BUILDING A SYSTEM OF NON-STANDARD TASKS AIMED AT DEVELOPING LOGICAL THINKING OF PUPILS

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ABSTRACT

Mathematics is mainly liked by students who know how to solve problems. Therefore, by teaching children the ability to solve non-standard problems, we will have a significant impact on their interest in the subject, the development of logical thinking and speech. Besides, they are a powerful means of activating cognitive activity, i.e. they arouse great interest and desire to work in children.

Keywords: Individual, non-standard task, solving problems, role, teacher.

INTRODUCTION

The effectiveness of the system of non-standard tasks largely depends on the degree of creative activity of students in solving them. Actually, one of the main purposes of the system of non-standard tasks is to activate the cognitive activity of students in the lesson [1, from 12-15].

Non-standard tasks should, first of all, wake up the thought of students, make it work, develop, improve. Speaking of activating the logical thinking of students, one should not forget that when solving non-standard tasks, students not only perform constructions, transformations, and memorize formulations, but also learn a clear logical thinking, the ability to reason, compare and contrast facts, to find common and different in them, to make the right conclusions.

The effectiveness of learning activities to develop logical thinking largely depends on the degree of creativity of students in solving a system of non-standard tasks. The system of non-standard tasks should activate the thinking activity of schoolchildren.

METHODOLOGY

Training on the given lessons is focused on development of logic thinking of the pupil - he acts as the researcher, the creator, the teacher - in a role of the invisible head. Teaching children on the given method, it is possible to reveal the following changes in the personality of the schoolboy, namely:

- students (in accordance with each student's abilities) develop logical thinking, imagination, and oral speech;
- children learn to creatively perform any given educational task;
- interest in mathematics.

So, the task of the teacher during any stage of the lesson to interest children in the solution of non-standard problems. Develop logical thinking, encourage them to think creatively, cause the excitement of solving non-standard problems; show the beauty of a complex task and, of course, to ensure a situation of success.[2]

In order to implement it, we suggested that the following stages be included in the classical

structure of the mathematics lesson:

1) activation of the processes of attention and perception;
2) actualization of a logical operation through memory, perception, and representation;
3) obtaining a holistic view of the mathematical object under study;
4) revealing the algorithm for solving a non-standard problem;
5) fixing the material;
6) control of the obtained knowledge.

RESULTS

At the first stage, the tasks aimed at the development of the thinking operation were used. During 5-8 minutes, an oral count was carried out, which included non-standard tasks for the development of logical thinking; it was a sequential performance of actions, solution of oral non-standard tasks.

At the second stage, students were offered a specific non-standard task, the solution of which should be done in class. The leading role in actualizing logical thinking activity here belongs to the teacher. Depending on the goal, he formulates and asks questions about the condition of the task. And the questions are prepared in such a way as to direct the child's thinking to the correct course of solving a non-standard problem.

At the third stage, the assigned task is solved. The leading role here belongs to the pupils. The teacher only coordinates their activities in a certain way, directing the children's discussion with the help of leading questions. At this stage, group work and work at the blackboard were mainly used.

At the fourth stage, identification of the algorithm for solving a mathematical problem is done by "playing" concrete actions in the mind and manipulating objects, which were carried out at the third stage of logical operation development. The leading role here belongs to the teacher; the main form of work is frontal conversation.

In the fifth stage, the material is fixed. The class was divided into several groups, each separately solved a non-standard problem, and then the solutions were compared; parsing the solution of a non-standard problem at the board with comments, etc.

At the sixth stage, the current control of learning was carried out at all lessons by means of individual control, mutual check of pupils, competitions between groups for solving problems. At some lessons, independent work was carried out.[3]

Inclusion in the classical structure of a lesson of the stages described above carries out two interconnected functions. First, they induce the teacher at each lesson on mathematics to accentuate the activity on development of logic thinking of pupils, instead of only to teach the decision of typical problems on algorithm; secondly, demand from it application of specially developed methods of development of logic thinking. Including it in the teacher's practice, it was preceded from the assumption that abstract logical thinking develops from intellectual operations, initially taking the form of external subject actions related to the child's sensual practice.

The implementation of the following pedagogical conditions: the motivation of pupils to master logical operations, active and personally oriented approaches to the development of logical thinking and the variability of lessons were provided in combination with the pedagogical condition considered, the use of active game methods of teaching, and the use of a large number

of non-standard tasks in lessons.

In the system of non-standard tasks, various educational tasks were presented, in the course of which pupils learn to observe, note similarities and differences, notice changes, identify the causes of these changes, their nature and on this basis draw conclusions and generalizations.

The choice of the system of non-standard tasks as an experimental material for formation of receptions and development of logical thinking of pupils of 5-6th grades was caused by a number of reasons. First, the process of their solution, as noted by many authors in general character quite coincides with the process of solving real creative tasks in science and technology. "Solving a scientific problem," writes L.M. Pikhtarnikov, "a researcher usually has a certain number of facts on which he cannot draw a certain conclusion. In this regard, the researcher makes hypotheses and tests their fairness by comparing them with the available facts... Almost in the same way one has to find a solution to a non-standard problem. Therefore, skills in solving non-standard problems will be useful for everyone, regardless of what specialty" students will choose after graduation.

Proceeding from the above mentioned, methodical recommendations on the use of non-standard tasks in mathematics lessons for the development of logical thinking of students were developed:

1. In order to improve the teaching of mathematics, it is expedient to further develop new methods for the use of non-standard tasks in mathematics lessons;
2. Systematically use non-standard tasks in the lessons, contributing to the development of logical thinking of students.
3. Carrying out purposeful training of schoolboys to the decision of non-standard problems, by means of specially picked up systems of problems, to teach them to observe, use analogy, induction, comparisons and to draw corresponding conclusions.
4. It is expedient to use at lessons a task on ingenuity, on transfusion, entertaining tasks, combinatorial tasks, logical squares.
5. To take into account individual features of a schoolboy, differentiation of cognitive processes in each of them, using non-standard tasks of different types.
6. It is important that pupils do not solve a specific problem, but look for the general principle of solving non-standard problems of this type.
7. In the lesson, a special activity of schoolchildren is necessary, aimed at clarifying the essence of the concepts and relations encountered in non-standard problems. Experimental training has shown that without understanding of essence of the last it is impossible to solve successfully a non-standard problem.
8. In teaching, it is necessary to organize schoolchildren's learning activities in such a way that they themselves "discover" ways of solving non-standard tasks and the principles of their construction. At the same time, it is necessary to consider with students all the ideas they have proposed and throw away only those that do not have a "rational grain".
9. It is necessary that pupils not only understand the way of solving a non-standard problem, but also understand the principle of its construction, and try to understand the basis for their actions.

CONCLUSIONS

In mathematics lessons, great attention should be paid to solving the system of non-standard problems. First of all, that training to the decision of non-standard problems was successful; the teacher should understand a problem, to study a technique of work.

Inclusion of combinatorial problems in the average mathematics course has a positive impact on the development of logical thinking of schoolchildren. "Targeted training in solving combinatorial problems promotes the development of such a quality of mathematical thinking as variability. By variability in thinking we mean the orientation of a student's thinking activity towards finding various solutions to a problem when there are no special indications for it".
Combinatorial problems can be solved by various methods. Conditionally, these methods can be divided into "formal" and "informal". In the "formal" method of solving, it is necessary to determine the nature of the choice, choose an appropriate formula or combinatorial rule (there are rules of sum and work), substituting numbers and calculating the result. The result is the number of possible options, while the options themselves are not formed in this case.

When selecting combinatorial tasks, one should pay attention to the subject and form of presentation of these tasks. We tried to make the tasks not look artificial, but understandable and interesting for children, causing positive emotions in them. It is desirable to use practical material from life to create the tasks.

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