

## THE INFLUENCE OF LOGICAL TASKS ON THE FORMATION OF COGNITIVE PROCESSES IN PRESCHOOL AND PRIMARY SCHOOL AGE

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### ABSTRACT

The main task of teaching mathematics in primary education is to use logical tasks that help children to realize their thinking ability, worldview and imagination. This article discusses methods and techniques for solving creative tasks in elementary grades.

**Keywords:** Educational task, systems of educational tasks, increasing the importance of mastering the content of education.

“The main task of teaching mathematics, and from the very beginning, from the first grade, is to teach to reason, to teach to think,” wrote the leading scientist methodologist A.A. Joiner.

Among first-graders, on average, 15–20% of children face difficulties in adopting a new social position of a schoolchild, in other words, it is difficult for them to enter school life. School life is perceived by them, first of all, from the formal point of view, and the content aspects of educational activity - the orientation towards self-change and the appropriation of scientific knowledge - do not act as relevant for them.

Based on the foregoing, it is important at the initial stage of learning to create conditions for children that organically combine play and educational types of life: it is necessary to organize a kind of complementary activity for children, which is playful in a form that is familiar and attractive to the child, but educational in its focus. Such activity should imply the achievement of goals related to the child's occupation of the position of the subject for the appropriation of a new learning and play experience.

The development of thinking occurs under the condition of mastering three forms of thinking: visual-effective, visual-figurative and logical.

The role of logical problems in the development of mathematical thinking is extremely great. The reason for such an exclusive role of mathematics is that it is the most theoretical science of all studied in school. It has a high level of abstraction and in it the most natural way of presenting knowledge is the way of ascent from the abstract to the concrete. Experience shows that at primary school age, one of the effective ways of developing thinking is the solution of non-standard logical problems by schoolchildren.

In addition, solving non-standard logical problems can instill a child's interest in learning mathematics. In this respect, the following example is very typical. The largest mathematician of our time, the founder of the Moscow mathematical school, academician Nikolai Nikolaevich Luzin, being a high school student, received solid

twos in mathematics. The teacher directly told N.N.'s parents, Luzin, that their son is hopeless in mathematics, that he is stupid and that he is unlikely to be able to study at the gymnasium. The parents hired a tutor, with the help of whom the boy barely moved to the next class.

However, this tutor turned out to be an intelligent and perceptive person. He noticed an incredible thing: the boy did not know how to solve simple, primitive problems, but sometimes he suddenly got non-standard problems, much more complex and difficult. He took advantage of this and managed to interest this seemingly mediocre boy in mathematics. Thanks to this creative approach of the teacher, a world-renowned scientist subsequently emerged from the boy, who not only did a lot for mathematics, but also created the largest mathematical school.

A significant place in the issue of teaching primary schoolchildren to logical problems was given in his works by the famous Russian teacher V.A. Sukhomlinsky. The essence of his reflections comes down to the study and analysis of the process of solving logical problems by children, while he empirically revealed the peculiarities of the thinking of children.

Logic, firstly, the science of the laws of thinking and its forms. Secondly, the course of reasoning, inferences. Also, logical-related to the intellectual content of the statement, to the sentence as the realization of the judgment.

Mathematical logic is a field of knowledge that has developed as a result of the application of formal methods of mathematics and logical research of mathematical reasoning and proofs in logic.

This means that logic is the science of the laws of correct thinking, of the requirements for consistent and evidence-based reasoning. It follows that we must teach students to analyze, compare, highlight the main thing, generalize and systematize, prove and refute, define and explain concepts, pose and solve problems. Mastering these methods means the ability to think. You cannot form logical thinking without studying logic, you cannot hope that logical. In many situations, students act intuitively, relying on ingenuity and ingenuity, and sometimes life experience or advice from elders. But logical intuition needs clarification.

Traditional primary school math problems do not take this into account. Therefore, they do not realize many of the possibilities hidden in the process of the child's intellectual development. In this regard, the practice of introducing logical problems into the elementary school course of mathematics should become a normal phenomenon.

Logic problems have high potential. They contribute to the upbringing of one of the most important qualities of thinking - criticality, accustom to the analysis of perceived information, its versatile assessment, increase interest in mathematics.

It is known that the great scientists-philosophers of this world had a special logical thinking. This gift was their reliable weapon against many troubles. For example,

Mahmud Ghaznavi (the conqueror of many countries of Central Asia) had a habit of mocking scientists. After his conquest of Gurgench (Urgench, the capital of Khorezm), he gathered scientists-members of the Mamun Academy, among whom was Abu Raikhan Beruni. Sultan Mahmud asked him a question: - "the astrologer say, - there are 4 doors in this bolokhon (the second floor of the domed door). Which of these doors will I leave now? Write down your answer on paper and put it on the shelf. "

Beruni took the paper and wrote something, folded it and put it on the shelf. Then the Sultan called the masters and told to cut a new door from the eastern wall of the house. "I'll go out of this door," said Mahmud and took out a note from the astrologer, where it was written "O most respectable Sultan, you are the most intelligent of all the cleverest, so you will open your new door from the eastern wall of this house". In fact, he logically figured out the rights of the destroyer.

The didactic value of such tasks is undeniable. Falling into a pre-prepared trap, the student experiences annoyance, regret that he did not attach much importance to those nuances that caused him to find himself in an awkward position. A simple message to children that students, as a rule, make mistakes of this kind in assignments is ineffective. For it, despite the generality and targeting, is not personally significant for a particular student. Firstly, the event that is reported happened a long time ago, in the past, and secondly, each of the disciples naively believes that He himself does not fall into the number of losers.

In order to get a holistic idea of the whole variety of logical tasks, their possibilities in the development of critical thinking in primary schoolchildren, we will present one of the available typologies of these tasks.

I type. Problems, the conditions of which in one way or another impose the wrong answer. (How many rectangles can you count in the window image?)

II type. Problems, the conditions of which in one way or another suggest the wrong way of solving. (Three horses rode 15 kilometers. How many kilometers did each horse rode?) I would like to perform the division  $15 : 3$  and then the answer is: 5 km. In fact, the division does not need to be performed at all, since each horse galloped as much as the whole three, i.e. 15 km.)

III type. Tasks that force to invent, compose, build such mathematical objects that under given conditions cannot take place. (Using the digits 1 and 4, write down the three-digit number, which gives a remainder when divided by 3, equal to 2. It is impossible to come up with such a number, since any number that satisfies the condition of the problem is divisible by 3 without remainder.)

IV type. Tasks that are misleading due to ambiguity in the interpretation of terms, phrases, alphabetic or numerical expressions. (The number 606 is written on a piece of paper. What action must be taken to increase this number by one and a half times? This does not mean a mathematical action, but simply a game with a piece of paper. If you

turn over the sheet on which the number 606 is written, we will see the entry 909 , i.e. a number that is one and a half times greater than 606.)

V type. Tasks that allow for the possibility of "refuting" a semantically correct solution in a syntactic or other non-mathematical way. (A peasant sold three goats in the market for 3 rubles. The question is: "What did each goat go for?" The obvious answer: "one ruble at a time" is refuted: goats do not walk for money, but walk on the ground.)

The described varieties of problems do not exhaust their entire variety, but give an idea of how to compose them and use them in teaching mathematics.

Logical tasks contribute to the formation of the ability to reason, mastering the techniques of correct reasoning. Since their solution is not based on special knowledge, the object of assimilation in the process of solving is the methods of reasoning. The information from which it is necessary to draw conclusions is given by the text describing quite common situations. Solving such problems teaches you to come up with unfamiliar situations to the end, not to retreat before difficulties, instills self-confidence.

"Logical thinking in solving problems is manifested in the fact that the child correlates judgments about objects, distracting from the peculiarities of their visual images, reasoning, drawing conclusions. The ability to think logically, to compare judgments according to certain rules is a necessary condition for the assimilation of educational material. "

After solving problems for logical thinking based on a clearly presented condition, it is advisable to work only with the textual part of the conditions of these problems (that is, without depicting judgments) so that children practice reasoning. Along with this, it is also useful to invite children to compose such tasks on their own. Two stages are possible here. At the first stage, the teacher offers two links of the condition, which speaks about objects and their signs, and the children come up with judgments characterizing the connections between objects and signs. In the second stage, the children compose the whole problem themselves.

Primary school students especially like logical tasks with a fairy tale plot. Being entertaining in form, they increase interest in the task itself, encourage the child to solve the problem, and make him want to help his favorite characters. The beauty of the solution, the unexpected turn of thought, the logic of reasoning, all this enhances the emotional perception of children.

It is very important to choose tasks that are feasible for students, corresponding to their capabilities, development. It is also useful to give the first impetus to encourage the child to take up the decision, and then increase his resistance to the difficulties that arise. Indeed, it often happens that even a capable student does not want to just read the problem, let alone solve it, and therefore it is advisable to use the external amusement of

the texts. The goal can be achieved if the condition of the problem looks like a fairy tale.

It is important to consider that mathematics in preschool education is one of the main subjects of instruction. To raise the quality of the employed to a higher level, it is necessary to use logical tasks that contribute to the exercise of thinking abilities, strength and speed of imagination. Since, the degree of students' mental activity is a barometer of the intellectual growth of a personality. As Cicero said, "Each person is a reflection of his inner world. How a person thinks, that is how he is"

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