts, including independent completion with replenishment of missing components;

- selection of bases and criteria for comparison, seriation, classification of objects;

- subscribing to a concept;

- establishing cause-and-effect relationships;

- building a logical chain of reasoning.

Communicative universal learning activities:

- arguing your point of view on the choice of bases and criteria for highlighting features, comparing and classifying objects;

- listening to the interlocutor and conducting a dialogue;

- recognizing the possibility of the existence of different points of view and the right of everyone to have their own.

Subject results.

As a result of studying the material, students should be able to:

- find an extra object in a group of homogeneous ones;

- give a name to a group of homogeneous objects;

- find objects with the same value of a feature (color, shape, size, number of elements, etc.);

- find patterns in the arrangement of figures by the value of one feature;

- name a sequence of simple familiar actions;

- find an omitted action in a familiar sequence;

- distinguish obviously false phrases;

- name words with opposite meanings.

The methods for checking the expected results are: current control (survey, checking assignments on a PC), games. The assessment system is non-graded. Only verbal assessment of students' achievements is used.

Form for summing up the results of the implementation of the additional educational program "My friend is a computer" - games, competitions, contests, marathon.

3. Content of the subject

The course has the following sections:

• Section 1 - "Subject":

- Color of objects.

- Shape of objects.

- Size of objects.

- Names of objects.

- Features of objects.

- Composition of objects.

• Section 2 - "Actions of objects":

- Concepts of "equal", "not equal".

- Relationships of "more" and "less".

- Concepts of "up", "down", "right", "left".

- Actions of objects.

- Sequence of events.

- Procedure.

• Section 3 - "Set. Coding":

- Digits.

- Ascending, decreasing.

- Set and its elements.

- Methods of defining sets.

- Comparison of sets.

- Displaying sets.

- Coding.

- Symmetry of figures.

• Section 4 - "Statement. Graphs":

- Negation.

- Concepts of "true" and "false".

- Concept of "tree".

- Graphs.

- Combinatorics.

Sequence of events and actions. Methodological recommendations.

Prepare an overview of the lesson topic

Lesson objective:

To teach how to determine the sequence of actions and events;

To prepare for the introduction of the concept of algorithms;

To develop work skills;

To develop the ability to consistently construct sentences when retelling.

Equipment: computer, presentation, projector, handouts, notebooks.

Lesson progress

I. Organizational part.

II. Eye exercises (children watch moving objects on the screen with their eyes).

III. Review of the material covered.

Task 1.

You have two drawings in front of you. Find the differences. What shapes does each drawing consist of?

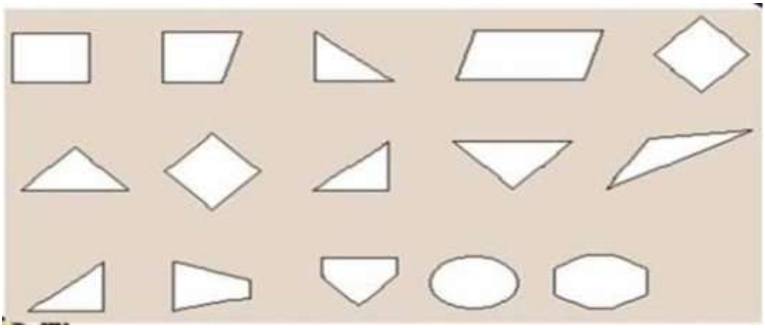
How many shapes are there in each drawing? (students come out and show the differences in the shapes on the slide).

Task 2 "Extra figure".

Look closely at the figures in each row. Is there an extra figure in each row? Find this figure.

-students find the extra figure and explain by what feature it is extra). in the first row there is an extra triangle, since the other figures are quadrangles;

-in the second row among the triangles there is a quadrangle; in the third row the extra polygon is an oval



IV. **Learning new material.**

Task 3.

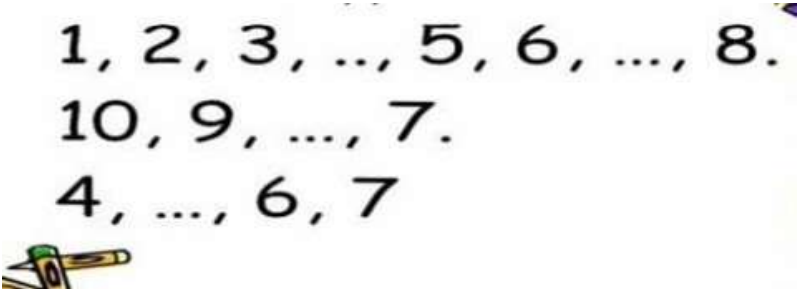
Let's have a conversation about the events in our lives: the changing seasons, the stages of life of plants, humans.

Let's list them in order:

- Days of the week,
- Months of the year,
- Seasons, etc.

Task 4 "Missing numbers".

Name the numbers that are missing. Determine the order of the numbers. Between which numbers are the missing numbers in the number row? (students name the numbers).



Task 5. Game "Who (what) will be...".

I will ask a question that can have several possible answers. What will an acorn be? A tree? Flour? An egg? A seed? A brick? A chicken? Fabric? Iron? An egg?

For example, an acorn can grow into a tree, a tree trunk can be used to make a boat or a house, chop wood, etc.

Task 6. Game "Who (what) were..."

Who were they? A horse, a chicken, a cow, a fish, an apple tree, bread, a bicycle... etc.

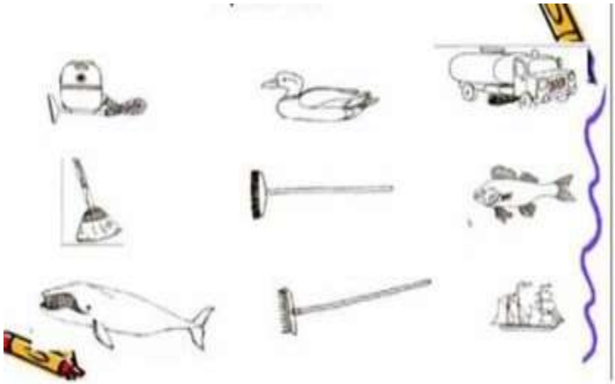
For example, a cow was a calf, bread was flour, etc.

Task 7 "Divide into groups".

The slide shows a group of objects, students must determine the features by which they can be divided into two groups.

Children suggest options, the teacher determines the correct classification:

-objects that can be used to clean at home, on the street (vacuum cleaner, broom, watering machine, mop, rake) and objects that float (duck, whale, ship).



Task 8 "The Life of a Dandelion".

According to the picture, students must arrange the numbers that determine the order of life of a dandelion.

Task 9 THE FAIRY TALE "Kolobok".

Determine the sequence of the pictures and tell the fairy tale "Kolobok" based on them

Task 10 FAIRY TALE "Under the Mushroom".

Determine the sequence of the pictures and tell the fairy tale "Under the Mushroom" based on them.

Pay attention to the friendship of the animals, the desire to help each other in a difficult

situation.

Task 11 "Getting ready for school..."

Let's remember how you get ready for school. Determine the order of actions based on the pictures and help the boy not to mix up the actions.

Task 12 "Order of actions".

Katya the girl is her mother's helper, she decided to wash the doll Natasha's dress and iron it. What did Katya forget to do? (plug the iron into the socket).

Task 13 "Seasons".

The seasons of the year go in order every year. You can determine eacheason of the year by the trees.

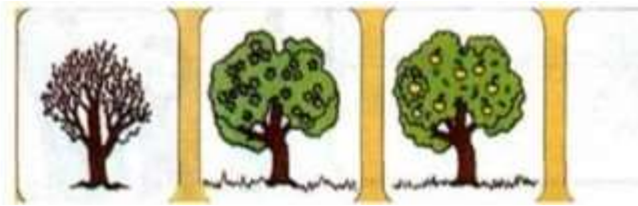
Determine the season of the year by the pictures and say what season of the year will be next?

What happens to the trees in winter, spring, summer, autumn?

By what signs do we determine the season?

What leaves do the trees have in summer, spring, autumn?

When do the flowers bloom on the trees? When do the fruits ripen?



Information. How they receive, transmit and use information.

Methodological recommendations. Prepare an overview of the lesson topic

Goal: Formation of concepts about objective and subjective information and its dependence on the senses.

Objectives. Educational: to introduce students to the concept of objective and subjective information and their properties.

Developmental: to develop the creative and cognitive potential of the student; communication skills; the ability to structure information, determine the main properties of information and their meaning.

Educational: to cultivate a culture of communication, labor discipline and cognitive interest in the subject.

Work format: frontal, group, in pairs.

Interdisciplinary connections: computer science, drawing.

Planned results. Subject. Students should know the types of information, its properties, meaning and perception of information. Should be able to distinguish between objective and subjective information.

Universal learning activities. Cognitive: - the ability to define concepts;

- to structure knowledge, establish cause-and-effect relationships, build logical reasoning;

- to analyze the selected information and interpret it in accordance with the task;

- the ability to independently search, analyze, select information (textbook).

Regulatory: - define the goal in the activity, choose the means to achieve the goal individually and in pairs;

- express your assumptions based on the educational material;

- exercise self-control,

- assess the degree of goal achievement in the educational situation, independently correct mistakes.

Communicative: - listen to and understand the speech of others, provide mutual assistance in the course of completing the task;

- be able to publicly defend your position;

- developing the ability to conduct a dialogue, effectively interact in pairs, groups;

- be able to express your thoughts orally and in writing.

Personal: - mastering knowledge, skills and abilities and their application in various life situations;

- be aware of your emotions, evaluate your own and other people's actions in different situations, understand the emotional state of others;

- forming a conscious self-esteem;

- have a respectful and friendly attitude towards another person, his opinion.

Equipment: computer, cards with tasks, a bag with objects (whistle, perfume, cotton wool, a picture, salt in a transparent bag), the textbook Technology 5th grade edited by V.M. Kazakevich, M., "Prosveshchenie", 2019.

Lesson progress.

1. Organizational moment. Checking readiness for the lesson.

2. Motivation and introduction to the topic.

Let's recall from the previous lesson what information is.

Answers:

Information is knowledge or data about someone or something. Information is data that can be collected, stored, transmitted, processed, used. Information is a reflection of the outside world using signs or signals.

Remember where we get information from?

Answers: in science, technology, everyday life.

More details about this were prepared for us by …..(student's name) Man has been studying the world around him since the moment he appeared on Earth. Studying the world gives man very important information, without which life itself is impossible. Man perceives this information with the help of his senses and presents it in a form convenient for further work.

Remember, through which organs do we perceive information?

Answers: through the nose, mouth, ears, skin of the hands, eyes. Let's conduct a small experiment. For this I need 5 brave souls. Blindfold. By touch you need to determine what is in the bag. (We can immediately determine cotton wool, perfume by smell, salt by taste, a whistle by ear, and a picture only by opening your eyes). A person receives information about the outside world with the help of his sense organs.

A person receives almost 90% of information through the organs of sight (visual), about 9% - through the organs of hearing (auditory) and only 1% with the help of the other sense organs (smell, taste, touch). It should be noted that human sense organs are called analyzers, since it is through these organs that information enters the brain. But, for example, for a fox, a dog and many other animals, the main information is that which comes through the nose. They have a good developed sense of smell. For bats, the main information is sound, they perceive it with their large, sensitive ears.

Is any information useful to a person? What do you think, in terms of reliability, what kind of information is there? Answer options.

If we were told that it is warm outside, what should we dress? After all, we do not know how warm it is. And if we are told that it is plus 25 degrees outside, then we will already have decided on our clothes.

Accordingly, in the first case we make up the information, and in the second case the information is clear. What do we call such information? Answers: objective and subjective.

That's right, this will be the topic of our lesson. Write down the topic of the lesson: Information objective and subjective. Characteristics of types of information from the senses.

Accordingly, our main task is to understand these concepts. So, we remembered that we receive information through the senses. This means that, according to perception, information can be: visual, auditory, olfactory, gustatory, tactile. (notebook entry) Information can also have different social significance. Think about what kind of information can there be in society? Answers: social, personal, special.

According to social significance, information can be:

-personal - this is knowledge, experience, intuition, skills, emotions, heredity of a specific person public - socio-political, popular science, i.e. what we get from the media.

-in addition, this is the experience of all mankind, historical, cultural and national traditions, etc.; everyday - that which we exchange in the process of communication; aesthetic - fine arts, music, theater, etc.; special - scientific, industrial, technical, managerial.

The human body reacts to information received from the outside with the help of sense organs. I suggest playing the game "Guess the situation".

The students are divided into 2 teams. The teams must name the initial information and describe the proposed reaction of the body. The team that is the most artistic wins. Mom gave you a bitter pill. A balloon burst. A cat ran across your path. Your hands are frozen.

3.Presentation of new material.

We have just guessed different situations. And it was not always immediately clear what was happening. And what properties should information have to be accessible to a person? Answers: Reliability, completeness, relevance, usefulness, comprehensibility. And when do we say that information is reliable? When it is true, real.

1.Reliable information helps us make the right decision.

Information can be unreliable for the following reasons: Intentional distortion (disinformation); When the significance of a real fact is underestimated or exaggerated (rumors, fishing stories).

2.Completeness of information. Information can be called complete if it is sufficient for understanding and decision-making. For example, a historian's dream is to have complete information about past eras. But historical information is never complete, and the completeness of information decreases as the historical era moves away from us. Even events that happened before our eyes are not fully documented, much is forgotten, and memories are subject to distortion.

3. **Relevance (timeliness) of information** - importance, significance for the present time. Only information received in time can bring the necessary benefit. Information can be irrelevant for two reasons: it can be outdated (last year's newspaper) or insignificant, unnecessary (for example, a message that prices in Italy have been reduced by 5%).

4. Usefulness or uselessness. The most valuable information for us is sufficiently useful, complete, objective, reliable and new. Let's take into account that a small percentage of useless information even helps, allowing you to rest on uninformative sections of the text. And the most complete, most reliable information cannot be new.

5. Information is understandable if it is expressed in a language accessible to the recipient.

• **PHYSICAL EDUCATION MINUTE. "**Kitty stretching". Starting position: sitting on a desk chair, bend at the waist, hands to the shoulders. Inhale - stretch, arms up, hands relaxed. Exhale - hands to the shoulders, elbows forward.

4. **Creative work. textbook page** 123. Paragraph 3. We read from paragraph 3. So, we have read that information can be transmitted using signs, symbols, numbers.

Now remember the safety precautions in the office when doing manual work, when working with an electric stove, iron, sewing machine. And think of a sign without words. Draw it.

(When the drawings are ready, we exchange notebooks and try to decipher this sign).

5. **Consolidation.** Today we have covered the topic "Information, its types and properties" and answered the questions: What does the word "information" mean? (knowledge or data about someone or something)

What are the main types of information? (visual, auditory, olfactory, taste, tactile)

What are the main properties of information? (reliability, completeness, relevance, usefulness, clarity)

How does a person perceive information? (through the organs of sight, hearing, smell, touch, taste receptors) Now try to formulate a conclusion. Give definitions of objective and subjective information.

Information is data, knowledge, messages that a person receives from the surrounding world. Subjective information is thought up by the subject, and objective reflects the real picture. (recording)

6**. Reflection.** Now, share your opinions about the lesson. Do you think we coped with the task? I would like to ask those who wish to express their opinion

• it was interesting...

• it was difficult...

• now I can...

• I learned...

• I was surprised...

• I wanted... Did you like the lesson? Draw a smiley face next to it.

7. **Summary**. Homework. Prepare reports on Cultivated and wild plants.

Technology report on the topic "Information in science, technology and everyday life" Information is data that can be collected, stored, transmitted, processed, used.

In science, technology and everyday life, the word "information" has different meanings:

-In everyday life, information is any data, information, knowledge that interests someone. For example, a message about some events, about someone's activities, congratulations on a birthday, a promotion at work; etc. When someone says: "I am informing", in everyday terms it means "I am informing you".

- In technology, information is understood as messages transmitted in the form of signs or signals (in this case there is a source of messages, a recipient (receiver) of messages, a communication channel); news on the radio, weather forecast on TV; news in the spheres of mass information.

In science, information is understood as that part of knowledge that is used for orientation, active action, management, i.e. for the purpose of preserving, improving, developing a system; scientific conferences, books, scientific seminars, scientific works of any figures in various spheres of scientific life.

Getting to Know the Computer. The Main Parts and Capabilities of the Computer.

Methodological Recommendations. Prepare an overview of the lesson topic

Topic: "Getting to Know the Computer. The Main Parts and Capabilities of the Computer."

Lesson Objectives:

- to help students learn the structure of the computer, the concept of the basic configuration of a PC, to give the basic concepts necessary to start working on a computer.

- to cultivate students' information culture, attentiveness, accuracy, discipline, perseverance.

- to develop cognitive interests, skills in working with a mouse and keyboard, self-control, the ability to take notes.

Equipment:

board, computer, computer presentation.

Lesson Plan:

I. Organizational Moment. (1 min)

II. Knowledge Update. (7 min)

III. Theoretical Part. (10 min)

IV. Practical Part. (12 min)

V. Homework (2 min)

VI. Students' questions. (5 min)

VII. Lesson summary. (2 min)

Lesson progress:

I. Organizational moment. Greeting, checking those present. Explanation of the lesson progress.

II. Knowledge check. In the last lesson, we began to get acquainted with the computer.

Today we will consider what computer devices are available, practically, in every PC, why they are needed and some of their characteristics.

III. **Theoretical part.** Sometimes they say "personal computer". The clarification "personal" here is not accidental - it means one's own, personal, accessible to most people, because there are a large number of other types of computers that cannot be called personal - workstations for enterprises, servers for connecting many computers to a network, etc. In the future, when we say "computer" we will mean a personal computer.

A personal computer is a computer designed to serve one worker. In terms of its characteristics, it may differ from large computers, but functionally it is capable of performing similar operations. According to the method of operation, there are desktop, portable and pocket PC models. In the future, we will consider desktop models and how to work with them.

In the modern computer market, the variety of modifications and options of computers is huge, but any, even the most unusual set invariably includes the same types of devices.

Basic PC configuration is the minimum set of hardware sufficient to start working with a computer. Currently, for desktop PCs, the basic configuration is considered to be one that includes four devices:

•System unit;

• Monitor;

• Keyboard;

• Mouse.

The system unit is the main block of the computer system. It contains devices considered internal. Devices connected to the system unit outside, are considered external. The system unit includes a processor, RAM, hard and floppy disk drives, optical disks and some other devices.

On the front panel you can see several buttons - the already familiar Power button - to turn on and the Reset button - to reboot the computer, which can only be used with the teacher's permission. Several indicator lights - to turn on and to access the hard disk. Two disk drives - for compact discs and floppy disks, which we will talk about in the next lesson.

A monitor is a device for visually reproducing symbolic and graphic information. It serves as an output device. They vaguely resemble household TVs.

Desktop computers usually use monitors on a cathode-ray tube (CRT). The image on the monitor screen is created by a beam of electrons emitted by an electron gun. This electron beam is accelerated by high electric voltage (tens of kilovolts) and falls on the inner surface of the screen, covered with a phosphor (a substance that glows under the influence of an electron beam).

The beam control system makes it run line by line across the entire screen (creates a raster), and also regulates its intensity (correspondingly, the brightness of the glow of the phosphor dot). The user sees an image on the monitor screen, since the phosphor emits light rays in the visible part of the spectrum. The image quality is higher, the smaller the size of the image dot (phosphor dot); in high-quality monitors, the dot size is 0.22 mm.

However, the monitor is also a source of high static electric potential, electromagnetic and X-ray radiation, which can have an adverse effect on human health. Modern monitors are practically safe, since they meet strict sanitary and hygienic requirements, fixed in the international safety standard TCO'99. Flat-panel liquid crystal display (LCD) monitors are used in portable and pocket computers. Recently, such monitors have become widely used in desktop computers as well.

LCD (Liquid Crystal Display, liquid crystal monitors) are made of a substance that is in a liquid state, but at the same time has some properties inherent in crystalline bodies. In fact, these are liquids with anisotropy properties (in particular, optical ones) associated with the orderliness in the orientation of molecules.

Liquid crystal molecules can change their orientation under the influence of electrical voltage and, as a result, change the properties of the light beam passing through them. The advantage of LCD monitors over CRT monitors is the absence of electromagnetic radiation harmful to humans and compactness. But LCD monitors also have disadvantages.

The most important of them are poor color rendering and blurring of a fast-moving picture. In other words, if you take a high-quality CRT monitor, it will be suitable for any task without reservations - for working with text, for processing photos, for games, and so on; at the same time, among LCD monitors, you can highlight models that are suitable for games - but they are not suitable for working with photos, you can highlight models that have excellent color rendition - but they are not suitable for dynamic games, and so on.

Monitors can have different screen sizes. The diagonal size of the screen is measured in inches (1 inch = 2.54 cm) and is usually 15, 17, 19 or more inches.

Keyboard - a key device designed to control the operation of a computer and enter information into it. Information is entered in the form of alphanumeric symbolic data. A standard keyboard has 104 keys and 3 light indicators in the upper right corner informing about the operating modes.

Mouse - a "graphic" control device. When you move the mouse on the pad, the mouse pointer moves on the screen, using which you can point to objects and/or select them. Using the mouse buttons (there may be two or three of them), you can set one or another type of operation with the object.

And using the wheel, you can scroll up or down images, text, or web pages that do not fit entirely on the screen.

In optical-mechanical mice, the main working element is a massive ball (metal, covered with rubber). When the mouse moves on the surface, it rotates, the rotation is transmitted to two shafts, the position of which is read by infrared opto couplers (i.e., pairs of "light emitter-photodetector") and then converted into an electrical signal that controls the movement of the mouse pointer on the monitor screen.

The main "enemy" of such a mouse is contamination.

Currently, optical mice have become widespread, in which there are no mechanical parts. A light source located inside the mouse illuminates the surface, and the reflected light is recorded by a photodetector and converted into the movement of the cursor on the screen. Modern mouse models can be wireless, i.e. they can be connected to a computer without a cable. Peripherals are devices that are connected to a computer from the outside. Usually, these devices are designed to input and output information. Here are some of them:

- **Printer;**
- **Scanner;**
- **Modem;**
- **DVB card and satellite dish;**
- **Web camera.**

A printer is used to output information to a paper medium (paper).

There are three types of printers:

- matrix
- inkjet
- laser

Matrix printers are impact printers. The print head of a dot matrix printer consists of a vertical column of small rods (usually 9 or 24) that are "pushed" out of the head by a magnetic field and strike the paper (via an ink ribbon). As the print head moves, it leaves a line of characters on the paper.

The disadvantages of dot matrix printers are that they print slowly, they make a lot of noise, and the print quality is poor (roughly equivalent to a typewriter).

In recent years, black-and-white and color inkjet printers have become widespread. They use an inkjet print head that, under pressure, ejects ink from a series of tiny holes onto the paper. As the print head moves along the paper, it leaves a line of characters or a strip of image.

Inkjet printers can print quite quickly (up to several pages per minute) and produce little noise. Print quality (including color) is determined by the resolution of inkjet printers, which can reach a photographic quality of 2400 dpi. This means that a horizontal strip of an image 1 inch long is formed from 2400 dots (ink drops).

Laser printers provide virtually silent printing. Laser printers achieve high printing speeds (up to 30 pages per minute) by using page-by-page printing, in which the page is printed in its entirety at once. High typographic quality of laser printers is ensured by high resolution, which can reach 1200 dpi and more.

Plotter. To output complex and wide-format graphic objects (posters, drawings, electrical and electronic circuits, etc.), special output devices are used - plotters. The operating principle of a plotter is the same as that of an inkjet printer.

Scanners are used to automatically enter texts and graphics into a computer.

There are two types of scanners:

• hand-held

• flatbed.

A hand-held computer scanner is similar to a scanner used in supermarkets to read barcodes. Such a scanner moves along a sheet of information line by line manually, and the information is entered into the computer for further editing.

A flatbed scanner looks and works much the same as a copier - the lid is lifted, the text or drawing is placed on the working field, and the information is read. Flatbed scanners are usually all color these days. Text recognition systems allow you to convert scanned text from a graphic format into text. The resolution of scanners is 600 dpi and higher.

A modem or modem card is used to connect remote computers via a telephone network. The modem can be internal (installed inside the system unit) and external (located next to the system unit and connected to it using a cable).

A DVD card and a satellite antenna are used for the so-called "asynchronous" connection of a computer to the Internet. If you have a DVB card and a satellite antenna, two communication channels are used to connect to the Internet:

-a modem is used to transmit data from the user, and a satellite channel is used to receive data,

-the data flow rate of which is several times higher than the modem.

A webcam will come in handy for organizing video conferences (or just chatting) on the vast Internet. With the help of these devices (and, of course, fast local networks), you can arrange a meeting with your employees at any time, without tearing them away from their comfortable workplaces. And this, as practice shows, gives a very tangible practical benefit.

Let's make it clear right away - we are not talking about real video cameras here. That is, you can not even dream of good optics, high-quality color rendition and other such luxuries. And it will not even occur to you to save a video image from a webcam. After all, this unit is needed for something completely different - to ensure the receipt of a video stream on your computer with the quality and volume sufficient for transmission on the Internet.

There is, however, one catch. Almost all webcams are designed to work not in the slow modem connection mode. Give them digital channels of communication - and then these devices will show themselves in all their glory.

As for Russia, unfortunately, there is no possibility to ensure the transmission of such a data stream in real time. Neither the transmitting devices, nor the communication channels.

Therefore, the maximum that your interlocutor can count on is the appearance of your personality in a tiny window slightly smaller than a cigarette pack (image size - up to 320x200 pixels). If this is enough for you, well, buying a webcam can brighten up your gray computer days a little.

Since the webcam does not produce a static image, you need to take into account another important value - the frame refresh rate. So, on a regular modem connection, even with a tiny picture of 150x200 pixels, you most likely will not get the desired 24 frames (in reality - from 10 to 20).

This means that jerks and delays are inevitable ... However, do not be upset - alternative methods of connecting to the Internet are increasingly persistently paving their way, and perhaps in a year or two your interlocutors will be able to enjoy a decent quality image at least a quarter of the screen in size.

For now, pay attention to other indicators of the webcam - reaction to various lighting conditions, the presence of a built-in or additional microphone, the length of the USB connection cable, the ability of the camera to work "in conjunction" with popular programs for voice and video communication (for example, Microsoft NetMeeting).

And, of course, the maximum resolution: although the image quality of 640x480 pixels has long been the standard, there are models on the market with a much lower resolution threshold (many cameras costing up to $ 50 provide a resolution of only up to 352x288 pixels).

By the way, did you know that a good webcam can successfully replace a digital camera? Most cameras can not only transmit a stream of video information to a computer, but also pull out individual frames-pictures from this stream.

But their future fate depends on the quality of the camera: expensive models can save images in the built-in memory, without requiring a constant connection to a computer, while cheaper ones are forced to immediately dump their entire “load” onto the hard drive.

Although, of course, a real digital camera works much better, and the quality gives something else... Especially since many mid-priced digital cameras can also, if necessary, work as webcams.

And lastly. Almost all camera models released after 1999 are connected to a computer via a USB port and do not require an additional power source.

Questions for consolidation:

• What does "personal computer" mean?

• What is "basic PC configuration"?

• What types of monitors do you know?

• What is mouse resolution?

• What is the difference between optical-mechanical and optical mice?

• What other input devices for a computer do you know?

III. Practical part.

Today, in the practical part, we will work with two programs simultaneously.

Windows is a multitasking operating system, i.e. several applications can be run in parallel. Each application is indicated by a button on the Taskbar, and the transition from working in one application to working in another can be done by clicking on the button. The running (active) application is displayed on the taskbar as a pressed button. You can also switch between programs using the key combination [Alt]+[Tab]. Open the text document Lesson 6 Practice, located in the folder C:\Our Lesson\. There are examples written there, you need to write down the answers. For calculations, launch the Calculator. Students complete the task.

IV. **Homework**

Know what the basic PC configuration and computer devices are. Students who have computers at home should continue to master the "blind ten-finger typing method".

Additional task: find information about additional devices

connected to the computer.

V. **Students' questions.**

Answers to students' questions.

VI. **Lesson summary.**

Summing up the lesson. Assigning grades.

In the lesson we learned what a basic PC configuration is, what devices are included in the basic PC configuration. We also learned how to work simultaneously with several programs on a computer.

Sources.

1. Do-it-yourself computer S. V. Glushakov et al.

2. Ramin Makhmudzade Ismail Sadygov Naida Isaeva methodological manual of the textbook on the subject of computer science

3. Pushkareva Irina Sergeevna "First steps in the world of computer science" for grades 1-4

Lesson - business game "Assembling a computer"

Lesson topic: Basic computer devices.

Lesson type: Lesson - review. Consolidation of the material covered.

Lesson objectives:

Educational: Assemble the correct computer configuration using the material covered.

Didactic:

Review with students the basic computer devices, their

functions and information interaction in a playful way.

Educational:

Acquisition of communication skills by students during teamwork: activation of their creative thinking; strengthening of students' personal interest, instilling in schoolchildren self-education and self-improvement.

Developing:

Teach students to make a crossword puzzle, search for information in price lists.

Lesson idea:

Students are offered the following business game situation: “In the city Semipalatinsk, there are several companies - limited liability companies (LLC) - assembling computers to order. The work of each company during one specific day proceeds as follows.

The working day begins. In the morning there are no orders yet and you can do something in your free time, for example, making a crossword puzzle from the words that are used in the work.

Then an order comes in: the customer wants to buy a computer, but does not know exactly what configuration this computer should have and what additional equipment for the computer he will need.

We need to help him with this" The simulation model in this case is the work of a company assembling and selling computers. The game model is the working day of such a company. The lesson contains two main stages, at each of which a certain task is performed.

Task 1 - making a crossword puzzle. At this stage, students get acquainted with new concepts of the topic and make a crossword puzzle using these concepts.

Task 2 - assembling a computer (determining the computer configuration). While completing this task, students review all the basic concepts on the topic of computer devices, the functionality of the computer components, the types of these components. At the end of the task, students must present a version of the computer configuration with a justification for why they propose this particular version.

Organization of the lesson.

The working group is divided into two teams (6-7 people). One of the group members is chosen to be the engineer (team captain), one acts as a marketer-designer, one as the chief accountant, and the rest act as technicians.

It is necessary to invite in advance from among the teachers who will help both the players and the leader during the game: give advice, check the completion of tasks, monitor the correctness of the answers and evaluate the work of the groups.

The leader is the computer science teacher who organized the game and teaches in this group. Before the start of the game, it is imperative to decide how the participants will be placed in the room; who will be where.

Lesson equipment.

Each game group should have sheets of paper with the rules of the game, the evaluation system, cards with images of components and peripherals or real components and peripherals, a price list, a memo on how to conduct a conversation with the customer.

Strips with words - computer terms, as well as an Excel sheet for compiling a crossword puzzle should be prepared. The price list can be obtained from any computer store.

Game rules.

The game is played in the form of a competition between game groups, the task of which is to score the maximum number of points, which are awarded for the correct completion of the task and tactful behavior during the game.

Players can seek advice from an expert. The host can influence the course of the game, participate in the discussion, giving remarks and asking questions. At the end of the game, the total points scored by the groups for the entire game are calculated, and for a certain amount of points (which is set by the host), each player receives a positive assessment.

Assessment system.

The correctness of the tasks is assessed according to the following criteria:

Task 1.

• Compactness of the crossword structure:

• Correctness:

• Rationality:

• Accuracy

Task 2.

• Orientation in the material

• Culture of speech

• Brevity

• Logic and persuasiveness

• Highlighting the essential

• Ability to interest the audience

The maximum number of points for completing each of the tasks is 5 points.

The behavior of the game participants is assessed according to the following criteria:

• Mutual assistance in a group

• Ability to communicate with colleagues

• Ability to organize work in a group

• Ability to meet the deadline when solving problems

• Ability to listen to the speech of your speaker and the speaker of another group.

The number of points awarded for tactful behavior during the game is 5, and a few more points can be added at the discretion of the host and the expert.

Fines are imposed for violation of discipline:

• Each remark by the presenter or expert consultant – 1 point

• Failure to comply with the rules of the game – 2 points

• Gross violation up to 5 points

Literature:

1. V.E. Figurnov “IBM PC for the user”

2. A. Levin “Self-study guide to working on a computer”

3. O. Efimova “Computer technology course” I, II vol.

Lesson plan:

1. Organizational moment – 5′

2. Composing a crossword puzzle, preparing a presentation – 20′

3. Assembling a computer – 25′

4. Homework – 3′

Lesson progress:

1**. Preparatory stage**

Participants take their places depending on the previously assigned roles: game groups, expert-consultant, presenter.

Presenter: Tells the participants the didactic goal of the game.

Presenter. Each of your groups has organized a limited liability company. I choose an engineer in each team – the chief technician. In then he distributes the responsibilities of each team member during the game. At the very beginning of the game, an accountant and a marketer-designer are chosen.

Please give a name to your enterprise.

The children come up with names for their firms – teams.

Presenter: Your first working day is starting. Until orders come in, you can spend your free time usefully - try to make a crossword puzzle from computer terms, the accountant at this time should calculate the salary of each specialist of the company in the MS Excel program, the marketer - designer should create an advertisement – presentation of his company in the Power Point program. The rest of the company employees are busy making a crossword puzzle.

2. Composing a crossword puzzle

The players of each team sit near one computer. Each team receives strips with words to compose a crossword puzzle. The strips are double-sided: on one side the word is written horizontally, on the other side the same word is written vertically. The players compose a crossword puzzle from these words - strips on the table next to the computer.

Then they redraw the resulting crossword puzzle on an Excel sheet prepared in advance by the teacher and displayed on the computer screen, number the words and compose questions for the crossword puzzle in the form of pictures. These pictures are already on the screen, and the students only have to arrange and number them correctly.

After the time allotted for completing this task has elapsed, the leader announces the completion of the stage. The engineer - technician must save his crossword puzzle and print it out. Then the printed finished crossword puzzles are passed to each other and they solve it within 5 minutes. The teams submit their decisions to the leader, who, while the players are completing the task of the next stage, checks and evaluates the work of each of the teams.

.3. **The accountant, having calculated the wages**, must print out a summary statement of payment in several copies. He must hand over these copies to the leader, the employees of his company and the guests. Calculation of wages according to the summary statement. The accountant fills in the full names of the company employees. (time of execution 15 minutes)

4. **The marketer-designer** must create an advertisement about his company, the advertisement must include 3 slides, they are created at the discretion of the company employee, no restrictions.

The marketer-designer must show that his company is a qualified supplier of computer, peripheral equipment and office equipment. (time to complete 20 - 25 min)

5. Assembling a computer

Host. Your company has received an order. The customer asks you to assemble a computer for him, but does not know exactly what configuration this computer should have and what additional equipment and what additional equipment he will need.

The customer wants to use this computer both for work and for games. He can pay no more than $700 for the computer for the first team, no more than $600 for the second team. Your task: to help the customer determine the configuration of the computer, i.e. to help him determine the computer power, hard drive capacity,

RAM, video card, monitor type and size, CD drive type, mouse and keyboard type, printer type, speakers, scanner, digital camera, etc. The conditions for fulfilling the order are as follows: on the one hand, the customer should not buy an unnecessary thing, i.e. if the company employee believes that the customer himself has chosen an item that he will not really need, then the employee must clearly and convincingly prove this; on the other hand, it is necessary to just as clearly and convincingly prove to the customer that he will not need exactly this item.

Each team receives several pictures with images of components and **peripheral devices**.

The players must clearly describe what is shown in each picture, whether the depicted item is necessary for the computer to work, present its functional capabilities and varieties. Next, the teams offer a computer configuration option for a given amount (using real price lists) and convince the customer to buy a computer of exactly this configuration.

Conversations between representatives of the companies - teams and customers take place in turns, one after another. Other teams can make suggestions or comments after the customer's conversation with the company is over.

The leader - teacher acts as the customer. He has a memo on how to behave, what to ask and for what purposes to demand a computer. The customer must communicate with all members of the game group, each must explain something. At the end of this stage, the customer announces whether he is satisfied with the service of this company.

Memo for employees of the first company “You need to offer a product for the entire amount that the buyer has. You only have Celeron, Pentium processors from Intel left in stock. ATX type cases.

A large batch of Epson inkjet and matrix printers has arrived. You have only 64 MB and 128 MB of RAM left, Seagate Barracuda hard drives with a capacity of only 40-80 GB, SVGA, VGA video card, 32 and 64-bit sound cards from Creative Live, a motherboard with a frequency of 100 MHz and 500 MHz, 14, 15, 17, 19-inch monitors (based on a cathode ray tube and on liquid crystals from LG)

A reminder for employees of the second company

“You need to offer goods for the entire amount that the buyer has. You have only Athlon, Duron processors from AMD left in stock. ATX, AT cases.

A large batch of Epson inkjet and HP laser printers has arrived. RAM you have only 128 MB and 256 MB left, Seagate Barracuda hard drives with a capacity of only 120-80 GB, SVGA, VGA video card, 32 and 64-bit sound cards from Creative Labs, motherboard with a frequency of 100 MHz and 500 MHz, monitors 14,15,17,19 inches (based on a cathode-ray tube and based on liquid crystals LG).

Curriculum for computer science (IV grade)

Curriculum for computer science (IV grade). - two hours

The work program for computer science and ICT for the 4th grade is based on the state educational standard of primary general education,

Information culture and its important component - ICT competence (information and communication competence) are becoming especially relevant today. The formation of the foundations of information culture in accordance with the new state standard of primary general education should begin in primary school.

The new standard is based on a system-activity approach, which involves education and development of personal qualities, in particular, those that meet the requirements of the information society.

The three main skills that correspond to the traditional content of primary education - reading, writing, counting - in accordance with the new standards should be expanded to form a new type of literacy, including the basics of ICT competence. This means expanding the concepts of reading (active search for all types and varieties of information, its perception and analysis)

Objectives and tasks

The study of computer science and information technology in the 4th grade is aimed at achieving the following objectives:

-forming general ideas of students about the information picture of the world, about information and information processes as elements of reality;

- familiarization with general theoretical concepts of computer science; ü gaining experience in creating and transforming simple information objects: various types of diagrams, including with the help of a computer;

- gaining experience in independent information activity as a personal

- learning result taking into account the practice of using ICT in research,

- design and project tasks.

- forming a system-information picture of the world (worldview) in the process of creating diagrams; ü forming and developing the ability to use electronic manuals, designers, simulators, presentations in the educational process; ü forming and developing the ability to use a computer when testing, organizing developing games and relay races, searching for information in electronic reference books and encyclopedias, etc.

The implementation of the set goals of studying computer science and information technology in the 4th grade involves solving the following problems:

-development of attention, thinking, memory of students based on tasks that clearly highlight the processes of processing information of the subject, the formation of a conscious and valuable attitude to their own activities on the surface of information;

- training in the field of information technology, ensuring the inclusion of informatization tools (computer hardware and software) in the educational and cognitive activities of students, the formation of stable skills in working with tabular information, including a comprehensive presentation of educational information in creative works (in a presentation environment), the ability to search for information using catalogs and reference books, on the Internet; üformation of initial ideological systemic and informational ideas about the world, information and information processes in society and technology, as well as the information nature of human cognitive activity.

General characteristics of the subject.

Since the experimental introduction of computer science in primary school, significant experience has been accumulated in teaching computer science to students. Teaching computer science in the 4th grade is aimed at developing initial understanding of the properties of information, methods of working with it, in particular using a computer.

It should be noted that the computer science course in the 4th grade makes a significant contribution to the formation and development of the information component of universal educational activities, the formation of which is one of the priority areas of primary general education.

Moreover, computer science as a subject in which skills and abilities in working with information have consistently fluctuated can be one of the guiding subjects in the form of universal educational activities (general educational skills and abilities).

The content lines of teaching information movement in the 4th grade correspond to the content lines of studying the subject in basic school, but are implemented at the propaedeutic level.

Upon completion of training, students should have more broadly formed skills and abilities in working with information and apply them in practical activities and everyday life.

Information processes Tags on examples of transmission, storage and processing of information in the information activities of man, wildlife, technology. In the process of studying computer science in the 4th grade, the dynamics of the ability to classify information, highlight the general and the specific, establish connections, discuss, draw analogies, etc.

This helps the student to see the world around him meaningfully, navigate it more successfully, and form the foundations of a scientific worldview.

The computer science course in the 4th grade is based on the fundamental principles of general didactics: integrity and continuity, scientific nature combined with accessibility, practice-oriented combined with developmental learning. In terms of solving the priority task of primary education - the formation of UUD (general educational skills) - the skills of building models of the problem being solved, solving non-standard problems are formed. Development of the creative potential of each learning process in the formation of planning skills in the course of solving various problems.

In the process of consciously managing their educational activities and the computer students master the relevant terminology and correctly construct their speech.

They learn to recognize management processes in the surrounding reality, describe them in terms of computer science, and give examples from their own lives.

Students learn to see and understand in the surrounding reality not only its individual objects, but also their connections and relationships with each other, to understand that management is a special, active way of relationships between objects. Seeing the relationships between objects of the system is the first active step towards a systems view of the world.

And this, in turn, contributes to the development of systems thinking in fourth-grade students, which is so necessary in modern life along with logical and algorithmic thinking. Logical and algorithmic thinking are also the subject of targeted formation and development in the fourth grade with the help of appropriate tasks and exercises.

Description of the value guidelines of the subject content A modern student is immersed in a new subject and information environment.

However, it is impossible to educate a specialist in the field of information technology or a programmer if you do not start teaching computer science in elementary grades.

Unlike past times, the reality surrounding a modern student is filled with countless man-made electronic devices. Among them are a computer, mobile phones, a digital camera, digital video cameras, players, decoders, etc. In these conditions, computer science in elementary school is no less necessary than the mathematics.

In computer science lessons, students consciously and purposefully learn to work with information (search for it, analyze, classify, etc.), distinguish form from content, i.e. meaning, recognize and call objects of the surrounding reality by their proper names in computer science terms.

The study of computer science in the subject area "Mathematics and Computer Science" is aimed at developing figurative and logical thinking, imagination, mathematical speech, forming subject skills and abilities necessary for the successful solution of educational and practical problems and continuing education.

A special place in training in computer science is given to the subject "Technology". Within the framework of this subject, close attention should be paid to the development of children's initial ideas about computer literacy.

The study of the integrated subject "The World Around Us" is aimed at "understanding the personal experience of the student's communication with nature and people; understanding one's place in nature and society." Computer science, teaching how to use a universal tool for searching and processing information (a computer), expands the ability of children to learn about the world around them and promotes their independence and creativity in the process of learning.

The study of subjects of the aesthetic cycle (fine art and music) is aimed at developing the "ability for emotional and value perception of works of fine and musical art, expressing in creative works one's attitude to the surrounding world." Mastering a graphic editor in computer science lessons gives the student the opportunity to create an image in a fundamentally different technique, developing his logical thinking in close connection with the emotional and value perception of the surrounding reality.

The study of Planned results of mastering the curriculum for grade 4

The main personal results formed in the study of computer science are:

- the presence of ideas about information as the most important strategic resource for the development of the individual, state, and society;

- understanding the role of information processes in the modern world;

- possession of primary skills in analyzing and critically evaluating the information received;

- responsible attitude to information, taking into account the legal and ethical aspects of its dissemination;

- development of a sense of personal responsibility for the quality of the surrounding information environment;

- the ability to link educational content with one's own life experience, to understand the importance of training in computer science and ICT in the context of the development of the information society;

- readiness to improve one's educational level and continue education using the means and methods of computer science and ICT;

-ability and readiness to communicate and cooperate with peers and adults in the process of educational, socially useful, educational and research, creative activities;

-ability and readiness to accept the values of a healthy lifestyle due to knowledge of the basic hygienic, ergonomic and technical conditions for the safe operation of ICT tools.

The main meta-subject results formed in the study of computer science are:

-active use of information and communication technology tools to solve communicative and cognitive tasks;

- mastering various methods of searching (in reference sources and the open educational information space of the Internet), collecting, processing, analyzing, organizing, transmitting and interpreting information in accordance with the communicative and cognitive tasks and technologies of the subject;

- ability to enter text using a keyboard, record (write) measured values in digital form and analyze images, sounds, prepare your presentation and deliver it with audio, video and graphic accompaniment; observe the norms of information selectivity, ethics and etiquette;

- ability to work in the material and information environment of primary general education (including with educational models) in accordance with the content of a specific subject.

In accordance with the federal state educational standard of primary general education, the main subject results of studying computer science reflect:

- mastering the basics of algorithmic thinking, recording and executing algorithms;
- acquisition of initial experience in applying mathematical knowledge to solving educational and cognitive and educational and practical problems in the field of computer science;
- ability to act in accordance with the algorithm and build the simplest algorithms;
- acquisition of skills to present, analyze and interpret data;

- mastering basic practical skills and abilities in specific forms of artistic activity based on ICT (video recording, elements of animation, etc.);
- acquiring initial knowledge of the rules for creating a subject and information environment and the ability to apply them to perform educational-cognitive and design artistic-design tasks.

To master the content of the computer science course, as well as information activities in other subjects, sets of tasks have been formed aimed at developing the readiness of students to solve educational-practical and educational-cognitive tasks based on:

- the system of basic concepts of computer science and ideas about information technology (analysis, comparison, search, evaluation, structuring of information, formation, execution, analysis, algorithm, control of the performer, computer program);
- the native language in primary school is aimed at developing speech, thinking, imagination of students, the ability to choose language tools in accordance with the conditions of communication - computer science teaches all this, awakening both a cognitive interest in the word and the desire to improve one's speech in the process of mastering a powerful tool for working with information

and its software, in particular - a text editor, an electronic notepad, an electronic book.

In computer science lessons, when typing texts in a text editor, students master the skills of writing correctly (since the computer highlights all errors in red and offers a correctly written word), participating in a dialogue (using the Skype program orally or in writing using the chat mode). While learning to work on a computer, children compose written texts-descriptions and narratives of a small volume, master the basics of business writing (writing a note, address, letter).

Based on the fact that a conversation with children about numbers, information and data, methods and tools for storing and processing them cannot take place on a purely abstract level, both mathematics and computer science are directly related to the content of other disciplines of primary education, in particular, with a foreign language. It forms "elementary communication skills in speaking, listening, reading and writing;

-develops speech abilities, attention, thinking, memory and imagination of the student." Computer science, on the one hand, uses the knowledge obtained.

- generalized methods of activity, skills in educational and cognitive and practical activities to use information technology tools (research, design, completing a small project assignment in a group, complex use of information activity tools);

- communication and information skills (working with e-mail, searching for information on the Internet, working with a program, screen interface, working with external devices and digital equipment connected to a computer);

- knowledge of the basics of healthy and safe use of a computer and information technology in studies and life (rules for safe work with complex equipment, hygiene of work at a computer, inclusion of preventive gymnastics in the culture of a healthy lifestyle).

In addition, compliance with the age characteristics of students was achieved through the development of the operational-activity component of textbooks, including tasks that develop research and project skills. In particular, the formation and development of skills is carried out:

- observe and describe objects;

- analyze data on objects (items, processes and phenomena);

- identify properties of objects;

- generalize the necessary data;
- formulate a problem;
- put forward and test a hypothesis;
- synthesize the acquired knowledge in the form of mathematical and information models;
- independently plan and forecast their practical

actions, etc.

- active use of information and communication technology tools to solve communication and cognitive tasks.

Course content (34 hours)

Information and computer (12 hours). Working with computer devices and software on a variety of subject material of the content of primary education. Information technology (e-mail and web browsing, working with catalogs and searching for information, presenting information in the form of presentations, photo, audio and video fragments, using a computer for calculations, managing computer laboratories, robots and performers, working with communications tools - e-mail, websites on the Internet).

Information and information processes (6 hours). Presentation of information, information coding, the concept of information objects, properties of objects, information processes of processing, searching, transmitting, collecting, storing information. Algorithms and performers (16 hours).

The concepts of a rule and a command, a plan and algorithm, types of algorithmic constructions, an executor, the language of executor commands, statements, logical connections NOT, AND, OR, checking a condition in a command, organizing a branching algorithm, a cycle, a software environment for controlling the executor of commands.

Curriculum in the educational system, a document defining the content and scope of knowledge, skills, and abilities that must be mastered in each academic discipline, as well as the content of sections and topics with their distribution by years of study. The curriculum is sometimes accompanied by an explanatory note, which reveals the objectives of teaching a given subject, the sequence of studying the material, the features of the methods and organizational forms of teaching, the connection with the teaching of other subjects, etc.

The main principles of constructing the curriculum: compliance of the content with modern achievements of science, technology and culture, the social goals of educating students and developing their creative abilities; continuity between the studied and previously studied materials; the relationship between academic subjects, reflecting the natural connections between the corresponding phenomena of the objective world.

The curriculum is a document created within the framework of the educational system that defines the content and quantity of knowledge, skills and abilities intended for mandatory acquisition in a particular academic discipline, their distribution by topics, sections and periods of study.

In addition to the full text, the curriculum may be accompanied by an explanatory note briefly disclosing the objectives of teaching a given subject, describing the sequence of studying the material, listing the most essential methods and organizational forms, establishing a connection with the teaching of other subjects.

Basic principles of constructing the curriculum:

• attention to modern achievements of science, technology and culture

• compliance with the social goals of educating students

• development of creative abilities of students

• continuity - from previously studied material to the current and subsequent;

• mutual connections between academic subjects corresponding to natural connections between the phenomena being studied.

The content of education determined by the curriculum is specified in textbooks, teaching aids and methodological guidelines.

Curricula can be standard, variable, working, school, author's, and individual. There are two ways of constructing a curriculum: concentric (when individual parts of the educational material are repeated at a constantly expanding and in-depth level) and linear (individual parts of the educational material form a continuous sequence of closely interconnected links, the content of knowledge is conveyed once in a certain logic).

Working curriculum is a curriculum developed on the basis of an approximate (standard) curriculum applicable to a specific educational institution, taking into account the national and regional component of the standard.

Working curricula are developed by educational institutions. The procedure for developing working curricula is established by regional education authorities, which are responsible for the implementation of the federal component of the standard.

Objective of the lesson:

- to consolidate the concepts: name and value of an object's property;

-to ensure the development of skills in analyzing objects, selecting bases and criteria for comparison, seriation, classification.

Computer program: "In the store". Textbook material: Tasks 13, 14, 15, 16. Homework: Task 16.

Lesson plan

1. Checking homework.

2. Reinforcing the concepts of "Name of an object's property", "value of an object's property",

"list".

3. Announcing the homework number.

4. Practical work on the topic of "making lists".

Lesson progress. Checking homework

At the beginning of the lesson, we discuss with the children how the homework has been completed. Children tell how they divided the objects into two groups, what lists of objects and their properties they made (see the commentary to task 12).

I ask: **Which three objects in the picture do not match the other five in their purpose?**

(Answer: three pencils do not match the five notebooks in their purpose.)

Who made the list of pencils?

How many items are on your list? (I address one of those who made the list of pencils.) (Answer: three.)

Read your list.

One of the students could name the pencils on the list as follows: short pencil, long pencil, medium pencil. This way of naming objects is also allowed.

Read the list of properties. The students complement each other.

Then the lists of notebooks and notebook properties are discussed. I mark those who named the largest number of properties or non-obvious properties. I ask the children which of the properties they named are of interest to them when buying notebooks or pencils. Reinforcing the concepts of "Object Property Name", "Object Property Value", "List"

Task 13.

There are three objects in the picture: a line segment, a watch strap, and a ruler. They all have a property called length.

a. Write down the value of the length property for each object.

b. Write down the names of the properties that all objects have except one.

a. Children measure the length of the objects in the picture using a ruler or compass and a ruler - just like they do in math lessons. The results of the measurements are the values of the "length" property for different objects. They should be written on the blue lines. Just like in math, you need to write down the named numbers.

b. The ruler and the watch strap are man-made objects. Both the ruler and the strap have properties with the names "material", "width", "strength", "color", "purpose", etc. The segment is a mathematical abstraction and does not have all these properties. Therefore, the listed properties can be given as an answer to the task.

Students give other properties that both the ruler and the watch strap have.

Task 14.

Distribute these words into three lists. Objects / Names of object properties / Value of the property color Students complete the task independently and then discuss the results.

The word "round" cannot be written into any list, since it is the value of the property "shape". I tell the children the homework number. Students complete practical work on the topic of "Making lists". The work is devoted to developing the skill of making lists. For this, the computer program "In the store" or Task 15 of the textbook is used. As part of the task, children prepare to perceive the topic of "Ordered lists".

Task 15.

Program "In the store".

In Computer Valley, Masha and Misha went into the "Computer World" store. Here is what they saw there.

a. Make two lists of input devices that Masha and Misha saw. In the first list, enter the input devices in alphabetical order, in the second - in ascending order of price. Input devices (sorted alphabetically) / Input devices (sorted in ascending order).

b. Assess the truth of the statements about the devices that Masha and Misha saw.

- The scanner is the most expensive input device.

- The keyboard is the cheapest input device.

c. Misha made a list of output devices based on the picture. How many elements were there?

a. If the task is done in the textbook, I discuss with the children what it means "in ascending order of device price":

This means first writing down the cheapest device, then the more expensive one. The most expensive device will be last on the list.

a. The result will be two lists consisting of the same elements, but written in different orders.

b. A new formulation is suggested for a task that is familiar in content. Previously, the student was asked to mark true statements with the letter I, and false ones with the letter L. Now the task sounds like this: "assess the truth of the statements." This is a different formulation of the same task. If the child does not understand this, I prompt him with a new formulation of the task

I prepare the children for the subsequent consideration of the property "truth" of the object "statement." The correct answer is:

I The scanner is the most expensive input device.

L The keyboard is the cheapest input device.

After the students have completed the task, I ask them what they used as a source of information when determining the truth of the statement - a picture or a list. If a list, then which of the two. To determine the most expensive and the cheapest device in the store, the students use a list in which these devices are sorted by increasing price.

Homework

Task 16.

Read an excerpt from M. M. Prishvin's story "Guests".

a. Write down the list of guests in the order they appeared.

b. Check the picture to see if you have listed all the guests. Add to the list if necessary.

c. Who arrived no later than the kite? Mark with a tick. Who arrived no earlier than the kite. Mark with an asterisk.

a. The task is done in a notebook in a box. List the guests in the order they appeared:

Guests

1. Wagtail

2. Crane

3. Kite

4. Marsh Harrier

5. Crows

b. Students compare their list with the picture. If there are fewer items on the list than the birds drawn, add the missing item to the right place on the list.

c. The wagtail and crane arrived no later than the kite. Not before the kite arrived the marsh harrier and the crow. By doing this item, children can notice how convenient the list is with the appropriate way of ordering.

Structure and progress of the lesson:

I. Introduction: organizational moment, updating previously acquired knowledge, setting lesson goals.

1.1. Organizational part.

Greeting. The teacher checks the students' readiness for the lesson. On the tables are:

-a notebook, a pen, a pencil, a ruler, an eraser. The interactive board displays a number, the topic of the lesson.

1.2. Updating background knowledge

- In the last lesson we got acquainted with such concepts as "object" and "name of the object", let's review the material already studied earlier. So, answer the questions:

-what common word can be used to call lightning, a computer, an apple, a cat?

2) Object

- what does the word "object" mean? (An object is a common name for any object, living creature, phenomenon, process, event, if we paid attention to it)

- what three names can an object have? (general, specific and proper)

-think about whether two different objects can have one name? (yes, for example: a ballpoint pen and a door handle, a key to a lock, a wrench)

-can one object have several names? (yes, for example a person-doctorwoman)

1.3. Setting the objectives of the lesson. Motivating students' learning activities.

- Today we will continue talking about objects. The topic of our lesson is "Object and its properties" (slide 7). Let's try to formulate the goal of our lesson together.

What should you understand today? and what should you learn? (student versions.)

- So, the main goal of the lesson: to understand what the properties of an object are, to learn to determine the properties of objects.

II. Working on the topic.

2.1. Immersion in the topic.

- Today I suggest that you not only gain new knowledge, but also build a house.

8). Here is a picture of a fence, near which we will build a house, which we will call…. But how? Let's think about this together a little later. It will grow thanks to the knowledge that you will receive during the lesson.

2.2. Primary assimilation of new knowledge

-We already know that each object has a name.

- What do you think we call the name of an object? (students' answers)

-We need to know the name of an object, first of all, in order to describe its properties. - Look at the object and say the name of this object. (This is a bus)

-Describe it according to the plan. (Students take turns going to the board and writing. The rest write in their workbooks).

- So, let's draw a conclusion:

-What do the properties of an object indicate? (The properties of an object indicate size, shape, color, purpose, elemental composition, material, actions).

-Properties can be qualitative and quantitative. Read these definitions, remember and retell them to each other. (Read and remember definitions, say them out loud to each other) Properties that are qualitative are taste, color, smell, size, i.e. its appearance and taste. Quantitative properties are height, length, width, weight, i.e. these properties can be expressed as numerical data.

- Let's do a little research. But for this, look at a fragment of a fairy tale.

- What is the name of this fairy tale? (This is the fairy tale "Tom Thumb", who appeared from a cabbage stalk, and he was as tall as a finger).

- In front of you is a table. You need to fill it in: write the name of the object, define its qualitative and quantitative properties.

(Students write down: name (Tom Thumb), qualitative properties (small, cheerful, kind)).

- To determine the boy's height, I suggest you measure your index finger with a ruler. The length of your finger will be the boy's height. Also indicate your weight, but convert it into grams.

- So, let's draw a conclusion: how can you describe the properties of objects? (in numbers and words).

- Let's get back to building our house (slide 8). What properties of objects have we already identified? (qualitative and quantitative). Click on the numbers 1 and 2 - the wall and roof of our house are ready.

- Let's build further.

- You are probably all familiar with the fairy tale "The Three Little Pigs". What is this fairy tale about? (About three little pigs who built houses for themselves, and their names were Nif-Nif, Nuf-Nuf and Naf-Naf.)

- Look at a fragment of this fairy tale.

- In front of you are three houses that were built by funny little pigs. Are these houses the same? (no)

- Name the main difference that you see? (They are built from different materials - straw, wood, brick)

- What do these houses have in common? (Purpose: for housing, elemental composition: windows, doors, pipe).

- Having looked at these pictures, draw a conclusion, what are the properties of objects? (the properties of objects can be common and distinctive).

- What do you think is missing in our house? (slide 8) (they express their assumptions). We press the next two numbers and windows will appear in our house.

-Properties can be essential and unessential.

We will consider an essential property to be the property of an object that is important for a person to make a decision. The remaining properties are unessential.

- What do you think will be the most important property when building a house? (the material from which the house will be built).

-Nif-Nif and Nuf-Nuf did not take this into account, so the wolf destroyed their houses so quickly.

- Let's finish building our house (slide 8). We just need to make a pipe and a door. And our house is ready. What should we call our house? (students offer their options).

- We built our house based on the knowledge we gained. Let's call it the House of Knowledge (number 7 is pressed). Do you think the evil wolf will defeat our house? (students' answers). You worked hard today, you remembered all the properties of objects well. And if you keep all your knowledge, then the house of your knowledge will stand firmly on Earth and the wolf will not be afraid of it, because in knowledge there is power.

2.2. Physical education minute.

-And now we will rest a little. (The children stand up and do exercises).

III. Consolidation of the studied material

3.1. Primary check of understanding.

3.2. Independent work in workbook No. 2

- Open the workbooks on page 8. Independently complete exercises No. 10, 12

IV. Lesson summary. Reflection. Information about homework

4.1. Final survey of students.

- And now I suggest going back to the beginning of the lesson. Remember what goal you set for yourself? Have you achieved it? (students' answers)

I think that the topic of today's lesson was quite easy and understandable, in order to find out if you understood everything, answer a few questions:

- What do the properties of an object indicate?

- What do the general and distinctive properties of objects mean?

- Which property will we consider an essential property of an object?

4.2. Reflection of activity

- In front of you on the table is the "Ladder of Success". Put a tick:

1. On the bottom step - if you did not succeed;

2. On the middle step - if you had problems;

3. On the top step - you succeeded.

4.3. Recording homework. Explanation of its implementation. Setting grades.

- This concludes our lesson. Thank you for your attention. Until next time.

Symmetry

Lesson Topic: "What is Symmetry? How to Get Symmetrical Parts?"

Product (Object of Labor): Composition of Symmetrical Parts.

Lesson Objective: - teach how to mark and cut out symmetrical parts (birch leaves) from paper, and make a composition out of them.

Objectives:

Educational:

1) introduce the concept of "symmetry"; expand children's knowledge of the types of applique and methods of doing it;

2) consolidate the skills of organizing a workplace, analyzing the design of a product, planning work, and doing work according to a plan;

3) consolidate the skills of performing technological operations: marking parts using templates; cutting out parts from paper along a curvilinear contour; gluing small paper parts onto cardboard;

Developing: promote the development of logical, imaginative, and artistic thinking; oral speech, fine motor skills, spatial imagination, eye.

Educational: to promote the development of a general work culture (compliance with the rules of safe work with tools and sanitary hygiene rules); technological culture (competent performance of work operations, rational use of time, economical use of materials, accuracy in work); artistic and aesthetic taste, creative activity, perseverance, hard work.

Lesson type: a lesson on discovering new knowledge.

Technologies: health saving, developmental learning, information and communication, development of research skills, creativity, stage-by-stage formation of mental actions.

Problems to be solved: "**how to get symmetrical parts?"**

Activities: developing students' construction skills, implementing new knowledge (concepts, methods of action, etc.): independently organize a workplace;

- collectively examine the drawings (textbook, page 26), name symmetrical images; work in pairs strong-weak: discuss the presented examples of traditional art in the technique of symmetrical cutting (textbook, page 27);
- solve design and technological problems by performing trial exercises: checking the symmetry of parts by folding; collectively read and discuss the master's advice; work in pairs strong-weak:
- examine the design of the product; make a plan for the upcoming work; with the help of the teacher make the product based on the drawings and plan;
- observe the rules for safe work with scissors; name the new things that have been mastered; make a statement - commentary on the work of classmates;
- with the help of the teacher, evaluate the result of their activities (quality of the product: accuracy of marking and cutting out the parts, neatness of gluing, overall aesthetics, originality).

Expected results

Subject: learn to compose a composition from symmetrical parts.

Meta-subject universal learning activities

Cognitive: perform educational and cognitive actions; analyze the product according to the specified criteria; observe the connections of man with nature and the objective world.

Communicative: participate in a collective discussion of problems; convey your position to others, giving arguments; listen to others.

Regulatory: act according to plan; control the process and results of activity, make necessary adjustments; perceive the assessment of your work, given by the teacher and classmates.

Personal UUD: developing the ability to express a positive attitude to the process of cognition: show attention, surprise, desire to learn more; developing the need for creative activity and implementation of one's own plans; using fantasy, imagination when performing educational activities.

Equipment (resources)

For the teacher: sample, textbook, presentation.

For students: textbook, workbook (a template is taken from it), cardboard, white paper, scissors, PVA glue, glue brush, simple pencil. Additional

equipment: backing sheet, hand cloth.

Preparation for the technology lesson is carried out during the break.

Lesson progress:

11. Organizational moment

Hello. Sit down. My name is Anastasia Valentinovna, today I will give you a lesson in labor technology.

2. Introductory conversation:

-Guys, who among you knows what traveling is? (studying different countries and cities; when traveling to different territories)

-Do you like traveling? Which countries have you visited? (Russia, Egypt, Turkey, France, Italy, China, etc.)

-**Wonderful**. Then you already know a lot about different countries and have managed to get a little acquainted with their traditions, customs and language.

-You know, I haven't traveled for a very long time, and today I want to invite you on an extraordinary journey to a country that is not on the map. Beauty, order, and balance reign there. And to find out the name of this country, answer my question.

- Tell me, about what object or figure can it be said that if you fold it in half, the halves will match? What are such objects or figures called? (Such figures or objects are called symmetrical)

-Well done, guys! So, what is the name of the country we will visit? ("Symmetry")

-Symmetry in translation from Greek means "proportionality, sameness in the arrangement of parts."

- Look at the poem that the inhabitants of this country are reading:

Symmetry! I sing a hymn to you!

I recognize you everywhere in the world.

You are in the Eiffel Tower, in a small midge, You are in a Christmas tree that is by a forest path

With you in friendship both a tulip and a rose

And a snow swarm, the creation of frost.

-Did you like the poem? (Yes) And do you know who the most important guest in this country is?

You will find out about this if you only guess the riddle:

A flower was sleeping and suddenly woke up -

He didn’t want to sleep anymore.

He stirred, perked up,

Soared up and flew away... (Butterfly)

- Why do you think the butterfly is the most important guest in this country? (If a butterfly folds its wings, the patterns on them will match, i.e. the butterfly's wings are symmetrical.)

- Let's look at the objects presented here. They can be divided into two groups.

In the first group, let there be objects in which the right half is a reflection of the left, in the second - those objects or pattern that do not have this property.

- What are the objects or patterns from the first group called? That's right, we say that these objects or patterns are symmetrical.

Compositions created by masters can also be symmetrical or asymmetrical. Look, for example, in the textbook on page 27 for examples of the traditional art of symmetrical cutting of different peoples. Each symmetrical object has an axis of symmetry - an imaginary fold line in symmetrical images.

- Guys, the Axis of Symmetry has prepared a small exercise for you. Let's do it.

1. Take a square blank.

Make one axis of symmetry on the square. What technological method will help you?

Is it possible to make another axis of symmetry? Two more axes?

2. Take a round blank. Try to determine how many axes of symmetry a circle has?

Symmetrical parts can be cut out using their property.

3. The main part of the lesson.

- Guys, do you like receiving gifts? The Symmetry Axis also likes to receive them.

Let's make her gifts with our own hands!

What do you think, what gift can we make her? (A composition of symmetrical parts)

A) Analysis of the product.

- What is depicted in the composition? (Gingerbread man, grass, fir trees)

- What materials is the composition made of? (From colored paper, cardboard.)

- How are the Gingerbread man, fir trees, grass made? (First, fold the sheet in half, accordion-style, then draw half of the object and cut it out)

— What paper is not suitable for making symmetrical objects and why?

(Thick, since it is difficult to bend and fold into an accordion.) Now we will work with scissors, so let's review the safety precautions. Rules for working with scissors.

1. Hold the scissors correctly when working.

2. Cut with the middle part of the blade of the scissors.

3. Do not leave the scissors open.

4. Pass the scissors closed with the rings forward.

5. Do not work with scissors with a loose fastening.

6. Work only at your workplace.

After we cut out the parts, we will need PVA glue to glue them to the base - cardboard. Let's remember the rules for working with glue.

Rules for working with glue.

1. Work on a backing sheet, oilcloth.

2. Take glue on the tip of the brush.

3. Use a brush stand.

4. Apply glue from the center to the edge, the brush should easily slide off the edge of the sheet.

5. Evenly distribute the glue over the entire surface in a thin layer.

6. Remove excess glue, if any, with a rag.

7. After finishing work, wash and dry the brush, close the glue.

B) Making the product under the guidance of the teacher.

Work order

1. Making a part of the bun. Take a square blank and bend it in half. Draw half of the bun on it so that after cutting out you get a whole bun. What should you remember to avoid making a mistake? How can you make eyes for the bun?

2. Making parts of the Christmas trees. Mark the fold lines. Fold a strip of paper in half or like an accordion. Draw half a Christmas tree on it. Cut out the Christmas tree. Then unfold the blank

Consider how to draw half a Christmas tree on a sheet of paper folded like an accordion: from the fold or from the edges of the sheet.

Make grass in the same way. Make a composition from the obtained parts.

Independent activity of students.

4. Lesson summary. Evaluation of works. (Exhibition of works. Discussion of finished works.

It is necessary to note the quality of the composition, assembly of the product, highlight the most accurate, compositionally interesting ones.)

- What is symmetry? (Symmetry in translation from Greek means "proportionality, sameness in the arrangement of parts")

- What is the axis of symmetry? (imaginary fold line in symmetrical images)

– What craft did you make today? (We made a composition of symmetrical details)

– What material is it made of? (Cardboard and colored paper)

– What technique is used to make the work? (applique)

– Did you like the lesson?

Cleaning up work places

Students clean up trash, put objects on their desks in their places. The lesson is over. Lesson outline on the topic of grouping objects

Grade 2

Corrective lesson

Topic: Grouping objects by given characteristics

Objectives: - to develop the ability to group objects by given characteristics, to recognize an object by a system of characteristics;

- to develop the ability to exercise self-control based on the result of completing a task

Organization of computer training in primary school. School computer room

Informatization of society and education acts as a meansof intensifying the learning process, improving its forms and methods, and transitioning tonew learning technologies aimed at mastering the ability to independently acquire new knowledge. In connection with the implementation of state programs of computerization of rural (2001) and urban and town general educational institutions (2002), almost all schools in the country are equipped with computer equipment.

As a rule, computer equipment is used in the computer study room. In this regard, the computer science room, in which classes should be held both in computer science and information technology, and, obviously, in other school subjects, is of particular importance. Undoubtedly, under certain conditions, the computer science room can also become a center for extracurricular and out-of-school work, professional training, and, finally, a means of financial support for the school and the computer science teacher. Organizational and methodological conditions for the functioning of the computer science room.

The computer science room is an educational and upbringing unit of a modern educational institution, equipped with a set of educational computing equipment (KUVT), educational and visual aids, educational equipment, furniture, office equipment and devices for conducting theoretical and practical, class, extracurricular and elective classes in computer science and other general education subjects using information technologies. The computer science room can also be used to organize socially useful and productive work of students, automate the processes of information and methodological support of the educational institution and organizational management of the educational process.

Under certain conditions, the computer science room can also become a center of extracurricular and out-of-school work, professional training. The computer science room is designed to solve the following tasks: - developing students' knowledge about the structure, functioning and areas of application of modern computing technology; skills and abilities in solving problems using computers, using modern computer software and working with information resources; - familiarizing students with the use of computing technology in production, in design organizations, scientific institutions, the educational process and management; - improving teaching methods and organizing the educational process in an educational institution.

The computer science room can conduct: - classes in computer science and other academic subjects using new information technologies (NIT); - students creating application programs based on assignments from teachers and school management to meet the needs of the school and basic enterprises; - extracurricular and elective classes using NIT. Computer Science Room An important prerequisite for successful learning in the computer science room is the creation of special conditions for the educational process, which include a set of interrelated components:

a) material (the room in which classes are held; workplaces of the teacher and students; educational and visual aids and educational equipment; technical teaching aids);

b) hygienic (sanitary conditions; temperature, light and air conditions);

c) aesthetic (room design);

d) ergonomic;

d) safety. In our opinion, this set of conditions should be

supplemented by:

e) organizational and methodological (organization of work in the room, number of computers and educational subgroups, types of information tools used, etc.).

In general, the room should provide a psychologically, hygienically and ergonomically comfortable environment, organized in order to maximize the successful teaching, mental development and formation of the information culture of students, their acquisition of solid knowledge, skills and abilities in computer science and the basics of science while fully meeting the requirements for the protection of health and safety of the teacher and students.

Provided that the computer science room works effectively in accordance with modern requirements, the following results can be expected:

-the transition of the school education system to a new, higher quality level;

-intensification of the educational process; widespread use of new technologies in education; more effective management of the school educational process; participation in telecommunication educational projects;

-generalization and replication of the pedagogical experience of school teachers; creation of a mechanism for preparing didactic and methodological materials ordered by teachers;

- formation of an information culture among students and teachers.

Organization of work in the computer science room

The development of informatization leads to the fact that in a number of schools there are 2 or more computer science rooms. The introduction of computer science in elementary grades requires the creation of a separate computer science room, since this age group of students requires a special solution to aesthetic, ergonomic, hygienic and psychological-pedagogical problems.

By letter of the Ministry of Education of the Russian Federation No. 01-51-088 IN dated 13.08.02, state and municipal education authorities are recommended to "consider the issue of introducing into the staffing schedule of general education institutions the position of deputy director for informatization of the educational process in order to coordinate work related to the use of information and communication resources in general education institutions."

In a number of schools, such a position has already been introduced. It is the deputy director for computerization of the educational process who organizes and coordinates the work of several rooms, media library, etc., ensures the introduction of information and communication technologies into the educational, educational-methodological and organizational-administrative activities of the school.

Effective use of computer technology in education is possible only with the availability of an integrated set of equipment, software, methodological General methodology of teaching computer science support, documentation, organizational measures for the introduction, support and repair of computer technology, and teacher training.

The computer science room is equipped with material resources in accordance with the "List of computer technology, educational equipment, basic and application software for computer science rooms, classes with VDT or PC in educational institutions of the general secondary education system", as well as other material resources.

The computer science room must ensure information interaction between students and technical means of storing and processing information, between students and the teacher, necessary for the implementation of the educational process. To solve these problems, it is necessary to fulfill a number of organizational and methodological conditions.

The organizational and methodological work of the computer science room is headed by the head of the room from among the computer science teachers, who is appointed by the order of the school principal and is the organizer of the equipment of the room, the work of teachers and students on the use of computer technology and information technology in the process of teaching the computer science course and individual topics of other general education subjects.

Under his leadership, a long-term plan for the development of the room (equipment and additional equipment) is drawn up, the work is distributed between the teachers and students. The plans are approved by the school principal.

The most important form of organizational and methodological work carried out by the deputy director for informatization of the educational process, the head of the office or teachers, should be an educational and methodological seminar, in which it is necessary to involve not only teachers of computer science, but also teachers of other general disciplines.

This seminar could take on the solution of such tasks as dissemination of experience, familiarization with new software for educational purposes, training teachers in the basics of working on a personal computer, developing the main directions of circle work with students, etc. Obviously, the organizational forms of the seminar can be very diverse and will probably change as the information culture of teachers grows.

The head of the office is responsible for the safety of the equipment, keeping the inventory log, maintaining the operability of the equipment, timeliness and thoroughness of preventive maintenance of computing equipment, its correct use, registration of refusals

The head of the room is responsible in accordance with the current labor legislation for accidents that occur with students during the educational process as a result of violation of labor protection standards and rules. The head of the room is in charge of disks with software, general-purpose instructions, subject-matter literature, consumables, etc.

The activities of the head of the room cover a wide range of responsibilities. Assistance in his work is provided by the computer science room laboratory assistant (technician). The laboratory assistant is directly subordinate to the head of the room and reports to him for the safety, proper storage and use of educational equipment.

The laboratory assistant is required to know the entire system of the room, the rules for its maintenance, the storage conditions for equipment, software and visual aids. In accordance with the long-term plan for the development of the room, under the supervision of the head of the laboratory, the laboratory assistant participates in the purchase and delivery of equipment, maintains records, and keeps inventory records.

According to the plan of the teacher and under his supervision, the laboratory assistant prepares equipment for the lesson;

-helps ensure that students comply with safety regulations; ensures the constant readiness of fire-fighting equipment and first aid equipment. The laboratory assistant can register the start and end time of each lesson in the log, register equipment failures during lessons. Under the supervision of the head of the room, the laboratory assistant carries out minor repairs to failed equipment.

Teachers working in the computer science room must strictly monitor students' compliance with safety requirements and work rules in the room and note at each lesson in the personal computer use logs the start and end time of work, the state of the workplace, and machine failures. When introducing students to the room, the teacher must:

-distribute students and assign them to workstations taking into account their height, vision, and hearing; familiarize with the safety rules and work in the classroom (Appendix 10). The teacher conducting the lesson must have disks (write-protected floppy disks) with spare copies (distributions) of the software used in the lesson. System disks and floppy disks must be protected from changes or accidental erasure. In the event of equipment failure or power outage, the teacher must have a "homework" - a work plan for continuing the lesson: independent work, role-playing game, etc. prepared in advance by the teacher. It is important to maintain the students' interest in the subject, or at least attention, despite the circumstances.

Students must pass a test on safety precautions and work rules in the classroom, which is noted in the "Registration Log of Introductory and Periodic Safety Briefings", which indicates the date of the briefings and tests, the names and initials of the teachers who conducted the briefing and accepted the test, the names and initials of the students who passed the test, and the content of the briefing. The safety briefing is conducted by the teacher leading the class.

The log is signed by the person who conducted the briefing and the students. Students must be responsible for the condition of the workplace and the equipment located on it. In the event of a violation of the work rules by one of the students, the attention of the entire class should be drawn, even if this is an accidental violation. A number of schools have experience using changeable shoes in the classroom, covering the personal computer after finishing work, and having students work in lab coats.

In addition to the obvious requirements for maintaining hygiene and preserving the equipment, this creates in students an appropriate attitude both to the classroom and to the lessons in general. It would be good if students wash and dry their hands before working with the keyboard.

To prepare and finish the lesson, a person on duty can be brought in to help the teacher. He can be entrusted with simple actions to turn on and off students' workstations, send programs over the local network. General methods of teaching computer science 123 The computer science room can be a school one (serving one school) or an interschool one (serving students from several schools).

The optimal number of workstations for students (RMU) is from 9 to 15, depending on the class size. Considering the real situation in the field education, opinions are expressed about the need to develop training technologies on the basis of one or four or five computers in the computer science room.

For computer science classes, classes are usually divided into two subgroups. In turn, when conducting practical classes in the computer science room, it is recommended to organize individual, group and collective work. At the same time, only one student can work on the RMU (the requirements of San PiN prohibit the use of one PC by two or more students).

For students in grades X-XI, before the fifth lesson, and for students in grades VIII-IX - before the fourth lesson, it is advisable to arrange a break lasting 50-60 minutes for lunch and rest for students. During industrial training of senior students using a personal computer, it is necessary to allocate 50% of the time to theoretical and practical classes.

The operating mode must meet the requirements with mandatory preventive measures. At the same time, the total time of industrial practice using a personal computer for students over 16 years old is up to 3 hours, and for students under 16 - up to 2 hours. Optional and club work using a personal computer for senior students should be carried out no earlier than 1 hour after the end of classes and no more than twice a week; no more than 60 minutes in duration for students in grades II-V and 90 minutes for students in grades VI-XI.

Computer games with an imposed rhythm are allowed at the end of club classes for up to 10 minutes for students in grades II-V and up to 15 minutes for older students. The club schedule must comply with the requirements set out for school classes.

To prevent general fatigue of students, between computer science lessons it is necessary to conduct physical education breaks and physical exercises, including general exercises that improve the functional state of the nervous, cardiovascular, respiratory systems, as well as cerebral circulation and eliminate congestion in the lower half of the body and legs, relieving fatigue from the muscles of the shoulder girdle, arms, trunk and legs (Appendix 12).

Document defines the hygienic requirements for the lesson schedule. It is established that that the biorhythmological optimum of mental performance in school-age children falls within the interval of 10-12 hours. During these hours, the greatest efficiency in assimilation of material with the least psychophysiological expenditure of the body is observed.

The mental performance of students is also not the same on different days of the school week. Its level increases towards the middle of the week and remains low at the beginning (Monday) and at the end (Friday) of the week.

Therefore, in the lesson schedule for students of the 1st stage, the main subjects should be taught in 2-3 lessons, and for students of the 2nd and 3rd stages - in 2, 3, 4 lessons. The distribution of the academic load during the week should be structured in such a way that its greatest volume falls on Tuesday and (or) Wednesday.

On these days, the lesson schedule includes either the most difficult subjects, or subjects of average and easy difficulty, but in greater quantities than on other days of the week1 .

Teaching computer science should be carried out in a specially equipped classroom - a computer room (CBL), equipped with a set of educational computers and which is also called a computer lab. A computer room or a set of educational computer equipment (KUVT) is understood as a set of student workstations, a teacher's workstation and peripheral devices connected to each other by a local area network for the joint use of data, hardware, programs and data exchange tools.

It is installed in a computer room (CBL), otherwise called a computer room, and is intended to be used for teaching students. The number of computers in the computer room should be equal to half the number of students in the class. For a maximum class size of 35 people, the required number of computers is 18, plus the teacher's computer - a total of 19 machines.

However, according to the methodological recommendations of the Institute of Informatization of Education of the Russian Academy of Education the number of student workstations can be 9, 12 or 15, depending on the class capacity. At the same time, the educational standard allows for dividing a class in computer science lessons only into two subgroups, and this can be 17 or 18 students for a class with a capacity of 35 people. There is an obvious contradiction, which teachers resolve by seating two children at one computer.

According to sanitary standards, each computer is supposed to have an area in the classroom of at least 6 square meters, which for

15 machines is 90 square meters, and for 19 machines - 114 square meters. There are no such classrooms in standard design schools. Standard premises for classes and offices are provided with an area of no more than 70 square meters - for such

Area standards allow for only 11 computers. The way out of the contradiction may be to reduce the number of working computers and divide the class into two or three subgroups.

The rapid pace of development of computer technology makes the moral obsolescence of the computer park of the computer room at school very fast. But economic reasons make it practically impossible to update it even once every 5 years. That is why many devices are currently working in schools

The debate about what kind of equipment to equip classrooms with - white, yellow and red computers is of little relevance. White computers are noticeably more expensive and in our country they are supplied only to large corporations and the railway. Yellow computers are much cheaper and are the majority. But the best option in terms of price-quality ratio is to purchase red computers. Such computers are now assembled not only in

Moscow, but also in a number of regions, so it makes sense to order them locally. Computers in the classroom must be connected to a local network using a hub or router. In such a classroom, one computer is the main one - the teacher's (lecturer's) workstation with a network printer connected to it, access to which the teacher can easily regulate by setting up the network. Access to the modem, scanner and other peripherals is also carried out from the main computer or, with the teacher's permission, through a local area network.

The local area network itself is usually organized according to one of two schemes - ring or star (radial). In a ring scheme, each computer is connected by a communication line to two nearest neighboring computers, and the information itself is transmitted over a closed ring channel. In a star scheme, all student computers are connected to the main teacher's computer through a hub with separate communication lines.

The star scheme should be preferred due to the convenience of connecting or disconnecting individual computers from the network and faster communication with them.

Recently, the cost of ordinary laptops has become equal to the cost of desktop personal computers, so it is becoming reasonable to equip computer classes with them.

In this case, we can have the following advantages:

• the laptop takes up noticeably less space on the table;

• its screen does not emit X-rays;

• the keyboard is smaller and more suitable for the hands of younger students (if necessary, a second keyboard of a regular size can be easily connected to the laptop);

• the laptop can be easily moved to another room.

It should be noted that in some US schools, several years ago, all schoolchildren began to be given laptops for permanent use, on the hard drives of which all the necessary textbooks and manuals, reference materials are placed. At the beginning of the school year, new textbooks are "downloaded" into these laptops, which provides significant savings due to the refusal to purchase their sets for the entire school.

Leading computer manufacturers have recently announced a program for the production of laptops for primary education of children, the selling price of which will not exceed 100 dollars. Some models of them are equipped with an autonomous power supply based on a hand-operated generator and a battery.

Computer Science Room and Organization of Its Work

The Computer Science Room (CSW) or IT room is an educational unit of a secondary school equipped with a set of educational computer science (ECS), educational visual aids and other educational equipment for conducting theoretical, practical, classroom, extracurricular and elective classes in computer science and ICT. It is also intended for teaching other subjects, work training, organizing socially useful and productive work of students using information and communication technologies, for the effective management of the educational process.

The room can be used to organize computer clubs and other forms of extracurricular work in computer science at school. In addition to computers, a local network and peripheral equipment, the room should have the following equipment:

• a set of educational programs for studying computer science and individual sections of other subjects;

• a set of educational, methodological, popular science corrective literature;

• stands for placing documentation and demonstration tables;

• a journal of introductory and periodic briefings of students on safety;

• a journal of computer use at each workplace;

• a journal of information about computer failures and their repair;

• a first aid kit;

• fire extinguishing equipment;

• an inventory book of equipment installed in the room;

• plans for the work of the room and additional equipment with computing equipment;

• a set of power supply and protective grounding.

In accordance with SanPiN, the computer science room must have a laboratory room of at least 18 square meters with two exits: into the classroom and onto the landing or into the recreation area. The laboratory room should have a work table, a radio editing table with local air extraction, shelves, cabinets, and a cabinet for instruments.

The placement of computers in the classroom is not an easy task. Of all the possible layouts, two are of practical interest - in a row and along the perimeter of the classroom. Each of them has its own advantages and disadvantages. The teacher's workstation (TWS) with a computer, printer, scanner and network equipment is located behind the students' workstations (SWS). The second teacher's desk is located at the front wall of the classroom, on which the blackboard is also hung.

The second auxiliary board is placed on the wall behind the TWS. It is recommended to use magnetic boards with white plastic surfaces, on which they write with special colored markers, and erase the writing with an ordinary woolen or velveteen pad.

This eliminates the need for chalk and chalk dust, which, getting inside computers, leads to their premature failure. The arrangement of computers in two rows allows the teacher to easily monitor the work of each student from his RMP not only via the local network, but also by visually observing the image on the screen of each computer.

While at the RMP, the teacher can, without distracting the students, do the work he needs, conduct an individual survey of students, etc. When explaining new material, the teacher sits in front of the board, and the students can be at their workstations or move to two-seater tables in the center of the room when the use of computers is not required.

The presence of tables in the center of the room allows for a more rational organization of the work of the room and students during classes. A feature of children's educational activity is that when they are at a switched-on computer, they are very inattentive to the teacher's explanations and are often distracted.

Therefore, in the case of studying theoretical material under the guidance of a teacher, students sit at desks without computers in the center of the room, and after an explanation and assignment, they move to the RMU. With this arrangement of computers, the light from the windows falls on the work desks from the left, as recommended by SanPiN.

The disadvantage of a two-row arrangement is that in this case it is difficult to ensure the required distance of 2 meters between the desks (in the direction of the rear surface of one video monitor and the screen of the other video monitor). However, when using flat monitors, this distance is easier to maintain.

In this case, the computers are located along two walls of the room. On the specified plan, the required area for a computer class should be 84 square meters, on which accommodates 12 RMUs, one RMP, 9 two-seater student desks in the center, two cabinets, an electrical panel and a washbasin. The distance between the side surfaces of the computers is the required 1.2 meters. If the classroom is square, it is recommended to place the RMUs along the perimeter along three walls.

The advantage of this RMU placement scheme is a more rational use of the room area and the least influence of harmful factors caused by the operation of cathode-ray monitors of neighboring computers.

The disadvantage of this scheme is that students sitting at monitors near the window wall are facing the windows, and glare from the windows forms on the surface of the monitor screens near the opposite wall. Therefore, when placing computers along the perimeter of the walls of the room, work must be carried out with the windows permanently curtained and artificial lighting. In addition, the teacher cannot see the image on the screens of the computer monitors located near the side walls and he has to either monitor the students' work via the local network or walk around the classroom all the time.

The teacher's desk and RMP should be located on the podium. A stand for an overhead projector can be placed nearby. The orientation of the windows of the room should be mainly to the north or northeast. Such arrangement of workstations when the main light flow from the windows is directed in front or behind the students is not allowed.

In the computer science room, grounding connected to the common grounding circuit of the entire building is mandatory. Electric power cables, communication lines of the local network must be mounted in metal sleeves or plastic tubes. Tables with computers must be equipped in accordance with safety requirements and fixedly fastened to the floor. All computers must be grounded through a power outlet.

The computers must be powered from a special electrical panel or a set of electrical equipment for the KUVT, equipped with a residual current device. The residual current device must ensure that the supply voltage from the RMU and RMP is disconnected in the event of leakage currents to ground in excess of 10 mA, as well as in the event of overloads and short circuits. The power panel must also have an emergency manual shutdown.

Installation of the office, power panels, electrical outlets, wiring of power cables, grounding, fire alarm systems in accordance with the rules and regulations must be carried out by specialized organizations that have licenses for these types of work.

Commissioning of the computer science room is carried out after permission from the sanitary and epidemiological supervision centers.

Powder and carbon dioxide fire extinguishers may be used as fire extinguishing agents, which allow you to eliminate the fire of hardware under electrical voltage. In terms of minimizing damage to equipment, preference should be given to the use of carbon dioxide fire extinguishers. There must be at least two fire extinguishers in the office.

The office must be organized as a psychologically, hygienically and ergonomically comfortable environment that contributes to the optimal organization of the educational process, mental development and education of students, their acquisition of solid knowledge, skills and abilities in computer science while fully meeting the requirements for the health and safety of the teacher and students.

To manage the work of the KVT, a head of the room from among the computer science teachers is appointed by order of the school director. The head of the room is the organizer of the work of the room and its equipment, the work of teachers and students. He ensures the use of the room in accordance with the school curriculum, develops a long-term plan for equipping the room, takes measures to equip it and replenish it with educational visual aids and technical teaching aids. He is also responsible for the safety of equipment and computing equipment, for keeping an inventory log, for maintaining the equipment in constant readiness for use, timely and thorough preventive maintenance of computing equipment, registration of failures and organization of repairs, for maintaining sanitary and hygienic requirements and safety requirements in the room.

The head of the room takes part in planning the KVT load with educational, club, elective and other classes with students. All types of classes in the KVT are conducted with the obligatory presence of a teacher. An important area of the KVT work is the educational and methodological seminar on the issues of teaching computer science and the use of computer technology and the room by teachers of other disciplines, to disseminate the experience of using information technology in the school educational process.

In cases where subject teachers have not fully mastered computer technology, it is assumed that the joint work of two teachers (computer science and subject teacher) will be financed when conducting classes in academic subjects using information technology. A laboratory assistant or technician is assigned to assist the head of the KVT.

The standard school staffing schedule (appendix to order No. 373 of the Ministry of Education of the Russian Federation dated September 2, 1996) provides for the following positions in the presence of an equipped computer science room: in rooms with 20 sets of working computers - 1 laboratory assistant position, 21-30 sets - 1 technician position, over 30 sets - 1 specialist (engineer) position and 1 laboratory assistant position.

The laboratory assistant (technician) is directly subordinate to the head of the room and reports to him for the safety, proper storage and use of educational equipment. The laboratory assistant is required to know the entire system of software and hardware of the KUVT, the rules for its care, the conditions for storing equipment and visual aids.

In accordance with the long-term plan for the development of the KVT, the laboratory assistant participates in the acquisition of the necessary equipment, maintains records and inventory lists. According to the teacher's plan and under his supervision, the laboratory assistant prepares equipment for the lesson.

He ensures that students comply with safety regulations, the constant readiness of fire-fighting equipment and first aid equipment, records equipment failures, and carries out minor repairs to failed equipment.

When using the equipment, be careful of:

- electric shock;

- mechanical damage, injuries.

Safety requirements before starting work:

1. It is forbidden to enter the classroom in outerwear, hats, with bulky

objects and food

2. It is forbidden to enter the computer science classroom in dirty shoes without shoe covers or without change of shoes

3. It is forbidden to make noise, talk loudly and distract other students

4. It is forbidden to run and jump, move around the classroom without permission

5. Before the start of classes, all personal mobile devices of students (phone, player, etc.) must be turned off

6. It is allowed to work only on the computer that is allocated for the lesson

7. Before starting work, the student is obliged to inspect the workplace and his computer for the absence of visible damage to the equipment

8. It is prohibited to turn off or on the equipment without the teacher's permission

9. The voltage in the classroom network is turned on and off only by the teacher

Safety requirements during work:

1. Handle the equipment with care: do not knock on the monitors, do not knock the mouse on the

table, do not knock on the keyboard keys

2. If any malfunctions occur: changes in the functioning of the equipment , its spontaneous shutdown, you must immediately stop work and inform the teacher about it

3. Do not try to fix the equipment malfunctions yourself

4. Perform only those actions on the computer that the teacher tells you to

5. Control the distance to the screen and correct posture

6. Do not allow work at maximum brightness of the display screen

7. In case of emergency situations, remain calm and strictly follow the teacher's instructions.

It is prohibited:

1. To operate faulty equipment

2. When the power is on, disconnect and connect cables connecting various computer devices

3. Work with open covers of computer devices

4. Touch the display screen, the back of the display, connectors, connecting cables, live parts of the equipment

5. Touch circuit breakers, starters, alarm devices

6. Touch pipes, batteries during work

7. Fix a keyboard malfunction yourself

8. Press the keys with force or allow sharp blows

9. Use any object while pressing the keys

10. Move the system unit, display or the table on which they stand

11. Block the aisles in the classroom with bags, briefcases, chairs

12. Take bags, briefcases behind the work place near the computer

13. Take outerwear and clutter the office with it

14. Move quickly around the office

15. Put any objects on the system unit, display, keyboard.

16. Work with dirty, wet hands, in damp clothes

17. Work in poor lighting

18. Work at the display longer than the allotted time

It is prohibited without the teacher's permission:

1. Turn on and off the computer, display and other equipment

2. Use various storage media (floppy disks, disks, flash drives)

3. Connect cables, connectors and other equipment to the computer

4. Take floppy disks, equipment, documentation and other items from the teacher's desk

5. Use the teacher's computer.

Safety requirements at the end of work:

1. At the end of work, wait until the teacher comes and checks the condition of the equipment, hand in the work, if it was done

2. Slowly stand up, collect your things and quietly leave the classroom so as not to disturb other students

Responsibility for violating safety rules:

1. For violating safety rules, the student will be reprimanded, penalized up to and including suspension from work with the equipment.

2. For regular violations of safety rules, the student will be suspended from computer science classes up to and including expulsion from the educational institution (or other sanctions provided by the educational institution).

Posters and pictures

• Poster "Safety and Sanitary Standards" • Poster "Correct Posture at the Computer" (COR)


Время попусту не трать -
Проводами не играй
Нужно взрослого позвать


С разрешения педагога,
Не приходит к нам никто.
А компьютер скажет "нет",
Не бывает без проблем
В грязной обуви, друзья,
Ты его не разбивай,

Forms of information presentation, information exchange. Methodological recommendations.

Prepare an overview of the lesson topic This lesson will cover the following questions:

1. What is information?

2. What actions does a person perform with information?

3. How does a person store information?

4. Information carriers.

5. Forms of information presentation.

2. Information

Information is data about the surrounding world, about the processes and phenomena occurring in it, perceived by living organisms and technical devices.

A person receives information using the senses:

Vision;

Hearing;

Smell;

Taste;

Touch.

3. **Actions with information**

Actions with information are varied:

1. **Reading a newspaper, a book**

An action with information is not cooking a meal - it is an action with

products.

Actions with information:

1. Receipt;

2. Presentation;

3. Transmission;

4. Processing;

5. Storage;

6. Transformation.

4. Receipt of information

Observation is the receipt of information.

The meaning of this action is to perceive information, to receive a message.

5. **Presentation of information**

The purpose of presenting information on a medium is its storage or transmission.

Ancient people made drawings on rocks. Later, information was transmitted using books, paintings. Modern methods of transmitting and storing information are magnetic tapes, floppy disks, disks, etc. History of information carriers First, let's look at how information was stored in the ancient world.

Rock paintings of the Paleolithic era:

- Rock painting (Fig. 5) - the first method of external storage of information in ancient times.

Rock painting (Source)

According to scientists, an artist of this era, who knew how to make tools and decorate the walls of caves, should have already had speech. Rock paintings showed how ancient people lived, hunted, and performed rituals. With the emergence of Homo sapiens and the advent of graphic art, oral communication developed.

Invention of writing:

Writing first appeared 5-4 thousand BC on the territory of modern Iraq, in the Tigris and Euphrates basin. The very first examples of writing (Fig. 6) are tablets from the city of Uruk - small rectangular clay blocks with pictograms scratched on their convex surfaces.

Example of ancient writing (Source)

Eventually, the signs took the form of wedge-shaped strokes, and this writing was called cuneiform. During excavations of the Assyrian capital of Nineveh, tablets from the royal repository were found containing dictionaries and grammars of the Sumerian, Babylonian and Assyrian languages.

Papyrus:

The material that replaced clay tablets and became established throughout the ancient world after the conquest of Egypt by Alexander the Great (332 BC) was papyrus

Papyrus (Source)

Papyrus was an expensive material, and scribes often reused sheets,

scraping away old text.

Papyrus blank

Reception and transmission of information in nature

Living nature is complex and diverse. The sources and receivers of information in it are living organisms and their cells. An organism has a number of properties that distinguish it from inanimate material objects. The main ones are:

- Continuous exchange of matter, energy and information with the environment;

Irritability (the ability of an organism to perceive and process information about changes in the environment and the internal environment of the organism);

Excitability (the ability to respond to the actions of stimuli);

Self-organization (changes in the organism to adapt to environmental conditions).

Before the advent of computers, the science of biology, which studies living organisms, provided descriptive models.

How do plants receive, process and accumulate information?

Plants must put out signals that would make their flowers especially noticeable. It is also important to somehow mark flowers that have already been pollinated and no longer contain nectar. This will save the insect from wasted work. The type of pollinator determines the choice of the appropriate signal by plants. A flower that is pollinated only by birds should not attract insects.

How do bees transmit information?

Bees have an amazing way of transmitting information - it is the language of dance. A bee that has found a flowering meadow flies to the hive and begins to dance in the air in front of its fellows, after which the bee swarm goes to the designated place for nectar.

6. **Storage of information**

The purpose of the action is to save the information (data) recorded (presented) on the carrier.

Human memory is divided into:

- Internal (operational) memory. - Each person stores certain information in their own memory - "in their mind".

External (long-term) memory (books, flash memory, etc.). - People understood the unreliability of human memory and sought to record the most important information on external media.

7**. Information transfer**

The meaning of the action is to share, exchange information, for example, with other people. Any process of information transfer can be simplified as follows:

Two parties always participate in the transfer of information: the one who transmits the information (information source), and the one who receives the information (information receiver).

Information is transferred orally, in writing, over telephone lines, with the help of computer networks.

8. **Information processing**

Information processing is the solution of some information problem. The meaning of the action is to change the form and meaning of the message, to obtain new information.

Example: solving a mathematical problem.

The performer processing the information is a person or a special technical device (for example, a computer).

9. **Information transformation**

The meaning of the action is to change (select) the form of presentation for storing, using, transmitting, processing information.

Level and stages of teaching computer science in primary school

Preparation for school in Azerbaijan begins with pre-school education, when children are instilled with a love and interest in learning in a playful way.

It is during this period that the foundation for the development of mental, physical and creative potential is laid, psychological stability, aesthetic education, simple work skills, a sensitive and conscious attitude to the environment and their health begin to form. In the process of pre-school preparation, using the child's interest, he is prepared for the most comfortable transition to school education.

Azerbaijani schools have a five-day school week. School education is free and takes place in 3 stages:

• Education in primary school. Available for children who have reached 6 years of age and lasts for 4 years. At the end of the training, all primary school students take an exam.

Based on the results, they are transferred to secondary school.

• General secondary education. It begins in the 5th grade and ends in the 9th. During this period, children study mathematics, history, foreign languages, literature, physics, chemistry and biology in sufficient depth, receiving the necessary preparation for passing the final exam.

Upon completion of the 9th grade, the child receives a certificate of basic education. Then he can get a job, continue studying at school or transfer to any vocational school.

• Complete secondary education. To obtain it, you need to study for another 2 years after the 9th grade. It is aimed at preparing for admission to universities. At the end of their studies, children take a paid state exam, based on the results of which they receive a certificate of general education and can enter the chosen university in the country.

Education in primary and secondary schools is compulsory for all Azerbaijani children. A schoolchild can decide for himself whether he wants to study in the 10th and 11th grades. But a certificate of general education is required to enter a university.

Russian, Azerbaijani or English?

Schoolchildren in Azerbaijan have the opportunity to choose the language of instruction. And although the main language in most schools is Azerbaijani, it is possible to get an education in

Russian.

There is all the necessary literature for this. Both options for education are free. According to official statistics, about 10% of students choose schools where they can study in Russian.

In addition to Russian-language educational institutions, there are branches of famous schools and foundations in Azerbaijan that offer education in English (British School, EF English First and others). Not only foreigners and emigrants, but also local residents can study there. Most of these schools are private, so education in them is paid.

Peculiarities of the educational process in Azerbaijani schools

The Day of Knowledge in the country is celebrated not on September 1, but on September 15, and the academic year ends 15 days later.

Schools offer education in specialized classes in four areas:

-mathematics and economics, technical, humanitarian, and natural science. Each profile has its own programs. Children can choose subjects for in-depth study.

Grades in the first grade do not frighten an Azerbaijani schoolchild. In the first year of study, they are abolished. And then the assessment takes place on a 100-point scale, in which "five" corresponds to scores from 80 to 100 points, "four" - from 60 to 80 points, "three" - from 30 to 60 points. A grade below 30 points is considered unsatisfactory.

The Azerbaijani education system has its own traditions. In the years since the collapse of the USSR, school education in the republic has changed significantly.

However, one thing has remained unchanged - providing the younger generation with knowledge, the proper level of education and cultural development. Only with this approach can young people grow up to be worthy citizens of their country.

Stages of mastering the basics of computer science.

Stage I (grades 1-2) - propaedeutic. This is where primary schoolchildren are initially introduced to computers, the first Elements of information culture are formed in the process of using educational game programs, simple computer simulators

Stage II (grades 2-3) - a basic course that provides a mandatory general educational minimum for preparing schoolchildren in computer science. it is aimed at mastering students of methods and means of information technology for solving problems, developing skills for conscious and rational use of a computer in their educational and then professional activities. studying the basic course forms ideas about the commonality of the processes of obtaining, transforming, transmitting and storing information in living nature, society and technology. the advisability of transferring the beginning of the systematic study of computer science to basic school, in addition to the need in the conditions of informatization of school education, is also due to two other factors: firstly, the positive experience of teaching computer science to children of this age, both in our country and abroad and, secondly, the significant role of studying computer science for the development of thinking, the formation of a scientific worldview of schoolchildren of this age group. the content of the basic course can combine three currently existing main directions in teaching computer science at school, reflecting the most important aspects of its general educational significance:

• the ideological aspect, associated with the formation of ideas about the system-information approach to the analysis of the surrounding world, the role of information in management, general patterns of information processes in systems of various natures;

• the "user" aspect, associated with the formation of computer literacy, preparing schoolchildren for practical activities in the context of the wide use of information technologies;

• the algorithmic (programming) aspect, currently associated to a greater extent with the development of schoolchildren's thinking III senior grades (3-4) - specialized training, differentiated in volume and content depending on the interests and focus of pre-professional training of schoolchildren. in particular, for schools and classes with a physics and mathematics profile, it is possible to study in-depth programming and computational mathematics methods, for schools with a biology and chemistry profile, a computer science course related to the use of a computer for modeling, processing experimental data; for schools and gymnasiums with a humanitarian profile - an idea of a systems approach in linguistics, literary criticism, history, etc. from the second half of the 90s to the present day, the current computer science course in many ways does not meet modern trends in the development of education and does not fully reflect the diversity of pedagogical functions of studying the general education field of "computer science" in schools. attempts to further technocratize the computer science course, reducing its content to the study of information technology lead to its integration with subjects of the technological cycle or dissolution in the mathematics course. secondly, it is necessary to transfer foreign experience with great caution in defining the priority tasks of the computer science course, in particular, a broad focus on the use of the Internet. there was a need to formulate provisions that would meet the traditions of domestic education and the pressing challenges facing the modern school as a whole. (draft) educational standard of basic general education in computer science and information technology the study of computer science and information technology in basic school is aimed at achieving the following goals:

• • acquisition of computer literacy and basic competence in using information and communication technologies, simple computer models in solving educational and practical problems at school and outside of it; obtaining the necessary training for the use of computer science methods

-and information technology tools in studying the academic disciplines of the main school and educational programs of the subsequent Stage of training, as well as for mastering professional activities in demand in the labor market;

• mastering the skills of working with various types of information using a computer and other information technology tools, the ability to apply these skills:

-to search, select, critically evaluate, organize, present and transmit information, plan and organize one's own information activities and their results;

• gaining experience in implementing individual and collective projects related to various academic disciplines, including publishing school magazines, creating school pages on the Internet, virtual local history museums, etc. using information and communication technologies; using information available on the Internet and on various media;

• mastering a system of knowledge related to the information picture of the world, including: basic concepts necessary for the formation of specific ideas about information processes, systems and technologies; ideas about the commonality and patterns of information processes in various social and technological systems, about the mechanisms of perception and processing of information by humans, technological and social systems, about modern information civilization;

• familiarization with the use of information and communication technologies as methods of understanding nature and society, observing and recording natural and social phenomena, presenting their results in the form of information objects;

• developing cognitive interests, intellectual and creative abilities in information activities;

• education of the necessary norms of behavior and activity in accordance with the requirements of the information society as a natural stage of development of civilization. the implementation of these goals is achieved as a result of mastering the following educational content. general educational skills, abilities, methods of activity

• handling information objects in their various representations: in mental, pictorial (on paper, screen), sound representation.

• acquisition of experience and skills of one's own information activity, application of information and communication technology (ICT) in the study of school subjects and other educational activities, organization of one's own information space (a set of personal folders), covering (using the simplest examples) the most widespread areas of application of information and communication technologies.

• solving problems of constructing the simplest visual information models of objects and processes of the real world. basic concepts of information processes basic concepts of computer science: information object, process, algorithm, main types of algorithms and methods of their representation, control, feedback. information transfer process, source and receiver of information, signal, coding and decoding, information distortion during transmission, information transfer rate. basic components of a computer and their functions: processor, memory, monitor, interfaces, keyboard and mouse; software principle of computer operation. classification of the main types of general-purpose and professional information resources. dynamic changes in the qualitative characteristics of ICT tools, taking them into account when deciding on the choice of ICT tools, including for individual use.

-creation of information models of real objects and processes, adequacy of the model to the object and purposes of modeling. language as a way of representing and transmitting information: natural and formal languages. features of human perception, memorization and processing of information. the role of information in modern society, in its economic, social, educational spheres. mass media, information

Ethics and law, information security. personal information, information rights of the individual. computer games, their positive and negative sides. practice of information technologies basic devices of ict connection of ICT units and devices, including a computer, the simplest operations for their management (switching on and off, understanding signals about readiness and malfunction, etc.), using various information carriers loading

Electronic and paper media, consumables. safety, hygiene, ergonomics, resource conservation; technical conditions of operation. educational areas of priority development: computer science and information technology.

Computer operating with information objects in visual-graphic interaction (interface). creation, saving, naming of objects and their families, selection of names and organization of individual folders, unzipping, deletion. protection against computer viruses. selection of a computer in accordance with the tasks of use and financial capabilities. assessment of the numerical parameters of information objects and processes: the amount of memory required for storing objects, the speed of transfer and processing of objects, the cost of products and services. educational areas of priority development: computer science and information technology. creation and processing of information objects texts. text entry (fluent or blind) using a computer keyboard.

On-screen text representations, fonts, use of templates. Moving fragments. structuring: font and color highlighting, paragraphs and their formatting, page numbers, lists, headings of different levels in a given style, links, indexes, tables of contents, reading notes, headers and footers, addressing, addressing, signature. printing. using spelling and grammar checking capabilities, thesauri. creating and including tables in the text. including images in the text. educational areas of priority development: computer science and information technology, languages.

- dynamic (Electronic) tables, other mathematical tools ICT. Entering data into a finished table, changing data, switching to a graphical representation. Input of mathematical formulas, representation of dependence on a graph. educational areas of priority development: mathematics, natural science.

-databases. search by selecting from a list and specifying field values. creating records in databases (such as filling out questionnaires), including those related to student information. educational areas of priority development: computer science and information technology, social studies, physical education, extracurricular activities.

-drawings and photographs. input using a graphic panel and a scanner.

-geometric, stylistic transformations.

-educational areas of priority development: fine arts, local history, extracurricular activities.

-drawings. selection, combination, movement and geometric transformations of fragments and components. three-dimensional image on a computer screen and tools for working with it. catalogs of objects. simple drawings. special types of drawings:

-diagrams, maps, etc. construction of a drawing of a given subject. design (assembly) of a subject according to a drawing. educational areas of priority development: technology (in particular, drawing). sound and video images, including music and animation. tools of work (editing, non-linear editing) in the On-screen visual representation. educational areas of priority development: languages, music, local history, project activities in various fields.

-recording information about objects and processes of the surrounding world recording of objects and processes:

-natural, cultural and historical, school life, individual and family history, etc., including recording images (using digital cameras, microscopes, various types of scanners, etc.);

- texts obtained by recognizing text images and oral speech;

- video and audio recordings (in particular, using digital recording devices);

- music (in particular, using a musical keyboard);

- tables of measurement results (in particular, using sensors connected to a computer);

- results of observations, surveys, etc.

-educational areas of priority development: social science, natural science. search and use of information computer encyclopedias and reference books; information in databases, the Internet, non-computer sources of information. formulation of queries. catalogs. Search engines. critical assessment and organization of information. formation of an individual information space using a file system, links to files and sources on the Internet. rules for links and citing sources of information.

-educational areas of priority development: social studies. organization, presentation and transmission of information presentation of information in the form of a printed publication, on the Internet, in a speech of a student. organization of one's own information space, including the student's work, its various versions, links to relevant assignments, projects, work of other students, collected arrays of information, sources used. group discussion, recording its progress and results in text form and in combination with video recording. telephone, pager, E-mail: rules of correspondence, attachments to letters, sending, receiving. saving for individual use objects from the Internet and links to them. teleconferences, videoconferences.use of digital telecommunications in collective educational activities. educational areas of priority development: computer science and information technology, languages, social studies. the organization of the educational process in computer science includes a number of aspects:

• distribution of educational program material;

• study of textbooks, methodological and scientific literature;

• continuous self-education of the teacher in view of his exceptional role;

• organization of a lesson in computer science;

• use of a computer in the educational process;

• extracurricular work;

• office of the teacher.

1.1. features of the school course of computer science.

- strong interdisciplinary links of the course.

- the course is not established, like, for example, a course of physics; progress of the teacher requires timely reflection both in the methodology and in the content.

- psychological and pedagogical support of the course acquires special significance. problems arise: the place of the computer in the educational process, the role of the teacher, the interaction of the student with the computer.

-there is an improvement in the methods and organizational forms of training. there is an increase in independent work, a departure from the traditional lesson, an increase in the volume of practical and laboratory work of a research nature, extracurricular classes.

-systematic use of computers ensures a broad current knowledge test.

- medical requirements for organizing the work of schoolchildren play a special role.

1.2. recommended planning of the educational process. documents. let us recall that the computer science course is "divided" conditionally into three parts: propaedeutic, basic, specialized. At the same time, the basic course should be taught in grades 7-9. accordingly, each of the levels is provided with the appropriate textbooks, for which there is a plan proposed by the authors. in reality, today, the basic computer science course is taught in grades

10-11 (although there are downward trends in many schools). the minimum mandatory volume of academic hours allocated to the study of computer science is 68 academic hours over two years. in the presence of appropriate conditions, it is possible to increase the volume of academic hours to 136 or more. since the educational standard in computer science has not been adopted to date, the "normative" document designed to provide basic knowledge to students of a general education institution is the "mandatory minimum content of education in computer science" (Order of the Ministry of Defense of the Russian Federation dated 30.06.99 No. 56). The document defines the volume and content of educational material. presented to students at school. "mandatory minimum content in computer science" provides for two levels of organizing computer science training:

• **level a -** for schools and classes studying a computer science course in the amount of 68 hours (2 years at 1 hour per week), and for schools and classes, as a rule. of the humanities profile;

• **level b -** for schools and classes studying computer science in the amount of 136 hours or more and provided with modern computers, which allows the school to present to students educational material. corresponding to the requirements of entrance exams in computer science to universities and all others.

To help the teacher, we recommend samples of final assignments for assessing the quality of basic school graduates' training in computer science (brochure "Assessment of the Quality of Basic School Graduates' Training in Computer Science", Moscow: Publishing House "Dro-fa", 2000, 2001), which can also be used at the senior level, in the case of studying the basic computer science course in grades 10-11 of a comprehensive school. The assignment options are selected in such a way as to be able to check the students' training in all topics of the computer science course included in the mandatory minimum educational content.

The proposed assignments can also be used by the teacher when implementing current monitoring as sample assignments when studying individual topics.

Students are given the right to take the Computer Science Exam at their discretion.

The Examination tickets recommended by the Ministry of Education will help the teacher in organizing the Examination. The Examination can be conducted in oral or written form or in the form of a test. The Examination ticket for the oral Examination may contain 1 or 2 theoretical questions and 1 or 2 practical tasks of various types (for example, one related to the development of a simple algorithm or program for a computer, and the second, testing the skills in using one of the information technologies). When conducting the Examination, it should be taken into account that training programmers is not the goal of the general education course in computer science.

When conducting practical classes, classes should be divided into subgroups so that each student is provided with an individual workstation. A system of additional education should be developed everywhere, especially for students in rural schools. These may be additional classes, electives, clubs, organizing distance learning courses using the Internet for students and teachers of various school subjects, holding summer camps for young programmers, etc.

The educational material of each content line of the mandatory minimum content of education in computer science requires different methodological approaches.

Approximate distribution of hours for studying the corresponding lines (recommended, but not mandatory, everything depends on the learning objectives)

Level A (68 hours) Level B (136 hours)

Information and information processes - 4 hours Information and information processes - 6 hours

Presentation of information - 12 hours Presentation of information. number systems and the basics of logic - 28 hours computer -10 hours computer - 14 hours modeling and formalization - 8 hours modeling and formalization - 12 hours algorithms and performers -16 hours algorithmization and programming - 26 hours information technology -18 hours information technology - 50 hours thus, when studying the content line "information and information processes" attention should be paid to the formation of understanding and the ability to give examples from different subject areas illustrating the flow of information processes in living nature, in society or in technical systems.

-the main meaning of the second content line "presentation of information" is that information is always associated with some "carrier": material (stone tablets, birch bark, paper, magnetic disk, etc.) and "immaterial" (native language, sound, melody, dance, pantomime, facial expression, one or another sign system, etc.).

-it is necessary to form an idea of natural and artificial languages, the binary form of presenting information, the advantages and disadvantages of different forms and types of presenting information.

-the content line "computer" allows students to get acquainted with the computer from a different point of view than when studying the previous content line:

-the computer appears to students as a kind of universal tool that allows a person to automate intellectual activity, automate information processes - search, storage, processing and transmission of information over long distances. It is important to develop an understanding that a computer does not "think" like a person, but is an executor, a powerful and fast-acting "tool" that helps a person in his information activities (information systems, expert systems, computing centers, e-mail, etc.).

It is important to draw students' attention to the functional capabilities of a computer and the hierarchical structure of computer software, to develop an understanding of the essence of law in the field of information activities. content line "modeling and formalization"

- This is one of the most important content lines of the computer science course, forming a system-information picture of the world in the minds of students, since it allows consciously identifying individual objects in the surrounding reality, seeing relationships between objects, identifying essential features of objects, classifying them and combining them into sets, constructing diagrams and "seeing" the internal structure of an object, representing some objects through others for the purpose of studying, presenting, manufacturing or using them.

Special attention should be paid to the essence of computer modeling, highlighting its advantages and disadvantages, and considering specific examples. content line "algorithms and performers" by solving a large number of problems forms students' algorithmic thinking. in the process of studying this topic, students' ideas about the properties of algorithms, about performers of algorithms, about methods of recording algorithms and about basic algorithmic structures are formed.

It is important for schoolchildren to understand that an algorithm is a dynamic model of an object (a model of a process), in contrast to a static structural model of an object, which does not reflect changes in the properties and behavior of an object over time, but only records its state, highlights the Elements and relationships between them.

The content line "information technology". mastering this content line is not only a means of preparing students for life in the information society and for future professional activities, but also a means of practical consolidation and development of students' theoretical training.

This is the simplest and most accessible part of the computer science course for most students, constituting the main content of the specialized computer science course in many educational institutions equipped with modern computers. despite the importance of mastering the technologies for processing text, graphic and numerical information. mastering the technology of searching, storing and sorting information, multimedia technologies and computer communications technologies, the main goal of the computer science course is not professional training in this area, but a whole complex of educational and upbringing tasks, such as: ensuring a solid and conscious mastery by students of knowledge about the processes of transformation, transmission and use of information and, on this basis, disclosing the significance of information processes in the formation of a modern system-information picture of the world, identifying and disclosing the role of information technology and computers in the development of modern society, instilling skills in the conscious and rational use of a computer in their educational and then professional activities.

2.1 lesson – the main form of the educational process the main features are a permanent composition of study groups of students, strictly defined content of training in each class, a schedule of classes, a combination of individual and collective forms of training, the leading role of the teacher, systematic assessment, knowledge testing.

-the most important characteristics of a lesson are: the goal, content, means and methods of training, organization of educational activities. classification of a lesson by didactic goals.

1. a lesson of communicating new information (explanation) – a lecture, a conversation, a film lesson, a lesson of independent practical work.

2. a lesson of developing and consolidating skills and abilities (training) laboratory work, practical work, a lesson-excursion, a seminar, a conference.

3. a lesson of testing knowledge, skills and abilities – an oral survey, a written survey, a credit practical work, a test.

4. a combined lesson. has a different structure. has the following advantages:

• creating conditions for the rapid application of new knowledge;

• providing feedback (accumulation of grades);

• implementation of an individual approach to teaching.

classification of lessons on computer use. computer science lessons are divided by the volume and nature of computer use:

- demonstration. showing educational Elements - new language objects, fragments of programs, diagrams, texts. teacher at RMP, students at RMU. the main didactic functions of demonstrations - communicating new information.

- laboratory work (frontal). students on the workstation, work simultaneously. the didactic purpose can be different: mastering new material (using training programs), reinforcing new material (using training programs), checking mastery (using monitoring programs). students' actions can be synchronized, can be carried out at different paces and even using different software tools. the teacher's role is to monitor students' work, provide rapid assistance.

- practical training: students receive an individual assignment for extended independent work (for 1-2 lessons, including completing part of the assignment at home). as a rule, such an assignment is given to practice knowledge and skills for a whole section of the course, the teacher observes students, helps, discusses general issues, highlights typical mistakes. requirements for organizing a lesson.

O determine the educational, upbringing, developmental goals of the lesson.

O prepare the content of the educational material.

O define the didactic objectives of the lesson, the consistent solution of which will lead to the achievement of the goal.

O choose the most effective combination of teaching methods and techniques.

O define the structure of the lesson.

O take into account the equipment of the classroom.

O take into account the economic conditions for conducting classes.

O take into account the individual characteristics of students.

2.2 lesson structure depends on the type of lesson.

1. lesson explaining new material. the main didactic goal is to introduce concepts, or establish properties, build an algorithm, etc.

- preparation for studying new material (repetition or updating basic knowledge)

- familiarization with new material

- primary consolidation of the material studied

- setting homework assignments

- summing up the lesson.

2. lesson consolidating what has been studied the main didactic goal is to form certain skills or systematize knowledge on the topic.

- checking homework

- consolidating the material covered

- setting homework assignments

- summing up

3. lesson for testing knowledge, skills and abilities. the main didactic goal is to find out the level of assimilation of the educational material by students.

- instructing students on the organization of work in the lesson and the content of assignments

- independent work of students

- summing up the most important problem is the choice of the organization of the forms of conducting classes. the leading form of activity is a collective one, carried out through seminars, discussions, collective-distributed forms of work with educational material. it is possible to recommend that the lesson consist of 2 parts:

Part I - the teacher explains the material clearly, simply and accessibly and checks the correctness of the assimilation of its main points by students.

Part II - discussion of new material among students while working on the computer.

-it is important that students independently use new information, can consult with each other. the teacher in this part of the lesson is a coordinator, a consultant, but not an active participant in training.

-in computer science lessons it is necessary to use the so-called traditional teaching tools.

2.3. preparation for the lesson.

At present, a system of preparing teachers for lessons has been developed and substantiated in didactics, consisting of 3 stages.

1. preparation for the school year. the teacher gets acquainted with the curriculum, makes a general description of the class group, develops calendar (semi-annual) plans.

2. construction of a system of lessons on academic topics, at this the place of the topic in the curriculum, its content and objectives of study are determined, tasks and materials of the textbook are distributed between lessons, the repetition of the covered material is planned in terms of time and content, the time for conducting independent and control works is outlined.

3. preparation for the next lesson.

a) develop a lesson scenario

• formulate a topic,

• define goals,

• structure

• a specific task for each Stage of the lesson

• select educational material in accordance with the educational goal and objectives of individual Stages

• determine methods and techniques of work

• determine techniques for teacher guidance of students' activities

• select training software

• determine the form and content of testing

• think over instructions for completing homework

b) prepare a lesson plan (the plan is written in three columns, each of which explains the role of the teacher, student and computer at the current moment) teacher student Computer

c) prepare software, didactic material taking into account individual assignments.

2.4 Features of a Computer Science Lesson

1. Students' motivation to work on a computer increases in conditions of dialogic communication with a computer. The problem of motivation cannot be solved only by means of computing technology.

2. the influence of the teacher's personality is more significant than in other disciplines.

3. the teacher's workload increases due to the need to work in the "multi-tasker" mode. in order to ensure individualization of learning in accordance with the personal characteristics of students, the pace of learning is set by the computer.

4. an important feature is the individualization of learning. the pace for different students varies (the pace of learning can vary up to 3-5 times). for the teacher, organizational problems arise. the old classroom-lesson structure is deformed.

5. working with a computer forms a managerial style of work.

6. a lesson is a businesslike, calm atmosphere. children communicate with each other and with the teacher on a businesslike, subject-based basis.

7. the functions of assessment and control are often transferred to the computer, conflict-free nature of learning.

You can specify 3 main areas of activity of a teacher:

• teacher of the subject "computer science"

• organizer of the use of NIT on the material of other school subjects

• organizer of the use of computers for administrative purposes and management of the learning process as a computer science teacher, a specialist must have the necessary knowledge of the content and methods of teaching school computer science courses at various levels: basic course, junior grades, in-depth study of computer science, elective classes and various types of extracurricular activities.

Sequence of events and actions. True and false judgments.

Methodological recommendations. Prepare an overview of the lesson topic

Topic: "Sequence of events"

Goal: Teach how to determine the sequence of events.

Prepare for introducing the concept of algorithms.

Develop the ability to consistently construct sentences when retelling.

Develop meta-subject connections.

Work on developing universal learning activities:

Personal: ability to demonstrate business cooperation;

Cognitive: modeling, building a logical chain of reasoning;

Equipment: Multimedia projector, teacher's computer, presentation for conducting the lesson, pictures with drawings

Lesson plan

No.

Item

Lesson stage Teacher's

activity

Student's

activity

UUD

1. Organizational moment Involvement in work, oral message of the teacher

Preparing the class for work

Personal: self-determination, manifestation of attention, desire to learn more

2. Goal-setting Organization Of work to Define the topic and goal of the lesson

Guessing riddles, answering questions

Cognitive: defining an object by its features; communicative: planning educational cooperation

3. Updating knowledge

Organization of games

Game "Pass on to another"

Cognitive: reproducing information from memory

Communicative: cooperation with peers

4th Stage of studying new knowledge

Order of numbers Survey, organization of work with

Work with interactive board,

Cognitive: ability to structure knowledge, modeling interactive board,

Communicative: cooperation with peers

The world around us Organization of the game

Game "Find your pair"

The life of a dandelion

Survey, organization of work with the interactive board,

Work with the interactive board

5 Physical education minute

6 Consolidation and application of what was learned

Organization

Of retelling of a fairy tale

Retelling

Of the fairy tale "Under The mushroom"

Cognitive: ability to structure

knowledge, modeling

Communicative: cooperation with peers

Organization Of retelling

Order in the fairy tale "Kolobok"

Lesson progress.

I. Organizational part.

Preparing the workplace for the lesson.

– Today we have gathered for another lesson on computer science.

Popular wisdom says: "Put your soul and heart into your work, cherish every second of your labor." Goal setting

– Guess the riddle.

What kind of birds are flying by?

Seven in each flock

They fly in a line,

They don't come back.

(Days of the week)

– List the days of the week in order.

– Can they be rearranged? (No, they are in a certain order)

– So, today in class we will talk about the sequence of events.

Let's observe where we encounter the sequence of events.

– What do you think, why do we need the sequence of events?

III. Knowledge actualization

The game "Pass it on"

The children stand in a circle and pass the ball to another.

– Please list: seasons, months of the year

– So, where do we encounter the sequence of events? (On the calendar)

A drawing of a calendar or a calendar appears on the board.

IV. Stage of learning new knowledge

1. The order of numbers.

– Where else do we encounter a sequence of events?

Slide task

– Fill in the missing numbers. (Work and interactive board)

– Determine the order of the numbers.

– Between which numbers are the missing numbers in the number line? (Students name the numbers).

– So, where else do we encounter a sequence of events? (The order of numbers)

A number line appears on the board.

2. The world around us

1. Game "Find a pair"

Children receive pictures with images of objects and find a pair for themselves according to the principle:

- who
- (what)

- will be

2. Dandelion

According to the picture, students must arrange the numbers that determine the order of life of a dandelion. After the answer, the correct answer appears for checking.

- So, where else do we see a sequence of events? (The order of the numbers)

A picture with the stages of plant development appears on the board.

V. Physical education minute "Kolobok"

VI. Consolidation and application of what has been learned

3. The sequence of events in the fairy tale "Under the Mushroom"

- We also need a sequence of events when retelling fairy tales.

Collective retelling

- Students tell the fairy tale one after another.

4. The fairy tale "Kolobok"

- Is it possible to tell a fairy tale based on these pictures? Why? (They are not in order)

- Use arrows to show the order of the pictures.

The work is done simultaneously on the board and in the notebook.

- So, where else do we see a sequence of events? (In fairy tales)

A picture from the fairy tale appears on the board.

VII. Control and self-control stage

1. Task 1

- Arrange all the numbers in order.

2. Task 2

– Arrange the numbers to get the order of life of a dandelion.

VIII. Lesson Summary

– What did we talk about in class today?

– Where do we find a sequence of events?

– What do you especially remember?

– What would you like to share at home today?

Content line: Information and information processes

Lesson outline on computer science on the topic "Information and information processes"

Lesson objectives:

Educational:

1. to acquaint students with information processes: receiving and transmitting, processing and storing information

2. to continue developing knowledge about information, properties of information, types of information

Developing:

1. to develop students' qualities: thinking (analytical, synthesizing, analytical-synthesizing, abstract), the ability to apply knowledge in practice;

2. develop cognitive skills (highlight the main points, take notes);

3. develop academic work skills (read, write);

4. develop independence

Educational:

1. cultivate a motive for learning, a positive attitude towards knowledge;

2. cultivate discipline;

3. cultivate aesthetic views.

Lesson flow.

1. Organizational moment.

2. Review of the previously studied topic.

3. Study of the new topic.

4. Lesson summary.

5. Homework.

It has become especially fashionable to complain about the intolerance of the information burden since the 17th century. In the 20th century, they began to talk about nothing less than an information catastrophe.

An information crisis is a growing contradiction between the volume of information accumulated in society and the limited capabilities of an individual to process it. According to experts, the amount of information circulating in society currently doubles approximately every 8-12 years.

There is a belief that the human body is not capable of coping with such an avalanche of information. This requires special means and methods of processing information, storing and using it. New scientific disciplines have been formed — computer science, cybernetics, bionics, robotics, etc., aimed at studying the patterns of information processes, that is, processes whose purpose is to receive, transmit, store, process, or use information.

In its most general form, an information process (IP) is defined as a set of sequential actions (operations) performed on information (in the form of data, information, facts, ideas, hypotheses, theories, etc.) to obtain some result (achieve a goal). Information does not exist in itself, it manifests itself in information processes. In computer science, information processes include:

Information search;

Information selection;

Information storage;

Information transmission;

Information coding;

Information processing;

Information protection.

Each of these processes is divided, in turn, into a number of processes, and some of the latter may be included in each of the identified generalized processes.

Collection of information

Searching for information is one of the important information processes. The timeliness and quality of decisions made largely depend on how it is organized.

In a broad sense, searching is the basis of human cognitive activity in all its manifestations: satisfying curiosity, traveling, scientific work, reading, etc. In a narrower sense, searching means systematic procedures in organized information repositories: libraries, reference books, card indexes, electronic catalogs, databases.

The success of your choice will largely depend on how you organized your information search. Use a variety of information search methods, this will help you collect more complete information and increase the likelihood of you making the right decision.

Methods of searching for information:

• direct observation;

• communication with experts on the issue of interest to you;

• reading relevant literature;

• watching videos, TV programs;

• listening to radio broadcasts and audio cassettes;

• work in libraries, archives;

• querying information systems, databases and computer data banks;

• other methods.

In the process of searching, you may encounter a wide variety of information. People are used to evaluating any information by its usefulness, relevance and reliability. After evaluation, some of the obtained information may be discarded as unnecessary, while some, on the contrary, may be left for long-term storage. That is, the process of searching for information is almost always accompanied by its selection. All this together is called the process of collecting information.

Storing information

Collecting information is not an end in itself. In order for the obtained information to be used, and repeatedly, it must be stored. Storing information is a process as ancient as the existence of human civilization. It is of great importance for ensuring the progressive development of human society (and any system), the repeated use of information, and the transfer of accumulated knowledge to subsequent generations.

Already in ancient times, man faced the need to store information. Evidence of this are notches on trees that help not to get lost during hunting; counting objects using pebbles, knots; images of animals and hunting episodes on the walls of caves. Structures, objects of fine art, clay tablets, records, books, archives, libraries, audio recordings, films - all this serves the purpose of storing information.

Different information requires different storage times:

• a bus ticket only needs to be kept for the duration of the trip;

• a TV program — a week;

• a school diary — an academic year;

• a high school diploma — until the end of life;

• historical documents — several centuries.

The main storage of information for a person is his memory, including genetic memory. There is also “collective memory” — the traditions and customs of a particular nation.

When the volume of accumulated information increases so much that it becomes simply impossible to store it in memory, a person begins to resort to the help of various kinds of auxiliary means (knots “for memory”, notebooks, etc.).

With the birth of writing, a special means of recording and disseminating information in space and time arose. Documented information was born — manuscripts and handwritten books, and unique information-storage centers appeared — ancient libraries and archives. Gradually, a written document also became a tool of governance (decrees, orders, laws).

The next information leap was printing. With its emergence, the largest volume of information began to be stored in various printed publications, and to obtain it, a person goes to the places where they are stored (libraries, archives, etc.).

Currently, we are witnessing the rapid development of new, automated methods of storing information using electronic means.

Computers and telecommunications are designed for compact storage of information with the ability to quickly access it. Information intended for storage and transmission is usually presented in the form of a document.

A document is information on any material carrier (clay tablets, paper, film, magnetic tape, compact disc, etc.), intended for distribution in space and time (from the Latin document - certificate. Initially, this word meant written confirmation of legal relations and events).

The main purpose of the document is to use it as a source of information in solving various problems of education, management, science, technology, production, social relations. Of course, in order for this information to be used, it must be formalized according to certain rules, that is, presented in the most convenient form for users.

Information transfer

Storage of information is necessary for its distribution in time, and its dissemination in space occurs in the process of information transfer.

Almost any human activity is associated with communication (man is a social being), and communication is impossible without the transfer of information.

The process of information transfer necessarily involves a source and a receiver of information: the first transmits information, the second receives it. Between them there is an information transfer channel - a communication channel. Information transfer is possible using any information encoding language that is understandable to both the source and the receiver.

An encoding device is a device designed to convert the original message of the information source to a form convenient for transmission. A decoding device is a device for converting the encoded message into the original one.

Example. During a telephone conversation: the source of the message is the person speaking; the coding device is the microphone, which converts the sounds of words (acoustic waves) into electrical impulses; the communication channel is the telephone network (wire); the decoding device is the part of the handset that we bring to our ear, where the electrical signals are again converted into sounds that we hear; the receiver of information is the person listening

During transmission, information can be lost or distorted: distortion of sound in a telephone , atmospheric interference affecting the operation of a radio receiver, distortion or darkening of the image on a television, errors in transmission by telegraph.

This interference, or, as experts call it, noise, distorts information. Fortunately, there is a science that develops methods for protecting information - cryptology, which is widely used in communication theory. Mankind has invented many devices for the rapid transmission of information: telegraph, radio, telephone, television. Devices that transmit information at high speed include telecommunication networks based on computing systems.

Information processing.

Processing (conversion) of information is the process of changing the form of presentation of information or its content. Information of anykind can be processed, and the rules for processing can be very diverse.

Examples of information processing:

Example of information processing

Input information

Conversion rule

Output information

Multiplication table

Factors

Rules of arithmetic

Work

Determining the flight time of the flight "Moscow - Yalta" Departure time from Moscow and arrival time in Yalta

Mathematical formula

Travel time

Guessing a word in the game "Field of Miracles"

Number of letters in a word and topic

Formally not defined

Guessed word

Obtaining secret information

Encryption from a resident

In each specific case

Decrypted text

Diagnosis of a disease

Patient complaints and test results

Doctor's knowledge and experience

Diagnosis

But do we always know how, by what rules, input information is converted into output?

Example. Children do not know what is inside a wind-up toy. They know one thing: if you wind up the toy, it will move. Most TV viewers know little about the structure of a TV. But when interference appears on the screen while watching a TV program, operating the knobs (buttons) of the settings often allows you to get a clear picture.

In the language of cybernetics, the TV viewer begins to manipulate the inputs, hoping to get the interference elimination at the output.

Such a system, in which only the input and output values are available to the observer, and its structure and internal processes are unknown, is called a "black box". It is no exaggeration to say that any thing, any object, any phenomenon - any cognizable object - always initially appears to the observer as a "black box".

Example. An engineer has a faulty computer in front of him, which is under warranty service. It cannot be disassembled, but the engineer must decide whether to send the device for repair or replace it with a new one. In practical activity, the doctor is faced with external manifestations of the disease, but the true state of the patient's body is unknown to him. The doctor is faced with the task of a "black box".

Processing information according to the "black box" principle is a process in which the user is only interested in and needs input and output information, but the rules by which the transformation occurs are of no interest to him, and they are not taken into attention.

Conclusion: Information does not exist in itself, it manifests itself in information processes. The most general information processes are the collection, transformation, use of information. Information processes carried out using certain information technologies form the basis of human information activity. A computer is a universal device for the automated implementation of information processes.

Content line: Information and information processes.

Lesson topic: In the world of codes.

Class: 5

Lesson objective:

-defines the concepts: code, information encoding, information decoding.

-encodes and decodes words.

-gives examples of information encoding and decoding.

Lesson objectives:

Educational:

• Show students the diversity of codes surrounding a person;

• Note the role of information encoding, learn to encode and decode information.

Developing:

• Developing students' interest in the subject "Computer Science"

• Using the example of completing a task on a computer, develop the ability to think logically

Educational:

• Foster a culture of communication, perseverance

• Foster a sense of collectivism, the ability to listen to others

Lesson type: Lesson on learning new material.

Equipment: multimedia installation, computers.

Lesson format: individual and group.

Lesson plan:

1. Organizational moment. (2 min.)

2. Preparing students to learn new material (updating knowledge, active

goal setting). (10 min.)

3. Studying new material. (10 min.)

4. Consolidating knowledge, skills (15 min.)

5. Summing up. (8 min.)

6. Reflection. (5 min.)

Lesson progress.

1. Organizational moment. (greeting, checking attendance).

2. Preparing students to learn new material.

Knowledge update: (the teacher asks students one after the other)

Let's recall the basic definitions and concepts that we studied in previous lessons:

1) number systems are...

2) types of number systems...

3) conversion from decimal to binary...

4) conversion from binary to decimal...

Active goal setting. (technique demonstrating multiple meanings.)

Demonstration of multiple meanings.

The teacher asks the following questions:

What do you understand by the concept of code?

Make a phrase with the word coding?

What associations do you have with the word decoding?

How do you think these words relate to our lesson? Let's

try to set the goals of our lesson.

Possible student answers:

1.know the concepts of code, coding, decoding.

2. where are these concepts used.

3. how is information coded and decoded.

3. Learning new material.

The teacher's story is accompanied by a presentation: A code is a system of conventional signs for representing information. Coding is the presentation of information using a certain code. Many codes have become an integral part of our lives. Thus, for communication in our country, the code is used - the Russian language.

The code is used to assess knowledge at school (the number "5" is the code for excellent knowledge, "4" is the code for good knowledge, "3" is satisfactory, "2" is bad). Guys, who knows what is shown on this slide? (After the students express their opinions, the teacher explains).

In the middle of the 19th century, the French educator Louis Braille came up with a special way of presenting information for the blind. The "letters" of this code are pressed onto a sheet of thick paper. One letter takes up two columns, each of which can contain three dots are pressed out. By running their fingers along the protrusions formed by the injections, blind people can distinguish letters and read.

You can find out information about a car and its owner from the license plate. Everyone is familiar with the following road signs (slide 9) And what do we encode with these signs?

What Role Does Information and Communication Technology Play in Education?

To find any type of information and communication technology (ICT) in our life today, we do not even have to leave the comfort of our own homes or rooms. Whatever it may be, whether it is a mobile phone, a plasma television, or a computer, we all have them in some capacity in our life. People in today's culture, who are users of information and communication technology, all aspire for the same ambition: the dream of living a connected life.

ICT eventually becomes a lifestyle choice for a significant portion of the population. According to Shermaningham (December 2008/January 2009), this lifestyle choice is also causing a change in the manner in which we communicate, a rise in the pace of shopping, and a shift in the way in which we engage with one another and receive information.

With the advent of information and communications technology (ICT), many elements of our life have been invaded and modified, to the point where we now live in an environment that is ruled by technology, which is driven by consumers (Semenov, 2005). No matter how we interpret its presence, there is no doubting that it is an essential component of our lives and that it will continue to be a part of our lives for the foreseeable future.

Each locality has its own six-digit code (postal code). It should be written on the envelope in a specially designated place. The code can be used to find out where to send the letter.

For example, the Moscow city code and the codes of all localities in the Moscow region begin with the number

1. And which locality's postal code is listed last?
2. Information is presented in the computer's memory in binary code as chains of zeros and ones.
3. Each symbol entered from the keyboard corresponds to a unique chain of eight 0s and 1s. For example, the letter "Q" has a binary code of 01010001, and the number "7" has a binary code of 00110111

4. Consolidation of knowledge and skills

Musical notes are also a way of encoding information. Many think that they have no ear for music, so they do not sing or play musical instruments. But now, with the help of information technology, everyone can create their own music. Let's try to do this. In front of you are some sheets of paper with notes, you need to write your own music using them. How can we play it? (students give their answers).

Have you noticed the new program installed on the computer? (MIDISCAN)?

Now, with the help of this program, we will play the music. And those who have musical instruments can do this at home.

After completing this work, the students, together with the teacher, come up with assessment criteria, then divide into pairs and assess each other. The task is completed on the card, after completing it, the students hand in the card.

1. Knowing that each number corresponds to a letter of the alphabet with the same serial number, decipher the following messages

(Answer: the cuckoo sewed a hood to the cuckoo)

Orally:

4. To find out the encrypted word, take only the first syllables from each given word:

a) ear of corn, furniture, cockroach;

b) milk, spawning, cockroach;

c) bark, lotto, boxer;

d) ram, wound, bathhouse attendant;

e) coin; horse, cow

Slide 15 is shown.

Teacher: Let's encode the word riddle.

Teacher: Now, using the source code, let's find out what is hidden behind the following digits.

14 16 19 12 3 1

Teacher: What have we done? We decoded the information. Try to

formulate a definition of decoding yourself.

Guys, you need to complete the following task: The words are encrypted. In order to find out the encrypted word, you need to leave only the second syllables from each given word, and delete the first or the last.

Remember, which key deletes the text written on the left? (Backspace) And which key deletes the text written on the right? (delete). The document with the following task is open.

a) nightingale, ceiling;

b) snake, frame;

c) button, hammer, lava;

d) reproach, elderberry, mud;

d) turn, powder, ditch

While completing the task, the teacher helps the students, since not all of them have enough skills with working on the keyboard. If there is a student who has completed the task quickly enough, the teacher appoints him as his assistant, and he also helps his classmates.

After completing the task, the children name the words that they got, and the correct answers appear on the screen.

5. Summing up.

The students evaluate themselves and justify their assessments.

6. Reflection.

The students write down the phrases on their pieces of paper:

I learned...

I felt...

I acquired...

It was difficult...

I succeeded most in...

I got from this lesson...

I thought...

Information technology.

Computer and its application.

Computer work. Methodical recommendations. Prepare an overview of the lesson topic

Relevance. Today, in developed countries of the world, information systems and technologies are being intensively introduced into the educational process at all levels of education.

New hardware and software that are constantly increasing the capabilities of the computer, the transition to the category of anachronism of understanding its role as a computer have gradually led to the displacement of the term "computer technology" by the concept of "information technology" (IT). This term refers to the processes of accumulation, processing, presentation and use of information with the help of electronic means.

The essence of informatization of education is defined as the creation of conditions for free access to large volumes of active information in databases, electronic archives, reference books, encyclopedias. If until recently information technology was perceived rather as some exoticism, an optional, but undoubtedly comfortable for the user element in the world of computer technology, now the situation has changed dramatically, in particular in the education sector.

Thus, didactically oriented software of today's generation, which are aimed at using IT, offer the user a great many options for individual adjustment, that is, the student in the process of mastering the educational material can independently set the speed of learning, the volume of educational and auxiliary material, focusing on the level of his difficulties, his own capabilities and life goals.

The modern stage of computerization of the educational sector, enriched by the possibility of using IT, is becoming a reality, which is currently already Status of the problem research. Currently, the consequences of using IT in education are being actively studied. A significant contribution was made by the works V.P. Bespalko, S.A. Beshenkov, Ya.A. Vagramenko, M.P. Lapchik, V.M. Monakhov,E.S. Polat, I.E. Robert, V.V. Rubtsov, E.G. Skibitsky, A. Bork, R. Williams and others. Psychological issues of using IT in education were studied by V.V. Davydov,T.V. Gabay, E.I. Mashbits, N.F. Talyzina, O.K. Tikhomirov, etc.

The purpose of the study is to study, based on a set of sources and literature, the theoretical and methodological foundations of using information technologies for distance work (using Moodle as an example). Based on the stated goal, we formulated the following tasks:

✓ to study the historical aspect of the use and problems of defining the concept of information technologies for teaching;

✓ to analyze the problem of pedagogical effectiveness and classification of information technologies;

✓ to characterize the psychological factors of using information

technologies;

✓ to consider the features of using Moodle in the educational process.

✓ to create a video instruction for teachers when working with Moodle.

The subject of the study is the process of using information technologies. The object of the study is technology in the education system.

1. General characteristics of information technology in education

1.1 Historical aspect of use and problems of definition of the concept

of information technology.

Computers were introduced to the education system of industrialized countries in the 80s of the last century. On the one hand, it was the latest management tool, on the other - a subject of study. Considering the past, it can be assumed that the idea of "computer literacy" was the main driving force behind attempts to introduce computers into the education system.

Students and their parents increasingly realized the need for computer-related skills. At the end of the twentieth century, it became clear that computers were beginning to be used in education not only for the sake of acquiring computer literacy, but also for other purposes.

Technological trends in both hardware and software began to change the status of the computer. The capabilities of processing different types of data increased, technical characteristics improved, computer equipment became compact and easy to use; the emergence of cheap equipment made it possible to communicate from one computer to another.

Thanks to the digital form of storing texts, images and sound on compact disks, the user has the opportunity to work simultaneously with information of different types of modality.

1.2 The problem of pedagogical efficiency and classification of information technologies.

Analysis of modern computer programs and experience of using information products in the general education system shows that a high-quality educational information product should have at least the following characteristics:

-the ability to be used to organize different types of educational activities;

-the ability to replenish educational material;

- a methodically substantiated graphical interface;

- moderate and justified use of video and audio materials;

- the ability to process different types of data;

- local and network operating modes.

However, any information is only a tool for the pedagogical practice of the teacher.

i. The following didactic features of teaching aids, which are based on the use of IT, create undoubted advantages (compared to traditional means) during the implementation of educational and cognitive activities.

Namely: information saturation; display of visually presented information of a substantially new level; the ability to combine logical and figurative ways of mastering information; the ability to present content at three levels:

observation, theoretical and practical, which allows integrating the abstractness of the theoretical with the concreteness and clarity of practical knowledge; implementation of a personal approach to learning: the ability to adapt to the individual style of the student; the ability to implement interactive interaction, communication in the information and educational space; expansion of means for the implementation of creative approaches to the methodology of teaching the subject.

Actual problems of the use of information technologies: the effectiveness of information training programs; classification of IT; the influence of computer technologies on the psychophysiological state of the student; communication of subjects of training; combination of traditional and informational teaching aids; formation of informational culture of future teachers; use of IT tools in studying different disciplines.

Thus, information technologies increase the efficiency of training, but only if they are used correctly by the teacher. Otherwise, as foreign and domestic studies show, information technologies will only distract from the educational process and complicate it.

2. Use of information technologies in the educational process

2.1 Psychological and pedagogical factors of using information technologies

The use of IT in education is undoubtedly connected with the fact that a modern computer is an effective means of optimizing the conditions of mental work.

New conditions give rise to new requirements for the learning process and, of course, for the teacher. To meet modern criteria, a teacher must know and use information and communication technologies.

The essence of the issue is not in increasing the level of knowledge of a specialist in developing the ability to find the necessary information, analyze it and implement it in practical activities, promptly respond to innovative experience, as well as design, create, experimentally test innovations, and be able to purposefully disseminate them.

Therefore, the main priority for the development of modern education is the introduction of modern information and communication technologies, which ensures further improvement of the educational process, accessibility and effectiveness of education, preparation of the younger generation for life in the information society.

Conclusion: To summarize, we note that the practical consequence of the introduction of information technologies in the learning process is:

- improving the organization of teaching, increasing the individualization of learning;

- increasing the productivity of students' self-study;

-individualization of the teacher's work;

- accelerating the replication of and access to the achievements of pedagogical practice;

-increasing motivation for.

learning; activating the learning process, the possibility of involving students in research activities; ensuring the flexibility of the learning process.

Content line:

Formalization, modeling, algorithmization

And Programming

Currently, computer science and information technology have become a powerful stream into our lives. It is difficult to name another area of human activity that would develop so rapidly and generate such a variety of problems as informatization and computerization of society.

The history of the development of information technology is characterized by a rapid change in conceptual ideas, technical means, methods and areas of application. In the modern world, the ability to use information technology has become very relevant for most people.

The penetration of PCs into all spheres of society convinces that the culture of communication with a PC is becoming part of the general culture of a person - the terms "Word", "Excel", "Internet" have become as commonplace as "telephone", "telegraph", "TV". But not everyone understands the difference between simply "pressing keys" and purposeful work on a computer, the ability to clearly set a task, and correctly approaching its solution, using software (the most suitable) to arrive at the expected result.

The computer science course was introduced to the school as a means of ensuring computer literacy of students, preparing schoolchildren for practical activities, for work in the information society. An important substantive line in the "Computer Science" course is the line

"**Formalization and Modeling".**

The computer science teacher has various goals. One of them is the development of logical and algorithmic thinking of schoolchildren. The correct approach to teaching the line "Formalization and Modeling" will make it possible to have a significant influence on the general development and formation of the students' worldview, as well as to solve many problems in their entirety.

Working with computer models that students use when studying the topic helps to form in students the concept of a computer model, as a method of understanding the surrounding life, to organize students' activities to create and study a computer model for practical use in various life situations.

The methodology is designed in such a way that students themselves look for answers to the questions posed by the teacher. This approach promotes the development of students' independence, develops their research competence, and enables students to choose the way to solve the problem themselves.

The goal set for students is to create a mini-project, which increases motivation to study computer science and other subjects. The program for the subject "Computer Science and ICT" by N.D. Ugrinovich "Teaching the basic course "Computer Science and ICT" in basic school is focused on teaching the subject according to the textbook by Ugrinovich N.D. "Computer Science and ICT, 9th grade" BINOM. Laboratory of knowledge.

Teaching the course is focused on the system-information concept of the program. The program "Computer Science and ICT" for the 9th grade at the basic level is designed for 2 hours per week (68 hours per year).

2. Section Objectives and Tasks

Objectives:

Educational:

- Students will master such concepts as model, simulation, formalization, research and analysis of a computer model as a method of understanding the surrounding life

Developmental:

- Developing students' research competence in modeling various processes for creating and researching a computer model for practical use in various life situations.

Educational:

- Fostering students' interest in studying the subject "Computer Science" and other subjects of the natural sciences and mathematics cycle, fostering a culture of behavior and computer literacy.

Objectives:

• to form an idea of approaches to classifying models;

• to form an idea of the types of information models depending on the form of presentation.

• to develop an indicative basis for students' actions when conducting modeling;

• to introduce students to the range of tasks for which it is possible to conduct modeling in application software environments;

• to consolidate the skills of working in application software environments.

3. Psychological and pedagogical explanation

The transition from childhood to adulthood is the main content and specific distinction of all aspects of a teenager's development during this period: physical, mental, moral, social. The importance of this age is also determined by the fact that in it the foundations are laid and general directions for the formation of moral and social attitudes of the individual are outlined.

The main psychological characteristic of senior school age can be considered a focus on the future. This applies to various aspects of mental life.

A senior schoolchild is on the threshold of social adulthood. He has specific life plans and motives corresponding to them. The ideas about the requirements of society for the individual become more real. For a schoolchild, the opinion of adults, including teachers, becomes more significant. The behavior of a senior schoolchild is increasingly becoming purposeful and organized, conscious, strong-willed.

Consciously developed or adopted criteria, norms and life principles of sorts play an increasingly important role. Elements of a worldview appear, a stable system of values emerges. Interest in the inner world - one's own, other people's, is born, the ability to put oneself in another person's place and empathize with him/her appears.

Educational activity becomes educational and professional, realizing the professional and personal aspirations of students. The leading place among high school students is occupied by motives associated with self-determination and preparation for an independent life, with further education and self-education. These motives acquire personal meaning and become significant.

The formation of a socially active position of a high school student's personality is carried out at every moment of their school life and studies and is determined, in particular, by the norm of established relationships and the nature of communication. This fully applies to computer science lessons.

Thinking at the level of formal operations requires the ability to formulate, test, and evaluate hypotheses. It involves manipulating not only known, testable elements, but also things that contradict the facts (e.g., "Let's assume, just for the sake of argument, that...").

The educational activities of 14-16 year old students have their own difficulties and contradictions, but there are also advantages that consist of selective readiness, increased susceptibility to certain aspects of learning. A teenager's great advantage is his readiness for all types of educational activities, making him an adult in his own eyes.

He is attracted by independent forms of organizing classes, complex educational material, the opportunity to build his own cognitive activity outside the children's association. At the same time, for teenagers, both the content and the process, methods, techniques of mastering knowledge are equally important.

The formation of learning motives is directly related to the satisfaction of the dominant needs of the age. One of such needs of a teenager is cognitive. Teenagers are attracted by the opportunity to expand, enrich their knowledge, penetrate the essence of the phenomena studied, comprehend the vital significance of knowledge and, above all, its significance for personal development.

The methodology of information modeling is associated with issues of systemology, system analysis. The depth of study of these issues depends significantly on the level of preparedness of schoolchildren.

The age of the students allows them to acquire knowledge independently.

This increases the ability for self-criticism and self-analysis, forms the skills of self-education. When performing practical work in the course, research tasks are also solved by independently searching for information on the

Internet, increasing the intellectual level of students.

This topic allows you to realize not only the cognitive, but also the creative needs of students, develops aesthetic feelings, the ability to see the beauty in life.

It is possible to study individual sections at home independently, and also use the project method.

Lessons focused on modeling perform a developmental, general educational function, since when studying them, students continue to get acquainted with another method of knowing the surrounding reality - the method of computer modeling.

4. Expected results of mastering the section of the program "Modeling and Formalization"

I believe that the main result of studying this topic is the formation of a system-information picture of the world through mastering the basic concepts of modeling. Development of the personality of students, the ability to solve educational and practical problems based on interdisciplinary knowledge for practical use in various life situations.

Acquisition by students of experience in solving problems of school subjects using computer skills and abilities and Internet resources, experience of creative activity and educational cooperation in achieving the goal.

- increasing interest in the subject;

- development of independence;

- the ability to find information on the Internet;

- the formation of a creative approach to work;

- the ability to process material;

- the realization of the creative potential of students, expressed in the ability to create a final product (in this case, a mini-project).

Result of the work: creation by students of a mini-project (model) using various software and Internet resources.

Students should know:

• what a model is;

• types of models;

• stages of solving problems on a computer;

• stages of modeling;

• principles of constructing a problem model;

• goals of conducting a computer experiment;

• main types of classification of models;

• main features of classification of models;

• characteristics of the classes of models under consideration;

• classification of an information model;

• methods and main stages of modeling.

Students should be able to:

• give examples of modeling and formalization;

• build models using a computer;

• conduct computer computational experiments;

• give examples of models related to a certain class;

• formalize problems;

• model in a word processor environment;

• model in a graphics editor environment;

• model in a spreadsheet environment.

5. Justification of the educational technologies, methods, and forms of organizing the activities of students used in the educational process for the section of the program.

The goal of a computer science and ICT teacher is to promote the formation of a personality capable of living in the information society. To implement the educational process when studying these sections, I use elements of the following pedagogical technologies:

• Traditional teaching;

• Developmental learning;

• Personally-centered teaching;

• Differentiated learning;

• Didactic games;

• Problem-based learning;

• Information technology;

• Project method;

• Health-saving technologies.

The following forms of organizing educational activity are the basis of the pedagogical process:

• Combined lesson;

• Lecture lesson;

• Demonstration lesson;

• Workshop lesson;

• Creative laboratory;

• Game lesson.

Methods: reproductive method, explanatory-illustrative, partially search, research.

Forms of work:

- Individual (self-education, self-control, self-assessment)
- Independent (workshops, knowledge tests, consolidation of material)
- Group, paired (drawing up a plan for studying the topic, creating creative projects,summarizing the material)
- Frontal (studying new material)
- Using problem situations (to set educational tasks)
- Studying literature, additional sources, Internet materials (for example, in the topic of creating presentations)
- The effectiveness of teaching and upbringing largely depends on the attitude of the students themselves to learning.

The need to acquire new knowledge is inherent in children by nature. According to psychologists, by the middle school level this need is sharply reduced, since the child is already overwhelmed with information. Here it is possible to use other natural needs of the child for this age: the need for communication, self-expression and self-realization, the need for new types of activity. It is these needs of teenagers that I try to take into account when motivating educational activities.

I consider the following tasks to be the most important for me as a teacher:

- to provide students with a sense of development, an experience of success in the activity, for which it is necessary to correctly select the level of difficulty of tasks and objectively evaluate the result of the activity;

- to use the content of the educational material in order to interest students and activate independent thinking;

- to organize cooperation of students in the lesson, mutual assistance, to create a positive attitude towards the subject as a whole;

- to see the individuality of each student, to motivate each one, to teach in the zone of proximal development;

- to build relationships with students correctly, to be interested in their successes.

Before studying, I announce to the students the name of the future topic and assign them homework to prepare short reports about what an object and an object model are, what models are needed for, what object models can be. I begin the first lesson of the topic with a frontal conversation about objects and models, we look at the following diagram, prepared by me on the slide:

object, process (chemical, physical, nuclear, social, etc.), phenomenon	need to study how? - by observing, studying the object itself; - create a model with the essential properties of the object or phenomenon for experimentation and study

In order to arouse interest in a new topic and its active assimilation by students, I use an entertaining plot (task):

- "For the experiment, we need cats with a tail length of 17 to 22 cm. The question is, is the cat Murka suitable for experiments if her tail is 19 cm?"

- Natural answer: yes.

- And if there are a lot of cats, what if we manually calculate whether they are suitable or not?

- There will be various suggestions. Perhaps there will not be the following one, which I offer to schoolchildren.

- Let's designate 17 cm on the x-axis with the letter a, 22 cm with the letter b,

19 - we will take as x. Then we can write the following condition: $a \le x \le b$.

And now we don't care whose tails we study. All measurements that are within the specified limits will suit us. (A condition for weight can be set on the y-axis. We will get another condition, say, $c \le y \le d$).

- What have we done? From a verbal description of the task we have obtained a symbolic version.

Who knows what this process is called?

It is quite possible that one of the guys who prepared the message will say that we have formalized the task. If there is no answer, then I will say so myself, smoothly moving on to further explanation of the theoretical material.

Object	**Object Systems of which the object consists**	**Models that can be executed**	**Stages of modeling**	**Actions**	**Modeling environment**
Human	circulatory - digestive - nervous - musculoskeletal - immune - etc. (having studied these systems, we will study the human body)	- drawings, photographs, collages - toys - dolls - anatomical skeleton - resume - medical card - portfolio - biorhythms - psychological and professional tests ……….	Statement of the problem Definition of the goals of modeling To perform a certain number of models on a given object. . Creating a model Testing the model Researching the model Accumulating results	Study of the personality of a person Content description of the object Analysis of results If the results correspond to the goal, finish the work, otherwise go back and do it again, making the necessary changes.	Development of an information model Conducting a series of experiments Development of a computer model Choosing the type of model, modeling tool

The stages of model construction, formalization is one of the steps of the algorithm, I am talking about modeling environments and computer implementation of models, research of models from different subject areas.

For homework I assign the execution of records with a list of objects, models that can be executed on these objects with a clear algorithm of execution, indicating the modeling environment.

In the next lesson I move on to the practical part of studying the material, where I use the research method. I suggest taking the following object for research and implementation of the model: a person ("Know yourself, and you will know the world," said the ancient sages). I project a table onto the screen - a hint, which we will fill in together with the students. In the process of work, they will supplement their tables in their notebooks independently.

I divide the students into groups (group work). Each student will complete all the work, but gradually and in a different order. The opportunity to choose always arouses the children's interest in learning. While some are writing a resume, another group is doing biorhythms in an electronic spreadsheet environment.

I have prepared the handout with the work algorithm in advance. Upon completion of one stage of the work, the students move on to the next.

I always conduct a frontal analysis of the completed work. As a homework assignment, I assign them to prepare text and graphic material for the portfolio.

I devote one of the lessons to completing the student's portfolio. The student chooses the execution environment. This can be a text editor, and programs for creating presentations or films, a website builder, or a desktop publishing system Microsoft Publisher. We look at the work collectively, rank the work by content, by complexity of execution. I always prepare a short material on personality psychology for the children.

I dedicate part of the lesson to professional testing. I conduct computer testing, which will tell the students those areas of professional activity for which they have abilities and inclinations.

Techniques and methods for creating motivation that I use in my lessons and which, in my opinion, allow for the most effective study of the material at any of the didactic levels:

Technique one: appeal to the life experience of children. Appeal to the life experience of students allows us to show children the applicability of the knowledge they receive in practical activities.

Thus, when studying modeling, I give the following situation as a vivid example - building an information model of the algorithm for purchasing some product.

First, together with the children, I decide on the type of product to be purchased. For example, it will be a printer. Then the question of its technical characteristics is decided (children unnoticeably for themselves simultaneously repeat the previously studied material from the topic "PC hardware"). Next, we consider all the possibilities of purchasing a printer with the characteristics named by the students. The proposed options are very diverse, but such a method as searching for a company specializing in the sale of office equipment via the Internet will certainly be mentioned.

Thus, it is possible to search for specific information via the Internet. On the same topic, I propose to complete a project to create an information model of a school evacuation plan.

Thus, turning to the experience of children is not only a technique for creating motivation, more importantly, students see the application of the knowledge they receive in practical activities. In our age of rapid development and use of information technologies, practical skills acquired in computer science lessons will be very useful to them in their professional activities.

Technique two: creating a problem situation

Undoubtedly, for many of us this technique is considered universal. It consists in the fact that a problem is set before the students, overcoming which the student masters the knowledge, skills and abilities that he needs to master according to the program.

For example, in the lesson: **"Modeling as a method of cognition."**

"To pass the computer test to determine career guidance, go to the shared folder of the main computer and open the test: "Professional testing"". (Login to the main computer will be unsuccessful, since the network card of the main computer is obviously disabled) Obviously, we will have to postpone the test.

Why do you think it is impossible to log in to the main computer? Students name various reasons: the network cable is not connected, a large number of connections at the same time, incorrect network settings, the workgroup of the main computer is not specified, etc. If there is no correct answer, I help to come to it (the network card is disabled or does not work) by asking leading questions.

Next, the students make up a sequence of actions to correct the malfunction:

1. open the device manager;

2. enable the network card;

3. update the driver.

As a result of the actions taken, the children repeated the topic of "telecommunication technologies" and were able to pass the test.

The third technique: role-playing approach and business game. In this case, I invite the student (group of students) to act in the role of one or another character. Playing a role forces you to focus on those conditions, the assimilation of which is the educational goal.

I use a role-playing approach when studying the topic: "Approximate solution of equations".

I ask the children to split into teams and come up with names. I distribute tasks with instructions for completing them. Each group receives instructions indicating the procedure for completing the work and the procedure for filling out an electronic report on the results of the experiment. At the end of the lesson, the results of the experiment should be presented by the responsible representative of the group.

I turn on quiet music during laboratory work. The group discusses the plan of action. Selects a student responsible for presenting the results of the experiment, the most competent member of the group.

After completing the task, the responsible groups make a presentation on the work done (what method was used to make the solution, and how much time was spent). Such modeling allows you to interest the children in solving equations.

Role-playing always enlivens the lesson, makes it interesting, gives the teacher the opportunity to make even the most difficult to understand material accessible for assimilation. Using such a lesson form as a business game can be considered as development of the role-playing approach. In a business game, each student has a very specific role.

Fourth technique: research and practice-oriented projects.

Creating a project is a complex process, but it encourages research and search activities. All students participate in such work with interest. This type of educational activity allows students to develop logical thinking, forms general educational skills and abilities. Previously colorless, sometimes not even supported by illustrations, speeches turn into bright and memorable ones.

In the process of demonstrating their developments, students gain experience in public speaking, which will certainly be useful to them in the future. Involving the student in creative work develops his ability to independently collect information and illustrative material, creative ingenuity, design skills, and most importantly, he gets satisfaction from the results of his work and a sense of self-sufficiency, which is the primary motive for a high school student.

To ensure sustainable motivation for learning activities, I widely use projects at all levels of computer science training. At the same time, a project, especially a research project, is often not only a form of knowledge control, but also a form of studying new material. When completing one project, you can study at least two topics in parallel. For example, when studying the topic "Computer Modeling", you can study M.S. Excel spreadsheets as a means of creating and researching a model.

For example, the research project "Forecasting the population of the Lukoyanovsky District".

Modeling stages:

1. Setting the task, determining the necessary initial data for computer modeling.

2. Searching for information on the population of Lukoyanovskiy district over the past 10 years.

3. Creating a tabular model of the initial data in the M.S. Excel program

4. Creating a graphical model of population dynamics.

5. Determining the type of graphical model.

6. Recording a mathematical model corresponding to the graph.

7. Calculating the coefficients of the mathematical model using Excel functions.

8. Testing the model on known population values.

9. Adjusting the model.

10. **Forecasting the population using the created mathematical model.**

11**. Analysis of the results**. Thus, the children feel like real researchers, and there is no need to explain in words the relevance of obtaining knowledge on the topics being studied.

I implement personality-oriented teaching very successfully. Teaching in conditions of constant access to a computer usually takes place with a heightened emotional state of students. This is explained, in particular, by the fact that with the correct formulation of tasks for the computer, the student very soon discovers a state of power over the “smart machine”.

This gives him confidence, the student develops a natural desire to share his knowledge with those who do not have it. The democratic system of relations that arises in this case unites the team in achieving a common educational goal, and the factor of knowledge exchange, the transfer of knowledge from more competent to less competent, begins to act as a powerful means of increasing the effectiveness of the educational process and the intellectual development of students.

I pay great attention to health-saving technologies. This is compliance with sanitary and hygienic standards: organization of the workplace, hygienic requirements for the correct seating of students, organization of the work schedule, cross-ventilation of the premises during breaks (if there are no students in it), physical education minutes for 1-2 minutes. To relieve local fatigue, they are performed individually when the initial signs of fatigue appear.

Thus, a variety of forms of work contribute to the activation of thinking and support of interest in learning.

Such study allows children to look deeper into themselves, to understand that research and analysis of personality, as well as the application of the results of work in real life can contribute to their further development.

In conclusion, one cannot fail to mention one more factor in the formation of positive motivation, without which all of the above may simply not work.

This is a friendly attitude in the lesson. For this, I pay attention to each student, praise the children for each new, even insignificant, but obtained by them result.

The teacher must behave correctly and always come to the aid of the child. This is exactly how I try to conduct my lessons. And this is another step, perhaps the most important one, on the way to forming a positive motivation for learning.

To sum up, I can say that there are no schoolchildren who are not interested in studying the topic. Everyone finds interesting, educational moments for themselves. Completing assignments gives students skills in working with various software products, toolkits for creating models, brings them satisfaction from the work done.

6. Results of applying methods and technologies

Control and assessment of students' knowledge, skills and abilities are the most important component of the pedagogical process. Students should know that any training is accompanied by testing, during which it is established how firmly and well the educational material has been learned. For this purpose, control measures are carried out not spontaneously, but systematically, each time the results are analyzed, and appropriate measures are taken for the timely correction of knowledge, skills and abilities.

Types of control when studying the topic "Modeling and formalization":

• input: test "Modeling";

• current: frontal survey, individual survey, tests, performing laboratory work, performing projects, reflection;

• thematic: practical test (creating a project) on the topic "Modeling and formalization" with test elements.

Type of control	Form of control	Technology of assessment
Input Tests Marking (self-control, mutual control)	Current Frontal survey Marking	Practical work on a PC Marking
Interactive test	Project implementation Marking	Reflection
Thematic Test work Marking		Computer assessment (according to the program)

During the study of the section "Modeling and Formalization", I conducted monitoring of the assimilation of this section by students. All 9th grade students have mastered the program material.

Students have mastered such concepts as: model, types of models, stages of modeling. They can give examples of modeling and formalization, build models using a computer, conduct computer computational experiments, formalize problems, model in various environments.

I conducted a study of students' attitudes to programs (Excel, Word, Visual Basic) using a questionnaire. After studying this topic, the rating of these programs in the eyes of students increased.

This topic is quite difficult, but interesting. It allows you to use interdisciplinary connections, broadens students' horizons, teaches them to think abstractly, and increases interest in the subject. A computer, as P. Norton emphasizes, is a powerful tool for helping people understand many phenomena and patterns.

Calendar-thematic planning in Computer Science, 9th grade

Program section “Modeling and formalization” Educational-thematic planning

№	Topic	Number	theory	practice	tests

	Including:	of hours			
1	Coding and processing of graphic and multimedia information	9	2	6	1
2	Coding and processing of text information	7	-	6	1
3	Coding and processing of numerical information	15	9	5	1
4	Fundamentals of logic	11	6	4	1
5	Fundamentals of algorithmization and object-oriented programming	4	4	-	-
6	Modeling and formalization	11	6	4	1
7	Informatization of society	4	4	-	-
8	Repetition	2	2	-	-

Modeling and formalization (11 hours)

The world around us as a hierarchical system. Modeling, formalization, visualization. Modeling as a method of cognition. Material and information models. Formalization and visualization of models. The main stages of development and research of models on a computer. Construction and research of physical models. Approximate solution of equations. Expert systems for recognition of chemical substances.

Information models of object management.

Practical work:

- Practical work 1. Project "Throwing a ball into the court"
- Practical work 2. Project "Graphic solution of the equation"
- Practical work 3. Project "Recognition of fertilizers"
- Practical work 4. Project "Models of control systems"

Information processes. Information coding. Computer and information.

Methodological recommendations. Prepare an overview of the lesson topic

By discipline: Computer science

Topic: "Information processes. Information coding"

Type of lesson: learning new educational material

Lesson type: theoretical work lesson (presentation of new material is accompanied by a slide show), story game to practice the acquired knowledge.

Duration: 1 academic hour

Lesson objectives:

1**. Educational**: Formation of an understanding of different types of encryption and decryption of information, formation of skills in distributing the volume of work, planning work time, structuring information

2. **Educational**: Fostering diligence, interest in the subject, attentiveness.

3. **Developmental:** Development of students' cognitive abilities, logical thinking, expansion of their horizons, ability to work at the proper pace, development of interpersonal communication and communication skills, initiative, self-confidence.

Lesson support:

Visual aids: PowerPoint presentation, task cards

Technical equipment: projector, PC

Interdisciplinary connections: disciplines "History", "Literature", "History of the arts"

Structural elements of the lesson:

1. Organizational moment
2. Updating of basic knowledge.
3. Explanation of new material
4. Story game "Cryptographers"
5. Summing up the lesson
6. Homework

Lesson progress

1. Organizational moment.
2. Updating of basic knowledge.

In the last lesson we looked at different types of information processes. One of them is information processing. Let's remember:

What is an alphabet?

What are natural languages? Give examples.

What are formal languages? Give examples.

What is an information process?

What processes in computer science are classified as information processes?

What is information processing? Give examples

3. Explanation of new material (presentation of new material is accompanied by a slide show).

We continue our journey through the ocean of knowledge called "Computer Science", and today we will stop at the island of "Information Coding". On this island, the inhabitants are very fond of coding and encrypting information.

The process of information processing is not always associated with obtaining new knowledge, information. The form of information often changes, but its content remains the same.

For example, this happens when translating a text from one language to another: from English to Russian; from spoken Russian to sign language for the hearing impaired. (slide 3)

This transformation of the representation of information from one symbolic form to another, convenient for its storage transmission or processing, without changing the content of the information is called information encoding.

The reverse transformation of information is called decoding A complete set of symbols used to encode text is called - the alphabet

Physical education minute: Let's try, using the semaphore and sign alphabets, to compose some kind of message. (Depending on the direction of the class, a short message may be offered, for example: "I love music", "I like to draw"). (Examples of alphabets slides 4-6)

In some cases, there is a need to classify information (letter, text, message) so that other people cannot read it. This is called protection from unauthorized access.

In this case, the information is encrypted

Encryption is also encoding, but by a secret method known only to the source and the addressee.

The science of cryptography deals with encryption methods

The history of cryptography is about 4 thousand years old.

There is evidence that cryptography as a text protection technique arose together with writing, and methods of secret writing were already known to the ancient civilizations

India, Egypt and Mesopotamia. In ancient Indian texts, among the arts, methods of changing text are named, some of which can be attributed to cryptography. The author of a tablet with a recipe for making glaze for pottery from Mesopotamia used rare symbols, omitted letters, and replaced names with numbers to hide what was written.

The great emperor Caesar used a cipher in his correspondence that went down in history as the Caesar cipher. In the Caesar cipher, each letter of the alphabet is cyclically shifted by a certain number of positions. The shift value can be considered as an encryption key.

Caesar himself used a shift of three positions

The most famous cryptographer of the 16th century can be called Blaise de Vigenere. In his treatise of 1585, he described a cipher where he changed the system of choosing a specific substitution cipher for each letter. One of the proposed techniques was to use letters of another plaintext to choose the key for each letter of the original text.

From the beginning to the middle of the 20th century, electromechanical devices were introduced into the work of cryptographers. Thus, at the beginning of the 20th century, telegraph messages were encoded and transmitted using Morse code. And from the middle to the 70s of the 20th century, the period of transition to mathematical cryptography began. Nowadays, the practical application of cryptography has become an integral part of the life of modern society - it is used to transmit information, it is used in cellular communications, paid digital television when connected to Wi-Fi, in transport to protect tickets from counterfeiting, and in banking operations, and even to protect e-mail from spam.

4. Story game "Cipherers"

And now, attention!

The museum received a message from the island residents with a request to hold an exhibition of paintings by famous artists. A list of paintings that the residents really want to see was attached to the letter. But the entire list is encrypted!

The museum asked you to help find out which paintings the island residents want to see. The class is divided into teams. The team names are written on the magnetic board. The teams are given tasks encrypted using different types of ciphers.

The children must independently distribute the cards with tasks among themselves. The players, having deciphered their task, write the answer on a sheet of paper and hang it on the board. The first team to decipher all the tasks wins.

After all the cards have been deciphered, the images of the pictures are displayed on the screen.

5. **Summing up the lesson**

So, today we learned what coding and decoding of information is, when cryptography is used and got acquainted with different types of ciphers.

6. **Homework.**

Guess the encryption rule and decipher the words:

Content line: Computer, information and communication

technologies

Content line: Information and information processes.

Lesson topic: In the world of codes.

Lesson objective:

-defines the concepts: code, information encoding, information decoding.

-encodes and decodes words.

-gives examples of information encoding and decoding.

Lesson objectives:

Educational:

• To show students the diversity of codes surrounding a person;

• To note the role of information coding, to learn to code and decode information.

Developing:

• To develop students' interest in the subject "Computer Science"

• To develop the ability to think logically using the example of completing a task on a computer

Educational:

• To cultivate a culture of communication, perseverance

• To cultivate a sense of collectivism, the ability to listen to others

Lesson type: A lesson on learning new material.

Equipment: multimedia installation, computers.

Lesson format: individual and group.

Lesson plan:

1. Organizational moment. (2 min.)

2. Preparing students to learn new material (updating knowledge, active goal setting). (10 min.)

3. Learning new material. (10 min)

4. Consolidation of knowledge and skills (15 min)

5. Summing up. (8 min)

6. Reflection. (5 min)

Lesson progress.

1. Organizational moment. (greeting, checking attendance).

2. Preparing students to learn new material.

Knowledge update: (the teacher asks students one by one)

Let's recall the basic definitions and concepts that we studied in previous lessons:

1) number systems are...

2) types of number systems...

3) conversion from decimal to binary...

4) conversion from binary to decimal...

Active goal setting. (method of demonstrating multiple meanings.)

Demonstration of multiple meanings.

The teacher asks the following questions:

What do you understand by the concept of code?

Make a phrase with the word coding?

What associations do you have with the word decoding?

How do you think these words relate to our lesson? Let's try to set the goals of our lesson.

Possible student answers:

1.know the concepts of code, coding, decoding.

2.where are these concepts used.

3.how information is coded and decoded.

3.Learning new material.

The teacher's story is accompanied by a presentation:

-A code is a system of conventional signs for representing information.

-Coding is the presentation of information using a certain code.

A multitude of codes have become very firmly established in our lives. Thus, for communication in our country, a code is used - the Russian language. The code is used to assess knowledge at school (the number "5" is the code for excellent knowledge, "4" is the code for good knowledge, "3" - satisfactory, "2" - poor).

Guys, who knows what is shown on this slide? (After the students have expressed their opinions, the teacher explains). In the middle of the 19th century, the French educator Louis Braille came up with a special way of presenting information for the blind.

The "letters" of this code are pressed onto a sheet of thick paper. One letter takes up two columns, in each of which three dots can be pressed. By running their fingers along the protrusions formed by the pricks, blind people can distinguish the letters and can read.

You can find out information about a car and its owner from the license plate.

Everyone is familiar with the following road signs (slide 9) But what do we encode with these signs?

Each locality has its own six-digit code (postal code). It should be written on the envelope in a specially designated place. The code can be used to find out where to send the letter. For example, the Moscow city code and the codes of all settlements in the Moscow region begin with the number 1. And which settlement's index is listed last? In the computer's memory, information is presented in binary code in the form of chains of zeros and ones. Each symbol entered from the keyboard corresponds to a unique chain of eight 0s and 1s. For example, the letter "Q" has a binary code of 01010001, and the number "7" has a binary code of 00110111

4**. Consolidation** of knowledge and skills

Musical notes are also a way of encoding information. Many think that they have no ear for music, so they don't sing or play musical instruments. But now, with the help of information technology, everyone can create their own music.

Let's try to do this. There are sheets of paper with notes in front of you, you need to write your own music using them. How can we play it? (students give their answers). Have you noticed the new program installed on the computer? (MIDISCAN)? Now, with the help of this program, we will play the music. And those who have musical instruments can do this at home.

After completing this work, students together with the teacher come up with assessment criteria, then divide into pairs and assess each other.

The task is done on the card, after completing it, the students hand in the card.

1. Knowing that each number corresponds to a letter of the alphabet with the same ordinal number, decipher the following messages: 12-21-12-21-26-12-1 12-21-12-21-26-16-15- 12-21 19-

26-10-13-1 12-1-17-32-26-16-15. (Answer: the cuckoo sewed a hood)

Orally:

4. To find out the encrypted word, take only the first syllables from each given word:

a) ear, furniture, cockroach;

b) milk, spawning, cockroach;

c) bark, lotto, boxer;

d) ram, wound, bathhouse attendant;

e) coin; horse, cow

Slide 15 is shown.

Teacher: Let's encode the word riddle.

Teacher: Now, using the source code, let's find out what is hidden behind the following digits.14 16 19 12 3 1

Teacher: What have we done? We have decoded the information. Try to formulate a definition of decoding yourself.

Guys, you need to complete the following task: The words are encrypted. In order to find out the encrypted word, you need to leave only the second syllables of each given word, and delete the first or last. the teacher draws the students' attention to slide

Remember which key deletes the text written on the left? (Backspace) And which key deletes the text written on the right? (delete). The document with the following task is open.

a) nightingale, ceiling;

b) snake, frame;

c) button, hammer, lava;

d) reproach, elderberry, mud;

d) turn, powder, ditch

While completing the task, the teacher helps the students, since not all of them have enough skills in working on the keyboard. If there is a student who has completed the task quickly enough, the teacher appoints him as his assistant, and he also helps his classmates.

After completing the task, the children name the words they got, and the correct answers are displayed on the screen.

5. Summing up.

Students evaluate themselves and justify their assessments.

6. Reflection.

Students write down the phrases on their pieces of paper:

I learned...

I felt...

I acquired...

It was difficult...

I succeeded most in...

I got from this lesson...

I thought...

I am dissatisfied because

Algorithm. Various characteristics of an object. Sequence of actions.

Methodological recommendations. Prepare an overview of the lesson topic

Course objective: development of logical and algorithmic thinking of students.

Objectives of studying the logical and algorithmic foundations of computer science in primary school:

1) development of students' problem-solving skills using approaches to solutions that are most typical and widespread in areas of activity traditionally related to computer science:

- application of formal logic in solving problems - drawing conclusions by applying logical operations to known statements "if ..., then ...", "and", "or", "not" and their combinations - "if ... and ..., then ...";

- an algorithmic approach to solving problems - the ability to plan a sequence of actions to achieve a goal, as well as to solve a wide class of problems for which the answer is not a number or a statement, but a description of a sequence of actions;

- a systems approach - considering complex objects and phenomena as a set of simpler components, each of which plays its role for the functioning of the object as a whole; considering the impact of a change in one component on the behavior of the entire system;

- an object-oriented approach - putting objects first, not actions, the ability to combine individual objects into a group with a common name, highlight the common features of objects in this group and the actions performed on these objects; the ability to describe an object based on the principle of "what it consists of and what it does (what can be done with it)";

2) expanding horizons in areas of knowledge closely related to computer science:

-familiarization with graphs, combinatorial problems,

- logical games with a winning strategy ("start and win") and some others;

3) developing students' skills in solving logical problems and familiarizing them with general techniques for solving problems - "how to solve a problem that has not been solved before" - with a focus on the problems of formalization and model creation (searching for patterns, reasoning by analogy, by induction, plausible guesses, developing creative imagination, etc.).

Features of the structure of the course "Computer Science in Games and Problems". The course includes the following sections:

- description of objects - attributes, structures, classes;

- description of the behavior of objects - processes and algorithms;

- description of logical reasoning - statements and logical inference schemes;

- application of models (structural and functional schemes) for solving various kinds of problems.

- Author's program of A.V. Goryachev "Computer Science in Games and Problems".

Educational and methodological complex according to the program of A.V. Goryachev. In accordance with the school curriculum for the 2015-2016 academic year, the work program is designed for 34 hours .1 hour per week.

SUBJECT PLANNING OF EDUCATIONAL MATERIAL

1st grade (30 hours)

Classification of objects (8 hours)

Identifying the characteristics of objects, recognizing objects by given characteristics.

Dividing two or more objects into groups according to the specified characteristics.

Action plan and its description (8 hours)

Sequence of actions. Sequence of states in nature. Carrying out a sequence of actions. Drawing up linear action plans. Finding errors in a sequence of actions.

Distinctive features and components of objects (10 hours) Description of sets, selection of different methods, establishing correspondence between different sets.

Logical models (8 hours)

Truth and falsity of statements. Logical reasoning and conclusions. Finding paths on the simplest graphs, counting options. Statements and sets. Building negation of simple statements.

As a result of training, students should be able to:

- find an extra object in a group of homogeneous ones;

- give a name to a group of homogeneous objects;

— find objects with the same attribute value (color, shape, size, number of elements, etc.);

— find patterns in the arrangement of figures by the value of one attribute;

— name a sequence of simple familiar actions;

— find a missing action in a familiar sequence;

— distinguish obviously false phrases;

— name words with opposite meanings.

2nd grade (34 hours)

Action plan and its description Sequence of actions. Sequence of states in nature. Carrying out a sequence of actions. Drawing up linear action plans. Finding errors in a sequence of actions. Getting to know the methods of writing algorithms. Getting to know branches in algorithms.

Distinctive features and components of objects Highlighting the features of objects, recognizing objects by given features. Comparison of two or more objects. Dividing objects into groups according to given characteristics. Components of objects. Logical reasoning

Truth and falsity of statements. Logical reasoning and conclusions. Finding paths on the simplest graphs, counting options. Statements and sets. Nested sets.

Constructing the negation of statements. As a result of training, students should be able to:

— suggest several options for an extra object in a group of homogeneous ones;

— distinguish groups of homogeneous objects among heterogeneous ones and give names to these groups;

— divide the proposed set of figures (pictures) into two subsets according to the values of different characteristics;

— find patterns in the arrangement of figures by the value of two characteristics;

— give examples of the sequence of actions in everyday life, fairy tales;

— accurately perform actions under the dictation of the teacher;

— distinguish statements from other sentences, give examples of statements, define true and false statements. Grade 3 (34 hours)

Algorithms

An algorithm as a plan of action leading to a given goal. **Algorithm notation forms:**

-flow chart,

-line-by-line notation. Algorithm execution. Algorithm creation. Search for errors in the algorithm. Linear, branching, cyclic algorithms.

Groups (classes) of objects

Common names and individual objects. Different objects with a common name. Different common names of one individual object. Composition and actions of objects with one common name. Distinguishing features. Values of distinguishing features (attributes) in different objects in a group. Names of objects.

Logical reasoning

Statements with the words "all", "not all", "none". Relationships between sets (union, intersection, nesting). Graphs and their tabular description. Paths in graphs.

Trees. Application of models (schemes) for solving problems

Games. Analysis of a game with a winning strategy. Solving problems by analogy. Solving problems on patterns. Analogous patterns. 4th grade (34 hours)

Algorithms

Nested algorithms. Algorithms with parameters. Cycles: repeating a specified number of times until a specified condition is met, for the listed parameters.

Groups (classes) of objects

Composite objects. The "consists of" relation. Scheme ("tree") of composition. Addresses of objects. Addresses of components of composite objects. The relationship between the composition of a complex object and the addresses of its components. Relative addresses in composite objects.

Logical reasoning

The relationship between operations on sets and logical operations. Paths in graphs that satisfy specified criteria. "If-then" inference rules. Chains of inference rules. The simplest "and-or" graphs.

Models in computer science

Techniques of fantasy ("on the contrary", "unusual values of attributes", "unusual composition of the object"). The relationship between the change of objects and their functional purpose. Application of the studied fantasy techniques to the materials of the previous sections (to algorithms, objects, etc.).

Expected results for the course "Computer science in games and tasks".

Personal results

Personal results of mastering information and communication technologies as a tool in studies and everyday life include:

-critical attitude to information and selectivity of its perception;

-respect for information about the private life and information results of other people;

-understanding the motives of one's actions when performing tasks with life situations;

-beginning of professional self-determination, familiarization with the world of professions related to information and communication technologies.

Meta-subject results

Regulatory universal learning activities:

-planning the sequence of steps of the algorithm to achieve the goal;

-searching for errors in the action plan and making changes to it.

Cognitive universal learning activities:

-modeling – transformation of an object from a sensory form into a model, where essential characteristics of the object are highlighted (spatially-graphic or sign-symbolic);

-analysis of objects in order to highlight features (essential,

inessential);

-synthesis – composing a whole from parts, including independent completion with replenishment of missing components;

- selection of bases and criteria for comparison, serialization, classification of objects;

- subsumption under a concept;

- establishment of cause-and-effect relationships;

- construction of a logical chain of reasoning.

Communicative universal learning activities:

-arguing one's point of view on the choice of bases and criteria when highlighting features, comparing and classifying objects;

-listening to the interlocutor and conducting a dialogue;

-recognizing the possibility of the existence of different points of view and the right of everyone to have their own.

• Subject results:

- determine the constituent parts of objects, as well as the composition of these constituent parts;

-describe the location of an object, listing the objects of which it is a part (similar to a postal address);

- fill in a table of attributes for objects from one class (each cell of the table records the value of one of several attributes for one of several objects);

- perform algorithms with branches; with repetitions; with parameters; inverse to the given one;

-depict sets with different mutual arrangement;

- write conclusions in the form of rules "if ..., then ..."; for a given situation, make short chains of rules "if ..., then ...".

Reference

1. Your first year teaching computer science: a practical guide to success for new computer science teachers by Chris Gregg 2021

2. Guide to Teaching Computer Science: An Activity-Based Approach Hardcover by Orit Hazzan 2015

3. Sue Sentance, Erik Barendsen, Carsten Computer Science Education: Perspectives on Teaching and Learning in School Schulte Bloomsbury Publishing, 2018

4. A Review of Computer Science in K-12, *An A to Z Handbook on Teaching Programming* 2021

The following are some of the most important things to keep in mind with regard to the significance of information and communication technology in education:

1.E-learning, often known as online learning, is a form of education that makes use of information and communication technology (ICT) to facilitate new learning experiences for both students and teachers.

This not only opens up opportunities for schools to ensure that students have access to curriculum materials while they are in the classroom, but it also enables them to ensure that students can learn outside of the classroom, such as at home or even in hospitals.

E-learning, also known as online learning, is becoming increasingly popular, and with the many unprecedented events that are occurring in our lives, this not only opens up opportunities for schools to ensure that students can learn.

2.One of the benefits of information and communication technology (ICT) in education is that it allows all of the pupils in the classroom to learn from the resources that are included in the curriculum. It is no longer the case that students with special needs are at a disadvantage because they now have access to critical materials, and students can employ specialized information and communication technology tools to better meet their own educational requirements.

In spite of this, it raises additional concerns over the "digital divide" and the provision of access to information and communication technology (ICT) tools and resources for people who are less privileged.

3.Higher-order thinking abilities, which include evaluating, planning, monitoring, and reflecting, are among the most important skills for the 21st century. Information and communication technology (ICT) helps to promote these skills. Skills such as explaining and justifying the use of information and communication technology in the process of developing answers to issues are required for the effective use of ICT in education. All of the many tactics that the students will employ need to be discussed, tested, and speculated upon by the students.

4. In today's world, it is common knowledge that the implementation of information and communication technology (ICT) in educational settings provides a great deal of value to essential learning domains such as reading and numeracy.

5. Both ICT literacy and ICT capability are 21st-century abilities that are best acquired while ICT stays transparent in the background of topic learning. ICT literacy and ICT capability are both developed through the usage of new technologies. Providing students with meaningful activities that are immersed in purposeful subject-related contexts is the most effective method for developing their capacity to use information and communication technologies.

6.To see how the use of information and communication technology (ICT) facilitates collaboration, all you need to do is bring a laptop, iPad, or computer into the classroom. Children are naturally brought together by information and communication technology (ICT), where they are able to chat and discuss what they are doing for their job. This, in turn, opens up possibilities for communication, which ultimately leads to the development of language.

7.Learning can be motivated via the use of information and communication technology (ICT). The demands of society for new technologies have not neglected children and their requirements. Technology is something that children are incredibly interested in, and it plays a role in encouraging and motivating them to learn in the classroom.

8.When information and communication technology (ICT) is incorporated into educational settings, students become more involved in their work, which in turn increases their ability to retain information. In terms of teaching the same topics in a variety of various methods, this is due to the fact that technology offers a variety of chances to make it more engaging and pleasant. As a result of this greater involvement, it is believed that students will be able to remember information in a manner that is both more effective and more efficient.

9.The use of information and communication technology makes it possible to implement successful differentiation in instruction. We all learn differently, at various rates, and in different ways, and technology makes it possible for this to happen effectively.

10.The incorporation of information and communication technology (ICT) is an essential component of the national curriculum. For instance, the incorporation of digital technologies, often known as ICT, is an important component of the Australian Curriculum. This is a trend that many governments across the world are adopting as they begin to recognize the importance of ICT in the field of education.

11.We live in a “knowledge economy": This is an economy where it is vital to have the ability to produce and use information effectively (Weert, 2005). It is a time when ICT is pervasive and permeates throughout all industries in the economy whether it may be health, education, environment or manufacturing (Moon, Feb/Mar

2007). The significance of ICT in the Australian economy was emphasised in the recent article by Alan Patterson, CEO of the Australian Computer Society, in his statement that the "ICT industry now rivals mining in terms of the contribution to the economy" (Patterson, Jan/Feb 2013, p. 8).

It will continue to be a significant part of our future as it connects itself to more and more aspects of our lives. It will continue to evolve and change because, as consumers, we all prefer to have options. We like to use information and communication technologies for personal development, creativity, and joy, as well as for consumption and riches (Semenov, 2005).

he Importance of Students Participating in Information and Communication Technology

It is essential for students to interact with information and communication technology in order to:

1. Develop their capacity to use information and communication technology (ICT) and cultivate their ICT literacy.

2. Raise the level of achievement that they hold.

3. It prepares them for a society that is integrated and dominated by improvements in information and communication technology.

4. In order for them to acquire the knowledge of how to use information and communication technology as a tool for learning throughout their entire lives.

If you put a lot of effort into your planning, you will notice a higher degree of involvement, and this can lead to the development of skills that are relevant in the 21st century, such as the ability to think in a complicated manner, creatively solve problems, and work successfully with others.

The incorporation of technology into the classroom is a decision that you, as the instructor, make from an educational standpoint. This decision should always involve collaboration and careful planning.

The Advantages That Our Information and Communication Technology Training Offers to Both Teachers and Their Students

Having a solid grasp and sound judgment regarding how to use information and communication technology skills in an appropriate manner is more vital than it has ever been for teachers in today's digital world.

In addition to assisting educators in remaining current with the most recent technological breakthroughs, information and communication technology (ICT) training may also be of great service to the students they teach in a variety of ways. Having a digital pedagogy in early childhood education and primary school is about having the attitude and the ability to do so.

The following is a list of some of the most important advantages that our information and communication technology training for educators offers, including the enhancement of teaching methods and the enhancement of student involvement.

Improved Teaching and Learning Experience.

One of the biggest benefits of ICT training for teachers is the improvement in the teaching and learning experience. With the use of technology, teachers can create more interactive and engaging lessons that cater to different learning styles. This can lead to better retention of information and improved academic performance for students. Additionally, ICT training can help teachers stay up-to-date with the latest teaching methods and tools, allowing them to provide a more effective and efficient learning experience for their students.

A higher level of engagement and participation from the students.

One of the most significant benefits of ICT training for teachers is the increased engagement and participation of students in the classroom. With the use of technology, teachers can create more interactive and dynamic lessons that capture the attention of students and keep them engaged throughout the class.

This can lead to better retention of information and improved academic performance for students. Additionally, technology can provide opportunities for students to collaborate and communicate with each other, which can enhance their social and communication skills. Overall, ICT training for teachers can have a positive impact on the learning experience of students and help them achieve their academic goals.

The ability to access a diverse assortment of educational resources.

Another benefit of ICT training for teachers is access to a wide range of educational resources. With technology, teachers can easily access online databases, educational websites, and digital libraries that provide a wealth of information and resources for their lessons. This can help teachers to create more diverse and engaging lessons that cater to the different learning styles and abilities of their students. Additionally, technology can provide opportunities for teachers to collaborate with other educators and share resources and ideas, which can enhance their teaching practices and improve the overall quality of education.

Communication and collaboration made significantly better.

ICT training for teachers can also improve communication and collaboration between teachers and their students. With the use of technology, teachers can easily communicate with their students through email, messaging apps, and online discussion forums. This can help to create a more interactive and engaging learning environment, where students can ask questions and receive feedback in real-time.

Additionally, technology can facilitate collaboration between students, allowing them to work together on projects and assignments, even if they are not in the same physical location. This can help to develop important teamwork and communication skills that are essential for success in the modern workplace.

We can assist you in establishing a foundation for the growth of your digital pedagogy in the following ways: our online professional development for early childhood teachers and primary teachers, as well as all of our educational resources, are all infused with the importance of information and communication technology (ICT) training for educators.

In order to facilitate student learning, technology should be utilized.

Technology is a powerful tool for teachers to help facilitate student learning. By utilizing technology such as interactive whiteboards, collaborative software, and other digital resources, teachers can create engaging and stimulating learning experiences for students. Additionally, these technologies can help make more complex topics easier to understand by providing visuals and audio feedback. Technology can be used in both the classroom and remotely to enhance student collaboration, comprehension, and communication.

Gain Knowledge of the Most Effective Methods for Classroom Integration

Teachers should become familiar with best practices for teaching with technology in order to ensure the successful integration of information and communication technology (ICT) into the classroom. This includes understanding the various learning styles of students and designing appropriate lesson plans to incorporate ICT tools. In addition, teachers should be comfortable using the hardware and software that is required to effectively teach ICT lessons. Participating in ICT training for teachers can help provide teachers with the confidence and skills they need to effectively use technology in the classroom.

Educate your students on the most effective methods for practicing digital citizenship.

The term "digital citizenship" refers to the responsible use of technology and decisions that impact both digital and physical communities. It involves teaching lessons on internet safety, website evaluation, data literacy, online etiquette, and other topics related to using technology with a sense of responsibility and respect.

There are many resources available online that can assist teachers in developing age-appropriate lessons on digital citizenship. When you have the tools and approach to use information and communication technology in the classroom, it is important for students to understand how to use technology in a manner that is both safe and appropriate.

Determine the Learning Objectives for Information and Communication Technology

You should determine what goals you have set for your students in terms of technology before beginning the lessons on information and communication technology (ICT). For instance, do you want your students to become proficient in a particular platform or language?

Do you require that all students create and demonstrate specific projects using technology by the end of the year? Answering questions such as these can help you determine what kinds of activities would be the most effective and how long each activity should take your students to complete.

Gain an understanding of the fundamental concepts of information and communication technology.

It is essential to have a solid understanding of a few key concepts before you can begin teaching your students about information and communication technology (ICT). The foundations on which you can build the majority of the training are elements such as digital citizenship, data storage and retrieval, network security, basic coding and programming, and computer literacy. Once you have a firm grasp of these concepts, you will be able to confidently introduce more advanced topics to your students.

The Benefits and Drawbacks of Information and Communication Technology in the Classroom

Although there are a lot of positive aspects to incorporating technology into the classroom, there are also some negative aspects to consider.

In my opinion, the following are some of the reasons why technology should be used in the classroom:

1. Enhance the learning of the subject

Technology can be utilized as a tool for learning, in addition to being used as a medium for entertainment and;

3. Make it possible for you to enhance students' capabilities in information and communication technology (ICT) and their literacy in ICT alongside topic study.

I have outlined below what I consider to be the advantages and disadvantages of utilizing technology in the classroom. In general, students should always use school technology as a tool for learning and as a means to an end by teachers. It should never be used simply because it is present.

Furthermore, simple exposure to technology in the classroom and the haphazard teaching of information and communication technology skills will not adequately develop a child's capability in the area of information and communication technology, regardless of whether it is incorporated into the curriculum or taught as a subject in and of itself.

The following is a list of the advantages and disadvantages that I believe technology in the classroom has.

A number of benefits

Online learning, often known as e-learning

Information and communication technology (ICT) in the classroom enables both students and teachers to learn in novel ways.

ICT makes inclusiveness possible.

It is no longer the case that students with special needs are at a disadvantage because they now have access to critical materials, and students can employ specialized information and communication technology tools to better meet their own educational requirements.

ICT enhances higher-order thinking skills and abilities.

One of the most important skills for the 21st century, which comprises, among other things, the ability to evaluate, plan, monitor, and reflect on one's actions.

ICT makes subject learning more effective.

These days, it is common knowledge that the implementation of information and communication technology (ICT) in educational settings provides a great deal of value to essential learning domains such as reading and numeracy.

ICT literacy and ICT capability are both developed through the usage of ICT.

In the 21st century, both of these talents are most effectively cultivated when information and communication technology (ICT) is kept in the background of topic learning.

By utilizing ICT, teamwork is encouraged.

Children are naturally brought together by information and communication technology (ICT), where they are able to chat and discuss what they are doing for their job. This, in turn, opens up possibilities for communication, which ultimately leads to the development of language.

The utilization of ICT inspires learning.

Children are captivated by technology, and it inspires and motivates them to learn in the classroom. The demands that society has placed on new technology have not neglected children and their requirements.

The use of information and communication technology in education increases student engagement and retention of information.

Students are more likely to be interested in their work when information and communication technology (ICT) is incorporated into the classroom. This is due to the fact that technology offers a variety of options to make the job more engaging and fun by teaching the same topics in a variety of different methods.

Utilization of information and communication technology enables effective differentiation of instruction using technology.

Every single one of us learns in a unique way, at a different pace and with a different approach, and technology makes it possible for this to happen.

The incorporation of information and communication technology is an essential component of the national curriculum.

For instance, the integrated use of digital technologies, often known as information and communication technology (ICT), is an important component of the curriculum in Australia. This is a trend that many governments around the world are adopting as they begin to recognize the value of ICT in instructional settings.

In the classroom, the disadvantages of the technology that is being used

From my point of view, the use of technology in the classroom has a significantly smaller number of drawbacks.

In the classroom, the usage of technology can be a source of distraction.

However, this is the reason why you should monitor technology to use in the classroom in addition to observing children's learning progression in information and communication technology (ICT). Students may appear to be usefully occupied with the task when, in reality, they are working very inefficiently and failing to exploit the potential of ICT. They may divert from the intended task without it being too obvious.

Students' opportunities for social connection may be diminished by technology.

This is not true, despite the fact that some people believe it to be. However, you must keep in mind that the use of technology in the classroom has the ability to bring students together.

It has the natural ability to encourage collaboration among students. Additionally, there are many ways for students to socially interact with technology in the classroom, such as blogs. Do I need to go?

Cheating can be encouraged by technology.

If this is referring to the Internet, then you should also consider it to be no different than a student handing on a book to another student and pointing out the same lines. However, there are various techniques or tools that teachers may use to prevent this from happening. Some examples of these tools are Turnitin and other similar programs.

Not every student has the same level of access.

It is possible that this is the most valid and significant of all the negative aspects. If there is one thing that a pandemic teaches governments, it is that technology contributes to the widening of the digital divide during extreme times like these.

It is clear that the benefits and drawbacks of implementing technology in the classroom are balanced in favor of the numerous opportunities that technology brings to teaching and learning. Despite this, there are some individuals who do not consider change to be important because they continue to adhere to the teaching methods and practices that are most effective for them in primary school classrooms.

Despite the fact that there is ongoing evidence that indicates that those who favor the disadvantages of technology in the classroom will be left behind if change does not occur in the classroom, these individuals continue to believe that the disadvantages of technology in the classroom carry more weight and influence than the advantages of technology in the classroom.

In a world that is increasingly online and digital, the pros and downsides of incorporating technology into the classroom continue to be a decision factor for many educators.

Why are these the best information and communication technology tools for use in the classroom today?

For the following reasons, these information and communication technology (ICT) tools for teaching and learning are the best in the primary classroom:

You probably already have these information and communication technology (ICT) tools for learning in your classroom or school because they are inexpensive.

2. They are generic, which indicates that they are easily accessible to a large number of people and are frequently utilized by both students and teachers.

3. Content-free software is a sort of software that presents children with intellectual difficulties.

4. Children who are in charge of technology - the information and communication technology (ICT) becomes a tool for learning in a range of different ways, and the demands of the situation

5. Foster the development of students' information and communication technology (ICT) capabilities and literacy; this is multiplied when you support and scaffold ICT learning in key learning areas.

How to Make Use of Information and Communication Technology in the Classroom

If you want to make the most of the potential that technologies have to offer in the classroom, you need to:

- Establish a beginning point for the information and communication technology (ICT) learning of each student and integrate formative assessment into the main learning areas of a primary school, such as literacy and numeracy.

- Make a plan for the evolution of information and communication technology (ICT) learning within the Learning Continuum of the Australian Curriculum.
- Make use of instructional methods that are supported by evidence and that are based on information and communication technology (ICT) knowledge.

PLEASE DO NOT GO IN THE DIRECTION OF THE MOST RECENT TECHNOLOGICAL DEVELOPMENTS IN THE EDUCATION SYSTEM!

ICT PROFESSIONAL DEVELOPMENT: WHY IS IT IMPORTANT FOR YOU?

"Teachers need specific professional development opportunities in order to increase their ability to use ICT for formative learning assessments, individualized instruction, accessing online resources, and for fostering student interaction and collaboration."

Learn also about other technological applications that are underused in the classroom:

Edagogy and information and communication technology: how to use ict tools for classroom learning (online workshop)

ICT tools that are both the best and most appropriate for empowering you.

The evaluation of the incorporation of technology in the lesson plan

Language, literacy, and early childhood education can all benefit from the use of excellent ICT learning tools.

How does information and communication technology improve learning and teaching?

However, some of the most important ones are as follows: there is a list of factors that indicate how information and communication technology might improve teaching and learning in the 21st century:

Motivating students to learn.

- The levels of student attained knowledge.
- Student engagement in subject learning.

The list of information and communication technology (ICT) instruments that are used in classroom instruction is broken down into several learning domains.

Subsequently, this will serve to highlight the advantages that each offers to both educators and pupils.

TECHNOLOGIES THAT ARE INTELLECTUALLY CHALLENGING AND CAN BE PLACED IN THE CLASSROOM

The Use of Information and Communication Technology to Foster Literacy

With the 'new literacies' comes new ICT skills as literacy is no longer limited to reading paper books and texts. Today, new literacies brings the learning of new technologies which are essential for students to master if they are to be literate for the 21st century. New technologies can be used to do traditional things in a different, more motivating way. As a consequence, teachers are challenged not only to integrate technology into traditional aspects of literacy instruction but also to engage students in emerging technological literacies.

Student proficiency in word processing skills is something that they will continue to utilize and improve upon throughout their time in school because of the close connection between word processing and the development of literacy and language skills.

Students have a wonderful opportunity to work together and connect with one another through the use of an online word processor by creating blogs.

- Wikis (also known as "What I Know Is"): These can serve as a store of information for students, and similar to blogs, the possibilities for wikis are extremely broad. Some examples of wikis include research projects, writing projects, and library projects, to name just a few.

When it comes to improving skills in online literacy, emails are an excellent tool. We all write differently online, and we all write for different audiences.

- **Web development and design:** These are essentially online word processors, and as a result, the possibilities in literacy classes are virtually limitless; nevertheless, the teacher's own competence in information and communication technology may be a limiting factor.
- **Web searching (Information literacy skills):** The capacity to locate information is an essential talent to possess in the 21st

century. What methods are available to explore electronic texts and the internet? Where are the signposts and hints that may be found?

- **Drawing and graphics programs:** Visual literacy is equally important today than ever before. Imagine demonstrating to your students how to use one of these drawing or graphics programs so that they can use it creatively in order to add an image to a newspaper article, to understand how pictures can sometimes tell a thousand words just by the colour, expressions or medium used
- Utilize the power of video to assist children in the development of their language abilities through the use of digital video.
- **Spreadsheets and Databases:** Who said that they can't be utilized in English lessons? What about potential for the teaching and reinforcement of a range of higher-order language abilities, such as keyword selection and the skimming and scanning of text?

Tools Utilizing Information and Communication Technology to Encourage Literacy and Language Development in Early Childhood Education

The most general educational goal that early childhood educators strive to achieve is the growth of the child.

In early childhood education, information and communication technology (ICT) can be utilized to facilitate the acquisition and development of both language and literacy.

The majority of this is accomplished through activities that include working together with other children around computers, where the quality of the conversations that take place can be highly intriguing.

Computers provide a "print-rich" learning environment for young children. You will most likely notice that there is a great deal more attention to detail in their conversations than in other situations. Some people believe that this may be due to the abstraction that the computer provides, as it is commonly believed that it forces children to talk more and physically do less.

- Programs that are developmentally appropriate - When selecting the most developmentally appropriate programs, there are a few things that you need to keep in mind. It is essential that you look for programs that encourage children to speak, listen, read, and write. There are programs that can record children's voices. One example of such a program is the Gruffalo App, which enables children to record their voices in time with the story that is being told.

Additionally, they are able to listen to their own voice throughout the story as it is being told.

- **The Internet:** The Internet may also assist children in learning literacy skills in their native language as well as in the language of their friends.
- **Word processors:** These provide children with the opportunity to compose and write without the need for them to have mastered the production of letters by hand. Information and communication technology (ICT) learning tools for early childhood education offer such a wide variety of ways for children to learn, and the use of photos and videos is another method to develop literacy and language skills. The reason why this is the most popular activity for this is because it enables children to weave together words and pictures.

I would recommend using these primary information and communication technology (ICT) learning tools to assist in the development of reading and language skills.

In addition to multi-link headphones, digital cameras, webcams, audio recording software, walkie-talkies, and telephones, there are other instruments that can be utilized to foster the development of speaking and listening abilities.

On a wide scale, interactive whiteboards and smartboards are utilized to develop writing abilities; nevertheless, the majority of the time, these are used in conjunction with the ones I outlined previously.

There is a wide variety of information and communication technology (ICT) tools that can be successfully integrated in a learning environment. Since learning environments in early childhood can now be both indoor and outdoor, these technologies can have a more extensive range of applications.

Primary educators are tasked with the responsibility of improving students' information and communication technology (ICT) capabilities through the process of effectively integrating technology into the classroom. Students are required to make progress in their learning in ICT competency from Foundation to Level 4 in Year 6.

I have compiled a list of the best information and communication technology tools for elementary schools.

Students are expected to make progress in their skills throughout primary school and should be able to save documents, save them in different formats, and understand what those formats mean. You should have the ability to effectively assist students in developing key typing skills and provide them with access to printers. Word processing is a fundamental and essential skill that students should have throughout their formal education.

Like with word processors, you need to be able to save documents and have adequate typing abilities in order to use spreadsheets. The primary essential skills include the ability to set up columns, use basic formulas, insert and delete rows, change font size, and other similar tasks.

Students need to know both practical skills and critical skills such as understanding domain names and what they mean, knowing which are more trustworthy, and knowing which are more useful for information and research. o Information literacy skills The ability to search the internet is an essential skill in this age of information.

Students can enhance their higher-order skills by crafting a story and practicing animation (clay or drawing) — stop motion is the ideal way for students to practice animation. They can also build their skills by planning, monitoring, and evaluating their own work.

• **Presentation software** – you could use Prezi or PowerPoint, whichever one you prefer and are familiar with the most. Ensure that by the end of primary school, they leave with skills such as being able to create handouts and notes pages, setting up animations, designing their own slide design and inserting tables, images, and smart art graphics.

- Blogging is a form of website or a section of a website that may be updated with fresh content on a regular basis. The majority of blogs are interactive and provide students with the opportunity to have a controlled presence online.
- Web 2.0 is one of the best ways for kids to develop higher-order abilities. It includes social networking sites like as Twitter and Facebook, where school pages may be created, as well as Tumblr, which is fantastic for posting digital photographs with brief captions.
- Publishing programs, the most well-known of which is Microsoft Publisher, which is an excellent tool for helping students build their literacy abilities and is therefore particularly important in elementary school instruction.

Students are able to create a video, edit it, and analyze it because the majority of iPads come equipped with a recording camera. Students may then transfer the video to a program where they can continue to piece together their work.

The design of websites is something that students can do at any time and from any location in this day and age. Did you know that if they have Microsoft Word, they can use this application to make a single web page? That is pretty cool, isn't it?

In what ways may information and communication technology (ICT) in education benefit your pupils today?

You may have observed it yourself, but the digital divide between people who are capable of using information and communication technology and those who are not is being heavily exposed. I came to realize a significant realization about what is occurring right now with the global pandemic the other day.

As a consequence of this, the value of utilizing information and communication technology in the classroom has never been more significant.

In this blog, I will discuss the significance of information and communication technology (ICT) in education. You will gain this knowledge by observing an example of the application of ICT in education. However, before I begin, let us first examine what ICT in education actually is.

ICT: A Definition

What does the acronym ICT stand for in the field of education? ICT is an abbreviation that stands for "Information and Communication Technologies." This is a phrase that has been given many different meanings, and although it can be rather broad, defining the most appropriate ones to use will enable you to successfully implement ICT in the classroom.

ICT in Education: What Does It Mean?

There is so much information and communication technology (ICT) that is being introduced into the education sector these days that it is almost impossible to keep track of it. However, depending on where you work, you might not have access to them. Because of this, I will make this relatively easy for you to comprehend. You do not need the most cutting-edge ICT in education to accomplish your objectives of incorporating ICT into your learning environment.

Therefore, what exactly is information and communication technology (ICT) in education? The ICT that you use in your classroom can be selected by applying the following criteria.

- Content-free and generic, which means that the majority of the things that you can successfully integrate new technologies with are already in your possession;
- to present students with intellectual challenges;
- Allows pupils complete control over the information technology;
- Allows pupils to exercise a significant amount of control over the decisions that are made.

In this context, I am talking to information and communication technologies (ICTs) in the field of education, including word processors, databases, spreadsheets, codes, and multimedia programs like presentation software.

What are the most used ICTs in education?

The application of information and communication technology (ICT) in education will be explained in later blogs that I have written; nevertheless, according to other sources, the most common utilizations include the following:

- **Social networking sites and blogs; ***

Planned using information and communication technology tools;

· storing of information in the cloud;

-whiteboards that engage the audience.

Additionally, you will find additional material on the advantages of utilizing ICT in the classroom here.

Acquiring an understanding of the reasons why educational institutions should invest in information and communication technology

The numerous reasons or advantages of information and communication technology (ICT) in education were discussed in a previous blog post; nonetheless, in order to provide you with an idea of what the benefits of ICT in education are, they would include the following:

- **An increase in the pupils' level of engaged and motivated participation;**
- Foster communication and information technology skills among students;
- Cooperative effort or activity;

- Encourages moral insight;
- Conducting a search for sources on the internet;
- Increasing the zeal with which students pursue education;
- the use of interaction;
- Fostering creative expression;
- Enhanced interactions and communication;
- The adaptability of educational experiences.

We at ICTE Solutions Australia are aware of the fact that you require professional development in the area of technology integration. By means of our online professional development courses, we are able to demonstrate to you how we can successfully implement ICT in educational settings.

When properly incorporated into your teaching and learning, you can help bridge the gap on the digital divide. You can also help show students the ICT capabilities that they will need in the future when and if another pandemic occurs. This is the reason why information and communication technology (ICT) is so important in education during a pandemic.

ICT Policy Advice for Schools

As an educational leader, if you want to make change happen, then one of the things that will need to be constantly amended and reviewed is the school's information and communication technology (ICT) policy. This is one of the factors that form the ICT culture of the school and influence the development of ICT capability and ICT literacy at the school. Schools today have well and truly entered the 21st century and what is known as the information age.

This is a time when information is driven by the integration of ICT and technology. It is a time when information is driven by the integration of technology and other forms of information and communication technology (ICT) integration.

ICT policies in schools should also take the shape of a vision for the entire school, and as a result, they should be partially developed by various members of staff who are members of the ICT committee. ICT policies in schools consist of numerous sections that serve as a roadmap for staff to follow.

Curriculum in informatics. (II class)

The advancement of technology has an impact on education in schools and increases the number of options for efficient learning among students. It is becoming increasingly common knowledge that the fields of informatics, computer science, and computing play increasingly important roles in the education of students.

The following are some examples of arguments that are presented and discussed in support of the inclusion of informatics education in schools: Don Passey (2019) presents the six main arguments for wider-scale introduction of the informatics subject, the implications for researchers, schools, teachers, and learners, and evidence of outcomes of informatics in compulsory school education.

Furthermore, in his book titled "Learner-Centered Design of Computing Education" (Guzdial, 2015), Mark Guzdial compiled an excellent list of the reasons that were presented. According to the CECE-Report (2017), the curriculum for informatics is often determined either on a national or state level.

Teachers who are well-qualified and who deliver topics that resonate with students, teachers who motivate students, teachers who stimulate their deeper thinking skills, and teachers who attract their curiosity to continue the course further are all essential to the success of the curriculum, which is important for schools and especially for those who make decisions about issues pertaining to education policy.

Recent research conducted by Denning and Tedre (2019) in their book titled "Computational Thinking" has identified four distinct stages of development in the field of computing and computational thinking.

1) Phenomena that involved computers between the 1950s and 1970s!

2) The 1970s saw the beginning of programming as both an art and a science.

3) The 1980s saw the rise of computing as robots. Fourth, computing as an all-encompassing information process (from the 1990s to the current day).

Through a variety of activities, such as data analysis, modeling, or robotics, students can be introduced to various parts of computational thinking. This can be accomplished by having them participate in algorithms and programming.

A comprehensive picture of the current condition of informatics education at the school level has been presented by the

Committee on European Computing Education (CECE), which was jointly founded by the Association for Computing Machinery Europe and Informatics Europe. In the first of the three primary suggestions for the curriculum of informatics, which can be found in Figure 1, it is stated that "all students must have access to ongoing education in informatics in the school system."

In the best case scenario, instruction in informatics should begin in elementary school, and at the very latest, it should begin at the beginning of secondary school. (Report of the CECE, 2017). A two-tier method that is implemented throughout all educational levels is an essential component of the program known as "Informatics for ALL."

1) Informatics as a field of specialty, which is a fundamental and independent subject throughout the educational system,

2) the incorporation of informatics with other disciplines that are taught in schools. Learning to Compute (also known as specialization) and Compute to Learn (also known as integration) are the names given to these two developments.

In the field of informatics, the following are some fundamental principles and practices:

Data, information, and representation, algorithms and programming, patterns and parametrization, abstraction and conceptual modeling, and devices, networks, and the web are all topics that will be covered in this course by the students.

● The process of computing and communicating.

● Design and interface concepts. The concepts of security, privacy, and ethics. The influence on society.

If the execution of the program is visible, for example by moving robots or drawing images, then the functionality of the program, which is generated as a result of the activity of the learners, can be explored in an exceptionally effective manner.

The phrase "learning by getting things to work" should not, however, be limited to the realm of programming. If, for instance, the product of the activity of learners is a cryptosystem, then one can analyze this product by putting it to use in the process of communication and by attempting to break it.

It is possible to design the instructional process by adhering to the constructionist philosophy, which may be applied to everything that we wish to teach. In the field of informatics, the "unplugged" style is an embodiment of the constructionist ideas that promote the tactics of employing more kinesthetic and active techniques (Kirschner et al., 2006).

Comprehensiveness of learning results across all levels of education The data that has been compiled from the various educational systems in Europe demonstrates unequivocally that the number of educational systems that define learning outcomes in relation to informatics significantly increases from elementary to upper secondary education. In addition, as students go through the various stages of education, they are exposed to instruction in a greater range of subject areas.

When it comes to elementary education, the subjects that are most frequently taught in school curriculum across Europe include safety and security, programming, and artificial intelligence algorithms. Less than one-third of the educational systems in Europe explicitly include learning outcomes that are associated with data and information, networks, awareness and empowerment into their curriculums. There are just a few that incorporate learning outcomes that are associated with computing systems, modeling and simulation, people–system interface, and design and development.

Generally speaking, the teaching of informatics becomes more widespread beginning with lower secondary school. This is evidently represented by the much increased number of learning outcomes that are associated with the various domains of informatics. Programming, algorithms, safety and security, networks, data and information, awareness and empowerment, and computing systems are all topics that are expressly addressed by the majority of European education systems at this level of education provision.

However, this is only the case in a small fraction of the educational systems in Europe. This is the case for the fields of modeling and simulation, people–system interface, and design and development.

The subjects of algorithms, programming, and safety and security are officially included in the curriculum of more than thirty European education systems for students in elementary and secondary school. Computing systems, networks, data and information, awareness and empowerment, and networking are all topics that are covered by the majority of educational systems. The remaining three domains, namely design and development, modeling and simulation, and people–system interface, are incorporated into over a dozen educational systems, which is a greater number than at lower levels of education.

Students who want to pursue the optional informatics topics are typically the only ones who are required to pursue those learning objectives at this level of education, in contrast to the situation in elementary and lower secondary school, where learning outcomes are typically required for all students. In spite of this, more than a dozen countries offer compulsory informatics studies that encompass a wide variety of subject areas.

The most important aspects of education in informatics in terms of the consequences of learning The most common types of learning outcomes are those that are associated with both programming and algorithms. There are currently learning outcomes in primary school that are related to algorithms in more than half of the nations in Europe. The majority of countries, almost fifty percent, specifically address this subject at all three levels of schooling.

One of the areas that is frequently incorporated into the teaching of mathematics is the study of algorithms. The field of programming is closely connected to the field of algorithms, and in some educational programs, these two fields are presented as if they were a single field. The majority of the time, specific programming languages are not presented in the curriculum of schools. In its place, they concentrate on fundamental ideas, and the programming language that is used for the Informatics instruction at school in Europe 12 is selected by the schools or by the individual teachers.

Educational goals that are associated with programming, such as those pertaining to the field of algorithms, are already extremely prevalent in the curricula of European schools. In about half of the countries, these are incorporated in the educational system from elementary school all the way up to upper secondary school. Learning objectives that are related to safety and security are quite widespread in European school curriculum.

This is due to the fact that digital competence is considered to be a particularly important competence. However, particularly in secondary education, its content may extend beyond the safe use of technology to cover the technical methods to detect and mitigate security concerns. This is especially true in the primary education sector.

In basic education, about half of the countries already address this topic, and in secondary school, three quarters of the countries do so as well. Learning outcomes that are related to safety and security are included in the curricula of all three levels of education in more than one third of the countries.

A little over a dozen nations have previously addressed the topic of networks in primary school and have established learning outcomes that are connected to this topic at all three levels of education.

Nearly three quarters of the educational systems in Europe incorporate explicit learning outcomes linked to this subject area into their curricula for students in the upper secondary level of school. In a similar vein, the majority of educational systems focus on data and information at the secondary level, while fewer than a dozen educational systems treat this subject from the primary level all the way up to the upper secondary level. The subject of awareness and empowerment is frequently included in the curriculum of schools that are concerned with information technology.

More than half of the nations in Europe address this issue in lower and upper secondary education, despite the fact that only one quarter of the countries in Europe already have clear learning outcomes related to this subject area in primary school.

Consequently, the current investigation of educational programs in European schools substantiates the notion that there is a growing recognition of the significance of the social impact components in the field of informatics education.

There are just a handful of nations, including Greece, Switzerland, Liechtenstein, Montenegro, and North Macedonia, that have connected learning outcomes at all three levels of education. Computing systems is a subject that is not typically taught beginning with primary education. On the other hand, more than half of the countries explicitly integrate this subject in their computer science and information technology curricula beginning with lower secondary education.

The topic of modeling and simulation is one that is not typically covered in the curricula of schools that teach informatics. There are only five nations that have clear learning outcomes for this subject area in primary school. These countries are Bulgaria, Czechia, Greece, France, and Slovenia. Of these five countries, only three of them handle this topic at all three levels of education: Czechia, Greece, and France. On the other hand, this subject is taught in the upper secondary level of school in more than a third of the European education systems.

Design and development is yet another subject that does not appear to be incorporated in school curricula in a particularly specific manner. Greece, Poland, and Turkey are the only three countries that consistently achieve similar learning outcomes throughout all three levels of schooling. Ireland, France, and Latvia are the other three countries that address this topic in both lower and upper secondary education.

More than a third of European countries include this subject in their upper secondary school systems, which is where it is most prevalent. Finally, in terms of learning outcomes, the field of people–system interaction is less established in school curriculum, similar to the way that design and development are less developed.

Only Greece, Croatia, and Hungary have already included explicit learning outcomes from elementary education, and only a little more than a dozen nations include learning outcomes that are related to primary education in upper secondary education.

Curriculum in Informatics (3 rd grade)

In the Computer Science Grade 3 course, students will be able to gain fundamental abilities in computer science through the use of content that is both engaging and appropriate for their age group.

Students will be introduced to a variety of ideas, including problem-solving, algorithms, and fundamental computer abilities, during the course.

Students will take part in an offline environment in which they will learn block-based coding. In addition, students will acquire knowledge on the responsible utilization of technology, the application of typing techniques, the qualities of becoming good digital citizens, the identification of cyberbullying, and the ability to communicate effectively and safely with technology.

The goals of the curriculum are designed to represent the distinction between the three strands of the curriculum, which are computer science, information technology, and digital literacy. The curriculum may be split down into these segments.

The national curriculum for computing has the following goals in mind for all students:

- possesses the ability to comprehend and implement the fundamental principles and concepts of computer science, such as abstraction, logic, algorithms, and data representation (Computer science); is able to analyze problems using computational terms; and has a significant amount of practical experience writing computer programs in order to solve problems of this nature. Computer science (Computer

- users who are responsible, competent, confident, and creative in their use of information and communication technology are able to analyze and apply information technology, particularly new or unfamiliar technologies, in an analytical manner to solve problems (Information technology). (The ability to use tech)

Gain an understanding of the fundamentals of computer science. Utilizing Scratch, a block coding language, you may construct projects and find solutions to problems with debugging. Through the process of recognizing variables, loops, and conditionals, you can develop your analytical and computational thinking skills. Internet safety, real-world technological challenges, and a variety of STEM jobs are some of the topics that are covered in the lessons associated with Unplugged and Digital Citizenship. Students will have acquired the knowledge and abilities necessary to independently code projects by the time this course is over, and they will have significantly expanded their grasp of block coding.

Learning Goals and Objectives

The purpose of each lesson plan is to provide students with the opportunity to attain particular learning outcomes that are associated with computer science capabilities that are aligned with the course. As an illustration, by the time they have completed this course, students will be able to:

The result of functions should be predicted, and variables and loops in the code should be identified.

Show that you have an understanding of how conditionals work by coming up with examples and naming them.

Make use of your familiarity with Scratch blocks in order to develop a program that accomplishes the goal you have set aside.

Provide an overview of the operation of variables in the code.

Describe the function of online communities as well as the advantages they offer.

Provide an overview of the ways in which they can evaluate the reliability of digital media by employing a critical lens.

The standards for the third grade place an emphasis on breaking down larger challenges into smaller ones and making use of the iterative design process in order to devise a comprehensive strategy for the construction and implementation of programs.

Utilizing computing systems to mimic characteristics and behaviors connected with a subject is something that students are introduced to when they are in the third grade.

The utilization of technologies in a responsible manner and the utilization of terminology that is accurate will continue to be developed further. In order to successfully acquire skills across a variety of subject areas, it will be essential to have a fundamental understanding of computing and the use of technology.

Programming and Algorithm development

The student will develop sets of step-by-step instructions, sometimes known as algorithms, both individually and in collaboration with other students.

a) by employing in sequence;

b) the utilization of loops, which encompass a wide range of patterns, including developing patterns and repeating patterns; and [SOL Math 3.16 is related to this]

Use events as their source.

A block or text-based programming language will be used by the student to develop programs that will execute tasks as a means of creative expression.

These programs will be constructed both individually and in collaboration with other students.

a) by employing in sequence;

b) the utilization of loops, which encompass a wide range of patterns, including developing patterns and repeating patterns; and

b) Finding out what happened.

The student will perform an analysis, make corrections, and improve (debug) an algorithm that has loops, events, and sequencing.

A plan will be developed by the student as part of the iterative design process.

This plan may be developed independently or in collaboration with other students utilizing techniques such as pair programming (for example, storyboards, flowcharts, pseudo-code, and narrative maps).

The student will compare and contrast a group of items that have been grouped into at least two sets and two subsets depending on the traits or activities that they possess.

Decomposing a major problem into smaller sub-problems is a skill that the student will be able to demonstrate either independently or in collaboration with other students. [SOL Math 3.3b is related to this]

The student will give acknowledgment to the sources when borrowing or modifying ideas (for example, when utilizing information and graphics generated by others, when using music created by others, or when remixing programming projects).

The Computerized System

A model of the operation of a computing system, including input and output, will be created by the student to demonstrate.

Using the appropriate terminology, the student will be able to recognize simple hardware and software issues that may arise while using the device, and they will be able to implement solutions to these issues (for example, restarting the device, checking for power, checking network availability, and shutting and reopening an application).

Computer security

The learned individual will be able to recognize issues that are associated with the incorrect utilization of computing devices and networks.

It is expected that the student would generate instances of strong passwords, provide an explanation as to why strong passwords should be used, and show the appropriate usage of personal passwords and protecting them.

Information and Analyses

The student will respond to questions by observing data on a computer before drawing conclusions and making predictions. This will allow the learner to draw conclusions and make predictions.

An artifact will be created by the student through the utilization of computing systems in order to mimic the characteristics and behaviors that are linked with a notion (for example, day and night, animal life cycles, and plant life cycles). [Related subject matter areas: mathematics: models, science: phases of the moon]

Computers' Effects on Society

The student will have the ability to recognize computing technologies that have had a significant impact on the world and will articulate the ways in which these technologies influence cultural practices and are influenced by them.

The student will be able to identify the good and negative aspects that are associated with the widespread use of computers and computing in everyday life (for example, downloading films and music files, electronic appliances, wireless Internet, mobile computing devices, GPS systems, and wearable computing).

It is expected that the student would be able to recognize social and ethical concerns that are associated with computing devices and networks.

Internet access and social networking

The students will debate the fact that information may be communicated via computing devices through a network (for example, through email, blogging, and video messaging) both in tandem with one another and as a class.

Curriculum in Informatics (4 th grade)

The study, creation, and development of information technology for the benefit of individuals, organizations, and society are all elements that are encompassed by the term "informatics," which is a broad term.

The term "informatics" was not commonly used in the United States at the time when the iSchool decided to adopt it as the name of their bachelor of science degree program in the year 1999.

The selection of this name was based on the fact that it reflected the options that are open to students who possess the strong technical background that is required to provide answers to the information difficulties that are faced internationally.

The Informatics major was developed to be both theoretical and practical, academic and professional, and to place an emphasis on the human and humanistic aspects of the design and application of information systems.

There is no change in the vision: the Informatics major at the University of Washington addresses directly the requirement for qualified and talented professionals in every area of society who are able to transform information into knowledge that can be put into action.

The following is a description of informatics that can be found in the Classification of Instructional Programs (CIP): "A program that focuses on computer systems from a user-centered perspective and studies the structure, behavior, and interactions of natural and artificial systems that store, process, and communicate information.

" Instruction in information sciences, human computer interaction, information system analysis and design, telecommunications structure, and information architecture and management are all included in this course.

Comprehending the Major Skills Necessary for Informatics

Numerous individuals are vying for the opportunity to acquire knowledge regarding computer science and information technology majors. Source.

You Should Be Familiar With These Informatics Major Skills. Over the past few years, the informatics department has emerged as one of the most popular majors among a great number of individuals.

Since the informatics major offers the possibility of a prosperous professional future, it has attracted a large number of students who are interested in studying computer science and programming languages.

If you are interested in pursuing this major, however, you should first get a deeper understanding of the fundamental abilities required for this informatics major.

Skill Number One in Informatics: Algorithm

During the course of this educational program, you will be exposed to a variety of programming languages. Algorithms, which are a combination of logic and mathematics, are the most fundamental component of practically all programming languages, despite the fact that they differ in terms of modeling and writing. In a general sense, an algorithm is a series of actions that are specific, logical, detailed, and ordered in a systematic manner.

These stages are taken with the sole purpose of solving a problem. Because of this, having the capacity to think logically or systematically as well as quantitatively will ensure that you will rapidly comprehend and adhere to the lesson.

Competency number two for the Informatics Department: data management and analytics

For the purpose of implementing information technology changes that will result in a culture of digital interaction, organizations require IT staff that possesses these skills. According to the digital exchanges, the objective is to read and comprehend the patterns of communication that have been established. The ability to read trends and prioritize them for development is provided to businesses by this.

As an additional point of reference for corporate reviews, data that analyzes the digital behavior of consumers and target groups can be utilized. If particular classifications are required, then the collection of data can be completed more rapidly. The objective of the company is to maintain its pace of expansion while avoiding the occasional loss of market share.

in the Informatics Department: Logic

During your time in this major, you will become familiar with a variety of programming languages. The logic is the most important aspect of all programming languages, despite the fact that they differ in terms of modeling and writing capabilities.

If you had a methodical mindset or a mastery of sense, that would be the ideal thing for you to have. If you possess this talent, it is certain that you will swiftly comprehend and adhere to the instructions that are given to you.

Cloud computing is the fourth skill of the Informatics Department.

Computing in the cloud is a field of information technology that focuses on the storage and application of data. Data originates from the use of specific portals or websites by customers, whereas applications are products developed by information technology companies that can be utilized to make profits. Obviously, data and applications will continue to develop over time, necessitating the need for greater storage and management.

As a result, information technology professions and organizations require skills related to cloud storage. The field of cloud computing is rumored to be the most lucrative career in information technology at the moment. mainly due to the fact that cloud computing typically overlaps with a wide variety of other information technology abilities, particularly artificial intelligence (AI) and the Internet of Things (IoT).

In light of this, not all firms are able to easily accommodate IT workers in order to address issues related to storage computing. At the absolute least, it would be preferable if you were really comprehensive and should not be confused with a person. For everyone working in information technology, this presents both a difficulty and a good opportunity.

The fifth skill of the Informatics Department is an understanding of the concept and how it can be applied.

This talent is going to be absolutely necessary for a programmer in the future. When it comes to designing Cascading Style Sheets (CSS) for designs that are applied to web pages and subsequently flow to other elements on the page, this feature comes in quite helpful.

Expertise number six: creative and innovative

You possess the ability to innovate, which is the most significant skill you possess. In addition to the ability to write code for the program that is now being worked on. To be able to solve a problem, you also need to have the ability to think creatively.

You need to be able to think creatively and innovatively in order to be able to handle the situation when your employer complains about a problem. You are required to develop a solution that is not only effective but also efficient.

Due to the fact that you are creative, your boss will always require your services, and you will be a person that is in high demand inside the workplace whenever you are present.

Accuracy is the seventh skill.

One of the most difficult aspects of entering the world of programming is the fact that you will be confronted with a deluge of code written in a broad variety of programming languages. Consequently, during the process of working on projects, you will unavoidably be required to polish your foresight by doing things like meticulously writing each letter and punctuation mark along with its meaning.

But you have no reason to be concerned since if the program is able to function without any problems in the future, all of your complaints and exhaustion will be rewarded with a sense of joy and pride.

Skill No. 8: Outstanding Capabilities in Presentations

In the field of programming, where presentation skills are required to transmit information, it is suitable for communication skills.

Whether you are meeting with other employees or presenting a proposal to the CEO of the company, when you have strong presentation skills, you will impress a large number of people all at once.

During a presentation, there are a lot of aspects that need to be taken into consideration, such as the capacity to lead an audience, the ability to master the content, the ability to talk, and having appropriate body language.

To be able to master this talent, you will need to put in a lot of practice and give a lot of presentations. You can also learn from professionals who are skilled in public speaking and watch them deliver presentations whenever they have the time.

Knowledge of a Foreign Language (Skill No. 9)

It is necessary for you to be familiar with all programming languages, and the ones that are used on the computer are written in English.

The fact that language is a soft skill that you will utilize in the future as a communication bridge with customers is something that should be underlined once more. Engage in the process of learning English and at the very least comprehend the passive level.

Teamwork is the tenth skill.

Having the capacity to interact with others and work together is the final factor that will contribute to your learning process while you are working in this sector. mainly due to the fact that a project will typically be executed by a group consisting of multiple individuals working together. For all of that to be resolved, you need to have an understanding of the personalities of the members of the team. This will allow them to assist one another and compensate for each other's flaws in the future.

Lesson plan for computer science

It is the instructor's road map of what the students need to learn and how it will be done efficiently during the time that they are in class that is referred to as a lesson plan. Once you have done that, you will be able to design appropriate learning activities and devise techniques to get feedback on the learning of the students.

Your ability to enter the classroom with more self-assurance and to increase the likelihood of having a meaningful learning experience with your pupils is enhanced by the fact that you have a lesson plan that has been meticulously crafted for each three-hour lesson.

A successful lesson plan takes into account and incorporates the following three essential components:

- Learning Goals and Criteria
- Educational pursuits such as
- An evaluation to determine whether or not the students have understood the material

A lesson plan is not an entire document; but, it does give you with a rough description of your teaching goals, learning objectives, and the tools to attain them. The definition of an effective lesson is not one in which everything goes according to plan, but rather one in which both the students and the instructor learn from themselves and from one another. On this page, you may find an example of a lesson plan that lasts for three hours.

Steps to take in order to get a lesson plan ready before the class

Following are the six stages that you need to take in order to get your lesson plan ready for your class.

1**. Identify the goals of the learning experience.**

Identifying the learning objectives for the session is the first step that you will need to do before you can begin planning the class. It is more accurate to say that a learning objective explains what the learner will know or be able to do after the learning experience, as opposed to what the learner will be exposed to during the instruction (also known as topics).

The majority of the time, it is written in a language that is simple enough for children to comprehend and is directly connected to the learning outcomes required by the program.

The following is a list of the traits that have been identified as clear learning objectives:

Describe the characteristics of the Tasks that are articulated in a clear and concise manner, free of jargon and complicated vocabulary; tasks that are explicit and attainable

- (such as "describe," "analyze," or "evaluate") NOT ambiguous activities (such as "appreciate," "consider," or "consider")
- "understand" or "explore" these terms).

Define the vital (rather than the trivial) learning that a student will acquire during the course according to the important learning goals.

The goal is attainable if it can be accomplished within the allotted time frame and there are sufficient resources available.

The ability to display and measure anything may be demonstrated in a concrete form; they are able to be evaluated; achievement and quality **as evidence of accomplishment can be seen.**

Fair and equitable Every student, including those who have limitations or disabilities, is given an equal opportunity to complete their education **about accomplishing them.**

It is important to take into consideration the larger aims, which include the objectives of the course and the program, as well as the goals of the institution.

The Bloom's Revised Taxonomy of Educational Objectives (link) is a helpful resource that may be utilized in the process of developing learning objectives that are specific, measurable, and verifiable.

2. Making a plan for the specific educational activities

In the process of arranging learning activities, it is important to take into consideration the many kinds of activities that students will be expected to participate in. This is done to ensure that they acquire the knowledge and skills necessary to exhibit effective learning throughout the course.

It is important that the learning activities be directly tied to the learning objectives of the course. Additionally, the activities should present students with experiences that will allow them to engage in, practice, and receive feedback on their progress with regard to those objectives.

You should make an estimate of the amount of time you will spend on each of the learning activities as you plan them. You should schedule time for a more in-depth explanation or conversation, but you should also be ready to move on quickly to various applications or challenges, and you should be able to identify and implement ways that check for comprehension. In the process of designing the educational activities that you will utilize, some questions to consider are as follows:

• What steps will I take to clarify the subject matter?

• What are some various ways that I may demonstrate the subject we are discussing?

• How can I get pupils interested in the subject matter?

• Can you provide students with some real-life examples, analogies, or scenarios that are pertinent to the topic and can assist them in comprehending it?

• What are some of the things that students will need to undertake in order to improve their understanding of the subject matter?

It is possible to engage students through a variety of activities. The activity kinds (that is, what the student is doing) and their examples that are offered below are by no means an entire list; rather, they will assist you in thinking through how to the most effectively develop and execute high impact learning experiences for your students throughout a typical lesson.

Different types of learning activities and their descriptions

The interaction with the content

Providing students with opportunities to engage with the content in some way increases the likelihood that they will remember the information that is delivered in these ways. In the drill and practice, pupils are given a problem or task to complete, and they are expected to produce a response. The problem or assignment may be timed or untimed.

Communicate ideas through the use of words, frequently accompanied by visual aids (such as slides from a presentation).

A quiz is an exercise that is used to evaluate the degree of student comprehension, and the questions that are asked can be in a variety of formats, such as multiple-choice, short-structured, essay, and so on.

Presentation by students Oral report in which students communicate their findings from study on a subject and assume a position and/or role in the presentation

Participation in digital content interactions

Game is a goal-oriented exercise that stimulates collaboration and/or competitiveness inside a controlled virtual environment. Students experiment with decision making and visualize the effects and/or repercussions of their decisions in virtual surroundings.

The examination of relationships, settings, and concepts is made possible through the use of simulations, which are replicas or representations of real-world phenomena.

A conversation with other people

Peer relationships, informal support systems, and interactions and relationships between teachers and students Debate is a verbal activity in which two or more opposing points of view on a topic are presented and argued.

A discussion is a formal or casual discourse about a certain topic or question, in which the instructor supports student sharing of responses to the questions and builds upon those responses.

Feedback is information that is either offered by the instructor or by one or more peers regarding aspects of an individual's performance or understanding.

The feelings, emotions, ideas, and experiences that are unique to a certain subject are shared by a presenter who has been invited to speak on the subject.

The ability to solve problems and think critically

The process of presenting students with a problem, scenario, case, challenge, or design issue, which they are then asked to address or deal with, provides students with opportunities to think about or use knowledge and information in new and different ways.

Case study is a detailed story, either true or fictional, that students analyze in detail in order to identify the underlying principles, practices, or lessons that it contains.

Concept mapping is a graphical representation of information that is related to one another and in which concepts that are the same or shared are linked together.

Real-world projects are a planned collection of interconnected tasks that are to be carried out over a predetermined time period, within a specified budget, and within other constraints, either independently or in collaboration with other people.

The act of reflecting

The first step in the process of reflection is for the student to consider what they already know and any experiences they have had in regard to the subject matter that is being investigated or learned. This is then followed by an investigation of the reasons why the student thinks about the issue in the manner that they do, as well as an examination of the assumptions, attitudes, and beliefs that the student brings to the learning process regarding the topic.

Reflection diary Students are required to keep written records of their intellectual and emotional responses to a specific topic on a consistent basis (for example, once a week after each teacher's lecture).

Each learning activity in the lesson must meet the following criteria:

(1) it must be aligned to the learning objectives of the lesson;

(2) it must meaningfully engage students in ways that are active, constructive, authentic, and collaborative;

(3) it must be useful in the sense that the student is able to take what they have learned from engaging with the activity and use it in another context or for another purpose.

3. Make a plan to evaluate the students' level of comprehension.

Students are given the opportunity to demonstrate and practice the knowledge and abilities that are outlined in the learning objectives through the use of assessments (such as exams, papers, problem sets, and performances). Additionally, instructors are able to provide targeted feedback that can be used to steer further learning through participation in assessments.

Through the process of planning for assessment, you are able to determine whether or not your kids are learning. It entails making choices regarding the following:

• the quantity and kind of the assessment activities that will provide students with the most opportunity to demonstrate their mastery of the lesson's learning goals

• Illustrations featuring a variety of evaluations

• Both formative and summative in nature

• the standards and criteria that will be utilized in the process of selecting candidates for evaluation

• a try soles the roles that students play in the evaluation process

• Evaluation of Oneself

• Evaluation by one's peers

• the process by which individual task evaluations will be incorporated into the overall grade for the course, as well as the weighting of individual assessment tasks

• Students are required to be provided with information regarding the manner in which the various assignments are to be weighted and merged into an overall grade.

• providing comments to the recipient

• providing input to students on how they can improve their learning, as well as providing feedback to teachers on how they can improve their teaching

Click this link to learn more about the process of designing assessments.

4. Make sure that the lesson is organized in a way that is both interesting and significant.

In order to facilitate the process of preparing the order in which your lesson will be delivered, Robert Gagne created a nine-step procedure that he dubbed the events of instruction. In order to develop training that is both relevant and engaging, it is helpful to make use of Gagne's 9 events in conjunction with Bloom's Revised Taxonomy of Educational Objectives (link).

1.Obtain the attention of the students: In order for the students to watch and listen when the instructor provides the material for learning, it is necessary to obtain their attention.

- **Tell a tale or describe a problem that has to be solved.**

Activities that break the ice, current news and events, case studies, videos from YouTube, and other similar resources should be utilized. The goal is to instantly capture the attention of the students and pique their interest in the subject matter.

In order to ask leading questions before to a lecture, survey opinion, or obtain a response to a contentious subject, you might make use of technologies such as clickers and surveys.

2.The learner should be informed of the objectives, and they should be given the opportunity to organize their thoughts in relation to what they are about to see, hear, or do.

The learning objectives should be included in the slides that are used in the lectures, the syllabus, and the instructions for the activities, projects, and papers.

- Describe the performance that is required
- Outline the criteria for the standard levels of performance

3.**Recall of previous information should be stimulated:**

- The best way to assist pupils in making sense of new material is to relate it to something they already know or something they have experienced in the past.
- Recall the events that occurred in the prior lecture, incorporate the outcomes of the activities into the current topic, and/or apply the material from the previous lecture to the situation at hand.

- **Inquire of the students on their comprehension of the concepts that came before.**

4.Make use of a wide range of instructional strategies, including as lectures, readings, activities, projects, multimedia, and other approaches, in order to provide new content.

· To prevent mental overload, organize the material in a sequential and chunked fashion.

- **Combine the information in order to facilitate the recollection of information**

It is possible to use Bloom's Revised Taxonomy to assist in the sequencing of the lesson by assisting you in chunking the lessons into different levels of difficulty.

5.Give pupils direction by informing them of methods that will assist them in studying the material and of the resources that are available to them.

Students are less likely to waste time or become frustrated when they base their performance on incorrect information or concepts that they do not fully understand when they are provided with learning guidance. This results in an increase in the rate of learning.

Support for instruction should be provided on an as-needed basis, in the form of scaffolds (cues, hints, and prompts) that can be eliminated after the student has mastered the job or the material.

- Serve as a model for a variety of learning tools, including metaphors, idea mapping, role playing, and visualizing

Examples and non-examples should be used.

Please click here for additional information regarding the scaffolding of student learning.

6.Let pupils put their newly acquired information and abilities to use through practice.

- Give pupils the opportunity to apply their knowledge both in group and individual activities
- If you want pupils to learn more deeply, you should ask them questions that make reference to what they already know or have them work together with their classmates.
- Instruct the students to recite, review, or restate the knowledge that they have acquired.

In order to facilitate student elaborations, you should ask students to elaborate or explain details and add greater depth to their responses.

7.Provide feedback: In order to evaluate and support learning, it is important to provide rapid feedback on the performance of pupils.

Consider providing feedback to students at the group or class level (highlighting typical faults, providing instances or models of target performance, and demonstrating to students what you do not want them to do).

Consider putting in place a system of peer feedback

- Make it mandatory for students to explain how they incorporated feedback into their following works.

8.Assess performance: In order to determine whether or not the instructional activities were successful, it is necessary to conduct tests to see whether or not the desired learning objectives were attained. It is important that performance be based on the objectives that were mentioned before.

· Make use of a wide range of assessment strategies, such as tests and quizzes, written assignments, projects, and so on.

9.Allow students to apply material to personal circumstances in order to improve their ability to retain and transfer information. Through the process of personalizing knowledge, this boosts retention.

- Make it possible for pupils to draw connections between the material they are studying and their own life experiences.
- Offer supplementary methods of practice
- Five. Develop a timetable that is credible.

Your list of learning objectives should be narrowed down to the two or three most important ideas, concepts, or skills that you want students to acquire throughout the class. A list of 10 learning objectives is not feasible. You will be able to make judgments on the spot and alter your lesson plan as necessary with the assistance of your list of learning objectives according to their priority. In order to create a timeline that is accurate, the following are possible strategies:

Assume that each of the activities will require a certain amount of time, and then schedule some more time for each of them.

During the process of developing your lesson plan, make sure to mention, next to each activity, the amount of time that you anticipate it will take.

• At the end of the lesson, schedule a few minutes to address any questions that may still be raised and to summarize the most important elements.

• If you still have time, you should make plans for an additional activity or a question for discussion.

• Remember to be adaptable; you should be prepared to modify your lesson plan in accordance with the requirements of your pupils and concentrate on what appears to be more effective rather than adhering to your initial plan.

6. Arrange for a lesson to be finished.

The chance to consolidate student learning is afforded by the conclusion of the lesson. The practice of closing out a lesson is beneficial for both teachers and students.

It is possible to employ closure to:

• Determine whether or not the students have understood the material, and use this information to inform subsequent lessons (make adjustments to your teaching accordingly).

• Place an emphasis on the most important information

• Bring all of the loose ends together

• Clear up any confusion that the pupils may have

• A sneak peek at upcoming articles

As a result of your closure, your pupils will find it helpful for:

• Concluding, reviewing, and proving that they have a sufficient comprehension of the most important points

• Bringing together and assimilating the most important facts

• Establishing a connection between the concepts being taught and various conceptual frameworks and/or prior knowledge

• The ability to adapt one's ideas to new circumstances

The lesson might be brought to a close in a number of different ways, including the following:

In your own words, state the most important points ("Today we talked about...").

You should ask a student to assist you in summarizing them.

• Instruct each and every student to jot down on a sheet of paper what they consider to be the most important insights gained from the lecture.

In the course of the class, you will present your lesson plan.

You may help your pupils remain more interested and on track by informing them of the activities and lessons that they will be participating in during the class period.

The provision of a meaningful organization of the time spent in class can not only assist students in remembering information more effectively, but it can also assist them in following your presentation and comprehending the reasoning behind the activities that are planned for learning.

Your lesson plan can be communicated to the students by either putting a quick agenda on the whiteboard or by providing them with a clear explanation of what they will be learning and doing throughout the class period. For advice and strategies on how to make a lesson more interactive, please click on the link provided below.

Reflecting on your lesson plan after the election of the class

Take a few minutes after each lesson to think about what went well and why it went well, as well as what you could have done differently. In order to make it simpler to adapt to the various circumstances that may arise in the classroom, it would be beneficial to identify effective and less successful ways of organizing class time and activities. The lesson plan should be revised if necessary.

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Organization of computer training

In primary school. School computer room

ETHICS IN COMPUTER ROOM MANAGEMENT

Any computer room needs to be managed in the appropriate manner. We are required to maintain a computer room in a good shape at all times, in contrast to our residences.

MANAGEMENT PRACTISES FOR THE COMPUTER ROOM

1. ensuring that the environment is clean and free of dust.

2. Keeping the lights at the proper level

3. ensuring that there is sufficient and suitably enough ventilation.

4. The computer system should be properly configured, and all connections should be completed before it is used.

5. In the sixth computer room, it is recommended that you refrain from eating and drinking. 6. It is important to keep noise to a minimum in a computer room.

7. Each and every computer ought to be inspected by a maintenance officer both before and after use.

REQUIREMENTS FOR A COMPUTER ROOM TO BE CONSIDERED STANDARD

1. Structures of computers

2. Furniture, including a chair and a table

3. A source of electricity number

4. Air conditioning and fan number

5. Uninterruptible power supply, sometimes known as a UPS, number

6. The seventh printer.

7.There are eight speakers.

8. The surge protectors and wires number

9. There are ten scanners. Extinguisher for fire, etc.

There are five reasons why school computer labs are still important.

A growing number of students are purchasing their own personal computers, which has led some people to question whether or not it is necessary for schools to have computer laboratories.

There are several reasons why school computer labs continue to be applicable in today's classrooms, which is a source of great relief. Students are able to prepare themselves for a future that will be dominated by technology by participating in learning environments that are both structured and inclusive.

At this time, the computer laboratories in schools are the focus of budget cuts explicitly. A one-to-one ratio is advocated by those who are in favor of doing away with them as the solution to all computer problems.

The primary focus of the problem is on educational institutions that do not yet supply computers to each and every student but strive to do so in the near future.

Those who are working to eliminate or restrict the amount of computing resources that are made available to students are concentrating their efforts on the computer lab at the school. Despite this, a significant number of teachers are in favor of its continued use. ICT labs in schools continue to be crucial in today's society, and here are the top five reasons why their importance cannot be overstated.

1. Workstations are able to facilitate more

Computer labs are created with workstations that are more ergonomically designed. These workstations contain computers that have strong CPUs and keyboards that are full-sized.

The students are now more comfortable, and their future health is protected by a monitor that is full-sized and adaptable and can be adjusted. In order to reduce the risk of experiencing pain, discomfort, and long-term damage such as herniated discs, it is vital to employ good ergonomics when working with a computer.

Through the provision of full-sized external displays and Wi-Fi for easy connectivity, you will be able to reap the benefits of increased workplace comfort and productivity.

2. The computer labs in schools guarantee access without bias.

A greater number of schools are adopting the 1:1 computing model as a direct result of the establishment of school ict labs. Every single pupil in the classroom will now have access to a single gadget as a result of this.

Children in elementary school have the least amount of access to personal technology, and only a small percentage of them have access to gadgets that are not shared and that enable them to use the internet at home. As the use of computer laboratories in schools becomes more widespread, there will be positive changes in the educational system.

3. Collaboration is encouraged in contemporary computer labs.

There is now a process of redesigning computer laboratories in order to facilitate the collaborative exploration of concepts and the creation of meaning. The purpose of these is to make a wide variety of educational activities easier to accomplish.

In the same way that classrooms are being rearranged to accommodate the constructivist learning methods of today, information and communication technology laboratories in schools are undergoing the same shift.

4. Students get access to advanced resources.

The majority of the time, schools that have the capacity to do so transform outdated labs into constructive development spaces, STEM labs, and other types of labs. These rooms are still excellent for desktop workstations, but they now integrate a greater number of high-tech resources and collaborative equipment, such as 3D printers, scanners, software, and other tools.

To facilitate a wide variety of learning activities, as well as student inquiry and collaboration, they are designed to be as flexible as possible.

5. An enhancement to learning both in the classroom and at home

Students have the opportunity to acquire skills that are not directly relevant to the subject that is being taught in the classroom, such as basic typing abilities and advanced editing skills, through the usage of a computer lab.

Important things to think about while establishing a computer lab in a school for the 21st century

It is necessary to have the ability to adapt to new trends in pedagogy and technology, as well as flexibility. The construction of a computer lab that is suitable for the twenty-first century cannot be done in a single way. The construction of a school computer lab encompasses a wide range of activities, including but not limited to: online or remote learning and research; the creation of content; studying and evaluation; group and individual work; tutoring; studying; socializing; and more.

There is little doubt that the existence of school computer labs has had an effect on the way in which kids acquire education. School computer labs provide students with an environment in which they can investigate, create, connect with others, and develop their digital literacy. Through the provision of more processing capacity, online learning, and other features, these technologically enhanced rooms are able to handle a greater number of pupils.

There are five reasons why school computer labs are still important.

Schoolnet India is the author of this article, which was published on November 28th, 2022.

A growing number of students are purchasing their own personal computers, which has led some people to question whether or not it is necessary for schools to have computer laboratories. There are several reasons why school computer labs continue to be applicable in today's classrooms, which is a source of great relief. Students are able to prepare themselves for a future that will be dominated by technology by participating in learning environments that are both structured and inclusive.

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It's possible that you're referring to:

Computer laboratory

• A facility that is used to host computer systems, often known as a data center

A public location where individuals can use the Internet is known as an Internet cafe.

The server room is a room that is dedicated to housing computer servers.

• Telecentres, which are public locations in economically developing nations where individuals can access the Internet

Alternatively, an office is a room in a building (particularly a house or apartment) that is designed to accommodate the use of a personal computer.

We are going to talk about how to build up your very own personal computer room.

If you want to set up your own personal computer room, this guide will walk you through the process step by step. It will also provide you with advice on how to select the appropriate hardware and furnishings, as well as how to maximize your space for gaming and work.

Earlier than anything else, there are a few things that you need to take into consideration. They are as follows:

1. Location of

Select a place that is convenient for both you and the other people in your group. It must to be conveniently accessible and have sufficient space for all of your equipment to be stored underneath it.

2. Arrangement of

Determine how you would like to arrange the equipment and furniture in your space. Make certain that everything is easily accessible and within easy reach.

3. Luminisance

When selecting lighting, make sure it is neither too bright nor too faint. It is important that you are able to view the screen without causing any strain to your eyes.

Please refer to this page for our suggested solution for illumination.

4. Air circulation

Check to see that the room has adequate ventilation. Make sure that your apparatus does not become overheated.

Please refer to this page for our suggested remedy for ventilation.

5. Blocking out noise

Soundproof the area if you are able to do so, so that you do not disturb other people when you are working or playing video games.This is where you can find the soundproofing solution that we recommend.

Finding the appropriate apparatus to use

Assuming that you have a room that is specifically designated for your personal computer (preferably, a spare bedroom or office), the first thing you need to do is select the appropriate workstation.

Picking out the ideal workstation

In order to maximize your gaming and productivity, you will need a spacious desk that has sufficient space to accommodate your monitor, keyboard, and mouse, even if you have some extra space. In the event that you intend to make use of many monitors, you will require a desk that is slightly larger. Both online and at your neighborhood office supply store, you may discover gaming desks that are of high quality.You can view the solution that we offer for a computer desk here.

Investing in the appropriate chair

Following that, you will have to select the appropriate chair. This is of utmost significance if you intend to spend a significant amount of time in your own computer room.

You should look for a chair that is not just supportive but also comfy, and that has a backrest and armrests that can be adjusted. Again, there are a lot of wonderful options available both online and in businesses that sell office supplies.

Check out this link to see the solution that we offer for an office chair.

How to select the appropriate computer

At this point, it is time to select the appropriate computer. It is sufficient to utilize any current computer if you are only a casual user. On the other hand, if you are a power user or a gamer, you will require a more powerful computer. Ensure that the PCs you are contemplating are suitable for your requirements by conducting research on their specifications.

How to select the appropriate headphones

On any personal computer, headphones are an indispensable component. They make it possible for you to work or play games without getting in the way of other people. Keep an eye out for a pair that is not only comfy to wear but also has an outstanding sound quality.

There is a wide variety of reasonably priced gaming headsets available on the market (marleysguide.com), in case you are running out of money.

Although there are significant distinctions between headsets that are inexpensive and those that are expensive, the ideal option is ultimately determined by your financial constraints and requirements, so make an informed decision.

Choosing the Correct Stand for Your Headphones

To maintain a tidy and well-organized workspace, you will require a stand for your headphones. You won't have to worry about your headphones becoming tangled or taking up additional space on your desk thanks to this.

Choosing the perfect stand that is made of the appropriate material for both your desk and your headphones is also very important to keep in mind since if you don't, it could potentially cause harm to your headphones. There are a lot of wonderful choices available online; therefore, you should take your time and pick the one that is best for you.

How to select the appropriate microphone

In order to use voice chat while working or playing video games, you will need to have a microphone accessible. Try to get a microphone that is not only clear but also simple to operate. Once more, there are a lot of wonderful choices available on the internet.

Please refer to this page for our suggested solution for microphones.

Selection of the Appropriate Webcam

A webcam is required if you intend to use video chat as a communication tool. If you can, look for a webcam that has both high definition clarity and night vision. On the other hand, there are a great deal of other possibilities available online.

You may view the solution that we recommend for webcams here.

Putting everything down on paper

You are now in possession of all of the necessary equipment, and it is time to put it all together. I will now offer some advice:

1. Take the necessary steps to ensure that your workstation is arranged in a manner that is comfortable for you. Each and every piece of equipment that you have should be within easy reach.

2. In order to prevent strain on your neck and eyes, position your monitor so that it is at eye level.

3. Put your mouse and keyboard in a position where they are easily accessible so that you don't have to extend.

4. For the best possible sound quality, position your speakers so that they are pointing directly at you.

5. Ensure that your space has adequate ventilation in order to prevent your equipment from becoming overheated.

6. Keeping cords and cables tidy and out of the way can be accomplished with the help of cable management systems.

7. In the event that you have more than one monitor, arrange them in such a way that they do not obstruct your view.

8. Find a posture that is comfortable for you by adjusting the height of both your chair and your desk.

9. Taking frequent breaks to stretch and rest your eyes is essential if you intend to spend a significant amount of time in your computer room.

Utilizing your available space

When you have all of the necessary furniture and equipment, it is time to optimize your space so that it is conducive to gaming and productivity.

• Make sure that your furniture and equipment are arranged in a manner that is ergonomically sound and pleasant for you. Make certain that everything is easily accessible and within easy reach.

If you want to maintain a clean and well-organized workstation, you might think about installing shelves or storage cabinets.

• In the event that you have more than one monitor, you should arrange them in a manner that is convenient for you to use. In order to assist you with this, you might want to consider purchasing a monitor stand or mount.

• Check that the room has adequate ventilation and, if at all feasible, that it is soundproofed. While you are working or playing video games, this will assist you maintain a comfortable position.

Lastly, in order to make the place your own, you need incorporate some unique touches. One example of this would be the addition of paintings, posters, or other types of decorations.

Step-by-step instructions for setting up your personal computer room

Now that you have taken all of these considerations into account and are aware of the equipment that you ought to be purchasing, let's go on to the next step of setting up your own computer room.

1. Determine both your location and your layout.

2. Put your furniture and equipment in the place that corresponds to the layout that you have chosen.

3. In order to confirm that everything is functioning properly, you should connect your equipment and test it.

4. . Put in place any software that you require.

5. Make adjustments to your settings in order to create the best possible gaming and productivity experience.

6. Have fun in your brand-new computer room.

Final Thoughts

Making the perfect personal computer room requires a lot of time and effort, but it is well worth it. You will be able to create a room that is not only elegant but also pleasant and practical if you follow these guidelines. It is essential to ensure that you choose the appropriate chair, gaming headset, headphones stand, and desk for your game room, as this is one of the most essential components of a gaming sanctuary.

Therefore, what are you holding out for? Create the computer room of your dreams by getting started right away.

The level and stages of teaching computer science in primary school

The first step in getting children ready for school in Azerbaijan is to provide them with a preschool education. During this time, children are taught to love and be interested in learning in a joyful manner. It is at this era that the basis is established for the development of mental, physical and creative potential, psychological stability, aesthetic education, simple work skills, a sensitive and conscious attitude towards the environment and one's health begin to shape.

By utilizing the child's interests during the process of preschool preparation, he is prepared for the transition to school education that is the most straightforward and comfortable for him. There are five days in a week that schools in Azerbaijan are open. Every student receives a free education that is broken up into three stages:

Primary school education is provided. Available to children who are older than six years old and has a duration of four years. Every single student in primary education is required to take a test at the conclusion of their studies. They will be transferred to secondary school based on the results of the investigation.

A secondary education that is more general. It begins in the fifth grade and continues until the ninth grade. The children receive the necessary preparation to pass the final examination during this time period, during which they study mathematics, history, foreign languages, literature, physics, chemistry, and biology in great detail.

The youngster is awarded a certificate of basic education upon completion of the ninth grade.

After that, he has the option of obtaining employment, continuing his education at school, or enrolling in any vocational institution.

Obtain a secondary education and finish it. After completing the ninth grade, you will need to continue your education for a further two years in order to obtain it. Its purpose is to help students get ready for acceptance into universities.

Upon completion of their education, pupils are required to take a state examination that is paid for. The results of this examination earn them a certificate of general education and allow them to enroll in the institution of their choice within the country.

Every single child in Azerbaijan is required to attend elementary and secondary school as part of their formal education. The decision of whether or not a student wishes to study in grades 10 and 11 is left up to the individual student. However, in order to enroll in a university, one must first obtain a diploma of general education.

Children attending schools in Azerbaijan are given the choice to select the language that will be used for instruction. Even though

Azerbaijani is the primary language taught in the majority of schools, it is also possible to receive an education in Russian. Every piece of literature that is required for this is available.

There is no cost associated with either of the training alternatives. The official figures indicate that approximately ten percent of students select educational institutions that provide Russian language classes.

In addition to educational establishments that specialize in the Russian language, Azerbaijan is home to branches of well-known schools and foundations that provide instruction in the English language.

These include the British School, EF English First, and other similar organizations. Local citizens, in addition to foreigners and emigrants, are able to pursue their education at that venue. As a result of the fact that the majority of these schools are private, tuition fees are also paid.

Aspects of the instructional method utilized in Azerbaijani educational institutions

In this country, the celebration of Knowledge Day takes place not on September 1st, but rather on September 15th, and the end of the school year occurs 15 days after that. In addition to mathematics and economics, schools also provide instruction in specialized classes in the following four areas: technical, humanities, natural sciences, and scientific. There are individual programs for each profile.

The children have the ability to select their own topics for more in-depth study. There is no reason for Azerbaijani students to be concerned about their grades in the first grade. In the first year of study, they are not allowed to be taken.

The evaluation is then carried out using a scale that ranges from zero to one hundred points, with "five" representing indicators that range from eighty to one hundred points, "four" representing indicators that range from sixty to eighty points, and "three" representing indicators that range from thirty to sixty points. Any score that is lower than thirty points is regarded as unacceptable.

There are a number of traditions that have arisen within the Azerbaijani educational system. Education in the republic has seen considerable transformations in the years that have passed after the fall of the Soviet Union.

Nevertheless, there is one thing that has not changed: the provision of the younger generation with knowledge, the appropriate degree of education, and the development of cultural characteristics. Only via the implementation of this strategy can young people develop into deserving citizens of their nation.

There are several stages involved in becoming proficient in the fundamentals of computer science.

Propaedeutic stage I (grades 1-2) of the process. Primary school students are the ones who are introduced to the computer for the first time. It is through the utilization of educational gaming programs and basic computer simulators that the foundations of information culture are established.

Students in grades two and three are required to take Stage II, which is a fundamental course that fulfills the requirements for a minimal level of general education in computer science. Students will be able to learn the methods and means of information technology for problem solving, as well as build the skills necessary to make conscious and sensible use of a computer in their educational and later professional activities.

Through the study of the fundamental course, one can develop an understanding of the similarities that exist between the processes of acquiring, converting, conveying, and storing information in living nature, society, and technology.

The feasibility of transferring the beginning of the systematic study of computer science to primary school, in addition to the need in the conditions of informatization of school education, is also due to two other factors: firstly, the positive experience of teaching computer science to children of this age, both in our country and abroad and, secondly, significant the role of studying computer science for the development of thinking, the formation of a scientific worldview of schoolchildren of this particular age group.

It is possible for the content of the basic course to incorporate three primary directions that are now being taught in the field of computer science in schools. These directions reflect the most essential components of the fundamental significance of computer science in education:

The ideological component that is involved with the formation of concepts concerning the system-information approach to the analysis of the surrounding world, the function of information in management, and the general patterns of information processes in systems of varying natures;

• the "user" aspect that is linked with the establishment of computer literacy, which prepares students for tasks that are practical in the context of the widespread use of information technologies;

• the algorithmic (programming) aspect, which is currently related with the development of schoolchildren's thinking to a higher extent

The third and fourth grades of the senior year are a customized training program that is differentiated in terms of both volume and content based on the interests and primary focus of pre-professional education for kids.

An in-depth study of programming and methods of computational mathematics is possible for schools and classes that have a physics and mathematics profile. Additionally, for schools that have a biological and chemical profile, an informatics course that is related to the use of a computer for modeling and processing experiment data is possible.

Additionally, for schools and gymnasiums that have a humanitarian profile, an idea of a systematic approach in linguistics, literary criticism, history, and other related fields is possible.

The current course in computer science does not, in many respects, satisfy modern trends in the development of education and does not fully reflect the diversity of pedagogical functions of studying the general education field of "computer science" in school. This has been the case from the second half of the 1990s until the present day.

When attempts are made to further technocratize the computer science course, the substance of the course is reduced to the study of information technology. This results in the computer science course being integrated with the topics of the technical cycle or being dissolved in the mathematics course.

The second point is that it is essential to transfer foreign experience with great care when selecting the priority tasks of the computer science course, with a special emphasis on the utilization of the Internet. In order to meet the urgent challenges that the modern school as a whole is currently confronting, it was necessary to be able to develop regulations that conform to the traditions of domestic education.

A project a standard of education for the general and fundamental education within the realms of information technology and computer science

In elementary school, students are encouraged to learn computer science and information technology with the intention of accomplishing the following objectives:

Acquisition of computer literacy and initial competence in the use of information and communication technologies, the simplest computer models when solving educational and practical problems in school and outside of it; obtaining the necessary training for the use of computer science methods and information technology tools in the study of academic disciplines of the basic school and educational programs of the subsequent

Stage of training, as well as for mastering professional activities that are in demand in the labor market at the time of the acquisition of these skills;

• having the ability to search, select, critically evaluate, organize, present, and transmit information; having the ability to plan and organize one's own information activities and the results of those activities; mastering the skills necessary to work with different kinds of information using a computer and other forms of information technology;

• gaining experience in the implementation of individual and collective projects related to a variety of academic fields, such as publishing school magazines, creating school pages on the Internet, virtual local history museums, and other similar endeavors, using information and communication technologies; making use of information that is available on the Internet and in a variety of media;

• having an understanding of a body of knowledge that is associated with the information picture of the world, which includes the following: fundamental concepts that are required for the formation of specific ideas about information processes, systems, and technologies; concepts regarding the generality and patterns of information processes in a variety of social and technological systems; concepts regarding the mechanisms of information perception and processing by humans, technological and social systems; and concepts regarding modern information civilization.

• familiarization with the use of information and communication technologies as techniques of understanding nature and society, including the observation and recording of natural and social phenomena, as well as the presentation of the results of these observations and recordings in the form of information assets;

• the development of intellectual and creative ability, as well as cognitive interests, through participation in information activities;

As a natural stage in the progression of civilization, education of the necessary rules of behavior and activity in accordance with the requirements of the information society is an essential component.

The accomplishment of these objectives is accomplished by achieving mastery of the educational material that is presented in the following paragraphs:

- qualities, skills, and procedures that are general to education pursuits and activities

-operating with information objects in their many representations: mental, graphical (on paper, Screen), aural representation.

The acquisition of experience and skills in one's own information activities, the utilization of information and communication technologies (ICT) in the study of school subjects and other educational activities, the organization of one's own information space (a set of personal folders), and the covering (using simple examples) of the most widespread areas of application of information and communication technologies technologies are all examples of such activities.

• the resolution of issues pertaining to the construction of the most basic visual information models of things and processes that occur in the real world!

Fundamental principles underlying information processing

The fundamental ideas that underpin computer science are the information item, the process, the algorithm, the primary types of algorithms and the means by which they are presented, control, and feedback. information transmission process, information source and receiver, signal, encoding and decoding, information distortion during transmission, and the speed at which information is transmitted are all topics that are covered in this article.

The fundamental elements of a computer and the functions they perform, including the processor, memory, monitor, interfaces, keyboard, and mouse; the software philosophy that governs the operation of a computer? A classification of the primary categories of information resources that are available to both general users and professionals.

We take into account the dynamic changes that occur in the qualitative qualities of information and communication technology tools when making judgments regarding the selection of ICT tools, including those that are used by individuals.

The areas of education that are receiving the most attention for development are languages, computer science and information technology.

Mathematical information and communication technology tools, including dynamic (electronic) tables. altering data, moving to graphical representation, and putting data into a table that has already been prepared. inputting mathematical formulas, which are used to describe the reliance on a graph respectively.

Mathematics and natural science are high-priority topics for improvement in the educational system.

Data storage. search through the selection of items from a list and the designation of field values. producing records in databases (by doing things like completing out surveys), including records that pertain to information about the student they are studying.

Computer science and information technology, social studies, physical education, and extracurricular activities are the areas of education that are receiving the most critical attention for development.

Pictures and drawings are included. both the graphic panel and the scanner are used for input. geometric and stylistic alterations taken.

Additional curricular activities, the fine arts, and local history are the areas of schooling that should have priority growth.

The blueprints. Selecting, combining, shifting, and transforming components and pieces geometrically are all examples of transformations. a three-dimensional image displayed on the screen of the computer, together with the working tools for that image. object catalogs. drawings that are straightforward.

A creation of a drawing of a certain item, including but not limited to diagrams, maps, and other special forms of drawings. in the process of developing or putting together a thing based on a drawing.

Technology (and drawing in particular) is one of the educational topics that should receive priority attention.

Aural and visual media, including musical compositions and graphics. editors and non-linear editors are examples of work tools that are included in the on-screen visual representation.

Project activities in a variety of subjects, as well as languages, music, and local history, are among the educational areas that are receiving priority development.

The act of recording information about the processes and items that are present in the surrounding world **objects and processes that are being recorded:**

-the natural, the cultural, and the historical, the school life, the individual and family history, and other topics, including the capturing of images (using digital cameras, microscopes, and various types of scanners, among other things);

- written writings that are obtained by the recognition of text pictures and spoken words;

video and audio recordings, with a particular emphasis on the utilization of digital recording mechanisms;

- music, in particular the use of a keyboard designed for musical music;

- tables that contain the results of measurements (the use of sensors that are connected to a computer in particular);

- outcomes of observations, surveys, etc.

Social studies and natural sciences are two areas of education that are receiving priority attention **looking for and making use of information:**

-Encyclopedias and reference books on computers;

-information found in databases and on the internet;

-sources of knowledge that do not involve computation, formulation of demands for items. catalogs as well.

The search engines. material that has been critically evaluated and organized. A personal information space is created through the utilization of a file system, linkages to other files, and sources that are located on the Internet. Guidelines for referring and citing the sources of information or references.

Social studies are among the educational priority areas that need to be developed.

information administration, display, and dissemination of information

Information that is presented in the form of a printed publication, on the Internet, or in the form of a speech given by a student. the organizing of one's own information space, which may include the student's works, the many versions of those works, links to pertinent assignments and projects, the works of other students, information that has been acquired, and sources that have been used. Group conversation, with the progress and outcomes of the conversation being recorded in written form and also being combined with video recording. telephone, pager, E-mail:

- norms of correspondence, attachments to letters, sending, receiving. individuals can save objects from the internet and links to those objects for their own personal use.

-video conferencing and teleconferences for example.

-the utilization of digital telecommunications to facilitate activities that involve group learning.

Computer science and information technology, languages, and social studies are the areas of education that are receiving the most attention for improvement.

There are a variety of components that make up the structure of the educational process in computer science, including the following:

• the delivery of learning materials for educational programs;

• gaining knowledge from textbooks, scientific literature, and methodological literature;

• continued self-education on the part of the educator in light of the extraordinary role he plays;

• planning and executing a lesson on computer science;

• instructional activities that involve the utilization of a computer;

• activities outside of the classroom;

Tues., the office.

The characteristics of the computer science course that is being taught in school.

Substantial linkages between different fields of study throughout the course.

VT advancement demands timely reflection in both the approach and the content of the course. -the course is not set, as, for example, a physics course.

A particular emphasis should be placed on the psychological and instructional assistance that the course provides. The role of the instructor, the interaction of the student with the computer, and the position of the computer in the educational process are all issues that emerge as potential sources of contention.

-There has been an advancement in procedures and organizational structures that are used for training. There has been an increase in the amount of work that is done independently, a departure from the traditional lesson, an increase in the amount of work that is done in the laboratory and in practical settings, and extracurricular activities.

- The utilization of computers in a methodical manner allows for broad and continuous testing of information.

In the context of the organization of schoolchildren's work, the medical requirements play a particularly important role.

The planning of the educational process coming highly recommended. providing evidence.

We should keep in mind that the course in computer science is "divided" into three sections: the preparatory, the fundamental, and the specialized sections. In this particular scenario, the fundamental course ought to be offered to students in grades 7 through 9. Consequently, relevant textbooks are made available for each level, and the authors have established a scheme for how these textbooks should be organized.

In point of fact, the fundamental computer science subject is taught in grades 10 and 11 in today's schools, despite the fact that there are diminishing trends in many institutions. A minimum of 68 study hours must be devoted to the study of computer science over the course of two years in order to fulfill the requirements for passing the course. It is possible to raise the number of study hours to 136 or more if the settings are suitable for doing so.

Because the educational standard in computer science has not yet been adopted, the "regulatory" document that is designed to ensure that students in general education institutions have a fundamental understanding of the subject is the "mandatory minimum content of education in computer science" (Order of the Ministry of Defense of the Russian Federation dated June 30, 1999 No. 56). This paper includes a definition of the amount of educational material as well as its content. offered to children while they are at school.

The "mandatory minimum content in computer science" allows for two different levels of organization in the field of computer science education:

For schools and classes that are taking a computer science course that is 68 hours long (two years, one hour per week), as well as for schools and classes in general, the level A certification is required. profile of humanitarian work;

The level B designation is reserved for educational institutions and courses that devote at least 136 hours to the study of computer science and are equipped with contemporary computers, which enables the institution to provide students with educational content. providing evidence that one is capable of passing the admission examinations for computer science studies at universities.

Every additional advice paper is crafted in compliance with these levels before being sent.

Samples of final assignments for evaluating the quality of training received by graduates of a basic school in computer science are recommended for the purpose of providing assistance to the instructor (a brochure titled "Assessing the quality of training of graduates of a basic school in computer science" was published in Moscow by the publishing house "dro-fa" in the years 2000 and 2001). These assignments can be utilized at the senior level, in the event that a basic computer science course is being studied in the tenth and eleventh grades of a secondary school. Due to the fact that the assignment options have been chosen in such a manner,

It is feasible to evaluate the level of preparation that the students have on all of the topics that are included in the mandated minimum educational content for the computer science course. The tasks that have been provided can also be utilized by the instructor in the process of carrying out continuing monitoring as examples of tasks that can be utilized when studying individual subjects.

The students are given the opportunity to pick whatever computer science exam they would like to take. Exam tickets, which are recommended by the Ministry of Education, will be of use to the instructor in the process of organizing the examination. The evaluation could be conducted verbally, in writing, or in the form of a test. One or two theoretical questions and one or two practical tasks of varying kinds may be included on an examination ticket for an oral examination.

For instance, one of the practical tasks may be related to the creation of a straightforward algorithm or computer program, and the other may evaluate the candidate's ability to utilize one of the information technologies. In the process of administering the Exam, it is important to keep in mind that the objective of a general education course in computer science is not to teach someone how to write computer programs.

When conducting practical classes, it is recommended that classrooms be separated into subgroups in order to provide each student with their own particular workplace.

It is imperative that a system of supplementary education be established everywhere, particularly for pupils attending schools located in rural areas. Additional classes, electives, clubs, the organization of distant learning courses through the use of the Internet for students and teachers of a variety of school disciplines, the staging of summer camps for young programmers, and other similar activities could fall under this category.

A variety of methodological techniques are required in order to accommodate the educational material that is included in each topic line of the obligatory minimum content of education in computer science.

A rough estimate of the number of hours that should be spent studying the lines that correspond to them (this course of study is advised but not compulsory; it all depends on the learning goals).

During your study of the content line "information and information processes," you should pay close attention to the growth of your comprehension as well as your ability to provide examples from a variety of subject areas that show the flow of information processes in living nature, in society, or in technical systems.

Information is always associated with some kind of "carrier," which can be material (stone tablets, birch bark, paper, magnetic disk, etc.) or "immaterial" (native language, sound, melody, dance, pantomime, facial expression, one or another sign system, etc.). The primary meaning of the second content line, which is titled "presentation of information," is that information is always associated with a "carrier." In order to build a concept about natural and artificial languages, the binary form of information representation, and the benefits and drawbacks of various forms and types of information presentation, it is important to form an idea about these things.

The "computer" content line gives students the opportunity to become familiar with the computer from a different perspective than when they were studying the content line that came before it. The computer is perceived by students as a kind of universal tool that enables a person to automate intellectual activity and information processes, including the search, storage, processing, and transmission of information over long distances.

It is essential to have a clear knowledge that a computer "does not think" like a human, but rather that it is a performer, a powerful and quick-acting "tool" that assists a person in his information activities (such as information systems, expert systems, computer centers, e-mail, and so on). For the purpose of forming an awareness of the fundamental nature of law in the realm of information activities, it is essential to draw the attention of students to the functionality of the computer as well as the hierarchical structure of computer software.

Content line “modeling and formalization” - This is one of the most important content lines of the computer science course, forming a system-information picture of the world in the minds of students, as it allows you to consciously identify individual objects in the surrounding reality, see relationships between objects, highlight essential features of objects, classify them and combine them into sets, build diagrams and “see” the internal structure of an object, represent some objects through others for the purpose of studying, representing, manufacturing or using them.

Particular focus ought to be placed on the core of computer modeling, with particular attention made to highlighting both its benefits and drawbacks, as well as taking into consideration specific cases.

The "algorithms and performers" topic line facilitates the development of pupils' algorithmic thinking by requiring them to solve a significant number of tasks. During the course of their investigation of this subject, students develop their understanding of the characteristics of algorithms, the executors of algorithms, the various ways in which algorithms can be written, and the fundamental structures of algorithms. An algorithm is a dynamic model of an object, also known as a process model.

This is in contrast to a static structural model of an object, which does not take into account changes in the characteristics and behavior of an object over time. Instead, a static structural model of an object only records the object's state and identifies the elements and relationships between them. It is critically important for schoolchildren to comprehend this distinction.

Last but not least, the content line "information technology" Mastering this subject line is not only a method of preparing students for life in the information society and for future professional activity, but it is also a means of practically consolidating and developing students' theoretical training.

This is because students become more proficient in this content line. For the vast majority of students, this is the most straightforward and easily accessible portion of the computer science course. It is also the primary focus of the specialized computer science course that is offered at a variety of educational institutions that are equipped with contemporary computers.

Despite the fact that it is essential to acquire the skills necessary to process text, graphic, and numerical information. mastering the technology of searching, storing and sorting information, multimedia technologies and computer communications technologies, the main goal of the computer science course is not professional training in this area, but a whole range of educational tasks, such as: ensuring students' strong and conscious mastery of knowledge about processes transformation, transmission and use of information and on this basis, revealing the significance of information processes in the formation of a modern systemic information picture of the world,

highlighting and revealing the role of information technologies and computers in the development of modern society, instilling skills in the conscious and rational use of computers in their educational and then professional activities.

Content line: Information and information processes

Through the use of the notion of meaningful thematic unity, the content line is a didactic group that is utilized in the teaching process. The content line, in contrast to an academic discipline, which is constructed on the idea of subject-disciplinary unity, makes full use of interdisciplinary and interdisciplinary links. In particular, the content line titled "Information and Information Technologies" makes use of knowledge from the fields of computer science (which serves as the foundation of the line), mathematics (for instance, the number system), physics and technology (for instance, the fundamentals of computer operation), and other related fields.

It also makes use of information processing, which includes the acquisition, recording, organization, retrieval, display, and dissemination of information. Over the course of the past few years, the phrase has frequently been utilized to refer to computer-based activities in particular.

When used in common parlance, the term "information" refers to the facts and opinions that are provided and received in the course of daily life. One can obtain information directly from other living beings, from mass media, from electronic data banks, and from a wide variety of observable phenomena in the environment around them.

An individual who makes use of such facts and ideas generates additional information, some of which is transferred to other individuals through speech, instructions, letters and documents, and other forms of media. A body of knowledge is a collection of information that has been arranged in accordance with certain logical relationships.

This body of knowledge can be obtained by systematic exposure or study. The application of knowledge (or abilities) results in the development of expertise, and what is considered to be instances of wisdom are additional insights gained via analysis or experience.

The term "information" can be used in a variety of contexts, not just in the context of its conveyance through natural language. Additionally, information is registered and shared through the medium of art, as well as through facial expressions and gestures, as well as through other physical responses for example, shivering. In addition, every living thing possesses information in the form of a genetic code. This includes the ability to reproduce.

All of these information phenomena are present in both the physical and mental worlds, and the variety of these occurrences is so great that it has been impossible to come up with a single definition of information up to this point.

In the 20th century, there was a significant rise in the number of people who were interested in information phenomena. These phenomena are now the subject of research in a variety of fields, such as philosophy, physics, biology, linguistics, information and computer science, electronic and communications engineering, management science, and the social sciences.

When it comes to the business side of things, the information service industry has emerged as one of the more recent industries all over the world.

The processing of information is becoming an increasingly important topic for almost all other industries, including manufacturing and service manufacturing. The various perspectives and phenomena that are associated with these domains, which frequently overlap with one another, result in distinct notions and "definitions" of information, which can sometimes be in conflict with one another.

Input, processing, storage, output, and communication are the components that make up the five primary steps.

THE INPUT

The data is inputted into the computer at the stage known as the input stage. This can be accomplished in a variety of ways. There are, in point of fact, as many different ways to input data as there are different input devices. Input devices are things like keyboards, touchscreens, and microphones. You would have learnt about them in the tenth grade, but just to refresh your memory, input devices are everything that you use to enter information.

The user is the one who enters the data into the computer, which can be done in a variety of ways, such as by typing on a keyboard or speaking into a microphone. This data is collected by the device, which then transforms it into a sequence of ones and zeros, which is referred to as binary code.

DATA HANDLING

After that, the central processing unit (CPU) of the computer takes that binary code and does the calculations that are necessary to display the data in a manner that is comprehensible to the user. The central processing unit (CPU) collaborates with the memory of the computer to obtain instructions on how to show the information taken from the input device.

These instructions are then stored in the memory of the computer as pixels. Information of this nature is transmitted to the output device, where it is translated and displayed in a manner that is of practical value. Only a fraction of a second is required to complete all of this.

A STORAGE PLACE

The computer takes the information that is input and stores it in its memory banks. This is referred to as storage. It is possible to save the data in a variety of methods; nonetheless, the fundamental procedure is as follows:

1.The central processing unit (CPU) writes the data to the random access memory (RAM), which is the temporary storage of the computer.

2.Before moving the data from the random-access memory (RAM) to a more permanent storage location, the computer waits for the user to issue a command. In the event that this command is executed, the computer will write the data to the disk drive.

3. The next step is for the computer to save the data in a position on the disk, which might be either the primary storage location or a location that the user has specified. After that, the user is able to get this information whenever they remember it.

The use of external storage devices, such as USB drives or external hard drives, is another option for storing information.

A OUTPUT

During the output step, the computer takes the pixels that were processed during the previous stage and displays them in a manner that allows the user to see them. There is a wide variety of output devices, including but not limited to printers, screens, video and audio devices, and so on.

Through the use of these devices, the raw data is rendered useful and visible, so enabling human users to interpret the data and transform it into information. Possibly the sound waves of a song or the text of a document are the ones responsible for this.

INDIVIDUAL BETWEEN

During the information processing cycle, communication is connected to the many processes that occur elsewhere. In other words, each stage in the cycle occurs because one of the other steps came before it, which indicates that they are connected to one another. Within the context of the information processing cycle, this connection represents the communication component.

The connection that exists between the input and the output is the element that is most readily apparent. The process of input and output occurs very instantly (for instance, when a letter is typed on a keyboard, it appears almost instantly on a screen). At this point, the user and the computer are communicating with one another.

Once this is accomplished, communication can be transmitted to further computers via a network. Just for a moment, consider surfing the internet. The internet is essentially a vast network of computers that are connected to one another all around the world.

The act of opening your browser establishes a connection between you and the other computers, and these computers communicate with one another in order to provide you with the relevant information. Communication is also possible between computers that are connected to one another over a network. Examples of this include machines that are connected to a server or those that are connected to the intranet of a firm.

COMMISSIONING A Message Via WhatsApp

To get a better understanding of how this operates, consider sending a message over WhatsApp from your mobile device. In order to initiate the process, you must first open WhatsApp and then utilize the touch keyboard to enter your message (this procedure encompasses input, output, and communication).

After you press the deliver button, the WhatsApp application will contact with the servers in order to deliver the message, and it will also show the message within the discussion that is now taking place (this is the communication, processing, and output).

The application stores a record of the discussion on your phone, the phone of your friend, and the WhatsApp server (this is referred to as storage or storage).

A computer information processor is responsible for processing data in order to generate outputs that are comprehensible. Among the activities that may be included in the processing are the gathering, recording, assembling, retrieval, and broadcast of information. When a text file is printed, for instance, an information processor is responsible for translating and formatting the digital information so that it may be utilized in printed form.

Since the beginning of the information processing industry, corporations and governments have been looking for ways to handle huge amounts of data, which are typically statistical or calculated based on the data that has been gathered.

The revolution in information processing received greater momentum as a result of the ambition to journey into space, which further drove the need to handle massive volumes of data.

The twenty-first century has witnessed a surge in the quantity of data, and the amount of information that is processed on a daily basis has reached enormous dimensions. There are billions of devices, hundreds of satellites, and millions of software applications that participate in the processing of information. Over the course of one minute, trillions of data are processed.

A continual increase in the amount of information that is processed on a global scale has been brought about by larger systems and more widespread ownership. The information processing industry is still in the process of expanding significantly.

It is possible to define data as the unprocessed facts and figures. Data might be meaningless or confusing in some cases. Data frequently lack significance until they are arranged in a particular order or until we derive some kind of calculation from them. Data processing is the term used to describe this kind of calculation. The processing of data results in the dissemination of information.

There are streams of raw data that represent events that are taking place in an organization or the physical environment before they have been structured and ordered into a form that people can comprehend and use.

The term "information" refers to data that has been arranged in a manner that is both intelligible and valuable. To put it another way, information is data that has been structured.

• Information that has been transformed into a format that is meaningful and functional to human beings

Acquiring knowledge

Having knowledge is the process of applying information in order to find a solution to a problem or to make a choice.

*The development of a knowledge and respect for information processing and information systems will be facilitated by the utilization of these principles.

Features of the data they contain

The term "raw data" refers to data that has not been processed and is also referred to as "primary data." It is a term that is relative. Raw data can be entered into a computer program or utilized in manual analytical methods such as the collection of statistics from a survey and other similar activities.

The binary data that is stored on electronic storage systems like hard disk drives is one example of what it might refer to. It is possible for it to have the following characteristics in the field of computing: it may have errors, it is not validated, it may be in a variety of different forms (colloquial), it may be uncoded or unformatted, and it may be questionable, demanding confirmation or citation.

Qualities of the information being provided

A data set that has been transformed by some form of processing is referred to as information, and it is utilized to find solutions to problems on all levels. You should get familiar with certain qualities of information if you intend to use it to solve problems. These characteristics are described below.

One of the features of information is its accuracy, which refers to the correctness of items and the completeness of the information. Another characteristic of information is its reliability, which refers to the consistency with which the information is accurate. Reliable information is information that is correct on a constant basis.

"Comprehensibility" refers to the capacity of the data to be utilized in a significant manner. This is the kind of information that can be interpreted.

The availability of information to users at the appropriate moment to make decisions that are pertinent is referred to as timeliness. Both information and data have a certain amount of time during which they can be helpful. Due to the fact that the information has reached the end of its lifespan, it is no longer relevant in making decisions. The generation (or collection) of data, the processing of data into information, and the reporting of information to the user in a timely manner for the purpose of making appropriate decisions are all components of the lifetime.

When it comes to the resolution of an issue or the process of reaching a choice, relevance refers to the suitability of the material.

The term "interpretation" refers to the process by which different users assign various meanings to the same information.

The concept of security refers to the ability of authorized users to access data while simultaneously preventing any unauthorized users from gaining access to the stated data. In order for users to be able to solve problems and make decisions, the availability of information is determined by the level of security it possesses.

The concept of confidentiality refers to the availability of data to a limited group of users who are restricted in their access. It is imperative that it is not viewed by anyone who is not the intended party for it. To protect the data's privacy, it is necessary to ensure that it is secure.

The term "value" refers to the utility of information in terms of facilitating problem solving and decision making, as well as providing the company with the ability to acquire an advantage over its competitors. As a result of the fact that information possesses value, it is a commodity that can be sold and it can be shared. It is possible to deliver it in a variety of formats and on a range of modes of communication.

One definition of distortion is the process of presenting data in such a way as to generate a specific presentation. There is also the possibility of data being masked in order to discourage particular conclusions.

The distortion of

Concealment

Trustworthiness

Inconsistency in behavior

The inability to comprehend

Interpretable in a variety of ways

A value

Importance of

Secrecy at all times

Assurance of safety

Ability to share

Obtainability of.

Duration of life

A commodity that can be purchased is information.

A format

Moderate

Data and information representations in their various forms

Included in the data are:

Character is a symbol that is used to symbolize letters, such as the letter A or the letter a.

A string is a representation of a word, such as "man" or "dog."

Numbers such as 0 and 1 are examples of numeric expressions.

Morse Code, dots and dashes are examples of audible communication.

For example, fingerprints and individual frames from a movie are examples of visual evidence.

"Mors"

Information possesses the following characteristics:

Text, graphics, audio, and video are all included.

Notations that are used for specific purposes, such as mathematical, scientific, and musical notation

Graphs and charts are examples of graphical representations.

The tables

Different Informational Sources

The following are the three primary categories that we will use to categorize the sources of information:

1. Materials for Printing

2. Secondly, Electronic Sources

3. Contacts with Individuals

The lesson plan for the information processing model

Objectives

As a consequence of this instructional session, pupils will possess the ability to verbally articulate their residence when presented with a map.

Demonstrate their comprehension of the fact that individuals hail from many regions of the world through verbal explanations

The materials required for this project are the book "It's a Small World" written by Richard M. Sherman and Robert B. Sherman, which must include a music CD.

In addition to the CD player, there are also small bells and drums. Map of the world

Timing Recommendation: thirty minutes

1. The instructor will begin the session by bringing the students around a global map and then asking them to discuss any prior knowledge they may have regarding the map.

2. The instructor will inquire, "Where should we be living?" as well as "Does anyone have family members who reside in any other location?"

3. The answers to these questions will kick off a conversation about the many states, the entire United States of America, and even other countries, as well as a discussion about the student's family and their ancestry.

4. The educator will present the book "It's a Small World" to the students in the class group. Ask the kids to discuss what they

believe the book will be about based on the pictures that are displayed on the cover of the book.

5. Before commencing the music, read the entire book to the students. This gives them sufficient time to become familiar with the text (the lyrics) and to discuss each image along the way.

6. While the students are looking at and discussing each artwork, the instructor will show them the region of the world in which the children depicted in the illustration are located.

7. To celebrate the completion of the book, provide the pupils with miniature bells and drums.

8. Insert the music CD into a CD player and play it off.

9. If the students are familiar with the lyrics, they can sing along with the song, or if they are not familiar with the lyrics, they can dance and perform instruments. While the music is playing, you should gather the children in a huge circle and lead them around the classroom. The music should be played multiple times.

Confirm that you have understood

To demonstrate their family to the rest of the class, students will be asked to draw a picture of themselves and their family. It is possible for them to add any member of their family that they desire and to discuss the aspects that make their family unique, such as the holidays that they celebrate, the particular meals that they consume, the language that they use at home, and others.

References include:

1. Jensen, E. Brain-based learning systems and methods. The Association for Education in Florida? brain-based learning methodologies, retrieved from the following website: http://feaweb.org/

2. W. Huitt's work from 2003. The cognitive method that is based on the processing of information. Instructional Psychology that is Interactive. Vadosta State University is located in Valdosta, Georgia. This information was obtained from the website http://www.edpsycinteractive.org/topics/cognition/infoproc.html.

3. (2010) written by Wolfe. Brain matters: putting research into practice in the classroom is the second edition of this book. The Association for Supervision and Curriculum Development is located in Alexandria, Virginia.

When attempting to explain human learning, Information Processing Theory employs a computer model. The collection of information begins with its reception, followed by its processing, storage, and eventual retrieval.

Using the computer model provides us with a decent overview and a simile, despite the fact that this is, of course, an oversimplification of human learning. (To put it another way, with the help of our computer schemas, this theory is able to assist us in comprehending it.) An explanation of the method is provided below in a simplified form:

The first step involves the recognition and recording of information. We are able to detect, or perceive, something in our surroundings, and then we make a choice regarding whether or not to pay attention to it.

This is what it means to be human. Is it a significant part? Do you find it stimulating? Is it clear to the human eye?

The second step involves temporarily storing information in the working memory, sometimes known as short-term memory. We are able to store around seven "chunks" of knowledge in our working memory at any given time, according to research that is rather exhaustive. There is a high probability that the information will be lost if it is not exercised or utilized in any other way.

The third step involves the encoding of information and its subsequent storage in long-term memory. During the time that information is stored in working memory, encoding takes place, during which it is frequently connected to previously acquired knowledge (also known as schemas).

As a result of being "filed" in a position that is more easily accessible, information that is well-organized is simpler to encode.

The retrieval of information is the fourth step. The ability to retrieve information with the appropriate environmental signals is contingent on the degree to which it was encoded as well as the amount of time it was spent working with it in working memory.

There is evidence that executive functioning is active throughout. The executive function is responsible for a wide variety of functions, the majority of which are associated with self-regulation. Retaining attention, planning ahead, organizing thoughts, completing tasks, adapting to unforeseen changes or barriers, and regulating emotions are all functions that fall under the purview of the executive function. The individual is responsible for some of this (for example, people who have attention-deficit/hyperactivity disorder (ADHD) have a harder time keeping their attention), whereas the nature of the material and the task (is it interesting? Do you have it active? Do you find it to be nicely organized?

In order to guarantee that the information is saved and accessible, what steps can I take?

1. Make an effort to maintain the attention of the kids.

A "break" should be provided every ten to fifteen minutes. Around fifteen minutes into the lesson, even the most attentive students begin to lose interest. When planning class time or lectures, you should try to divide them into "chunks" of approximately fifteen minutes each.

At each of these "chunks," you should give the students a break. The term "break" does not refer to a break from thinking; rather, it refers to a break from one activity that is followed by the beginning of another action. A demonstration of your notion could be shown on a DVD or a clip from the internet, for instance. Alternatively, you could have students talk about the concept with one another for a few minutes. In order to "refresh" the attention of kids, taking breaks is a useful strategy.

Encourage students to participate actively in the learning process. Are there ways that individuals might learn knowledge in a more active manner, as opposed to simply listening to it?

Taking the concept as an example, you could hold a conversation with the students and guide them through the process of comprehending it. It is possible that you may ask them to make an effort to find a solution to the situation. It is only natural that pupils will pay more attention while they are engaged in activities.

Bring to the forefront the most significant ideas in a clear and concise manner. "This is important - you need to understand this," is all that is required to get the kids' attention to become concentrated, even if just for a few moment.

The phrase "This will be on the test" is likely to attract the attention of pupils; nonetheless, it encourages an orientation toward extrinsic incentive rather than an orientation toward intrinsically motivated mastery. Due to the fact that the information is valuable to the individual, it is appropriate to underline the significance of the information.

The second step is to activate the working memory.

Make sure that students have the opportunity to actively work with the content that is being taught in the course.

There are a variety of methods that can be utilized in the classroom, outside of the classroom, or even online to encourage students to engage in more in-depth thought about the material they possess.

Worksheets, informal quizzes, written student summaries (for example, papers that are only one minute long), case studies, problem sets, and larger projects are some of the possibilities. Discussions can take place in pairs, small groups, or with the entire class!

To encourage students to organize their thoughts, encourage them to do so. Consider having students create a chart, map, or outline of the subject through some exercise that needs them to organize the information.

This is a strategy that not only helps students organize the data but also gets them thinking about it.

"Memory is the residue of thought."

The Willingham Report (2009)

3. Arrange the information in such a way that it can be quickly retrieved and stored.

Offer a summary of the material covered in the lesson. Putting up a summary of the lesson that will be taught today is one idea that you might want to consider.

Create a map of the concepts as you go. Organizing information graphically for students by utilizing circles, lines, and boxes (or tables) to help them comprehend the links between concepts is all that is required to accomplish this task. It is not necessary to do so in a formal map.

You should make it clear to the pupils that there are connections between the new information and the information they already contain.

Students are better able to comprehend how new ideas are to be arranged inside the framework of ideas that they are already familiar with when they employ this method.

Content line: Formalization, modeling, algorithmization and programming

The following list of lines (directions of study) relate to the primary portions of the computer science course:

· **Information and the processes that involve information**

· The presentation of given information

There are several areas of study that encompass computer architecture, formalization and modeling, algorithmization and programming, information technology, and humanitarian informatics, often known as social informatics.

A variety of methodological techniques are required in order to accommodate the educational material that is included in each topic line of the obligatory minimum content of education in computer science.

In the course of your study of the line "Information and inf. processes," you should pay close attention to the creation of understanding as well as the capacity to provide examples of many topic areas that show the flow of information. processes in living nature, in society, or in technical systems.

Information is always associated with some kind of media, whether it be material (stone tablets, birch bark, paper, magnetic disk, etc.) or intangible (local language, sound, melody, dance, this or that sign system, etc.).

This is the meaning of the sentence "Presentation of information," which states that information is always associated with some method of communication. In order to build a concept about natural and artificial languages, the binary form of information representation, and the benefits and drawbacks of various forms and types of information presentation, it is important to form an idea about these things.

Through the "Computer" line, students are given the opportunity to become familiar with a computer from a different perspective.

A computer is a universal tool that enables a person to automate intellectual activity and information processes, including searching, storing, processing, and transmitting information over long distances.

It is essential to become aware of the fact that a computer does not think in the same way that a person does; rather, it is a performer, a powerful and quick-acting tool that assists a person in his information activities (such as information systems, electronic systems, computing centers, and e-mail). When teaching kids about computers, it is essential to bring to their attention the multipurpose capabilities of a computer as well as the hierarchical structure of computer software.

A systemic information picture of the world is formed in the minds of students by the "Formalization and Modeling" line. This line enables students to consciously identify individual objects in the surrounding reality, see the relationships between objects, highlight the essential features of objects, classify and combine into sets, construct diagrams, and represent some objects using others for the purpose of studying, presenting, making, or the purpose of using them.

Particular focus ought to be placed on the core of computer modeling, with particular attention made to highlighting both its benefits and drawbacks, as well as taking into consideration specific cases.

The line of work titled "Algorithms and Performers" helps students strengthen their algorithmic thinking skills by having them solve a huge number of tasks. It is through this process that students develop their understanding of the characteristics of algorithms, algorithm performers, recording methods, and algorithmic frameworks.

The "IT" line is not only a way of preparing students for life in the information technology society and for future professional activities, but it is also a means of consolidating and developing students' theoretical training through practical experience. (Detailed explanations can be found in Makarova's textbooks). According to Makarova, Beshenkov, and Ugrinovich, the phrase "Humanistic computer science" is still not well reflected in contemporary textbooks.

According to the educational standard of primary general education, the important goals of mathematics education are: developing in students the foundations of logical and algorithmic thinking, skills in writing and executing algorithms; skills to act in accordance with the algorithm and build simple algorithms; explore, recognize and depict geometric shapes; work with diagrams, present, analyze and interpret data.

In the scientific and scientific-methodological literature, issues pertaining to the teaching of children the fundamentals of programming are considered by professionals in the field of information technology, as well as by teachers and scientists. Taking into consideration that programming is a means of interacting with a computer in a language that it can comprehend, experts were in favor of the concept of teaching children programming at a young age.

We are of the opinion that computer science should not be taught as one of the fields of mathematics, nor should it be relegated to the realm of technology. Not only should programming be studied, but also information technology, information modeling, and the mathematical underpinnings of information theory.

This indicates that programming should be studied in addition to these other subjects. By utilizing the variable component of the second generation of standards, it is feasible to initiate a computer science course with the backing of the administration of the school.

At the same time, when teaching early programming, another challenge arises: kids in elementary school are unable to retain complicated commands and lengthy codes that are written, as a rule, in a foreign language (which they are just beginning to learn).

A programming language that is close to the way that children think is required in order to resolve this paradox. This language should contain commands for interacting with objects that are engaging and understandable to children, while at the same time provide a solid foundation for learning other programming languages. In the 1980s of the previous century, Seymour Papert and Alan Kay, who were the architects of the Logo language and one of the pioneers of the notion of artificial intelligence, made the observation that technologies that dramatically alter the way people think ought to be made available to children at the earliest feasible age.

In the fall of 2014, classes in the United Kingdom started teaching students the fundamentals of programming. pupils in primary school in British schools learn to design simple programs in blocks by utilizing software such as Scratch, Kodu, and Logo from the Massachusetts Institute of Technology (MIT). By the age of eleven, pupils should have a grasp of basic algorithmic structures and utilize them while developing curricula.

This is something that is included in the curriculum of a number of countries, including South Korea, Estonia, France, and Australia, as well as the Finnish project Koodi 2016, which teaches children the fundamentals of programming beginning in elementary school.

It is important to highlight that the trend of learning to program in school at an early age is backed by a large number of top organizations in the field of information technology. These companies not only provide easily available programming tools, but they also provide widespread support for the concept of learning to program in academic settings.

There is a growing interest among members of modern society in gaining knowledge and comprehension of the art of programming, as seen by the large number of people who use resources such as Scratch and AppInventor, which are offered by MIT, Codecademy, and Code.org, amongst others.

In these kinds of settings, particular "functional brain organs" are developed during the process of learning various programming languages. Furthermore, it is of utmost significance that these "organs" are developed through the use of communication and objective action in the child.

The programming environment is a representation of transitional objects that serve as metaphors. With the assistance of these metaphors, students are able to transform the experience of bodily manipulations with things (turn right, step forward, etc.) into conceptual generalizations and abstractions.

This is an important skill for students to develop when they are in elementary school because mental activity is not separated from the motor activity of the subject.

While we are in the Code.org environment, let's have a look at some of the components that make up the methodology for teaching programming to elementary school children.

As part of the process of teaching computer science to elementary school students, it is essential to take into consideration the fact that students are not permitted to spend more than fifteen minutes in the classroom using the computer.

As a consequence of this, the course needs to be broken up into two parts that are interconnected with one another. In the first stage, students are introduced to new information on the theoretical aspect of computer science (for instance, information coding), and in the second stage, they work on computers.

It is possible to highlight the following aspects of the Code.org environment in order to facilitate the development of algorithmic thinking in elementary school children. The first and most essential element is the learning done through the use of games.

During the course of the environment, students are required to participate in an online game. During this time, children are exposed to the fundamentals of programming. Children take control of a zombie, a bee, an artist, or a farmer throughout the course of the game. These characters wander about the playing field and fulfill various objectives.

The player is required to first create a series of orders and then execute them in order to do this. Hints are provided before to each level, and all of the activities are both visual and voice-based. This aspect of the environment is intended to address the most significant challenge that arises while instructing programming, which is the lack of motivation to learn about a new and difficult subject.

The algorithm is represented in the environment in two different ways: first, as a block visual language, and second, as javascript. This is yet another characteristic of the environment.

The process of programming does away with the requirement of writing text and instead involves merely dragging components from the palette together. There is only a small amount of code that needs to be written in order for the program to function properly. This code must be performed after the "execute" button is clicked.

Students are able to observe the algorithm being carried out in a step-by-step manner through the use of visual display and interactive execution, which also makes it feasible for them to examine and modify the algorithm. When it comes to mastering the possibilities of a programming language, consistency and systematicity are the third aspect of the environment.

There are a number of various courses available on this website that are tailored to different age groups. These courses range from learning simple commands for children who are four years old to dealing with loops, variable processes, and functions, which are geared toward students who are 16-18 years old and older.

Following the completion of the pre-registration process, the instructor is given the chance to create classes, assign relevant courses to those classes, and further monitor the progress of the students.

Classes that specify the subject matter and the total number of pupils. It is possible to use an image as a password for children in elementary school, while a code word can be used for students in higher grades. Information pertaining to the students in the class

Following the formation of the teacher's classes, there are connections that offer students the opportunity to enter the website. When students click on the link, they are able to view the names of their classmates, locate their own, and choose a picture that represents a code.

A new opportunity has been added to the resource, and that is the ability to include a friend while enrolling in the class. It is quite helpful to have this capability available in the event that there are not enough computers in the classroom. It is strongly suggested that the first course be utilized for lesson plans in the second grade. At the beginning of the school year, when students are just starting to become familiar with the computer, it is recommended that the tasks that have been proposed be completed.

Working with the mouse and sketching drawings are the activities that are meant to be completed throughout the third stage.

For instance, a sample of the first assignment for the course. As children progress through the subsequent phases, they acquire accustomed to the process of creating algorithms for a variety of characters.

Students acquire knowledge of linear algorithmic structures, branching structures, and cyclic structures through the completion of assignments in these classes. You have the opportunity to review functions and processes when you are enrolled in these classes in high school. As an illustration of the execution of a linear algorithm. Each course is broken up into numerous distinct stages. One example is that there are 19 stages in the second course.

The construction of an algorithmic way of thinking can be broken down into four distinct phases, which can be separated into tasks at each stage:

1. An introduction to the algorithm, including both the updating of existing information and the discovery of the method by students, as well as the mastery of the algorithm's primary steps

2. Practicing the individual operations that are contained in the algorithm and becoming proficient in their sequence is the second step in mastering the algorithm. Conducting operational drills

3. Application of the algorithm, which involves doing practice runs of the algorithm in both familiar and unusual scenarios.

Constructing an algorithm in response to a new and challenging circumstance The process of learning algorithmization and programming requires not only the invention of an algorithm but also the implementation of an algorithm for use.

The experience that youngsters have demonstrates that they are unable to do this immediately; for many of them, using the method is a significant challenge.

When it comes to this, we make sure to spend a fair amount of time working in pairs and reciting each step aloud. It is recommended that students who have been successful in the past be used as expert advisors to assist students who are falling behind in their coursework. This is because all completed activities are saved in the student's profile.

Not only does this kind of work increase the overall performance of the class, but it also generates additional incentives that students can use to enhance their motivation.

As a result, the Code environment gives elementary school pupils the opportunity to become acquainted with the fundamentals of algorithmization and programming while simultaneously interacting with characters they are already familiar with, studying a difficult subject, and getting ready to study programming.

The use of algorithms is one of the most widespread aspects of both computers and humans. Each of them employs algorithms in order to arrive at decisions that are interconnected to difficulties.

It may appear that these algorithms are difficult to understand, but in reality, they are nothing more than intricate sets of instructions that computers follow in order to generate a response. It is common for humans to make use of algorithms, which are more straightforward; for example, a supper dish is an algorithm.

The ability to build an algorithm can provide children with a good foundation for logical reasoning and problem-solving, which can be beneficial to their development. Children who teach themselves to think using algorithms are able to gain the cross-disciplinary skills that are necessary to find creative and original solutions to a variety of problems that they face in their own lives and beyond.

Children might not consider the word "algorithm" to be significant, but algorithms are present in every aspect of their lives. In point of fact, these algorithms possess complete power over every facet of their existence, including the technology they employ and the decisions they are required to make on a daily basis. Accordingly, it is of the utmost importance to educate children about algorithms and to explain them to them, particularly if parents wish to introduce their children to the world of coding.

There are one way to help children comprehend algorithms.

1.Start with the Fundamentals

Create a Recipe Algorithm Activity for Children to Participate in While They Are Cooking

Participate in a Selection of Rounds of an Online Game That Involves the Development of Algorithms

Algorithms that are based on computers should be introduced to children in a gradual but consistent manner.

Concluding Remarks Aspects That Can Help Children Understand Algorithms

Learn the fundamentals first.

Before children begin to learn about computer algorithms, they should have a thorough understanding of several fundamental applications that are used in the real world. It is possible for parents to get things started by having their children develop a comprehensive algorithm that outlines their morning routine. The distance that kids have to travel in order to wash their teeth, arrive at the breakfast table, and consume all of their milk would also be included in this definition.

Because of this, they are able to divide ordinary chores into smaller portions, which makes it easier for them to use a computer for a particular purpose.

During the course of their journey, they would acquire algorithmic capabilities like as sequencing, repetition, conditional reasoning, and other fundamental abilities. After being familiar with the algorithm's procedures, they would be prepared to comprehend the situation with a greater degree of clarity.

Create a Recipe Algorithm Activity for Children to Participate in While Cooking

When it comes to cooking, there are a number of principles that are comparable to those of coding and algorithms. A youngster will benefit from this activity since it will help them review algorithms and other important coding concepts while they are having fun in the kitchen with their children while they are cooking.

Children should be made aware of the reasons why it is essential to carry out the steps in a recipe in a specific order in order for them to have a thorough understanding of algorithms. Inspire them to think about the consequences that may arise if they fail to complete a step or carry out the procedures in the correct manner.

It is also possible for this to assist a youngster in understanding the concept of logical progression, which will assist them in performing well in subjects such as reading and mathematics.

You should try your hand at a few rounds of an online game that requires you to create algorithms.

If you are looking for a fun way to practice algorithms with children, it is recommended that you play a few rounds of online games that are centered around coding and algorithms with them.

There are a lot of games that can be played online that will test the child's algorithmic dexterity, and they will also test them against other children in live competitions.

Children will have such a good time playing that they won't even be aware that they are gaining knowledge. In addition, because every game is unique, it is possible to be certain that children will constantly be presented with a new challenge to help them develop their ability to think logically and solve problems appropriately.

The implementation of computer-based algorithms should be done in a gradual but consistent manner.

It is important to keep in mind that before introducing children to computer and program-based algorithms, you should wait until they have a general understanding of algorithms. In addition, one can seek assistance from online resources that offer learning modules for the purpose of instructing children in algorithmic concepts.

The children are able to select the most suitable educational alternative that caters to their own requirements and interests thanks to these internet resources.

Keep the children motivated at all times.

Encourage the children to write down their morning routine or the algorithm for something even simpler, such as eating cereal or brushing their teeth. Doing so will help them remember it.

Without even being aware of it, they will be learning fundamental concepts related to computation, such as repetition (brushing the bottom left tooth five times), sequencing (putting food in the bowl and then adding milk), and conditional reasoning (stop eating if the bowl is empty).

You should encourage the youngster to provide directions that are as specific as they can possibly be. In the event that the instructions do not specify that the bowl must be removed before the computer can comprehend the instructions, milk will be splattered all over the floor.

Have you ever wondered how you can get your youngster started with coding? When you were growing up during the early days of the Internet, coding was a skill that was only available to highly skilled technicians.

To learn how to code, you needed to earn a degree in computer science and develop computer software applications for desktop computers. Due to the fact that older computer languages such as C and C++ were difficult to learn and required a strong basis in mathematics, it was not a skill that was widely possessed.

These days, code may be found everywhere. Code is responsible for the creation of every video game, website, and YouTube video that your youngster currently views. Even with non-technical workers and those who are not directly involved in technology organizations, programming is now one of the most in-demand talents that employers are looking for in potential workforce candidates.

For this reason, parents and instructors all around the world are encouraging their children to begin learning how to code at a younger age than ever before. It is being more recognized that computer science, along with English, mathematics, and history, is an essential subject to study in school.

To our good fortune, the accessibility of coding has increased in tandem with its increasing prevalence. When it comes to learning programming, there has never been a better moment than now, and in this post, we have described how you may teach your children how to program.

Discover how to instruct children in programming.

The number of reasons to begin coding is comparable to the number of resources that are available online for studying coding. If you want your children to learn about programming, we have broken down the five steps that you need follow in order to accomplish this goal.

1. Can you explain what coding is?

One of the first steps in learning how to code is to provide an answer to this question. In the most straightforward manner imaginable, coding can be defined as the process of providing instructions to computers so that they can carry out specific jobs. This is how easy it is. However, it is also highly complicated.

Coding appears to be a complex process because computers are unable to comprehend the ambiguity and subtleties that are inherent in human language.

As a result of the fact that they think in terms of binary choices, the language that programmers use needs to be accurate and simple for the computer to comprehend in order for a program to function without incident.

There are a lot of incredible things that computers are capable of doing, but if they did not have code and programmers to develop code, they would just sit there collecting dust on our desks.

There are numerous programming languages, each of which is used for a specific purpose: A visual, block-based language called Scratch is designed to make it easier for children to learn how to code. JavaScript is used to power the majority of websites and interactive online games.

Python is utilized in the field of data science and artificial intelligence. C and C++ are used to run operating systems and large programs. Java, Unity, and Roblox Lua are all languages that can be used to design video games.

Depending on the nature of their work, every professional computer scientist can be required to understand multiple of these areas.

While it is important to encourage children to pursue their passions, it is also important to provide them with a structured atmosphere in which they are not overburdened by the numerous options and paths available to them.

Every single computer language makes use of comparable ideas and functions, such as loops and algorithms, that are shared by all of them. It is important to keep things approachable, begin slowly, and have fun when you are defining coding to your children.

2. Develop an interest in computer programming

Coding is something that children enjoy doing, but when they learn that the vast majority of the games and programs that they enjoy are developed with code, they become really excited about the prospect of creating their own.

You will be able to relate the various programming languages to activities that your children already like if you are able to define coding and explain how the various programming languages function.

Do they enjoy playing video games? They might be interested in learning Java, which is the language that is used to create Minecraft, as well as Unity and Unreal, which are used to create the majority of the big video games for personal computers and consoles.

Do they enjoy virtual reality, artificial intelligence, or robotics?

As a result, Python might be the ideal choice for them. Even if they simply have a passing interest in sports or LEGO, you may discover methods to connect these interests to coding in a way that will pique their interest in the subject. It is essential to keep in mind that there are several approaches to learning, and that every child has their own preferences and approaches to learning that work best for them.

When you have a thorough understanding of your child's learning style and communicate with them in depth about what inspires them, you will become aware of the most effective way for them to achieve success.

3. The race is won by those who go slowly and steadily!

A significant portion of being a programmer is experiencing frustration. Failing and troubleshooting are actions that occur on a regular basis in professional software development; but, for children, this persistent irritation might hinder them from moving forward and interacting with content that appears to be difficult or obscure.

Becoming self-paced is a terrific approach to build a sense of fun and enthusiasm surrounding coding, particularly for younger learners.

This is especially true for younger learners. However, self-paced does not mean self-taught, and although it is feasible for children and adults to learn coding on their own, it is important for beginners to have a structured setting and, ideally, a good instructor.

This can make a significant difference in developing a long-term interest in the subject.

Start from the very beginning.

Scratch was created by engineers at the Massachusetts Institute of Technology (MIT) with the intention of making the study of computer science more enjoyable for younger students.

The free, visual, block-based programming language known as Scratch gives children the opportunity to create their own games, applications, and animations by employing pieces of code that are colorful and simple to comprehend.

These blocks are similar of LEGO blocks. Children can progress from creating simple animations to scripting complex games by just putting the blocks together. Once they have reached this level of development, they can then share their creations with the largest community of child programmers on the internet.

Scratch is a game that is not only entertaining but also has a user interface that is so simple that even the most book-shy children will find themselves drawn to it.

Scratch is a text-based computer language that was designed to teach fundamentals and serve as a stepping stone for learning more advanced computer languages. However, more experienced students who already have a foundation of knowledge might begin with something like coding in Roblox, Minecraft, or Python.

This is a terrific option for kids who are just starting out or who are in the intermediate level. An engaging and beginner-friendly education in Scratch is provided by Create & Learn. During this course, a live instructor walks students through the process of learning fundamental concepts while simultaneously bringing great creations to life.

Final Thoughts

Let the children know that they are free to create anything they choose. Inspire them to create any game or application that they can conceive of that they would enjoy playing, and encourage them to do so.

It is important to assist children in understanding that anything is possible and that they have the ability to turn any dream into a reality.

When material is given in a way that is not just entertaining and intriguing but also on a personal level, children will automatically become enthusiastic learners.

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processing. It's designed for both students and professionals who want to improve their algorithmic problem-solving skills.

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Content line: Computer, information and communication technologies

Computers, information, and communication technologies are the topics covered in the contents of Lecture 10.

When pupils are introduced to the ideas of computing and programming in elementary school, it can serve as a beneficial foundation for the development of important problem-solving and computational thinking skills. Regarding the subject matter that may be discussed, the following is a general guideline:

Computers:

1.An Introduction to the Subject

2. Having an understanding of what a computer is and the fundamental components that make it up (central processing unit, display, keyboard, and mouse). It is important to differentiate between software and hardware.

3.The fundamentals of computers include learning how to turn a computer on and off and how to use the most fundamental peripherals.

• Being familiar with the desktop and different icons.

• Fundamental file management, including the ability to create, save, and organize files etc.

4.The third topic is operating systems, which includes an introduction to common operating systems such as Windows, macOS, and Linux.

• Using the interface of the operating system to navigate.

5.Internet Safety: • The most fundamental guidelines for internet safety, such as avoiding the public disclosure of personal information online.

• Introduction to safe and responsible web browsing.

Introducing the concepts of sequences and algorithms is the fifth step in the programming process.

6.Block-based programming languages such as Scratch and Blockly are presented in this course.

• Exercises in simple coding that would allow you to construct animations or games.

The sixth topic is fundamental logic and problem solving, which includes puzzles and games that encourage logical thinking.

Simple exercises in problem-solving are provided.

7.Computer Vocabulary: • An introduction to fundamental computer-related vocabulary, including terms such as hardware, software, keyboard, mouse, and monitor).

8.Understanding code as a collection of instructions is the eighth step in the introduction to coding concepts step.

This includes directions for sequencing and ordering.

• Correcting easy flaws in the code.

9.Students should be encouraged to explore and interact with instructional software and rudimentary coding environments as part of the hands-on activities offered in the ninth grade.

Use coding platforms and tools that are suitable for the user's age.

10.Creativity and Projects: • Inspire creativity by having students work on projects such as making short stories, animations, or games using block-based programming.

• In the realm of programming, educate yourself on the concepts of loops and conditionals.

11.Collaborative Problem-Solving and Collaboration: Encourage students to work together on coding projects using collaborative problem-solving strategies.

• Inspire kids to collaborate with one another and find solutions to problems as a group.

12.A fundamental understanding of hardware includes the following: • An introduction to input and output devices, such as a keyboard, mouse, and printer.

• Being able to comprehend storage devices such as USB disks.

13.Teaching children about responsible online behavior and digital citizenship is an important part of the ethical and responsible use of technology.

• Have a conversation about the significance of respecting the labor and privacy of others when using the internet.

14.An Introduction to Robotics (optional): • For more advanced primary school programs, you can introduce fundamental concepts of robotics by utilizing age-appropriate kits and tools.

15.Assessment and Evaluation: • The use of straightforward quizzes, coding exercises, and project evaluations are all effective ways to evaluate the students' level of comprehension and progress.

Take into consideration that the precise content and curriculum may change depending on the grade level and the resources that are accessible.

At this point in time, the major objective is to cultivate an interest in technology, problem-solving, and computational thinking among young kids, all while making learning entertaining and accessible to them.

Technologies related to computers, information, and communication make up the content line.

When instructing students in computer, information, and communication technologies, it is essential to give a comprehensive education that covers a wide range of topics related to these areas of study. The following is a content line that addresses the most important themes that pertain to this domain:

1. An Introduction to Computers and Information and Communication Technology: • An understanding of the fundamental components of a computer, including the central processing unit (CPU), display, keyboard, and mouse.

It is important to differentiate between software and hardware.

1. ICT stands for information and communication technologies. This is an introduction to they.

2. Operating Systems and Software: • Acquiring knowledge of several operating systems (such as Windows, macOS, and Linux) and the interfaces that they each have.

3.Word processing, spreadsheets, and presentation software are examples of fundamental software applications.

• The principles of the Internet, including how it operates and its history. • Web technologies and the Internet.

4.The internet should be used in a sensible and secure manner.

• Exploring, searching, and analyzing information through the use of the internet.

This course will provide an introduction to web technologies such as HTML, URLs, and web browsers.

5.Having an understanding of the fundamentals of digital citizenship is the fourth step in ensuring online safety.

• Identifying and avoiding potential dangers that can be found online, such as cyberbullying and internet frauds!

6.The practices of privacy and security on the internet.

7.An introduction to algorithms, sequences, and logic is included in the fifth section of the basic concepts of coding and programming.

8.Block-based programming languages, such as Scratch, are utilized for the development of straightforward programs.

• Problem-solving through coding exercises and small projects.

9.Email etiquette and fundamental email communication are the sixth set of tools for communication and collaboration.

• An introduction to several technologies for creating collaborative projects, such as Google Workspace and Microsoft Office 365.

• Protocol for communicating and using the internet.

Understanding data and information, fundamental data organization and management strategies, and an introduction to spreadsheets and databases are the first steps in the seventh step of the data and information management course.

• Creating and modifying digital images and graphics. This is the eighth step in the process of creating multimedia and digital content.

• The fundamentals of producing digital audio and video.

Software for making multimedia presentations, sometimes known as presentation software.

A brief introduction to local area networks (LAN) and the internet is included in the ninth section on networking and connectivity.

• The manner in which information is send over networks.

• Both wireless and cable connections are available.

10. Emerging Technologies, is an introduction to emerging technologies such as artificial intelligence (AI), virtual reality (VR), and the Internet of Things (IoT). This topic is optional.

11.The impact that information and communication technology has had on society and on day-to-day living. There are ethical issues to take into account when using technology.

12. Careers and Opportunities in Information and Communication Technology: - Explore careers that are related to ICT. - Understanding the value of digital skills in diverse occupations.

13. Hands-On Projects and Practical Application: Encourage students to use what they have learned by having them participate in projects, giving presentations, and applying what they have learned in the real world.

14.Assessing and evaluating students' knowledge and abilities in information and communication technology (ICT) can be done through the use of quizzes, assignments, projects, and practical examinations.

15. Up-to-date information on current trends and innovations in the information and communications technology industry, as well as a discussion of the possible impact these trends and breakthroughs could have on society.

This topic line offers a comprehensive overview of many technologies, including those related to computers, information access, and communication. If you want to ensure that you give a balance between theory and practical application, you should modify it so that it is appropriate for the age and level of proficiency of your students. Moreover, maintain a flexible and open attitude toward the incorporation of new technologies and innovations as they become available.

How teach Computer, information and communication technologies in primary school

Students are able to improve their abilities in fundamental computer skills such as keyboard skills, mouse use, safe internet surfing, and software use by using lesson plans that teach computer skills.

Lesson plans for computers typically begin with basic keyboarding abilities and then advance to creative projects in which students exhibit what they have learned.

There are simple plans, advanced plans, and more specific plans available on the internet, and you may discover them all depending on the age and skill level of your children.

Computer Skills Lesson Plans That Can Be Printed Out

These printable lesson plans can be of assistance to you in getting started with teaching computer skills if you are either not yet prepared to construct your own lesson plan from scratch or if you are short on time.

To utilize the lesson plan that you wish to use, click on the image of the plan, and then download and print it. You can obtain the printed lesson plans by looking at the troubleshooting suggestions if you are experiencing any difficulties.

An Instructional Plan for Keyboard and Mouse Skills

It is possible to utilize this straightforward lesson plan for keyboard and mouse abilities for beginners of all ages and levels, including toddlers and adults who are learning how to use computers.

The kids are able to review the fundamental keys on the keyboard and how to utilize a mouse by playing a fun game called Computer Says, which is designed after the game Simon Says.

You have the option of maintaining the lesson plan in its current form, making revisions directly on the PDF lesson plan, or using it as a source of inspiration for your own one-of-a-kind class.

When it comes to real beginners and younger children, it is recommended that you give three to five instructions in a set rather than ten.

When working with older children, you can begin to incorporate more complicated commands, such as "copy and paste that last word," in which the students are required to determine which keys or buttons to press.

Students who are further along in their education can begin to use entertaining written elements with directions such as "make a smiley face" in which they create emoticons.

Plan of Instruction for Learning to Make Use of Software

There is a wide variety of kids' computer learning software available to choose from. When developing the lesson plan for the

Software Scavenger Hunt, you should select either a well-known application such as Google Docs or a fun new program that you would like to teach, such as Scratch. It is possible for children of any age to acquire knowledge about software through discovery; however, depending on the program that you select, this lesson is most suitable for children in grades one and two and older.

In addition to computer lessons, you can use the lesson plan in other settings, such as advanced art classes for older children who are able to experiment with programs such as Adobe Photoshop for a project.

Young children can acquire knowledge about software by participating in straightforward online activities, such as interactive coloring pages, in which they are required to determine the type of line or filler that is produced by each tool.

During self-guided sessions or on days when there is a replacement instructor at school, this kind of autonomous exercise is an excellent choice.

An Instructional Plan for Responsible Internet Use

The world of YouTube stars and "fake news" can make it challenging for students to differentiate between that which constitutes responsible use of the internet for particular online platforms and that which constitutes irresponsible use of the internet online. This YouTube Yes or No lesson plan is intended toward older children and teenagers, and its primary focus is on the ways in which the internet may be used for positive purposes, as well as the ways in which people can use it in the wrong way.

If you want to be sure that your younger children are not exposed to anything that is actually improper, you should use the YouTube Kids app.

Children of a more mature age might concentrate on many online news providers and evaluate them to choose which one is the most responsible.

In small groups, students will complete the task, during which they will vote on whether or not each video is appropriate and discuss any disparities that may arise.

Techniques of Technology That Should Be Taught

Understanding how to use a computer has become an absolute requirement in today's world, which is dominated by technology. You most likely have at least one computer in your home, as well as digital audio equipment, computerized appliances, and a substantial amount of other electronic devices. Children learn how to use a computer computer by observing their parents, older siblings, and teachers using a mouse and typing on a computer keyboard. Students who are educated at home are not an exception.

Fundamentals of the Keyboard

There is a common practice of beginning lesson plans for teaching computer skills with fundamental keyboard abilities. For the vast majority of people who use computers in the United States, the QWERTY keyboard continues to be the standard. Among the fundamental keyboard abilities are:

How to position your hands when you are typing

How to make use of the letter codes

How to make use of the numerical keys

What are the functions of the special keys such as the space bar, "Enter," and "Shift"?

Instructions on how to copy highlighted text using simple keyboard shortcuts such as "Ctrl + C"

Using the arrow keys to navigate the screen in order to move around

Basic abilities using a computer mouse

For beginners, having the ability to use the mouse well is equally essential because it is the mouse that makes it possible to use the computer. Young pupils who are learning how to click on items on the screen can benefit from increased eye-hand coordination by playing a simple computer game like jacks, which is included in many lesson plans designated for beginners. Among the skills that are taught are:

- Instructions on how to hold and work the mouse
- What happens when you click left
- What happens when you right-click
- How to make use of a mouse pad
- Fundamentals of Computer Software Abilities

After the students have learned the fundamentals of using a keyboard and mouse, they move on to learning how to use a variety of software. The programs and procedures that are responsible for the operation of a computer are referred to as computer software. The types of software that are most frequently taught to children are those that are used for word processing and graphic design. Scanning devices and spreadsheets are two more apps that students might be interested in learning how to utilize. Software that is frequently used by children includes:

- Google Drive: Microsoft Office Applications
- Alternatives for Internet browsers
- Ideas for Reading Eggs Brainchild
- Utilization of the Internet That Is Both Secure and Productive

The usage of the internet is a topic that is widely discussed among educators, and there is a plethora of online safety lesson plans that are available to teachers and parents who homeschool their children.

To assist you in developing a course that is centered on online safety for children or internet safety for adolescents, you can make use of a straightforward guide for teachers on internet safety.

It is common for students to rely on the Internet as a source of knowledge for a variety of tasks, as well as for social connection with other students and classmates. It is essential to incorporate lessons that are beneficial to each student:

- In the internet, evaluate the information and the sources of information.
- Don't reveal any private information to anyone.

- The correct way to use and cite sources found online

- Be responsible when using social media.

- Come up with your own lesson plans for teaching students how to use computers.

You are able to make your own computer skills lesson plans by making use of free lesson plan templates. These lesson plans might cover any rising topic. Through this method, you will be able to develop plans that are suitable for every educational setting, ranging from home schooling to library programs.

There is a worldwide network of computer classes.

Skills and activities that are vital for today's student include the ability to use the computer, solve difficulties, surf the internet in a secure manner, and use software packages. Homeschooling parents and teachers are fortunate in that they have a wide variety of options and free lesson plans from which to choose in order to teach these important skills to their children.

Computers, information, and communication technologies are the topics covered in the contents of Lecture 10.

When pupils are introduced to the ideas of computing and programming in elementary school, it can serve as a beneficial foundation for the development of important problem-solving and computational thinking skills. Regarding the subject matter that may be discussed, the following is a general guideline:

Computers: An Introduction to the Subject

• Having an understanding of what a computer is and the fundamental components that make it up (central processing unit, display, keyboard, and mouse).

It is important to differentiate between software and hardware.

2. The fundamentals of computers include learning how to turn a computer on and off and how to use the most fundamental peripherals.

• Being familiar with the desktop and different icons.

• Fundamental file management, including the ability to create, save, and organize files etc.

The third topic is operating systems, which includes an introduction to common operating systems such as Windows, macOS, and Linux.

• Using the interface of the operating system to navigate.

4. Internet Safety: • The most fundamental guidelines for internet safety, such as avoiding the public disclosure of personal information online.

• Introduction to safe and responsible web browsing.

Introducing the concepts of sequences and algorithms is the fifth step in the programming process.

Block-based programming languages such as Scratch and Blockly are presented in this course.

• Exercises in simple coding that would allow you to construct animations or games.

The sixth topic is fundamental logic and problem solving, which includes puzzles and games that encourage logical thinking.

Simple exercises in problem-solving are provided.

7. Computer Vocabulary: • An introduction to fundamental computer-related vocabulary, including terms such as hardware, software, keyboard, mouse, and monitor).

Understanding code as a collection of instructions is the eighth step in the introduction to coding concepts step.

This includes directions for sequencing and ordering.

• Correcting easy flaws in the code.

Students should be encouraged to explore and interact with instructional software and rudimentary coding environments as part of the hands-on activities offered in the ninth grade.

Use coding platforms and tools that are suitable for the user's age.

10. Creativity and Projects: • Inspire creativity by having students work on projects such as making short stories, animations, or games using block-based programming.

• In the realm of programming, educate yourself on the concepts of loops and conditionals.

11. Collaborative Problem-Solving and Collaboration: Encourage students to work together on coding projects using collaborative problem-solving strategies.

• Inspire kids to collaborate with one another and find solutions to problems as a group.

A fundamental understanding of hardware includes the following: • An introduction to input and output devices, such as a keyboard, mouse, and printer.

• Being able to comprehend storage devices such as USB disks.

13. Teaching children about responsible online behavior and digital citizenship is an important part of the ethical and responsible use of technology.

• Have a conversation about the significance of respecting the labor and privacy of others when using the internet.

14. An Introduction to Robotics (optional): • For more advanced primary school programs, you can introduce fundamental concepts of robotics by utilizing age-appropriate kits and tools.

15. Assessment and Evaluation: • The use of straightforward quizzes, coding exercises, and project evaluations are all effective ways to evaluate the students' level of comprehension and progress.

Take into consideration that the precise content and curriculum may change depending on the grade level and the resources that are accessible. At this point in time, the major objective is to cultivate an interest in technology, problem-solving, and computational thinking among young kids, all while making learning entertaining and accessible to them.

Technologies related to computers, information, and communication make up the content line.

When instructing students in computer, information, and communication technologies, it is essential to give a comprehensive education that covers a wide range of topics related to these areas of study. The following is a content line that addresses the most important themes that pertain to this domain:

1. An Introduction to Computers and Information and Communication Technology: • An understanding of the fundamental components of a computer, including the central processing unit (CPU), display, keyboard, and mouse.

It is important to differentiate between software and hardware.

ICT stands for information and communication technologies. This is an introduction to they.

2. Operating Systems and Software: • Acquiring knowledge of several operating systems (such as Windows, macOS, and Linux) and the interfaces that they each have.

Word processing, spreadsheets, and presentation software are examples of fundamental software applications.

• The principles of the Internet, including how it operates and its history. • Web technologies and the Internet.

The internet should be used in a sensible and secure manner.

• Exploring, searching, and analyzing information through the use of the internet.

This course will provide an introduction to web technologies such as HTML, URLs, and web browsers.

Having an understanding of the fundamentals of digital citizenship is the fourth step in ensuring online safety.

• Identifying and avoiding potential dangers that can be found online, such as cyberbullying and internet frauds!

The practices of privacy and security on the internet.

An introduction to algorithms, sequences, and logic is included in the fifth section of the basic concepts of coding and programming.

Block-based programming languages, such as Scratch, are utilized for the development of straightforward programs.

• Problem-solving through coding exercises and small projects.

Email etiquette and fundamental email communication are the sixth set of tools for communication and collaboration.

• An introduction to several technologies for creating collaborative projects, such as Google Workspace and Microsoft Office 365.

• Protocol for communicating and using the internet.

Understanding data and information, fundamental data organization and management strategies, and an introduction to spreadsheets and databases are the first steps in the seventh step of the data and information management course.

• Creating and modifying digital images and graphics. This is the eighth step in the process of creating multimedia and digital content.

• The fundamentals of producing digital audio and video.

Software for making multimedia presentations, sometimes known as presentation software.

A brief introduction to local area networks (LAN) and the internet is included in the ninth section on networking and connectivity.

• The manner in which information is send over networks.

• Both wireless and cable connections are available.

The tenth topic, Emerging Technologies, is an introduction to emerging technologies such as artificial intelligence (AI), virtual reality (VR), and the Internet of Things (IoT). This topic is optional.

The impact that information and communication technology has had on society and on day-to-day living. There are ethical issues to take into account when using technology.

12. Careers and Opportunities in Information and Communication Technology: - Explore careers that are related to ICT. - Understanding the value of digital skills in diverse occupations.

13. Hands-On Projects and Practical Application: Encourage students to use what they have learned by having them participate in projects, giving presentations, and applying what they have learned in the real world.

Assessing and evaluating students' knowledge and abilities in information and communication technology (ICT) can be done through the use of quizzes, assignments, projects, and practical examinations.

15. Up-to-date information on current trends and innovations in the information and communications technology industry, as well as a discussion of the possible impact these trends and breakthroughs could have on society.

This topic line offers a comprehensive overview of many technologies, including those related to computers, information access, and communication. If you want to ensure that you give a balance between theory and practical application, you should modify it so that it is appropriate for the age and level of proficiency of your students. Moreover, maintain a flexible and open attitude toward the incorporation of new technologies and innovations as they become available.

Content line: Informatization of society

The term "informatization of society" refers to the extensive incorporation and utilization of information and communication technologies (ICT) in a variety of aspects of human life and society.

The following topic line provides an overview of the most important components of informatization of society:

1. **The first step in the process of informatization**:

• This article will discuss the meaning of the term "informatization" in today's culture.

• A look at the development of information technology throughout history and how it has influenced everyday life.

2. The acronym "ICT" stands for "information and communication technologies."

• An overview of the components of information and communications technology (hardware, software, and networks).

• Different sorts of ICT gadgets and their functionalities.

3. Transformation to the Digital Age:

• Having an understanding of the phrase "digital transformation" and the role that it plays in the process of modernizing various industries (such as education, healthcare, and business).

• Case studies of businesses and industries that have successfully experienced digital transformation and presented their findings.

4. The Industrial Society in Contrast to the Information Society:

The characteristics of an information society are compared and contrasted with those of an industrial society.

• How information and data have become valuable resources.

5Internet and Connectivity: the Fifth Point

• The function of the internet in facilitating connections between individuals, organizations, and states.

Access to the internet has a significant impact on both social and economic growth.

6. Cyber-Government and Electronic Services:

• Investigating the ways in which governments make use of information and communications technology to enhance service delivery (e-government).

• Some examples of e-services are filing taxes online and accessing government websites electronically.

7. Telemedicine and electronic health care:

Telemedicine, electronic health records (EHRs), and health applications are all examples of how information and communications technology is revolutionizing the healthcare industry.

• E-healthcare present both opportunities and challenges.

8.e-Learning and online education: the eighth point

This article discusses the rise of online education and the impact it has had on traditional learning techniques.

The educational technology tools and platforms available.

9. Analytics and Big Data [Big Data]:

• Being aware of the relevance of big data and its components.

• The use of data analytics in a variety of different industries.

10. Cybersecurity and Privacy: - The significance of cybersecurity in a society that is increasingly reliant on various forms of information technology. - Concerns regarding privacy and methods to safeguard personal information.

11. Identifying gaps in access to information and communication technology (ICT) resources and making efforts to bridge the digital divide and promote digital inclusion are the two main goals of this initiative.

12.Social media and online communities: the role of social media in connecting individuals and affecting public discourse; the positive and negative elements of using social media; and the role of social media in molding public discourse.

13.Ethics and Digital Citizenship: - Ethical considerations in a society that is becoming increasingly reliant on technology. - The promotion of ethical digital citizenship and behavior when using the internet.

14. Future Trends and Emerging Technologies: - An investigation into the potential impact that emerging technologies, such as blockchain and artificial intelligence, could have on society. - A speculation regarding the future of information technology.

15. The Perspective of Informatization on a Global Scale: - The manner in which various nations are adopting informatization. -

International collaboration and the global difficulties associated with information and communication technology.

16. Informatization Projects and Case Studies: - A review of successful informatization projects and initiatives from all over the world to consider.

17. Assessment and Evaluation: Make use of exams, projects, and conversations in order to evaluate the students' comprehension of the ideas of informatization and the ramifications of those concepts.

This content line should be adapted according to the level of your audience, whether it is for a school curriculum or a more advanced course. Additionally, it is important to stay up to date with advances in the area, as the topic of informatization is one that is rapidly growing and makes a great impact on society.

The letter "a"

The content line is a didactic group in teaching, built on the principle of meaningful thematic unity. Unlike an academic discipline, built on the principle of subject-disciplinary unity, the content line makes extensive use of interdisciplinary and interdisciplinary connections. In particular, the content line

“Information and Information Technologies” uses knowledge from the field of computer science (which forms the basis of the line), mathematics (for example, the number system), physics and technology (for example, the principles of computer operation), etc.

Informatics is the science of information, which can be defined as the study of the structure and properties of information, as well as the methods of collecting, processing, and transmitting information. The term "information" can be defined as knowledge or information about someone or something; information that can be collected, stored, transmitted, processed, and eventually used.

According to K. Shannon's definition, information is the removal of uncertainty. Information is derived from the Latin word information, which means information, explanation, or presentation. In everyday life, information is understood to be information about the world around us and the processes that are occurring in it. In information theory, information does not mean any information, but only that which completely removes or reduces the uncertainty that existed prior to its receipt.

Because information is a reflection of the external world through the use of signs or signals, the information value of a communication is based on the new information that it includes (in the sense that it helps reduce ignorance).

Information technologies are contemporary means and systems of information exchange that enables operations for collecting, producing, aggregating, storing, processing, and sending information. These technologies also give operations for storing information.

The acceleration of scientific and technological progress, based on the introduction into production of flexible automated systems, microprocessor tools and program control devices, robots and machining centers, has set an important task for modern pedagogical science - to educate and prepare the younger generation, capable of actively participating in a qualitatively new stage of development modern society associated with information technology.

The solution to the above problem fundamentally depends on the technical equipment of educational institutions with electronic computing equipment with the corresponding peripheral equipment, training, demonstration equipment operating on the basis of new information technologies.

The content line titled "Information and information technologies" contains the following blocks and links (the latter of which are denoted by brackets):

1. Man in the material and informational worlds (the objects and phenomena of the material world; the flow of energy; man in the material world; information exchange; signals, signal registration; the idea of data etc.).

2. Reproduction and processing of data (including natural, hardware, and software techniques of reproduction and processing of data that are available).

3. Information (including the evolution of the notion of information, the contemporary concept of information, the definition of information, and the concept of the contextual method)

4.Information process (the idea of information process; information processes in society and in computer technology) is the fourth topic.

5.The characteristics of the information, which include its sufficiency, dependability, completeness, redundancy, objectivity and subjectivity, accessibility, and relevance.

6. Data and the coding of the data (data carriers, data operations, data coding using binary code: integers and real numbers, text data, visual data, and audio information) 5.

7. Basic data structures (linear, tabular, hierarchical; ordering of data structures; address data).

8. An comprehension of files and the organizations of files in general

In particular, when studying the first link of the line, which is titled "Man in the information and material world," examples can be provided or tasks can be proposed to find examples. The end result of this study is that information is a phenomenon that occurs on a daily basis in all aspects of people's lives and activities. Here is an example of one of these tasks.

Describe some examples of the information:

In the realm of inanimate nature (for instance, in the fields of geology and archeology);

- within the realm of biological systems (for instance, coming from the existence of plants and animals);

-with regard to technological gadgets (such as television and telegraph signals, for instance);

-in the functioning of society (for instance, in the dissemination of historical information, advertising, the media, and human contact).

You can also provide an illustration of the loss of knowledge and the implications that it has. Let us recall that Jules Verne's heroes were forced to journey around the world along the 37th parallel since the information regarding the second coordinate, which is longitude, was lost.

Studying the content line “Information and Information Technologies” can help solve the following problems: the formation and application of information and communication competence of students in the educational process; the formation of new models of educational activities using information and communication technologies; organizing training against the background of the development of the game situation; formation of a system of information resources; systematization of educational and didactic material by topic, etc.

Teaching the content line "Information and Information Technologies" can be done using any technique of instruction.

Learning is regarded to be a pedagogical process that is related with the assimilation of knowledge by students as a form of information.

This classification of teaching methods, which was proposed by I.Ya. and takes as its basis the nature of educational and cognitive activity (or the method of assimilation) of students in their assimilation of the material that is being studied, is widely used in the field of didactics. Lerver and M.N. Skatkin. This classification includes five methods:

1) a method that is both illustrative and explanatory;

2) the technique of reproduction;

3) the manner in which the problem is presented; the method of partial search, often known as heuristics;

5) The methodology of the research.

Among these techniques, there are two distinct categories:

1) reproductive, which includes processes 1 and 2, in which the learner absorbs pre-existing information and reproduces (reproduces) activities that he is already familiar with;

2) productive (methods 4 and 5) defined by the fact that the learner acquires (subjectively) new information as a result of creative activity; this is achieved via the use of the creative process.

Visualization is used in the explanatory and illustrative method. It can otherwise be called information-receptive, which reflects the activities of the teacher and student with this method. It consists in the fact that the teacher communicates ready-made information through various means, and the students perceive, realize and record this information in memory.

The teacher communicates information using the spoken word (story, lecture, explanation), the printed word (textbook, additional aids), visual aids (pictures, diagrams, films and filmstrips, natural objects in the classroom and during excursions), practical demonstration of methods of activity (showing a method for solving a problem, proving a theorem, methods for drawing up a plan, annotations, etc.).

Students listen, watch, manipulate objects and knowledge, read, observe, relate new information to previously learned information, and remember. The explanatory and illustrative method is one of the most economical ways of conveying the generalized and systematized experience of mankind.

Students make use of a wide variety of information objects, including but not limited to words, numerical data, sounds, still and moving images, and hyperobjects, which are basically objects that have associative relationships between constituents.

The content line can be mastered by students within the framework of the class-lesson system in the topic "Computer Science and Information Technologies," in the course of their application in all disciplines and project activities. It can be concentrated or distributed, depending on the student's preference.

The lack of time that teachers have to listen to the perspectives of each student is the primary challenge that they face when attempting to organize communicative interaction in the classroom. As a consequence, only the students who are the most engaged in the discussion take part in it, while the remaining students (and the majority of them) are content with the role of passive listeners. In order to overcome this challenge, it is now possible to leave your answer on the site. This provides the teacher with a means of organizing communicative interaction, which enables him to quickly receive and process information from each student.

The utilization of pedagogical software (PPS), specifically electronic textbooks and electronic interactive courses, is the method of visualization that is considered to be the most acceptable when it comes to the instruction of the content line related to "Information and Information Technologies."

The introduction of a special course “Informatics” for grades 5-6 into the basic curriculum will increase children’s interest in further study of the subject, enable students to acquire early computer skills and allow each child to use them in their educational activities.

The purpose of the course is to develop computer literacy, information culture, and skills for rational use of computers in educational activities. At the end of the course, students should be able to use the capabilities of a computer in educational activities: the ability to work with computer devices, typing and editing essays, creative works, etc.

Materials from the electronic interactive course "Basics of Informatics," a collection of exercises and laboratory works from the "Robotlandia" PMK, instructional computer games, and methodological improvements made by the instructor are utilized in the process of creating and delivering lessons.

The "Basics of Informatics" electronic textbook is introduced to the students before they begin their studies.

The electronic textbook contains two “layers” - the main one and the additional one. The main layer is aimed directly at the learner.

An additional layer is the teacher, who accompanies the student in working on the book and helps him. As a last resort, if the student works with the book completely independently, he can use the second layer for additional reading and checking answers to questions in the book.

According to the structure, the primary layer is composed of:

The reading room, which may be accessed by clicking on the title phrase, is where the actual lesson material is located.

Definitions and important terminology pertaining to the reading room are given in the abstract.

In order to consolidate the material that is being studied, questions serve as the basis.

Collaborate with the performers and the testers on the subject matter of the lesson during the workshop.

Automated verification of the content that has been completed for the test class.

During each and every lesson, switch to an extra layer.

You can access an additional layer in each lesson in the book by clicking on the title of the lesson at the beginning of the lesson or by clicking on the button with a question mark at the end of the lesson.

The electronic textbook is comprised of lesson chapters, and each chapter is a single topic. In fact, studying a chapter may take several school lessons. This is because the amount of time it takes to study a chapter is contingent on the level of preparation of the students, their age, the specifics of the study, and the amount of third-party material that the teacher uses to supplement the material in the textbook.

In most cases, the lecture will involve the following format:

1. An introduction to the topic that will be covered in the session. Students will become familiar with new content based on the

texts that are found in the "Reading Room" and will create a brief explanation of the new concept.

2.Workshop. After students have completed their studies of new material, they move on to practical work. Any experience or experiment helps to solidify new knowledge, shifting it from the realm of the abstract and logical to the realm of the objective and sensory. In addition, a computer workshop considerably boosts the drive to learn.

3. The test class. Once the workshop has been completed, the students will start working on the exam. They will continue to work on the tasks until they earn a grade of 5 or 4. If they receive grades of 3 or 2, then the test class will be solved once more.

4. An examination of the questions on the test.

5. Homework; the students are separated into three distinct groups.

There is no requirement for the student to have a computer at home in order to complete the tasks. These projects are of a reproductive character, which means that they are only dependent on the contents and procedures that were learned and mastered in the classroom.

Option 2 includes, in addition to reproductive responsibilities, search and research work for children who have access to a computer while they are at home.

Option 3. Creative option. Completing activities requires students to have intellectual initiative and contemplation; assignments can be performed both in a notebook and on a home computer, provided that the student sends a printout or file for verification (if the teacher agrees to the latter).

After finishing all of the stages of the lesson, students not only acquire new information about the subject matter, but they also consolidate their newly acquired knowledge through practical work and a test solution in class.

Another option for visibility through the use of information technology is multimedia technology, which is a collection of techniques, methods, and methods for producing, processing, storing, and transmitting audiovisual information based on the use of CD-ROM (compact disc read only memory) technology.

This includes CD-audio, CD-video, CD + G, CD - information, CD - phono, CD - TV, and LV (Laser Vision). Multimedia is a set of operating environments that are based on the use of CD technology that enables the integration of audiovisual information presented in a variety of formats (video, text, graphics, animation, slides, and music) utilizing the capabilities of interactive dialogue.

Audio information includes speech, music, sound effects. The most important issue in this case is the information volume of the medium. Compared to audio, video information appears to have a significantly larger number of elements used. First of all, this includes elements of static video, which can be divided into two groups:

Graphics, sometimes known as drawn images **a photograph.**

There are a variety of drawings, interiors, surfaces, and symbols that are in graphic mode that are included in the first group. The second category consists of photographs and scanned images.

The capabilities of multimedia systems make it possible to integrate any audiovisual information on the computer screen, realizing an interactive dialogue between the user and the system. At the same time, the system provides the ability to select, based on the results of the analysis of user actions, the desired line of development of the presented plot or situation.

The pedagogical goals of using multimedia technology are determined by the possibility of implementing intensive forms and methods of teaching, increasing learning motivation through the use of modern means of processing audiovisual information, increasing the level of emotional perception of information, and developing the skills to implement various forms of independent information processing activities.

The term "information" is the most fundamental idea in the field of computer science, which is reflected in the name of the subject itself. However, the question "What is information?" is the most challenging one for computer scientists to answer.

There is no one answer that is definitively correct to this question! Numerous scientific works are devoted to discussions on the concept of information. The paradox of computer science is that, despite the absence of a definitive answer to the fundamental question, "What is information?", applications of computer science, also known as information technology, are successfully developing and significantly influencing the state of human society.

The need to discuss the concept of information in a school course also has methodological reasons. According to the fundamental principle of didactics - the principle of systematicity of the educational course, the computer science course must have a system-forming basis that connects it into a single whole.

According to the definition of the subject of computer science, such a basis should be the concepts of information and information processes. A teacher who wants to thoroughly understand the problems discussed in modern science around the concept of information.

In the 2000s, the proliferation of personal computers and information and communication technologies has made it possible to teach students how to process different kinds of information and how to carry out different information processes. This includes the ability to search for and transmit information through computer networks.

As a result, the content of the computer science course in schools is undergoing a transformation. In the first educational standard in computer science (2004), the concepts of information and information processes became the central concepts of the curriculum.

A new generation of textbooks is currently being developed that implement this concept. In the sample computer science program for the Federal State Educational Standard, the concepts of information and information processes continue to be the central concepts of the course. This is reflected in the content of the course.

The problem of measuring information is directly related to the problem of defining information, since first we need to understand what we are going to measure, and then how to do it, what units to use.

If you rely on a student’s vague, intuitive idea of information, then it is impossible to give any logical definition of the amount of information or introduce units of its measurement. The textbooks discuss two approaches to measuring information: the content approach and the alphabetic (volume) approach.

The first approach is based on the definition of information as a measure of the content of a message that adds to a person’s knowledge. The second approach, alphabetical, connects the amount of information with the size of the text in a certain symbolic language through which information

Informatization of society is an organized socio-economic and scientific-technical process of creating optimal conditions for meeting information needs and realizing the rights of citizens, government bodies, local governments, organizations based on the formation and use of information resources.

The material and technological basis for the informatization of society are various types of systems based on computer equipment and computer networks, information technology and telecommunications.

What kind of understanding do scientists have of the information society?

In the information society, Japanese scientists believe that the process of computerization will provide people with access to trustworthy sources of information, free them from the burden of routine work, and guarantee a high level of automation of information processing in both the industrial and social spheres. The production of informational products, rather than material products, should be the driving force behind the development of society. The material product will become more information-intensive, which means that the proportion of its value that is attributed to innovation, design, and marketing will increase.

In the information society, not only will production be altered, but also the entire way of life, the value system, and the significance of cultural leisure in relation to material values will be elevated. In contrast to an industrial society, in which everything is geared toward the production and consumption of goods, in the information society, intelligence and knowledge are produced and consumed, which results in an increase in the proportion of mental labor. Additionally, a person will be required to have the ability to be creative, and the demand for knowledge will rise.

Numerous systems that are founded on computer hardware and computer networks, information technology, and telecommunications will serve as the foundation of the information society in terms of both its material and technological capabilities.

It is possible to define an information society as a society in which the majority of workers are engaged in the production, storage, processing, and selling of information, particularly the most advanced type of information, which is knowledge.

In the actual practice of the development of science and technology in advanced countries at the end of the 20th century. The picture of the information society created by theorists is gradually taking on visible shape. It is predicted that the entire world space will transform into a single computerized and information community of people living in electronic apartments and cottages.

Any home is equipped with all kinds of electronic devices and computerized devices. Human activities will be focused primarily on information processing, while material and energy production will be entrusted to machines.

It has already been established through the publication of a number of factual materials that this is not a utopia but rather an unavoidable reality that will occur in the not too distant future.

Example: A sociological study that was carried out in the United States found that there are already 27 million workers who are able to carry out their activities without having to leave their homes. Furthermore, one third of all newly registered businesses are founded on the widespread use of self-employment. In the United States, the following individuals were classified as self-employed: in 1980, there were 5.7 million people, in 1989, there were 14.6 million people, and in 1995, there were 20.7 million people.

A new information processing business that is founded on computer and telecommunication information technology emerges during the process of transitioning to the information society known as the information society.

Several researchers in the field of science have highlighted the characteristics that are unique to the information society:

It has been determined that the information crisis has been resolved, which means that the contradiction that existed between the information avalanche and the information hunger has been resolved.

The importance of the information is ensured in comparison to other resources;

It is anticipated that the information economy would be the primary mode of development;

The generation, storage, processing, and utilization of knowledge will be automated with the assistance of the most recent information technology and technologies; this will serve as the foundation of contemporary society.

• the information technology industry will become all-encompassing, encompassing all aspects of human social life;

• the formation of the information togetherness of the entire human civilization is taking place;

• it is possible for any individual to have unrestricted access to the information resources of the entire civilization thanks to the advancements in computer science;

• The implementation of humanistic principles of social management and environmental impact has taken place.

Not only are there beneficial features, but there are also potentially detrimental developments that are predicted:

• the growing impact that the media has on society to a greater extent;

• Privacy can be compromised by information technologies, which can affect both individuals and companies;

• there is an issue with selecting information that is of a high quality and of trusted sources;

• The atmosphere of the information society will be challenging for a great number of people to adjust to. There is a risk of a divide between the "information elite" (individuals who are active in the development of information technology) and the general public.

Countries that have a developed information industry, such as the United States of America, Japan, England, Germany, and

Western European countries, are the ones that are closest to the path that leads to the information society.

In these countries, one of the areas of government policy has been related to investment and support for innovation in the information industry, in the development of computer systems and telecommunications.

The integral part that information technology plays in the evolution of society

The process of informatization of society is described in what way?

The activities of individuals, groups, teams and organizations are now increasingly beginning to depend on their awareness and ability to effectively use available information. Before taking any action, it is necessary to carry out a lot of work on collecting and processing information, understanding it and analyzing it.

Finding rational solutions in any area requires processing large amounts of information, which is sometimes impossible without the involvement of specialists.

Experience with information technology and concepts that show promise

Currently, all countries of the world are implementing the process of informatization to one degree or another. An incorrectly chosen informatization strategy or its insufficient dynamism and mobility can lead to significant and sometimes dramatic changes in all spheres of a country’s life. As you know, the first country that began informatization was the United States.

Other industrialized countries of the world, having realized the promise and inevitability of this direction, quickly took their bearings and began to increase the pace of implementation of computers and telecommunications. Currently, the entire business and political press of the United States is full of endless discussions about the loss of sales markets by this country in the computer, telecommunications.

When we discuss education in the information society, are we truly talking about a subject that we are dealing with? The phrase does not appear with its own motivation and meaning; rather, it is connected to the rhetoric of the "information society" (IS), which is proclaimed to be the society of the future, of the 21st century.

As a result of its lack of a singular meaning, it coexists with a large number of phrases that are related to it without having distinct boundaries, which is evidence of inadequate conceptual, theoretical, and pedagogical growth.

In Education in the Information System, the concepts of information, knowledge, and, to a greater extent, learning have been fundamentally reduced to the so-called modern Information and Communication Technologies (ICTs). These technologies, in turn, tend to focus on the computer and the Internet, which results in the creation of new identities and forms of inclusion and exclusion: those who are connected to the network and those who are not connected to the network.

For what kind of educational endeavor are these technologies being used?

In order to have a better understanding of the comprehensiveness and usages that Education in the IS has been adopting, it is necessary to get a better understanding of each of its core terms, which are "education" and "information society."

Conventionally, when people hear the word "education," they think of a school system, formal education, and childhood. On the other hand, learning has been less of a priority than teaching. There has been a predominant focus on quantitative markers for access to and termination of grades and cycles, with learning receiving a very small amount of attention. When it comes to learning, assimilation and repetition of knowledge are often seen as synonymous.

The infrastructure and equipment are typically given more importance than the teaching and learning environments, the supply point of view is given more weight than the demand point of view, and the results are given more weight than the procedures. Education has been separated from the economic, social, and cultural aspects of society within a broader framework as a result of the schooling mentality, which has contributed to the limitation of the vision and field of education.

As far back as the history of education goes, the "modern" information and communication technologies are essentially the final wave of a continuum. In the field of education, educational or instructional technology has been gaining a significant amount of attention over the course of several decades. During the 1960s and 1970s, radio and television were utilized; during the 1980s and 1990s, school textbooks, video, and the computer were utilized as a teaching aid; beginning in the middle of the 1990s, the computer and

CD-ROM have dominated the scenario; and in more recent years, the Internet has started to replace "conventional technologies."

At the end of 1980, the United Nations Children's Fund (UNICEF) adopted the term "Third Channel" to refer to "all the available instruments and information, communication, and social action channels that can be used to help transmit basic knowledge and inform and educate the population regarding social issues."

This was done under the assumption that formal and nonformal education were the other two educational channels (UNICEF, 1990). The World Conference on Education for All, which took place in Jomtien, Thailand, in 1990 and was organized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Children's Fund (UNICEF), the United Nations Development Program (UNDP), and the World Bank, placed a great deal of confidence on this "third channel" to achieve the six goals of basic education for all by the year 2000. However, when the year 2000 approached and the objectives had not been accomplished, the benchmarks were lowered and the deadlines were pushed out to the year 2015.

"Basic education" (filling people's basic lifetime learning needs, as stated at Jomtien) is no longer the goal for the countries in the South; rather, the goals for these countries are now "elementary education" (four, five, or six years of schooling). Previously considered to be a broad channel that was shared by both old and new technologies, the "third channel" has been eliminated from educational aims and confined to information and communication technologies (ICTs).

The Education in the Information Systems discourse over the past few years has completely entered the virtual world. It has abandoned the discussion on the fundamental learning needs of the people and instead adopted as its central themes competitiveness and the new skills required by the market in order to "adapt to change" rather than impinging on it.

It is essential to pinpoint the whereabouts of the "technological revolution" in both place and time, in addition to the proclamation of the information age and the "information revolution." Each and every one of them originates in rich countries, most notably the United States, and is then transported or, more accurately, appropriated by "developing countries" (the South).

They emerge in the decade of 1990, a decade that was a turning point in the history of humanity. It was during this decade that the neoliberal model was established in the world along with its great paradoxes, which included the following: the technological revolution with growing social exclusion; globalization with greater localization; the concentration of political and economic power in fewer hands; and the expansion and articulation (also global) of social protest and social movements.

The old utopia of "lifelong learning" reemerges in the decade of 1990, set up as the guiding paradigm for education, capacity-building/training, and research systems, thus contemplating the "school of the future" (Delors et al. 1996; European Communities Commission, 2000). This is largely inspired by the increased life span as well as the expansion of information and communication technologies.

From this context and time, which is intertwined with powerful interests and conflicts, very different visions of the information society emerge: an IS that is understood as access to information and communication technologies (ICTs), which aspires to reduce the "digital divide" and achieve a world that is "connected" to the network; and an IS "with a human face" that goes beyond ICTs and is committed to lifelong learning and the construction of a new social paradigm that includes economic justice, equality, and well-being for all. Both of these perspectives can be found at the World Summit on the Information Society (WSIS, Geneva 2003; Tunis 2005), where they are in direct opposition to one another.

The phrases "age" and "society" are frequently used interchangeably, while the terms "information," "communication," "knowledge," and "learning" are also frequently used without the appropriate differentiations being made. In 1997, the International Adult Literacy Survey (IALS) discussed competences for the "knowledge society," and in 2000, it discussed competencies for the "information age" (OECD/Statistics Canada 1997, 2000).

This is a perfect example of how the IALS communicated the importance of these competencies. As a result of the World Summit on Information Systems (WSIS), the term "information security" (IS) became official. Nevertheless, the problematic nature of the name IS remains.

A society based on information that has the potential to exacerbate existing inequity

The term "education for the information society" does not have a definition that is either completely clear or completely unique. The fact of the matter is that it has not been included in Glossaries for international bulletins on education or other topics that are connected. It has not been determined whether there are any parameters or indicators that can accurately assess its quality, relevance, and practicality.

The Education Index, which is a component of the Human Development Index (HDI) that is calculated by the United Nations Development Program (UNDP), continues to be constructed from fundamental data, which includes registration as well as the various educational levels and alphabetization rate. Given the current state of affairs, it is evident that these data are not sufficient to adequately capture the profile and educational requirements of any society.

Within the context of the strong trend toward reducing information and communication technologies (ICTs), education in the IS is typically understood to be the use of ICTs for educational-schooling purposes (source of content, didactic reinforcement, individualization of teaching and learning, aid for training/capacity-building and teaching personnel, facilitator in the teaching of individuals with special educational needs, etc.), to use during school hours or to broaden the field of learning outside of this area, to assist teaching personnel or to replace it.

Today, "Education and ICTs," "Use of ICTs in Education," and "digital literacy" are concrete ways of referring to this idea of Education in the Information System (IS).

In point of fact, many people confuse it with electronic or virtual education (also known as e-learning), which gives the means more importance and displaces the school system as the center of education and systematic learning. This, in turn, reinforces the strong tendency that is currently occurring to privatize education.

The provision of an education that is adaptable, diverse, and individualized, as well as one that is tailored to the requirements of particular groups and goals, are typically considered to be constituent qualities of the instructional system.

The supply, opportunities, and access (to the computer, to the Internet) continue to be the primary concerns, rather than the relevance and quality of the content and methods, the conditions of production and dissemination of these contents, and, in general, the question of what kind of information or education is being provided and for what purpose (social impact).

In the realm of education, hardware technology is more prevalent than software technology, and information is more prevalent than communication, knowledge, and learning.

In spite of this, there is a tendency to view information and communication technologies (ICTs) as tools that are capable of transmitting information, which constitutes a passive and reactive emphasis.

This is in contrast to an active and proactive focus, which views the subjects not only as consumers but also as providers of information and knowledge.

We have progressed from the first telematic networks, which were established in the 1980s with the intention of interconnecting schools on a national and international scale, to macro policies and projects that propose to install computers in every school and, even more ambitiously, to make personalized lifelong learning a reality, among other things with the assistance of manual artifacts that are portable and can fit in the palm of one's hand (for example, Harvard's Handheld Devices -WHD for Ubiquous Learning Project).

In point of fact, the possibility of permanent learning has never been so close and at the same time so far away: close for the minority of people who are able to access these and other means of learning in the present day; very far away for the vast majority of people in the world, for the poor, for the illiterate (more than 900 million in the world), and for those who live on less than one dollar per day (1,200 million people who are impoverished), for those who are being prescribed four years of elementary school, to be attended within the boundaries of the so-called "school age" In a more concrete sense, this is what the Millennium Development Goals (2000-2015) suggest for education in the present day.

These are targets that have been endorsed by the World Summit on Sustainable Development (WSIS), along with gender equality in terms of access to elementary and secondary education. However, there is no explicit aim for adult illiteracy.

We are then taking part in a peculiar information era, in which the right to education is being diminished while the economic and social difference between the North and the South, as well as between the poor and the rich, is growing wider.

Discussion and introspection centered on major concepts

Within this framework, we will present a number of issues and conundrums that are associated with the Information System (IS) and Education in the IS. These difficulties and conundrums are of a conceptual, political, social, ethical, and pedagogical nature.

Education in the information society is a problematic enunciation, and it is difficult to redefine its meaning. That is because it is imprisoned in two terms: education (when learning is desired, learning to learn), and information (when the purpose is to transcend data, to know, to comprehend, to learn, and to create).

- The failure to differentiate between information and knowledge, as well as between the information system (IS) and the knowledge system (KS), and the employment of both approaches as if they were interchangeable, with a greater emphasis placed on information than on communication.

The inability to differentiate between information and education, capacity-building and training, education and learning, and so on. Because of this lack of distinction and these simplifications, there are attributions of information and communication technologies (ICTs) that do not correlate, and there are even a few systematic explorations concerning the potential of ICTs in terms of their educational and training capabilities, as well as their informational and communication applications.

The conventional information and communication technologies (ICTs) and important institutions, such as the family, the community, the education system, the mass communication media, the library, the workplace, and so on, are being supplanted by modern ICTs, which are now at the center of information and communication.

- The Internet and computers as the only means of information and communication technologies (and actual notions on information and communication).

In addition, the term "modern" is a relative one when it comes to classifying information and communication technologies (ICTs). There are other technologies that are considered contemporary, and there are others that came before them. These technologies will soon cease to exist.

ICTs found themselves in a conflict between resistance and fascination, with fascination emerging victorious. Both "owning a computer and speaking English" have evolved into expectations and erroneous indications of the effectiveness of a school system, regardless of whether it is public or private, as well as in many more educational opportunities that are not official.

- The double edge of information and communication technologies, which serve both for the globalization of the neoliberal model and for the globalization of protests, solidarity, and the development of another alternative world (World Social Forum). This presents a dilemma between the domestication of power and the empowerment of individuals.

- The goal of "reducing the digital divide" was formed as an objective in and of itself, without taking into consideration the structural differences (political, economic, and social, between the North and the South, and within each country) that support it.

Under the guise of IS rhetoric, powerful interests, as well as financial and political gains, are at work behind the race for information and communication technologies. In recent years, the sector of education has evolved into a privileged market that is contested not only by political figures but also by private businesses and major multinational firms.

The tension that exists between the local, national, and global levels is characterized by a strong trend of cultural global industries and powers devouring one other. Additionally, there is a growing lack of culture, increased homogenization, and more biased thinking.

In the process of diverting attention and resources away from the essential conditions and structural factors that condition educational supply and demand, great expectations have been placed on information and communication technologies (ICTs) as artifacts of the anticipated education revolution.

These conditions and factors include the economic model, social policies, foreign debt, international cooperation, and the issue of teaching personnel. As long as there are computers, a poor school will continue to be a poor school.

Memorization, encyclopedism, learning without comprehension, hierarchies, asymmetries, and fixed roles between transmitters (teachers) and receivers (students) are some of the problems that affect education and school systems in the past. The information system (IS) and the emphasis on information contribute to instead reinforce these problems rather than avoiding them. The term "banking education" has moved beyond the confines of the classroom and is now being taught on a worldwide basis.

- A repetition of mistakes, with a disregard for the lessons that were learned. When it comes to the formulation and implementation of policies and programs that are associated with information and communication technologies (ICTs) and education, nations and international organizations continue to make the same mistakes and encounter the same issues.

In both the North and the South, there are two different discourses and two different goals. It is during the full emergence of the IS that the North adopts lifelong learning for itself and prescribes four years of schooling for the South.

This is done with the intention of thinking globally and acting locally. The "official aid for development" does not solve the long-standing issue of asymmetry, inequality, and mounting foreign debt. This is true regardless of the amount of aid provided or the conditions attached to it.

Towards achieving literacy for all

We begin by establishing that the IS is not a predetermined reality but rather a process that is undergoing continuous change, and that the fundamental goal is to construct societies that are capable of learning, communities that are learning. On this path, education in and for the information society ought to be an education that contains the following components:

Achieves universal literacy and provides a fundamental education that is both relevant and of high quality for the entire population in the countries that are located in the North and the South.

Learning is encouraged and aimed to be articulated in and outside of the educational system, in formal, nonformal, and informal education, in the home, in the community, in the workplace, in spaces of production, creative, and recreation, social engagement, and other settings.

- Makes use of all of the tools and technologies that are available, not just information and communication technology, within the context of an instructional and communication plan that is integrated.

- Instructs students on how to search for and make use of available information and knowledge in a selective and critical manner; how to recognize, produce, and disseminate information and knowledge; how to develop independent and complex thinking; how to actively participate in social action that transforms and transcends actual reality, which in turn is the source and process of knowledge and learning.

The right to education is primarily viewed as a right for all individuals to learn, learning to learn, and learning throughout one's entire life. This right is defended and embodied in the organization's own practices.

Intra-subject and inter-subject communication in the process of teaching computer science in primary school, the development of students' logical thinking. Educational issues in the process of teaching computer science in elementary school.

When teaching primary school pupils computer science with the goal of strengthening their logical thinking skills, it is necessary to engage in communication not only within the topic category but also between subjects. Incorporating these many modes of communication into the instructional process can be done in the following ways:

The Communication Within the Subject:

Intra-subject communication is a term that describes communication that takes place within the topic itself. In this type of communication, students investigate various ideas and abilities that are related to the field of computer science. In the framework of the development of logical thinking, the following are some techniques to facilitate communication within the content of the sentence:

-Teaching pupils the principles of algorithms, including how to break down issues into smaller stages and solve them in a methodical manner, is the first step in teaching them algorithmic thinking. To make it more interesting, incorporate both hands-on activities and visual aids.

-Implementing block-based programming languages such as Scratch or Blockly is a great way to introduce students to the fundamentals of coding logic. In order to establish a logical flow of instructions, encourage pupils to create programs by stacking code blocks that they have created.

3. Problem-Solving Challenges: Give pupils issues that are pertinent to the actual world and require them to come up with logical solutions. You should encourage students to use computational thinking to come up with ideas, plan solutions, and put those plans into action.

4. Logical Puzzles and Games: Incorporate logic puzzles and games (such as Sudoku and logic riddles) into your studies in order to improve your ability to think critically and solve problems.

Encourage students to recognize and work with patterns in data, sequences, and code by teaching them how to recognize and work with patterns. This assists children in developing their ability to reason deductively and inductively.

Debugging Skills: Teach students how to recognize and correct mistakes that have been introduced into their programs. Their analytical thinking and attention to detail can be improved through the use of debugging training exercises.

7. Collaborative Projects: Enable students to work together on coding projects that need them to communicate and plan together.

This will help students develop their ability to think logically via the process of working together.

Communication Between topics:

-Inter-subject communication is the process of linking concepts from computer science with those from other topics in order to produce a more comprehensive educational experience.

How to incorporate communication between different subjects is as follows:

1) Mathematical concepts: Establish a connection between logical thinking in computer science and mathematical ideas. One example would be to investigate the application of algorithms and logical conditions in the field of mathematics.

2. In the field of science, demonstrate how logical reasoning pertains to the process of scientific investigation and experimentation. In this discussion, we will examine the role of logic in drawing conclusions and data analysis.

3. Encourage students to document their coding work with clear explanations and written instructions using language arts. This

will help students develop their communication skills and their ability to sequence information logically.

4. History and Social Studies: Investigate the development of computing and the various ways in which it has influenced society. Have a conversation on the logical underpinnings of the older computing machines.

5. Art and Creativity: In order to inspire creativity while applying logical concepts, it is recommended to combine computer science with art projects. One example of this would be the creation of interactive digital artwork.

Engage in a conversation about the significance of sensors and data collecting in the realm of sports technology, establishing a connection between the concepts of computer science and physical activities.

Exploring the logic that lies behind musical compositions and the ways in which algorithms are utilized in music software and synthesizers is the seventh topic.

8. In the area of ethics and social studies, discuss the ethical considerations that are associated with computer science, with an

emphasis on the significance of making decisions that are both logical and ethical when utilizing technology.

Examine the ways in which computer science and data analysis might contribute to environmental monitoring and conservation initiatives. This is the ninth topic in the Environmental Science category.

10. Geography: Investigate the use of geographic information systems (GIS) and mapping tools, putting an emphasis on the logical reasoning that is necessary for spatial analysis.

Students are able to see how logical thinking in computer science ties to other elements of their education and the wider world when these courses are integrated and cross-disciplinary debates and projects are encouraged. This makes learning more interesting and engaging for the students.

In the process of teaching computer science to primary school students, there are also educational considerations to consider.

The instruction of computer technology in elementary school raises a number of pedagogical concerns that need to be appropriately addressed by teachers and other educational institutions.

There is a possibility that these problems will have an effect on the standard of education as well as the successful incorporation of computer science into the curriculum. When it comes to teaching computer science at the primary school level, the following are some of the most important pedagogical issues:

1. A lack of preparedness on the part of instructors It is possible that a significant number of primary school teachers have not obtained extensive training in computer science ideas and programming abilities. It is of the utmost importance to make certain that school teachers are sufficiently prepared to teach the subject.

2. The Development of Curriculum It might be difficult to create computer science courses that are age-appropriate and well-structured for elementary schools. It is of the utmost importance to make certain that the curriculum is in accordance with educational standards and that it promotes active, hands-on learning.

3. Availability of Resources: Not all educational institutions have access to the resources that are required, such as computers, tablets, or software for programming. When it comes to preventing the digital gap, it is crucial to ensure that everyone has equal access to technology.

4) Diversity and Inclusion: It is of the utmost importance to promote diversity and inclusion in the field of computer science. It is important that students with disabilities, students from underrepresented minorities, and girls feel supported and welcomed in computer science programs.

5. Engagement and Motivation: It can be difficult to achieve the goal of keeping young pupils interested and motivated in the field of computer science. If you want to keep people interested in the topic, it needs to be presented in a way that is both interesting and suitable for their age.

6. Assessment and Evaluation: It is of the utmost importance to devise efficient techniques for evaluating the level of comprehension and advancement that students have in the field of computer science. There is a possibility that conventional testing procedures are not always appropriate for this topic.

7. The ratio of teachers to students: Elementary schools typically have fewer resources and higher class sizes than secondary schools. When it comes to giving individualized help and guidance in the field of computer science, it is vital to maintain a low teacher-student ratio. 8. Integration with Other courses: Although integrating

computer science with other courses can be difficult, it is essential for offering a well-rounded education. One of the most important aspects of interdisciplinary learning is working together with instructors from a variety of fields.

9. Continuing Professional Development It is of the utmost importance to provide teachers with opportunities for continued professional development. As a result of the quick pace of change in the field of computer science, it is essential for educators to remain current on the most recent styles and technologies.

10. Support for Students Struggling It is necessary to identify students who are having difficulty with computer science and it is also essential to provide additional support for these students. Adapting instruction to fit the specific requirements of each student is an essential component.

11. The Involvement of Parents Although it may be difficult, educating parents about the significance of computer science and involving them in their child's educational path can have a substantial impact on the success of a student.

12. Considerations of an Ethical Nature Teaching computer science also requires having conversations with students about the

ethical and responsible use of technology, which can be difficult for younger pupils to understand. Taking necessary action to address ethical concerns is also vital.

13. Limited Class Time: Elementary schools typically have a limited amount of time for each subject it teaches. Finding strategies to properly incorporate computer technology into the curriculum without compromising the teaching of other disciplines that are equally important can be a tough endeavor.

In order to address these educational challenges during the process of teaching computer science in elementary school, it is necessary for educators, administrators, legislators, and members of the larger community to work together.

The establishment of computer science programs that are inclusive, well-prepared, and well-supported should be a priority for schools in order to guarantee that students obtain a thorough education in information technology, which is an extremely important field.

For the purpose of providing students with a full understanding of the subject matter and the ways in which it may be used in the real world, it is essential to incorporate both intra-subject and inter-subject communication into the teaching of computer science in elementary school. Incorporating these many modes of communication into the instructional process can be done in the following ways:

Within the field of computer science, intra-subject communication consists of:

1. Sequential Learning: For a core understanding of computer science, begin with fundamental ideas such as algorithms and data representation for example. Make certain that pupils have a firm grasp on these fundamentals before moving on to more advanced subjects.

Teaching programming principles in a step-by-step manner, beginning with block-based languages such as Scratch, is the second step in the programming logic process. Through the use of hands-on coding projects, gradually introduce coding principles such as loops, conditionals, and variables. This will provide an opportunity to reinforce logical thinking.

3. Exercises in Problem-Solving: Give pupils coding problems that demand them to use their logical problem-solving skills. In order

for children to solve problems on their own, you should encourage them to come up with techniques and algorithms.

Emphasize the significance of debugging as a method for resolving issues in the practice of debugging. Provide students with the knowledge and skills necessary to recognize and rectify problems in their code, hence enhancing their analytical and logical thinking abilities.

Assigning coding projects that entail planning, designing, and implementing solutions to real-world problems is the fifth step in the project-based learning approach at your school.

Due to the fact that students are working on actual applications of computer science, these projects have the potential to foster critical thinking and logical reasoning.

Communication Between Subjects (also known as "Across Subjects"):

1. **Mathematics:** Establish a connection between computer science and mathematics by illustrating the intersection of logical thinking and mathematical topics that you have learned. For instance, you may talk about the relationship between algorithms and mathematical sequences and patterns.

2. In the field of science, emphasize the significance of computer science in the process of data analysis and simulations, and talk about how the scientific method includes the use of logical reasoning in order to arrive at findings.

Language Arts: In order to integrate computer science with language arts, you should have students write about the coding projects they have successfully completed. The ability to explain their mental processes and logical reasoning in written form is facilitated by this information.

Explore the historical development of computers and the impact that technology has had on society, with a particular focus on the logical foundations of early computing machines. This is the fourth topic in the Social Studies course.

5. **Art and Creativity**: Combine computer science with artistic endeavors, such as the production of animations or interactive digital artwork. Both creative thinking and the application of logical ideas are stimulated by this combination.

6. **Discuss the role that technology**, sensors, and data collecting play in the realm of sports technology and physical activities. This is part of the Physical Education curriculum. Bring

attention to the rational processes that are involved in monitoring and enhancing performance.

7. **Ethics and Citizenship**: Involve students in conversations regarding ethical problems that are associated with computer science. Encourage them to think critically about the responsible use of technology and the implications it has for society.

8. In the field of environmental science, demonstrate how computer science may be utilized for environmental monitoring and data analysis, with an emphasis on the use of logical thinking in the process of tackling environmental concerns.

In the subject of geography, you should investigate the usage of geographic information systems (GIS) and mapping software, with an emphasis on logical reasoning for the purpose of spatial analysis and problem-solving.

Primary school teachers are able to provide students with a well-rounded education that not only helps students develop their logical thinking skills but also demonstrates the interdisciplinary nature of computer science in the context of solving real-world problems. This is accomplished by integrating computer science with other subjects and encouraging communication both within and between subjects.

1. The use of information and communication technology in education increases student engagement and retention of information: Students become more engaged in their work when information and communication technology (ICT) is included into the classroom. In terms of teaching the same topics in a variety of various methods, this is due to the fact that technology offers a variety of chances to make it more engaging and pleasant. As a result of this greater involvement, it is believed that students will be able to remember information in a manner that is both more effective and more efficient.

Forms and methods of teaching computer science

A "young" subject in the school curriculum is "Computer Science and Information and Communication Technology." However, as a result of the quick expansion and prospects of this field, the requirements for the goal, content, and approaches to its instruction also altered at a rapid pace.

In addition to the computer science and information and communication technology classes that are taught in schools today, students have access to a broad variety of possibilities to work on a computer. These opportunities include supplementary classes in clubs that are dedicated to individual technologies, work in computer clubs, and having a computer at home. In the event that such work does not have a particular organization, this can result in unfavorable outcomes, including the following:

The misconception that some youngsters have that they are well-versed in computer science and are generally comfortable with computers is something that some children develop. It has been demonstrated via practical experience that students frequently misinterpret the goal of the disciplines "Informatics" and "ICT," despite the fact that there is a level of progress in this field on the present day. There is a significant amount of room for improvement in both the actual degree of expertise in computer science and the culture of presenting the results of computer work.

If the objective of the knowledge and abilities acquired in information and communication technology (ICT) classes is easily understood, then students may not always perceive the practical application of the knowledge learned in computer science lessons outside of the context of this subject. A sufficient amount of faith is lacking in the notion that "Computer Science and ICT" is a "tool" that can be utilized in any field of study;

When it comes to working on a computer, pupils of the same age group have varying degrees of psychological preparation and confidence in their abilities.

Knowledge of information culture is one of the variables that contribute to successful social adaptation in modern society since the requirements of modern society are such that it is one of the factors. If you want to keep up with the rapid speed of technological advancement, you will need to continually work "on yourself" and improve yourself. In order to be able to actively work with a computer, a person needs to have faith in the computer and be psychologically prepared to do so.

The only way that communication with a computer may raise the urge for obtaining knowledge, contribute to the development of creative capacities in each individual, and contribute to the construction of skills that allow one to freely navigate the world of quickly evolving information technologies is through the use of this approach.

It is the mission of a teacher of computer science and information and communication technology (ICT) to foster the development of individuals who are capable of thriving in an information society.

To be successful in reaching this objective, it is important to accomplish the following tasks:

- establishing settings that will allow for the development of components of the information culture of the students;

— the establishment of conditions conducive to the acquisition of the abilities of self-education and self-development;

- the incorporation of the education of information and communication technology and computer science.

- establishing conditions for discovering students’ giftedness.

From one academic year to the next, the educational system offers an increasing number of options for each student to construct their own individual learning trajectory. The instructional system that takes place in the classroom provides opportunity for the utilization of individual forms and methods.

The V.G. According to Krysko, there are three categories of training: curriculum (which includes things like lessons, lectures, seminars, homework, and exams), unscheduled (which includes things like team laboratory classes, consultations, conferences, clubs, excursions, and classes in advanced and auxiliary programs), and auxiliary (which includes group and individual lessons, alignment groups, and tutoring).

The vast majority of contemporary publications make a distinction between broad forms of instruction and forms of organizing different aspects of the educational process.

There is an additional basis for classification in the field of computer science education, and that is the presence or absence of a computer in the learning process. As a result, the classification of types of training that is generally accepted takes into consideration both computer-based and non-computer-based kinds of training.

On the other hand, the current sanitary and hygienic standards do not permit the sole use of computer-based forms of education, and also restrict the duration of these forms of education to fifteen to thirty minutes (variable according to the age of the pupils).

The various types of general training can be broken down into the following categories: frontal, collective, group, paired, individual, and also with a revolving composition of pupils. It is based on the characteristics of the features of communicative contact between the teacher and students, as well as between the students themselves, that the main types of teaching are divided into their respective categories.

In the same way that it was used before the development of computer science, frontal learning is utilized when all of the students are working on the same material or when they are mastering the same kind of activity.

It also entails the instructor working with the entire class at the same pace, with activities that are similar. Despite the fact that it is employed in the application of verbal, visual, and practical approaches, as well as in the process of monitoring knowledge, this classic organizational structure continues to be an important component of computer science instruction.

According to what A.I. The ability of the student to immediately duplicate the activity that was taught by the instructor is indicative of the impact that the computer has had on the classroom, according to Bochkin.

While this is going on, the instructor should not only be able to manage the frontal and individual activities of students in an organizational and programmatic manner, but they should also be able to switch the computers of the students to the appropriate modes (frontal or individual activities), and they should also be able to establish a unified state of the computer environment at all RMUs (M.V. Klarin).

The primary contact that takes place in paired learning takes place between two students. These students can then debate the task at hand, engage in mutual instruction, or exercise mutual control. It should be noted that the assistance of a friend is frequently more beneficial to a student than the assistance of a teacher.

It is E.N. You, Chelak, and N.K. The paired type of learning, as described by Konopatov, is believed to be episodic paired communication that takes place during the class among "teacher-student" and "student-student" interactions.

Because there was a lack of computers, students came up with the idea of working together on a computer in pairs. In essence, this was something that students discovered on their own. It was later shown that even with a significant amount of RMUs, it can be useful at the beginning of training or when understanding a new complex topic. This was discovered after years of observation.

On the other hand, the SanPiN application that is now available does not propose using partnered approaches to work on a single machine. Because of this, work in pairs should involve alternation in today's current conditions: one student should be working at the computer, while the other student should be working on the part of the task that does not use the computer, and vice versa.

In order to facilitate the integration of the paired form of learning with the collective form of learning, many forms of learning have been devised in which students change in pairs in a specific sequence.

The engagement of a teacher with a single student is an example of an individual kind of education. This can take the form of consultations, tutoring, or other similar activities.

The management of the individual actions of students in a computer-based informatics lesson is particularly challenging because the circumstances at each computer are almost entirely different from one another.

The solution for the educator is to involve successful students in the teaching process (even within the context of pair work), to "autoformalize their own pedagogical experience" (A.P. Ershov) through the use of training programs, and to make use of the software and information resources that are readily available.

One-on-one instruction with a computer is a new form of individual learning that has been made possible by the field of computer science. According to what E.N. You, Chelak, and N.K. To answer your question, Konopatov, when it comes to the teaching of computer science, we can discuss the concept of individual learning in conjunction with collective knowledge, which is achieved in the form of "student and computer."

By working one-on-one with a computer (or more accurately, with a training software), the student is able to master the information at his own pace and select an individual path for learning instructional content within the context of a certain lesson topic. One of the most significant distinctions between this style of work and the traditional autonomous form of labor is that the program is an interactive "cast" of the author's brain and experience.

A time-limited design of a separate link in the learning process is the form of organization that is used for training.

Individualized modes of education are given new life by the computer. The advantage of frontal forms is maintained through the copying of knowledge in pedagogical software, the utilization of multimedia training courses, and the utilization of Internet resources.

This advantage includes the ability to learn from the most qualified instructors and to make use of a variety of information sources. The computer eliminates the inconsistency that existed between individual learning and community education.

A teacher's ability to help students develop the skills necessary for autonomous cognitive activity is one of the most crucial roles that they may perform.

The term "external forms of educational organization" refers to a particular kind of lesson, such as a lesson, lecture, seminar, excursion, workshop, elective lesson, examination, topic and technical innovation groups, student scientific societies, and so on. Due to the fact that they incorporate objectives, material, methods, instructional aids, and contact between the instructor and the students, they possess an integrative function.

As an illustration. With the use of a demonstration screen, the instructor presents a variety of instructional components that are included in the course material.

These components include interface elements, program fragments, diagrams, texts, and so on. In this scenario, the instructor is the one who is working on the computer, and the students either observe his movements or replicate them on the screen of their own computers.

Occasionally, the instructor will transmit specialized demonstration programs to the computers of the students, and the students will work independently with these programs. The overall graphic capabilities of current computers have increased, which explains why demonstrations using a computer are becoming increasingly important and have the ability to teach through their teaching capacities. Schoolchildren are the primary target audience for the demonstration, and its primary didactic function is to convey new educational content to them.

The majority of the work that is done in the computer science classroom is laboratory work, often known as frontal work. While simultaneously working at their respective workplaces, all of the pupils are using the required software.

The activities that students engage in can either be synchronous (for instance, when working with the same pedagogical software), or they can come at a different pace or even be carried out with a different program.

Despite the fact that the initial job is typically the same, there is frequently a rapid "spreading" of the frontal activity that has begun. During front-line laboratory work, it is the responsibility of the instructor to monitor the work of the students (including over a local network), as well as to offer them with immediate help.

It is possible for the software that is utilized to serve a variety of didactic purposes, including but not limited to the following: mastering new material (perhaps through the utilization of a training program), consolidating new material (perhaps through the utilization of a simulator program), and assessing the assimilation of acquired knowledge or operational skills (perhaps through the utilization of a monitoring program or computer).

When compared to frontal laboratory work, individual workshop work is a more advanced form of work. Frontal laboratory work is characterized by a variety of tasks, both in terms of complexity and level of independence; a greater reliance on textbooks, reference material, and possibly Internet resources; and more difficult questions to the instructor.

During the workshop, the instructor is responsible for monitoring the students' progress, providing them with assistance, and, if necessary, inviting all students to discuss general issues while paying attention to typical mistakes. This is done while taking into consideration the hygienic requirements for organizing the work of students in computer technology. The instructor must ensure that the amount of time that students spend working continuously at the computer does not exceed the recommended standards.

The term “lecture” has two meanings: it is both a form and a method. The lecture is always frontal. It can be supported by a computer as a means of clarity and demonstration and, if classroom equipment allows, it is carried out in a computer lab. The teacher is in charge. If students have notes prepared on a computer (for example, in the form of hypertext or presentation), self-management of cognitive activity is enhanced and the fear of not writing down something important is eliminated.

It is also possible for students to acquire a printed copy of their notes. At the same time, as the artificial intelligence has pointed out. According to Bochkin, the most effective format for a summary is one in which the most important aspects are summarized on the left side of the page, and there is a space on the right side of the page intended for the student to provide their feedback. The individualization of activities and the development of mental functions in students are both facilitated as a result of this.

Due to the fact that the seminar serves as a transitional form between frontal and individual work, it continues to hold essential significance in the field of computer science education. A number of non-machine and home-machine skills and abilities are required to be developed in a computer science course.

This is due to the fact that some of the tasks in the course do not require such skills (for instance, solving problems on the theoretical foundations of computer science), while others require preliminary or subsequent discussion (project method, giving a report or discussing it, algorithm development).

Working on the computer without first reviewing the instructions is a waste of both the student's time and their abilities to see well. In conclusion, we require a suitable method of work that will allow us to gain a common understanding of what was done on the computer, what occurred, and the reasons behind it in a more tranquil setting.

The computer itself has the potential to divert attention away from the primary purpose of the student's use of the device. There are extreme circumstances in which it is conceivable to substitute a targeted activity with a blind search of choices, which is not immediately distinct from productive effort.

The capacity to create a comprehensive prediction of the behavior of a computer based on the experience that has been collected while working with it is a significant intellectual skill. It is also necessary to have a seminar for activities of this nature.

The seminar also includes the implementation of collective forms of labor, which are a means of overcoming the individualism that is inherent in the one-on-one computer method. Due to the fact that they are required to be addressed, role-playing games are suitable for inclusion in the seminar.

Having an understanding of what is considered to be a consequence of the work done at the seminar is beneficial for the student. The following is a list of the possible controlled results that we use to decide what a student "needs to pass":

1) the final version of the algorithm's text, which is immediately ready to be input;

2) an execution table of an algorithm that was compiled without the use of a computer;

third, a project that involves dialogue with the software;

4) responses to questions in accordance with the rules and regulations;

5) directions for one's own program or for the program of another individual;

6) comments on your own program or on the program of another individual;

7) a description of the outcomes that are anticipated from the program;

The description of the roles and functions of the players in the game, including any faults that were found.

Form of education that is based on projects. The form of the project is based on creative activity as its foundation. Listed below are the characteristics of the project-based learning approach:

There is an organizational stage of preparation for the project, which includes the independent selection and development of a solution option, the selection of software and hardware, and the identification of information sources.

– the designation of a leader (organizer, coordinator) from among the individuals who are participating in the project, as well as the assignment of roles;

– the existence of a stage that includes self-examination and self-assessment (reflection on action), the safeguarding of the outcome, and the evaluation of the level of performance;

Each of the groups has the option of either developing their own individual project or taking part in the implementation of a group project.

The purpose of the expedition is to accomplish three primary objectives: to demonstrate "live" computer science in management or production; to provide career advise for specialties related to the utilization of computers; and to correct students' "bookish" and speculative beliefs about actual computer science.

It is possible to go on the expedition both before and after studying a certain course, segment, or topic. In the first scenario, one of its objectives is to generate interest in the topic at hand; in the second scenario, it seeks to generalize knowledge, organize it, and establish a connection between it and real-world situations.

Preparations are required for the excursion. When compared to tourism, the primary distinction is in the fact that excursionists possess a higher level of technical expertise and the gained knowledge is more precise.

In the beginning, the instructor needs to walk through the excursion route, determine what will be displayed and how it will be shown, and come to an agreement on who exactly will remark on the activity. The specific, practical tasks that people engage in while utilizing a computer while they are working are the focus of observation that is being carried out.

It is E.V. Among the many modern types and sorts of computer science lessons that are offered by Ogorodnikov, S.G. Grigoriev, and others are:

Lessons that are similar to those taught at universities (lesson-lecture, lesson-seminar, lesson-practical lesson, lesson-colloquium, lesson-consultation, and lesson-test classes);

The following are examples of special purpose lessons:

-workshop lesson, independent work lesson, test lesson, frontal laboratory lesson, excursion lesson, and transdisciplinary lesson;

-lesson plans that are based on games, such as role-playing lessons, competition lessons, quiz lessons, conference lessons, meeting lessons, and project lessons;

- Lessons that are based on content structures (such as a lesson on working with a book, a lesson based on an electronic workbook, a lesson based on dynamic reference signals, a lesson based on summary tables, a lesson based on dictation, and a lesson based on a standard program structure).

Computer science instruction strategies and methods

Method is a technique, method, or course of action; a way to attain a goal, a definite ordered activity; a series of techniques or procedures for the practical or theoretical mastery of reality, subordinated to addressing a specific problem. Method is derived from the Greek word methodos, which means "research."

When it comes to defining the concept of teaching method, there are a few different ways that can be found in the literature:

1) the manner in which the instructor and the learner engage in the activity;

2) a collection of different works;

3) the sequence of steps that the instructor takes in order to guide students from ignorance to knowledge;

4) the sequence of activities that teachers and students engage in together.

A statement made by I.Ya. Learner, the teaching method is a system of consistent and regulated actions of the instructor who, through the use of particular means, arranges the practical and cognitive activities of students to master social experience. This is done in order to achieve the learning goal.

At the same time, the activity of the teacher is determined, on the one hand, by the purpose of teaching, the laws of assimilation, and the nature of the educational activities that schoolchildren participate in, and on the other hand, it is the teacher who determines this activity, the implementation of the laws of assimilation and development.

Methods are ways of organizing and interconnecting activities that teachers and students engage in with the intention of resolving a set of issues that arise during the process of education, according to the majority of educators. Philosophers have observed that in the realm of social and material reality, there are no methods, but rather just laws that are objective.

It might be said that ways are accessible within the realm of consciousness, within the conscious action of an individual. According to P.V. Kopnin, the approach does not immediately record what is currently present in the objective world; rather, it records how a person ought to behave in the process of cognition and practical action.

One of the most important ideas that is included in the technique as a pedagogical word is an indication of an action that is suitable for an educational setting. The M.I. Makhmutov differentiates between two aspects of his methods, namely the outward and the inside.

The one that is external depicts the manner in which the instructor conducts himself, while the one that is internal reflects the principles that he adheres to. Therefore, this idea ought to express the unity of the internal and the external, the connection between theory and practice, and the relationship between the actions of the instructor and the activities of the student.

According to M.I. Makhmutov, a teaching technique is a set of regulatory principles and regulations that are used to organize pedagogically acceptable interaction between a teacher and pupils. This interaction is utilized for a specific range of activities that are associated with teaching, development, and rearing.

As a result, this definition places an emphasis on the fact that the technique includes not only the rules of how to behave but also the methods of behavior itself.

In addition to the concept of "teaching method," the concepts of "teaching technique" and "methodological technique" are utilized in both theoretical and practical aspects of pedagogical practice. It is generally agreed upon that a method, in the sense of a means of doing something, is comprised of techniques or specific acts undertaken with the intention of resolving pedagogical issues.

The selection of different types and approaches to training

It is the most crucial component of a teacher's job to be able to select the most appropriate instructional approach for a certain educational setting, one that is optimal for the conditions under which it will be implemented. Because of this, pedagogy places a particular emphasis on them (A.N. Aleksyuk, Yu.K. Babansky, I.Ya. Lerner, M.I. Makhmutov, and others).

When selecting and combining different instructional approaches, you need to be sure to keep the following characteristics in mind:

1) adherence to the goals and objectives of the training, education, and development programs;

2) conformity with the substance of the material that is being studied (complexity, novelty, nature, and the capability of visual presentation of the material, among other things);

3) conformity with the actual educational capacities of the pupils in the class, including age (both mental and physical), level of preparedness (including training, development, education, and degree of competency in information and communication technologies), and characteristics of the class;

4) In accordance with the conditions that are currently in place (including the provision of the classroom with suitable instructional aids, the availability of printed and electronic educational materials), as well as the prescribed amount of time for training;

5) Conditions that are ergonomic (time of the lesson according to the schedule, quantity of students in the class, amount of time spent working at the computer, etc.);

6) conformance with the particular features and skills of the teachers themselves (character traits, level of mastery of one or another method, relationship with the class, previous experience, level of psychological, pedagogical, methodological and information technology training).

It is always the case that the aim of the lesson is in accordance with the potential of the means to achieve it. These means include the substance of the lesson as well as the techniques of instruction.

However, because the approaches may vary depending on the contents, in order to select them, it is necessary to take into consideration all of the factors that have been given simultaneously. In order to accomplish this, it is necessary to conduct a thorough examination of the content of educational materials and to determine the degree to which students can access them.

The format of the class can be chosen by the instructor at his or her own discretion; groups, in pairs, or frontal instruction are all viable options. The only thing that has to be mentioned is that in order for students to be able to organize group work that yields positive outcomes, they need to have the right abilities.

When selecting a frontal method of instruction, it is necessary to take into consideration the fact that a lesson is not a monologue delivered by the instructor or the conventional explanations and surveys, but rather talks, discussions of new concepts, joint search and analysis. This is the requirement for productive class activity.

While this is going on, a portion of the lesson is going to be devoted to computer work, which will be done primarily by individuals. It is the responsibility of the teacher to function as a consultant in this activity, and if the student requires assistance, he should always seek it from the teacher.

Methods and formats for instructing students in computer science

The efficient teaching of computer science requires the utilization of a wide range of formats and approaches in order to retain the attention of students and assist them in the development of a solid foundation in computational thinking and problem-solving. In the field of computer science education, the following are some of the most frequent formats and methods:

1. Presentations Based on Lectures:

• Key concepts, theories, and algorithms can be introduced to students through the use of traditional classroom presentation methods. Understanding can be improved by the use of visual aids and demonstrations.

2. Programmes that are Hands-On:

• The most important aspect of computer science education is the focus on hands-on coding activities and projects. When it comes to finding solutions to problems and developing software, students actively write and debug code.

3. (PBL) stands for project-based learning.

• Project-based learning (PBL) is about giving students challenging projects that are based in the real world and challenge them to apply their coding and problem-solving skills in order to address real-world problems. It encourages creative thinking as well as critical analysis.

4. A Classroom That Is Flip?

• Students in a flipped classroom first examine the material covered in the lecture outside of class (for example, through the use of videos or texts), and then during class time, they participate in activities such as discussions, collaborative activities, and coding assignments.

5. Collaboration and Programming Conducted by Peers:

During the process of pair programming, two students collaborate on a project, with one student producing code and the other student providing input. Collaborative group projects foster teamwork and the exchange of information among participants.

6. Auditing of the Code and Bug Fixing:

Students should be instructed on how to evaluate and debug code, with an emphasis placed on the significance of locating and correcting problems in their own programs.

7. The use of games:

It is possible for students to have a more interesting and engaging experience while learning computer science by participating in educational games, coding challenges, and coding competitions.

8. Learning Platforms Available Online:

• Make use of online platforms and courses (such as Code.org, Khan Academy, and Coursera) that provide a structured curriculum for computer science and interactive coding activities.

9. Computing Environments for Visual Programming:

Before moving on to text-based languages, it is recommended that you begin by introducing coding ideas through the use of visual or block-based programming environments such as Scratch at the beginning.

10. Scaffolding: - Scaffolded learning is a concept that simplifies difficult concepts by breaking them down into more digestible chunks. To begin, you should begin with the foundations, and then gradually introduce more sophisticated concepts.

11. Applications in the Real World: - Teach computer science through the use of real-world applications, such as the development of websites, mobile applications, or projects involving data analysis.

12. Problem-Solving Challenges: In order to foster critical thinking and reasoning, it is important to encourage pupils to engage in coding challenges, riddles, and algorithmic issues.

13**. In order to educate students about hardware, sensors**, and the internet of things (IoT), robotics and physical computing can be utilized. Programmable robots and physical computing platforms such as Arduino or Raspberry Pi can be utilized to do this.

13. **In order to better prepare students** for the software development techniques that they will encounter in the real world, it is essential to emphasize the significance of documenting code and presenting projects in a professional manner.

15. **Mentorship and Peer Teaching:** Encourage students who are farther along in their education to act as mentors and teachers to

their classmates, so enhancing their own comprehension while also assisting others.

16. **Integration Across courses:** - In order to highlight the interdisciplinary character of computer science and its relevance to the real world, it is important to integrate computer science with other courses such as mathematics, science, and art.

17. **Assessment and Feedback:** - Make use of a wide range of assessment methods, including as quizzes, examinations, coding assignments, and peer evaluations, in order to evaluate the level of student comprehension and provide feedback in a timely manner.

18. **sector and Guest Speakers:** - Inviting professionals from the computer science sector to share their experiences and insights with students in order to assist them in comprehending real-world applications and career opportunities.

In order to cater to a variety of learning styles and to engage students in meaningful ways, effective computer science education frequently incorporates a number of various kinds of instruction and approaches. It is essential to modify your instructional strategy in accordance with the requirements of your group of students as well as the particular educational goals of the course.

Repetition of educational material in computer science lessons

Repetition of educational content is a popular and effective teaching approach, particularly in the context of computer science classes. Repetition is an effective method for enhancing retention, reinforcing concepts, and catering to a variety of learning styles. Listed below are some examples of how repetition might be incorporated into computer science training by:

1. **Before beginning each new lesson, go over the following**: At the beginning of each new computer science class, a brief review of the fundamental ideas that were covered in the prior lesson should be performed. Students' memories are refreshed as a result, and connections are made between new information and information they already know.

2. **Incorporate Regular Practice tasks**: Include practice tasks, coding challenges, or quizzes in each and every course. During these tasks, you should review and expand upon topics that have been taught in the past, so strengthening your understanding through application.

3. **Spiral Curriculum:** Make use of a spiral curriculum method, in which concepts are reviewed and examined in greater depth at various phases of the learning process. In the process of revisiting a notion, it is either investigated in greater depth or used in a different setting each time.

4. **Coding Projects: Instruct pupils t**o work on coding projects that incorporate topics that they have studied in the past. As students progress through increasingly difficult projects, they will inevitably come across and become more familiar with prior information.

5. **Homework Assignments** Be sure you provide children homework that requires them to practice and apply the information that they have acquired in the past. Among these activities include the authoring of code, the resolution of difficulties, and the conduct of research.

6. **Interactive Review Sessions**: In order to provide students with the opportunity to ask questions, get their doubts clarified, and apply what they have learned in a group context, you should organize interactive review sessions or coding labs.

Allow pupils to teach and clarify concepts to their classmates through the use of the peer teaching method. Because of this, their comprehension is strengthened, and they are able to consolidate their knowledge.

8. **Spaced Repetition**: Make use of approaches that involve spaced repetition, in which pupils study and return content at increasing intervals during the progression of time. Long-term retention is improved as a result of this.

Creating visual diagrams or idea maps that explain how different concepts in computer science are connected to one another is the ninth step in the conceptual mapping process. Students are better able to comprehend the wider picture and the connections between different concepts as a result of this.

10. **Integration with New information**: When introduced to new information, it is important to connect it to concepts that have been learnt in the past. When it comes to comprehending the new subject matter, this displays the significance and usefulness of what was previously learned.

Throughout the entirety of the course, formative assessments should be utilized to evaluate the level of student comprehension and to make appropriate adjustments to the teaching methodology. It is important to revisit and reinforce particular concepts if pupils are having difficulty with them.

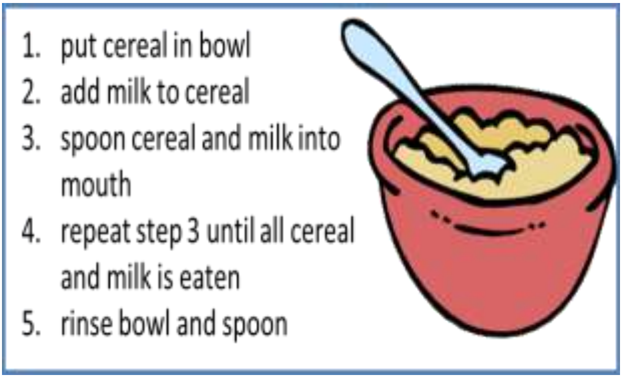
12. **Coding Challenges:** On a regular basis, you should present coding challenges to your students. These challenges should require them to employ previously learned algorithms, data structures, and problem-solving skills in unfamiliar ways.

13. **Reflective diaries**: Instruct students to keep reflective diaries in which they summarize the information that they have acquired since the beginning of each class. A stronger retention is achieved through the process of summary.

14. **Integrating Computer Science with Other Subjects:** Demonstrate how the concepts of computer science are related to other subjects, hence enhancing comprehension through the use of interdisciplinary linkages.

Self-Paced Learning: Make it possible for students to learn at their own pace by giving them the opportunity to revisit and review previously learned content at their own leisure.

This is especially important for students who require further practice in particular subject areas.



For the purpose of avoiding monotony and boredom, repetition ought to be balanced. Additionally, it should be adapted to the particular requirements and advancements of each individual student.

This will ensure that those students who are able to comprehend topics quickly are suitably pushed, while those students who require additional support get opportunities for reinforcement.

Lessons in computer science that include the repetition of certain teaching material when developing algorithms, there are three fundamental building components that should be utilized:

- reiteration, selection, and sequencing are all options.

What does it mean to repeat something?

Loops are another term that could be used to allude to repetition. The process of looping or continuously repeating sections of a computer program is referred to as repetition in the field of computer programming.

There are a few distinct varieties of one loop. One of the most fundamental is the process of repeating a set of instructions a certain number of times. Until a particular condition is satisfied, another kind of loop will continue to repeat itself indefinitely.

For instance, the following are some of the processes that could make up a very straightforward algorithm for eating morning cereal:

Dental hygiene is an example of repetition in practice.

The process of cleaning teeth can be simplified by developing an algorithm. Take for example an individual who has ten upper teeth. A representation of the algorithm would look something like this in order to guarantee that each and every one of the upper teeth is cleaned:

Consider the following alternative:

It is much easier to understand the second algorithm. However, in order for this algorithm to function properly, we will also need to incorporate a condition.

When instructions are repeated, a condition is a scenario that is checked to ensure that it is satisfactory. This particular criterion will be to determine whether or not the total number of teeth that have been cleaned is equal to ten.

The instructions are repeated if the condition is found to be "False," which indicates that the number of teeth that have been cleaned is less than 10. In the event that the criterion is 'True' (that is, the maximum number of teeth that have been cleaned is 10), then there will be no more repetition.

What is the significance of repetition?

It is possible to simplify algorithms by the use of repetition, which simply states that certain stages will be repeated unless they are informed otherwise. Because of this, the process of building algorithms is sped up and simplified because they do not need to include a large number of steps that are not necessary.

Aims of the Session:

• Determine the most effective ways to assist students in the development of their computational thinking skills

• Investigate the three strands of the curriculum and think about the types of activities that are appropriate for each of them

• Instructing students in the sequence, repetition, and selection programming concepts, also known as the "Big 3."

• Investigate the vast array of materials, assistance, and continuing professional development opportunities that are made accessible by the National Centre for Computing Education (NCCE).

Why do we use that? For this reason, it is essential that we provide our students with a high-quality education in computing.

Why should one teach computer science?

There are twelve million people who lack the skills necessary to flourish in the digital world.

• According to the United Kingdom Digital Strategy, the United Kingdom will require around 1.2 million new digitally skilled individuals by the year 2022 in order to meet the future skills requirements.

• According to the UK Digital Strategy, the economy of the United Kingdom loses 63 billion pounds of GDP every year as a result of a lack of digital skills, which hinders growth and hampers prospects for employment.

• we aim to encourage young people to be positive, digital citizens.

• additionally, 'there is a national scarcity in computer science professors that justifies schools hiring from abroad' (Home Office Migration Advisory's Committee [MAC]).

The transition from information and communications technology to computing: why?

The way that computing education is now being taught in many schools across the United Kingdom is extremely unsatisfactory.

Many students are not inspired by what they are taught and gain nothing more than fundamental digital literacy skills such as how to use a word processor or a database.

This is despite the fact that existing curricula for information and communication technology (ICT) are expansive and provide teachers with the opportunity to inspire students and assist them in developing an interest in computing.

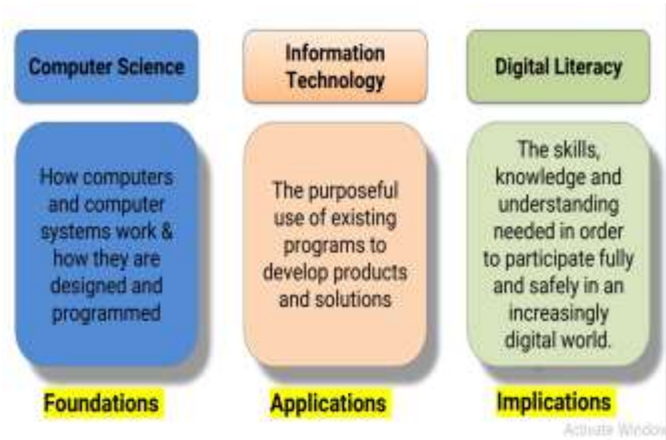
Principal alterations :

:• The name was changed to "Computing" in September of 2014.

• a stronger emphasis on computer science

• higher expectations - children are expected to accomplish more than simply "do," but also "understand" the material

• much more and more difficult computer science objectives • new vocabulary: algorithms, debugging, and variables



1. Students should be taught to comprehend what algorithms are, how they are implemented as programs on digital devices, and the fact that programs are executed by following instructions that are clear and unambiguous.

2. Create and troubleshoot basic computer programs

3. Make use of rational thought in order to forecast the behavior of straightforward programs

4. Make strategic use of technology in order to generate, organize, store, or manipulate digital content and retrieve it when necessary

5. acknowledge prevalent use of information technology outside of the classroom

6. make use of technology in a manner that is both safe and respectful, while maintaining the confidentiality of personal information; identify the resources available to them for assistance and support in the event that they have concerns over material or contact on the internet or other online technologies.

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Testing and assessing students' knowledge in informatics classes

In informatics lessons, it is essential to test and evaluate the students' knowledge in order to determine how well they comprehend the material, to pinpoint the areas in which they require development, and to evaluate how far they have come. For the purpose of testing and evaluating students in informatics classes, the following are some of the numerous approaches and strategies:

1. Written Exams:

It is possible for students to demonstrate their theoretical understanding of informatics topics, algorithms, data structures, and programming languages through the use of traditional written examinations. There should be essay questions, short response questions, and multiple-choice questions included.

2. Practical Coding Assessments:

It is recommended that students be given programming assignments or coding exercises to complete in order to assess their capacity to apply coding ideas and problem-solving skills. Conduct an analysis of their code to determine whether it is accurate, effective, and follows industry standards.

3. Projects and Assignments:

• The ability of students to design software applications, work on challenges that are representative of the real world, and apply informatics ideas in actual scenarios can be evaluated through the use of long-term coding projects or assignments.

4. Code Reviews:

Code reviews should be conducted, in which students either show and explain their code to the class or submit it for evaluation by both their peers and the teacher. Evaluate the approach to coding, the effectiveness, and the logical soundness.

5. Quizzes and In-Class Assessments:

• In order to test the students' comprehension of particular subjects or ideas that have been taught in recent classes, they should be given brief quizzes or assessments in the classroom.

6. Online Coding Platforms:

Codecademy, LeetCode, and HackerRank are examples of online platforms that provide automated code evaluation. You should make use of these services. In the case of coding challenges and exercises, these platforms offer instant feedback.

7. Group Projects and Presentations:

- Allocate group projects that call for cooperation and teamwork from those involved. Consider both the overall project and the contributions made by each individual. It is recommended that students present their efforts to the audience.

8. Problem-Solving Challenges:

The students should be presented with difficult problem-solving tasks that need them to apply their understanding of informatics and computational thinking in order to come up with solutions.

9. Oral Examinations:

Students are required to demonstrate their comprehension of informatics principles, algorithms, and problem-solving approaches through the use of oral tests or interviews.

1. **Practical Skills Tests:**

Hands-on examinations or simulations are used to evaluate students' practical skills, such as database design, data analysis, or system administration. These assessments are designed to evaluate students' skill sets in a practical setting.

11. Research Papers and Reports:. Assignments of Research Papers and Reports: Make sure to assign research papers or reports on particular informatics domains. Assess students based on their capacity to carry out research, evaluate information, and present the results of their investigations.

12. Peer Assessment Assessing Peers: - Include a component known as peer evaluation, in which students evaluate the work that their classmates have produced. This not only improves their capacity to critically analyze informatics projects and code, but it also motivates themselves to engage in self-reflection.

13. Portfolios:. Request that students develop portfolios that highlight their most successful coding projects, assignments, and thoughts on their journey of learning in informatics. Portfolios should be created by students.

14. Online Quizzes and Interactive Tools Use online quiz platforms and interactive tools such as Kahoot! to test your knowledge and develop your skills. to develop interactive exams and quizzes that encourage students to participate in their own learning.

15. Self-Assessment and Reflection: Self-Evaluation and Reflection: - Instruct students to constantly evaluate their own knowledge and abilities in the field of informatics. Ask them to write down their goals for improvement and to evaluate how far they have come.

16. Final Examinations: - Conclude the course with a comprehensive final test that covers the whole curriculum. - This examination should be taken at the end of the course. There may be a combination of written, coding, and practical questions included in this segment.

17. Rubrics and Assessment Criteria Formulation of explicit Rubrics and Evaluation Criteria: - Formulate explicit rubrics and evaluation criteria in order to guarantee uniformity and openness in the grading process.

It is absolutely necessary to ensure that the evaluations that are designed for informatics classes are aligned with the learning objectives and the results of the course.

Additionally, it is important to provide students with timely and constructive feedback in order to assist them in understanding their areas of strength and areas in which they may grow in the field of informatics.

Types and forms of knowledge control in computer science lessons

The improvement of testing and assessment of the learning outcomes of schoolchildren is one of the primary paths that should be pursued in order to increase the effectiveness of the educational process in the field of computer science.

The actions of a teacher that involve testing and evaluation are an essential component of all pedagogical work and a significant contributor to the enhancement of the quality of instruction. It is common for them to restrict themselves to conducting an oral survey of kids in order to control their knowledge. During this survey, the text of the textbook is merely repeated.

In order to conduct a more thorough quality check, it is necessary to make use of a wide variety of knowledge control methods.

Different kinds and methods of controlling knowledge:

1. Students are able to prepare themselves to master new material, generalize and systematize what they have learned, and practice skills successfully in executing basic processes through the use of dictation, which is a form of written knowledge testing. There is a list of questions that can be found in the dictation.

• a directive given by the instructor at a predetermined interval of time;

• be shown in slides, one after the other;

• be laid down in the form of tables to which a collection of answers is attached.

Pronunciation: "Information and the processes involved in information."

Option 1

1. Where is the focus of research in the field of computer science lie?

2) What exactly is information?

3. Do some writing down of a historical fact that you are aware of.

4. Make a note of a mathematical rule that you are familiar with.

5. Describe the "completeness" quality that this information possesses.

If you were to get the following message, "2x2=4," would you find it informative? Provide an explanation for the response.

7. Please provide an example of a worker in the information field.

8.With the assistance of which organ does a person acquire the majority of the information that they obtain?

9. If a person has access to information, what activities do they take with it?

10. Who is the source of information that a person can obtain?

11. What kind of medium does a person use to communicate information?

12. Provide some examples of information media from the past.

13. Identify the various technical forms of communication that are utilized in the process of information exchange.

14. Which instruments were utilized in the past by individuals in order to enhance the processing of information?

15: Please provide an illustration of how information is transferred in living nature.

Option 2

1. What is the subject matter of computer science?

Identify the three primary components that make up the world that we live in.

3. Please name a fact about physics that you are familiar with.

4. Please name a rule on the Russian language that you are familiar with.

5. Which characteristics of information are you familiar with?

6. Give an example of a message that is delivered at the appropriate moment.

7. What factors determining whether the communication you receive will be informative for you are the following?

8. Please provide an example of the information activities they engage in.

9.The use of one's senses allows for the acquisition of a variety of metaphorical knowledge, each of which is described below.

10.What information processing methods are you familiar with?

11. To whom is it possible for a person to provide information?

12.Give some examples of contemporary forms of information media.

13.In the context of a telephone conversation, what exactly is a telephone line?

14. What is the actual outcome of the processing of information?

15. What exactly is a device that can process information in a universal manner?

Working on one's own. It is important that the system of independent work:

• make certain that the required information and abilities are obtained and evaluated as necessary;

• be reflective of all of the fundamental ideas that are provided for by the program;

• come up with instructional strategies;

• encourage students to find appropriate techniques on their own;

• make sure that the same questions are asked in a variety of different configurations.

Work that is composed independently and is carried out in a methodical manner and is organized in an appropriate manner plays a significant part in the development of a student's capacity for independent thought.

One can categorize autonomous work into two distinct sorts, based on the purpose for which it is performed:

• **educational** (the objective is to determine the degree to which the fundamental ideas are firmly grasped, the manner in which they are interconnected, the degree to which pupils comprehend the hierarchy of these ideas, and the degree to which they are able to distinguish between basic and non-essential characteristics);

• **controlling**, with the objective being to evaluate the pupils' capacity to put the knowledge they have gained into practice;

Working alone on an educational project entitled "Algorithms, their types, properties, and recording methods."

Option 3

1. It is necessary to develop a definition of an algorithm.

2. How do you make sense of the following terms:

a) "a limited collection of activities"; "from the class of the same type" (b) does it mean? Provide examples to illustrate your point.

3. enumerate the characteristics of the algorithm.

4. Give an explanation of the fundamental nature of any property of the algorithm that you choose.

5. Describe the many kinds of algorithms.

Option 4

1. Describe the fundamental nature of the quality known as "certainty."

2. Describe the characteristics that make up the "unambiguity" feature.

3. Please explain the fundamental nature of the "effectiveness" characteristic.

4. Please explain the fundamental nature of the "mass" characteristic.

5. Describe the fundamental nature of the property known as "finiteness."

Option 5

1. What are some ways that you may demonstrate that the sequence of events that was suggested to you is an algorithm?

2. Demonstrate that the Pythagorean theorem can be thought of as an algorithm when it is applied in practice.

3. Is it possible to classify the well-known occurrence known as the "water cycle in nature" as an algorithm? Give an explanation.

4. Is it possible that this series of events may be classified as an algorithm?

The key is yours. It should be inserted into the keyhole. Make two turns in the opposite direction of the clock. Do away with the key. Turn the door open.

5. In one of the Russian fairy tales, the hero is given the following command: "Go there, I don't know where, bring that, I don't know what." Is it possible that a series of activities may be called an algorithm? Using the characteristics of the algorithm, provide an explanation for your answer.

Option 6

1. Create definitions of the following algorithms:

a) linear, and

(b) branching out.

This is a cyclical pattern.

2. **Illustrate a specific problem that could be handled by employing an algorithm by providing the following example:**

a) linear, and

(b) branching out.

This is a cyclical pattern.

3. Provide a list of the several ways that algorithms can be written.

The algorithm for solving the problem should be written down in the form of a block diagram, which is as follows: $y = \sqrt{a} + 2b$.

Five. In step 4, determine the type of algorithm that will be used.

Algorithms, their types, attributes, and recording methods are the topics that will be monitored for independent work.

The first choice

1. Compose a written declaration of the algorithm's definition. The words in the definition that are most representative of the algorithm's primary characteristics should be highlighted.

2. Please explain the fundamental nature of the "uniqueness" characteristic. Can you tell me what happens if this property is broken?

3. Identify the individual who is responsible for the following tasks:

a) preparing a cake;

b) tailoring clothing.

4. In order to solve an issue, what characteristics define a comprehensive set of initial data?

5. When it comes to solving the problem, it is necessary to determine and record a comprehensive collection of initial facts. "Determine the area of the circle."

Choice no 2

1. Compose a written record of the function of the program. What is the difference between an algorithm and a program? Provide an illustration that illustrates how this distinction can be seen.

2. Please explain the fundamental nature of the "effectiveness" characteristic. Can you tell me what happens if this property is broken?

3. Identify the individual who is responsible for the following tasks:

a)The repair of shoes;

b) the process of filling teeth.

4. In order to solve an issue, what characteristics define a comprehensive set of initial data?

5. Determine and record a comprehensive collection of initial facts in order to solve the problem: "Calculate the leg of a right triangle with the following information."

Choice No. 3

1. Using Heron's formula, develop an algorithm that can calculate the area of a triangle. The algorithm should be written in the form of a block diagram. Get a better understanding of the algorithm.

2. The algorithm for solving the following problem should be written down in the form of a block diagram. The problem is as follows: "If the coordinates of the ends of the segment are known, determine whether the point C(x,y) belongs to the segment AB."

Choice number four

1. Establish a method for determining the area and hypotenuse of a right triangle by developing an algorithm (the algorithm should be written in the form of a block diagram). Get a better understanding of the algorithm.

2. In the style of a block diagram, write down the algorithm that will be used to solve the following problem: "Square the smaller of the two numbers that are given, and reduce the larger number by two times." Determine the total of the numbers if they are equal to one another.

3. Exam - the examination is comprised of a series of smaller assignments that, when taken as a whole, include a wide variety of questions drawn from the many chapters of the computer science textbook as well as the overall course material.

There are three different sorts of tests, each of which is provided in two different versions:

Filling in the blanks of "ellipses" in such a way that a true statement is obtained is the starting point for the first category of examinations. Instead of using ellipses, students are required to indicate one or two words that they believe are missing from the sentence. This is the only restriction placed on them.

When it comes to the second category of examinations, students are required to determine if each of the proposed claims is true or false. Not only are students required to provide a simple "yes" or "no" response, but they must also demonstrate the ability to reason, make suitable conclusions, and differentiate between a mathematical language that is correctly stated and one that is incorrectly formulated;

The third category of examinations provides the candidate with a selection of multiple answers, including true and incorrect answers, as well as an answer that involves refusing to carry out the duties assigned to them.

Because it is important for students to be able to easily see the set of responses, the number of answers is restricted to the three that are considered to be the most crucial.

"Computer and information" is the type of test.

1. An information-processing device is referred to as

To begin, RAM;

B) memory that is external;

C) the keyboard;

D) the processor;

2. One type of device that can be used for

(A) the processing of information;

B) The act of reading and writing down information;

C) the storage of information pertaining to operations;

D) storing information for an extended period of time;

3. In order to save the term "INFORMATION" in the memory of the computer, you need to

1. In bytes, ten

2. twenty bytes;

3. (one byte)

4. 9 bytes in total.

5. To complete the sentence, replace the ellipsis with the following: "Magnetic disks are devices for..."

a) data storage for an extended period of time;

b) inserting data and information;

c) the output of information;

d) exchange of information between persons.

e) Among the addressable parts of RAM,

The smallest one is

1. A byte;

2. italics;

3. the kilobyte;

4. record.

1. It is possible to receive information about the mastery of the same content several times through the use of test work, which is a written test of students' knowledge and skills that must be carried out at various stages of mastering the material that has been studied. In order to accomplish this goal, it is recommended to carry out a variety of control tasks, which may be broken down into two categories:

2.During the time that students are studying the subject matter, verification tests are designed to assess whether or not they have mastered a specific section of the course;

The last point of repetition that occurs at the end of the school year is the final examinations. The tasks that are assigned to review fundamental theoretical topics are an essential component of these efforts.

4.In addition to serving educational, educational, and developmental purposes, the work that is done for tests is an essential component of the learning process.

5.. Testing is one of the most effective methods for consolidating information on the subject matter that has been covered with the highest success.

Open the tests. The students are made aware with the list of questions and tasks that are required to be completed on the subject before they begin studying the content. In addition, they are given additional questions and chores to do.

The student can choose the level of the test on their own and solve the problems that have been presented to them. Only in the event that the student has finished all of the tasks that were presented will the test be declared passed.

It is sometimes recommended to perform closed tests when studying certain portions, but it is also important to take into consideration the features of the study group while doing so. As a result of this, students are not initially presented with questions and tasks pertaining to the subject matter; rather, they are given them during the examination.

In this scenario, it is feasible to make use of instruction cards in the event that the student is unable to complete the work; however, this will be recorded in the grade, or the student will be required to complete an additional task.

Thematic examinations are administered at the conclusion of a subject or course, and they are required to be differentiated or as multi-level, multiple-choice examinations.

Take a look at "Command files."

1.The following question should be written into a batch file: "Do you want to know the formatting options (yes - Y, no - N)?Furthermore, if the response is "yes" (Y), it will provide the parameters that have been given, and if it is not, it will say goodbye to you.

2.The following question should be written into a batch file: "Do you want to learn how to work with the program ARJ.EXE (yes - Y, no - N)?" If you answer "yes" (Y), the file will provide you with the information that you requested, and if you do not answer "yes," it will say farewell to you.

3.The following question should be written into a batch file: "What kind of floppy disk do you have (360 KB or 1.2 MB)?"This floppy disk is formatted, and a message that corresponds to it was presented on the screen before the formatting process began.

4.The names of files that have an EXE extension and are placed in a subdirectory of the root directory of drive F should be printed out using a batch file that you have written. One of the parameters that is supplied is the name of the subdirectory.

1.To display a message that indicates the presence of a particular file in a directory, you should write a batch file that displays the message. The search location and the name of the file are both parameters that are supplied.

2Make a text file residing on the disk. Create a command file that takes the newly produced text file and copies it to a floppy disk. The command file should also inquire as to whether or not there is a file on the floppy disk with the same name. This will serve as confirmation that the copy has been finished. As a parameter, the name of the text file that is being used is supplied.

3Through the use of the FOR command, you can create a batch file that shows the contents of the NU directory that is stored on the C drive within the NC directory. Once this is complete, the following inquiry will appear: "Are you interested in printing the contents of this directory on a printer?" In the event that the response is affirmative, the contents of the directory will be printed.

4.Create a batch file that, in the event that a specific file is present, produces the following message: "Are you certain that you wish to delete the file that is named \filename\? Upon confirmation, the file will be removed from view. Whenever there is no file of this kind, a message that corresponds to the situation is displayed. There is an argument that specifies the complete name of the file.

In the context of computer science classes, various methods of tracking student activity

Let us place a particular emphasis on testing as a different kind of control. A well-designed exam can serve not only as a method of controlling one's knowledge but also as a means of reviewing and enhancing one's understanding of the information that has been taught. It is vital to provide exams to students on a consistent basis throughout the academic year in order to use tests as the ultimate control.

The utilization of tests as a means of providing a description of the conclusions reached by activities is an efficient educational tool. When it comes to this particular instance, we are discussing the notion of transparency in education.

To what extent does this approach prove to be effective?

Due to the fact that they were given examinations at the beginning of the subject matter, students are already focused on achieving a satisfactory result.

Computers can be used as a necessary technical tool in computer science, where all of the essential tests are pre-installed and students can test themselves at any moment without any anxiety whatsoever. If it is relatively difficult to transmit didactic materials during each session in other courses, then it is possible to utilize computers as a necessary technical tool in computer science.

After going through each topic (lesson), you can use tests that consist of five questions to evaluate your knowledge. For periodic monitoring, a test consisting of ten to fifteen questions is utilized. In addition, a test consisting of twenty to thirty questions is required to be used for the final control.

It must be utilized for the purpose of ultimate control while evaluating. For a test consisting of five questions, the evaluation makes use of the following scale:

a perfect score of five stars;

"4" is the score for one mistake;

a score of "3" for two mistakes;

The score is a "2" for three faults.

For a list of thirty questions:

Score a "5" for 25-30 responses that are correct;

Score of "4" for 19-24 answers that are correct;

with a score of "3" for 13-18 correct answers;

score of "2" if there are fewer than 12 correct answers.

These criteria are usual for secondary schools, which are places where students are given the opportunity to study academic material within the context of a fundamental plan. In the case of gymnasium classes, lyceum classes, and classes that focus on the in-depth study of computer science, these criteria are not appropriate; the prerequisites for students attending educational institutions of this nature ought to be far more stringent.

Using the criteria that are outlined in the examinations that are part of the Unified State Examination, it is possible to compute them.

The objective evaluation of students' knowledge through oral questioning and the completion of practical tasks is the aspect of control that presents the greatest quantity of challenges. Let's take into consideration the aspects that are affecting the evaluation:

-an extremely serious error in which the semantic meaning of a term or definition is utterly corrupted;

The error comes from phrases that are not accurate, which indicates that the thing in question is not represented in a clear manner;

A flaw is a misunderstanding about an object that does not have a significant impact on the knowledge that is considered to be specified by the training program.

Inaccuracies in oral and written discourse that do not lead to a distortion in the meaning of the answer or decision, inadvertent typos, and other similar errors are considered to be small errors.

In this context, the mandatory minimum content of computer science and information technology serves as the benchmark against which the students' ability to absorb information is evaluated.

To demand from pupils definitions that are not covered in the computer science course that they are taking at school is to put the student in a position where they are subject to problems that are related with the infringement of their rights ("Education Law").

On the basis of the standards (five-point system) that have been established in every subject area, a grade is assigned:

If the answer is perfect or if there are one to two minor errors, the score will be a five.

"4" – if there are one to two deficiencies as well;

"3" – from one to two major faults, numerous deficiencies, and a few minor inaccuracies;

"2" - a lack of familiarity with the fundamental program information;

One - the reluctance to carry out educational responsibilities

In the context of computer science classes, various methods of tracking student activity

Current, periodic, final, and self-control are the different types of control that are taught in computer science classes.

Techniques for evaluating students' levels of comprehension in computer science classes:

Oral examination, written examination, testing, and practical work are the traditional forms of examination.

Essay, vocabulary dictation, and project are examples of non-traditional assignments.

Various forms of control include tests, tests, autonomous work, and so on.

You are able to test the students' knowledge in general as well as in the system by administering a "test" that is both oral and written at the conclusion of each lesson. Before pupils can begin working on a personal computer, they must first pass the test. The men are driven by this as their primary source of motivation.

Your computer science classes might be more organized if you provide homework to your students. Over the course of the school year, I administer one or two home examinations to each student, in addition to assignments that require them to review previously learned material and to consolidate their knowledge.

Diversifying the work that is done in the lesson can be accomplished through the use of a variety of independent activities. The "solution by analogy" method is utilized at the initial phase of the knowledge building process, particularly in classes that are considered to be poor.

The ability to behave in a manner that is consistent with a model is not something that can be acquired on its own; rather, it is something that requires specialized methods from the instructor. In particular, it is essential to carry out a classification of information that guarantees the gradual development of such skills, particularly when it comes to the process of problem-solving.

Errors in the planned programs are something that the children particularly enjoy correcting. Through the use of this self-study method, you will be able to test your understanding of programming language operators in a way that is laid back and simple.

Determining the outcome of potentially executing an algorithm or program is a more difficult process that takes a large amount of knowledge. Developing children's logical and abstract ways of thinking can be accomplished through the use of this strategy, which involves drawing up an algorithm for the purpose of solving your problem.

An entire outburst of reasoning is triggered when an idea is proposed for the purpose of solving a problem for evaluation, which ultimately leads to the desired outcome. In the event that it suddenly did not work out for one, then the situation can be remedied by working together in a timely manner.

You are able to test your knowledge and skills in working on a personal computer by solving a task specifically designed to evaluate your intellect and speed.Both "theoretically" and independently, students are required to complete assignments and tests on their own computers. Students get the opportunity to increase their computer literacy through a variety of laboratory activities.

In the field of computer science, the targeted learning objectives are described in the form of particular requirements for the knowledge and abilities of students. These requirements make it possible to employ examinations as a form of control.

One example of the information that can be obtained with their assistance is information regarding the amount of assimilation of knowledge elements, as well as information regarding the growth of students' talents and skills in applying knowledge in a variety of scenarios.

When it comes to organizing the autonomous work of students in the self-control mode, test assignments are just as handy to employ as they are when it comes to repeating instructional material.

Tests offer the ability to conduct an objective evaluation of the students' knowledge and abilities by utilizing results that are consistent across the board for all students.

Students' understanding of the keyboard layout and their ability to type material swiftly, as well as their ability to use editing keys and their knowledge of programming language operators and instructions, can all be tested simultaneously through the use of computer dictation.

In order to prevent the students from becoming exhausted and to ensure that the teachings are not monotonous, it is essential to implement a variety of management methods within the classroom. In order to achieve this objective, I build the majority of my courses in this manner. One example of this is the open lesson that I have developed on the subject of "Strings."

There is such a large number of didactic material that has been amassed for each subject and for each type of control that it enables you to personalize assignments for students to the greatest extent feasible. It is possible to determine which students have not mastered the program material, which students have mastered it at a minimum level, which students have full and confident knowledge and skills in accordance with the requirements of the program, and which students have not only fully mastered the necessary knowledge, but can also apply it in new situations, and who have skills that are at a higher level than those provided by the program. These types of control strategies make it possible to determine which students have mastered the program material.

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