

Modeling as a method of teaching in primary school

In modern pedagogy, modeling is considered as a visual and practical method of teaching (E. V. Proskura, T. A. Azarenko, I. A. Arhip, etc.), which has an effective impact on the learning process.

According to many authors, modeling has a beneficial effect on the development of higher mental functions of students: thinking, memory, attention, speech. In the process of creating and using models, pupils form and develop the ability to perform actions independently, to carry out self-analysis and evaluate the results of the work performed.

In pedagogy, modeling is considered as a method of creating and researching models that allows you to get new knowledge and complete information about the object under study. From a psychological point of view, modeling, on the one hand, is considered as an educational action that is an integral element of educational activity, and on the other – as the content necessary for pupils to learn in the learning process.

The object of modeling is a model. A model is considered to be a substitute that has the characteristics of the object under study. In this case, the replacement model contains only part of the information of the real object[4].

Depending on the degree of materiality, models are divided into:

- subject (globe, flower model, transport);
- ideal, which in turn are divided into figurative (diagram, graph, drawing), symbolic (symbol, sign), mental (abstract representation of the object built in the mind).

Modeling is also considered as a type of sign-symbolic activity – the activity of using and transforming the system of sign-symbolic means. It should be noted that modeling forms an interconnected system together with other types of sign-symbolic activities: coding, schematization, and substitution [5].

Encoding is a type of activity that consists in translating text into a symbolic language that performs the function of transmitting information. Encoding, in turn, is an operation that is part of the simulation, but

Modeling is also related to schematization, since any use of schemas involves modeling. However, in schematization, pupils work with reality, while modeling involves working with models. Schemes in modeling and schematization may be the same, but in schematization they are reference points in reality, in modeling schemes are the object of action. E. E. Sapogova considers the scheme a special type of models, since when creating schemes and models, the same mechanism for highlighting the essential in an action or object operates [5].

Considering the relationship between modeling and substitution, it should be noted that substitution is the foundation of modeling. The center of substitution is the means of creating idealized objectivity, while the center of modeling is the process of constructing objectivity.

Modeling as a visual and practical method in pedagogy is becoming increasingly common in the education of children of primary school age.

L. I. Golubovich studied the possibilities of using the method of visual modeling in various lessons in primary classes [1]. In the process of studying a school mathematics course, the teacher suggests solving problems using mathematical models. The author states that to solve problems, pupils must be able to make the transition from the text of the problem to its mental representation, and then write down the solution of this problem using mathematical symbols. Taking into account the individual characteristics of children, the teacher develops pupils ability to make different models for the same mathematical problem. In order to develop the ability to draw diagrams for the task condition, the author uses a variety of tasks: translating the task text into a drawing, drawing up the task according to the scheme, and correlating the task text with a suitable scheme for it. In Russian language lessons, in order to teach pupils to read and write, the teacher uses schematic images of letters and their sounds, which contribute to the implementation of sound-letter analysis of words and facilitate the process of

acquaintance with a new letter. At the word level, you can create a word model that divides the word into syllables and places stress. At the lessons of literary reading, the author recommends using a memo model that allows you to form the ability to make a comparative table, find differences between different genres of a work.

G. V. Pankova is convinced that, starting from the 1st grade, it is necessary to train pupils to work with sign and letter models [2]. The teacher developed a set of techniques aimed at developing thinking abilities using the modeling method in mathematics lessons.

I. A. Yamova in the lesson "Man and the world" suggests using models to study and reveal the ecological relationships between plants and animals, between different animals [6]. Also in the lessons, it is suggested to create models of food chains that arouse great interest among pupils.

In her teaching practice, A. M. Ryazantseva actively uses the method of visual modeling in the process of studying the school course "Man and the world" [3]. She begins teaching modeling to younger pupils by studying a ready-made model (a globe), then proceeds to compare subjects of the same class (the Sun and the planet Earth), and completes the training work on developing pupils ability to replace an object with a symbol or diagram. When forming the ability to make models, it recommends inventing models made of plasticine (Sun, Earth), models-applications (rainbow, clouds). During the lesson, the teacher pays great attention to modeling food relations and features of interaction between humans and nature (for example, food chains, the cycle of water and substances in nature, the change of day and night, etc.).

All researchers claim that any modern teacher can independently develop models using computer programs that make the process of studying school subjects more effective. At all stages of the lesson, you can use a variety of modeling techniques: selecting a symbol for the corresponding object, creating a model during the teacher's story, completing the simulated series, finding errors in the arrangement of schematic cards, and other.

So, the significance and importance of using visual modeling in the learning process is not in doubt, since: increases the interest and motivation of pupils in the classroom; facilitates and accelerates the process of memorizing educational material; helps to form pupils ability to work with diagrams, tables; contributes to the formation of the ability to see the main thing in the material being studied; allows you to systematize, analyze and synthesize the knowledge gained.

List of references

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