

MNEMONICS, INFORMATION TECHNOLOGIES AND SOFTWARE METHODOLOGY OF TEACHING “ENGLISH + MATHEMATICS + INFORMATICS” (STEAM EDUCATION)

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Annotation. This article is designed to teach mathematics, computer science, technology mnemonics, the founders of STEAM education, in an information technology and computer program environment. Mnemonics is a term related to psychology that refers to the optimal use of one's memory. In this context, the integration of these is intended to provide advanced ideas on how to learn mathematics and computer science, as well as English.

Keywords: mnemonics, integrated learning, continuity and interdependence, use of auxiliary elements, memory, use of digital alphabet, digital-alphabetic alphabet, KDC decimal number code, voice memory.

Mnemonics comes from the Greek word meaning "the art of memorization". Mnemonics is the process of replacing associations (abstracts), abstract objects and facts with concepts and ideas that have a visual, auditory, or kinesthetic image, linking objects to information available in memory, to simplify memorization. A set of special techniques and methods that make it easier to remember the required information and increase the amount of memory by creating modifications. Also, the term “mnemonic” (analog of pictogram) is used to visualize an object, subject, or event (in the form of an image, set of symbols, or objects) as a sign of memorization or identification, describing it fully and facilitating its development.

The mnemonic technique facilitates memorization in individual cases (the artificial associations invented here are easily and quickly established during the memorization process). However, in some cases, the misuse of mnemonics can also cause direct harm, with meaningful (logical) memorization being replaced by mechanical memorization. Unfamiliar words can be difficult for many to remember. If such a word is “memorized,” it will disappear from memory after a few days. For long-term and at the same time easy memorization, the word should be filled with content. Mnemonic methods are something that is clearly associated with vivid visuals, sound images, and strong perceptions. The technical methods of modern mnemonics consist of a set of combined memorization methods that allow different information to be memorized in the same way. The main method of memorization is the method of forming an association (a set of images encoding elements of memorized data).

Mnemonics allows you to remember information from a single perception of each element. For example, 10 random words (numbers) can be memorized in a sequence of 6 seconds on average. In modern interpretation, mnemonics refers to all the techniques and methods of data storage used in a particular system, and the term mnemonics is interpreted as the practical application of the methods defined in this mnemonics.

Basic techniques:

- create semantic phrases from the capital letters of memorized information;
- rhyming;
- memorize long-term or foreign words using consonants;
- find bright unusual associations (pictures, phrases) associated with memorized information;
- Sitseron's method based on space;
- aivazovsky method is based on the teaching of visual memory;

Ways to memorize numbers:

- Patterns;
- familiar numbers.

The main method of memorization in modern mnemonics. In mnemonics, memorization is based on the property of memory to remember very quickly the connection between perceived images (or, similarly, the connection between imaginary images).

The system of descriptive codes, which currently has only mnemonics in Russian, is described not only by the "stroke method" but also by one of the main methods of memorization - the method of forming an artificial association (connecting multiple images with parts of a single image).

Memorization using mnemonics is limited by a much lower memory speed (average 6 seconds to write a single connection to memory). Mnemonic memorization is like writing a figurative note and most importantly memorizing it in the form of visual images. Mental mnemonic processes and group memorization methods are used to memorize large data sets in one form or another, including:

- divide the array into known and unknown parts;
- combine the elements of each unknown fragment into a single integral memory object;
- link all known and combined parts of the array to one unit; -being in the form of a set of associatively linked memory objects, repeating the actions of merging and linking to the final result, which, in general, provides easy access to memory for the contents of the original data array.

In pre-literate periods of human history, the art of memorization was very important. So priests, shamans, storytellers had to memorize a lot of information. Even after the advent of writing, the art of memorization has not lost its relevance. The very small number of books, the value of the written materials, the large mass and volume of the book written - all this makes me memorize the text. The long time he spent on the road during the trip was also affected by the time he was unable to read and write and had to use something he had in his memory. The first known texts on mnemonics were created by the ancient Greeks. The art of memorization was also developed by medieval monks who had to memorize many liturgical texts. During the Renaissance, when **"Knowledge is power"** began to be considered (Francis Bacon: "Knowledge itself is power"), the ability to keep knowledge in mind was also very, very highly valued. For example, books on mnemonics were written by Giordano Bruno. In his testimony to the Inquisition tribunal, he reported that he had published a book on memory in France, *In the Shadow of Ideas*. Given that Bruno was invited by King Henry III (King of France) and wanted to know where he got so much knowledge, it must be assumed that Bruno was well versed in the art of memorization.

The numeric-alphabet alphabet

Its essence is that each number is assigned some consonant letters. Several of these alphabets are known.

- 0 - The letter "ZERO" has no letters H and L or the letter X - cross, no numeric value.
 - 1 - The letter K from the word "one" which is easy to draw from the number P or 1.
 - 2 - D - "Two" or G, because this number is very similar to this lowercase letter.
 - 3 - T or Z from "Three" - external similarity or F as a trinity and its mirror image.
 - 4 - The letter H and the like Ts from the word "four".
 - 5 - P - "five" in sound similarity or B. in appearance.
 - 6 - Sh - "Six" or shch (also with similarity of sound).
 - 7 - C - "Seven".
 - 8 - B - Similar in "Eight" or F sound.
 - 9 - M for "Mnogo" because 9 is the largest number.
- Alphanumeric code (BCC) provided by J. Perelman

In the 1927 edition of Yakov Perelman's book, *Tricks and Entertainment*, the following alphanumeric code is given:

- 1. GJ
- 2. DT
- 3. KX
- 4. CHS
- 5. PB
- 6. ShL
- 7. NW

8. WF 9. RC 0. MN

How to use: You need to remember the hotel room number (e.g. 1725). The number 1 is the letter G, the number 7 is the letter C. 2 - T, 5 - P. Now we remember two words, the first of which have the consonants G and C, and the second - T and P. For example, Goose and Top. Create a consistent association: a goose is holding a ball in its beak.

KDC fractional number code

Letter combinations for fractional numbers are created in the form of a foreign word of the name and / or surname. These words have been translated into Russian.

Use of visual memory. Different external structure methods are used to activate visual memory. It can be used to memorize poems, master plan, sequence of actions, and so on. Such methods are especially effective for people who are superior to other types of visual memory. Many are familiar with the situation in which newly formed associations and the problem of obtaining connections related to visual imagery occur. For example, remember a person's last name. If the surname is defined in some way (especially if it is somehow memorable - with any important, notable events, episodes, designs, etc.), then it is enough to look at the place of entry (for example, a great magazine). the desired last name is immediately remembered. But if it is known that such a "stick" for the brain is not in hand, it is better to make it "artificial" in advance. He will always be "at hand".

Technique semantic drawing: "visual frame (skeleton, plan)" is created, which can be "walked" arbitrarily and from any point.

Use of auxiliary elements. Using some "accessories" makes it easier to remember some important information. For example, to memorize whether the phase of the moon is growing, you can use your finger "attached" to the crescent in the sky: if you take the letter P - growth, otherwise C - aging (option: P - child, C - old man or C - falling). There is a similar rule in French: p - "première" ("first" half) and d - "dernière" ("last" half), in other variants "decendante" or "décroissante" ("extinct" Moon) .

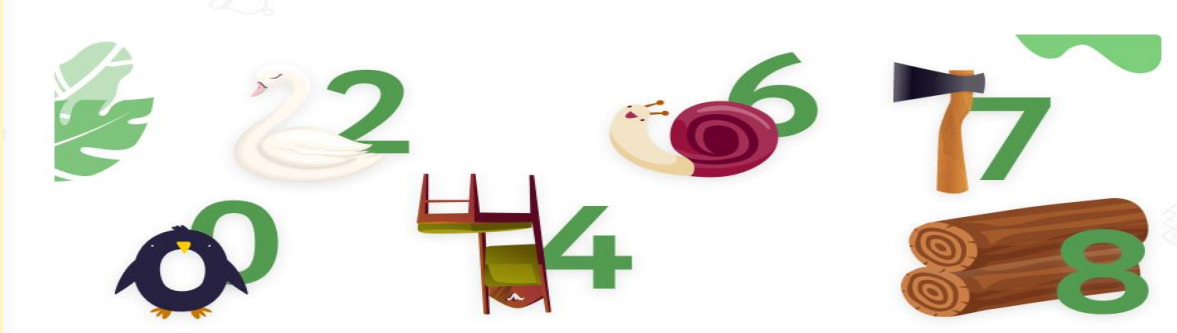
Using voice memory. Different external configuration methods are used to activate sound memory:
-to sing.

-audio memory usage, abstract data encoding with sound (song).

Numbers. Some people have difficulty memorizing numbers (because this is abstract information). If you use pictures associated with them instead of numbers, the memorization process will be much simpler. A number. The unit is a pile, covered with bark, a piece of rough wood to the touch. Two - swan, snow-white and fat, and for all figures. After creating a figurative line, memorizing numbers becomes a game similar to drawing a cartoon. For example, to memorize the number 21, one can imagine a swan falling down, blushing it, and the swan whispering and pinching the peg in anger. So, to correct the abstract numbers in the memory, the letters of the Roman numerals in descending order, you can use, for example, the phrase: "We give Juicy Limons, Vsem IX" is enough. Accordingly, M (1000), D (500), C (100), L (50), X (10), V (5), I (1). It is also possible to remember the numbers after X (10) with the phrase LC Monitor (LCD M). Instead, moving pictures appear, which are easily and firmly stored.

Mnemonics are methods of memorizing any information that are based on human psychology and sensitivity. Knowing and using mnemonics will help you better remember names, surnames, addresses, numbers, and so on.

Tips and exercises from mnemonics for beginners. Secrets of memorizing learning material for children and adults.



Picture

1. Remembering numbers and their spelling.



Picture 2. Memorization of color spectra in physics.

Exercise 1. Create a visual image of radish, teacher and good luck. With the first two words it is very easy: radish - a reddish-white vegetable with a tail appears in front of your eyes; teacher - you are introduced to a teacher you like. The word luck is harder, it's more abstract. Here you need to use the free association method. The first visual image that comes to mind when you read an assignment is a free association. Perhaps it will be a horseshoe or a wheel of fortune as a common symbol of good luck. In the beginning, the image must be voluminous and bright in order for the association to occur and the necessary neural connections to be formed. Associations are very individual and can be weird or funny - even better.

Why do children need mnemonics? By the age of 14, a child develops abstract-logical thinking and he or she mainly remembers what he or she has experienced personally. Mnemonics, on the other hand, allows abstract concepts in the school curriculum to be linked to real-life events, thus simplifying the process of memorization. Regular training in mnemonics accelerates the process of association preparation. The amount of data that surrounds us is growing every second. "A modern student should be able to work with information: to quickly identify the main thing, to remember what is useful in life. Mnemonics meets these requirements," said Gayane Kuryatova, a mnemonics teacher.

A child who has mastered the art of associative memorization will not only better master the school curriculum, but will also be able to work successfully with additional materials:

- memory and attention, - speech and dictionary,
- imagination and creativity.

Storytelling method. The essence of this technique is to connect words and descriptions into one text. It's easier to remember a funny story than 20 abstract concepts. The more paradoxical and fantastic the story, the easier it will be to remember.

Advantages of the method:

- does not require prior preparation, -nurtures creativity,
- interesting.

The disadvantage of this technique is that it is not suitable for memorizing large amounts of data.



Chain method

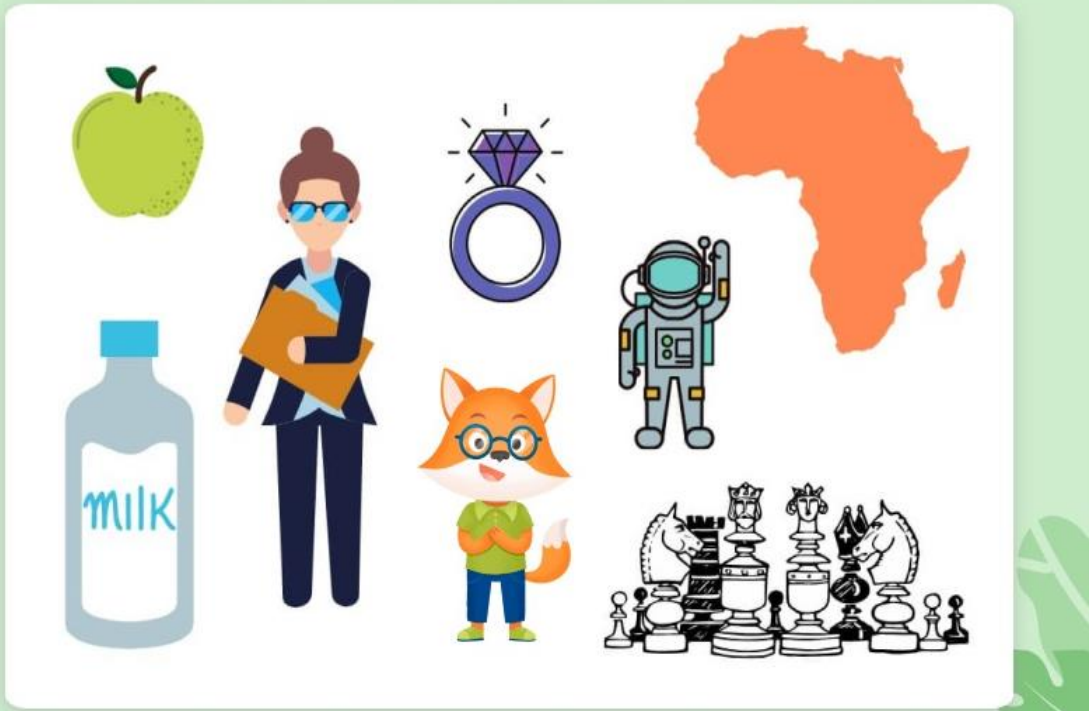
The essence of this memorization technique is to connect the images together. Concepts like chains need to be stacked on top of each other. It is important to connect them brightly and adhere to the consistency. In reproduction, you have to imagine the whole “construction” at once: remove the images from the chain in sequence as you put them.

Advantages of the method:

- rememberment speed;
- can be used literally on the road.

The disadvantage of this method is that you can forget one element of the chain and forget everything else.

Exercise 3. Memorize the chain of words: fox, astronaut, ring, apple, chess, teacher, Africa, milk.



Example: A red fox in a spacesuit (association with an astronaut), a ring on his paw and an apple on his nose play chess with a geography teacher (Africa), but not with numbers, but with a glass of milk.

Cicero method. The essence of this technique of mnemonics is to create space in imagining with supportive images. Other methods: Memory Palace, Roman Room Method, Locke Method, Mind Palace.

You don't have to create space from scratch, you can imagine your own apartment or room. There, select a few supporting images (TV, table lamp, refrigerator, etc.) and draw a route between them, moving them clockwise.

Add a memorable one to each supporting image. You can have not one, but an entire chain (as in the previous method). The amount of information you can remember depends on the location and size of the session. Images can be changed, meaning you can remember new information over and over again in the same places. But if you use the same places too often, the images will start to get confused. In this case, the location should be given a "rest".

Advantages of the Cicero method:

- you can remember large amounts of data;
- remember fast enough;

When repeated, images remain in memory for a long time.

The disadvantages of this method of developing memory are hard work.

Exercise 4. Select the auxiliary images in your room and "tie" the following words to them: frog, chocolate, whale, player, winter, school, computer, grapes, "Foxford".

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