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DIDACTIC APPROACHES TO LOGICAL PROBLEM SOLVING IN MATHEMATICS

Gulomova Vasila Dilmurodovna

Mathematics teacher ain presidential school, Nurafshon city

Abstract: This article analyzes methods for solving logical problems in mathematics, their role in developing students' thinking, and ways of fostering logical thinking through modern pedagogical technologies. Additionally, it examines practical methods aimed at encouraging students' independent thinking and enhancing their problem-solving skills. Keywords: mathematics, logical thinking, problem-based learning, problem-solving, innovative method, reasoning, cognition, IQ level.

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МЕТОДЫ РЕШЕНИЯ ЛОГИЧЕСКИХ ЗАДАЧ В МАТЕМАТИКЕ МЕТОДЫ РЕШЕНИЯ

Аннотация: В данной статье анализируются методы решения логических задач в математике, их роль в развитии мышления учащихся и способы формирования логического мышления посредством современных педагогических технологий. Также рассматриваются практические методы, направленные на развитие у учащихся навыков самостоятельного мышления и решения проблем.

Ключевые слова: математика, логическое мышление, проблемное обучение, решение задач, инновационный метод, мышление, сознание, уровень IQ.

Introduction.

In the modern education system, developing students' skills in logical thinking, analysis, and creative approaches is of paramount importance. Mathematics, in particular, plays a leading role in this process. This is because mathematics is not merely a collection of numbers and formulas, but rather the art of logically guiding human thought, analyzing problems, and finding solutions. In school education, one of the primary tasks facing teachers is to cultivate students' cognitive abilities through logical problems, teaching them to make independent decisions.

In the process of solving logical problems, students learn the stages of thinking - analysis, comparison, generalization, and drawing conclusions. This not only deepens their mathematical knowledge but also develops their ability to solve problems encountered in everyday life. Therefore, the effective use of logical problems in mathematics lessons, the development of students' thinking, and their engagement in creative activities are important factors in increasing the effectiveness of education.

In the Republic of Uzbekistan, a series of regulatory documents have been adopted concerning the reform of the education system, the implementation of modern teaching technologies, and the development of logical thinking in students. Specifically, the Law "On Education" and the "Concept for Further Improvement of the Continuous Education System" have outlined the task of widely applying innovative methods in mathematics instruction and fostering students' thinking potential. From this perspective, studying the methodology for solving logical problems and applying it to the lesson process is a matter of both scientific and practical importance.

Main Part.

Solving logical problems in mathematics is one of the most effective ways to deepen students' thinking, develop analytical reasoning, and cultivate independent decision-making skills. By their nature, logical problems require students not only to apply mathematical

knowledge but also to analyze it in various situations and arrive at logical conclusions. Therefore, this type of problem activates students' thought processes, enhances their speech culture, and develops their independent thinking abilities.

Logical problems in mathematics develop students' skills such as analysis, comparison, generalization, and identification of cause-effect relationships. For example, through questions like "Who lives where?," "Whose work depends on what?," and "In what order did the events occur?," students learn methods of logical thinking, constructing logical chains, narrowing down possibilities, and finding the correct solution. In this process, the teacher guides the student not directly to the solution, but towards the process of correct reasoning.

The methodology for solving logical problems is implemented in several stages:

1. Problem analysis - the student carefully reads the problem statement and identifies the relationships between the given information.

2. Planning - a logical sequence is established to find a solution, and any redundant or missing information is identified.

3. Logical reasoning - various options are analyzed, and the single correct solution is selected from among them.

4. Verification - the found solution is analyzed based on the question of whether it fully corresponds to the problem statement.

1. These stages educate students not only mathematically but also intellectually.

2. Methods of solving logical problems

3. There are several methods for solving logical problems, each of which is applied according to the age characteristics and knowledge level of the students:

4. Table-based solution method - all information in the problem statement is arranged in the form of a table. This method makes it easier for students to analyze and compare data.

5. The drawing (diagram) method - develops students' visual thinking by expressing logical connections in a pictorial form.

6. The elimination method - finding the unique solution by sequentially ruling out incorrect options.

7. The systematic approach method - the student establishes logical connections between all the information and arrives at a general conclusion.

Studies show that solving logic problems leads to the following changes in students:

1) development of analytical and critical thinking;

2) expansion of mathematical thinking;

3) improvement in attention, memory, and quick thinking abilities;

4) formation of skills to express and justify one's opinions with evidence.

For example, through logic problems like "Three Friends and Their Animals," designed for elementary school students, learners progress from simple to complex thinking, eliminate unnecessary information, and learn to draw logically correct conclusions. In higher grades, this process reinforces algorithmic thinking and the ability to find solutions in problematic situations.

When selecting logical problems, teachers should consider the students' level of knowledge, age characteristics, and psychological readiness. Gradually increasing the complexity of problems helps develop independent thinking skills in students. Furthermore, teachers should encourage students to express their thoughts freely, provide logical justifications, and support their viewpoints with evidence.

Conclusion.

Solving logical problems in mathematics is one of the most effective methods for developing students' intellectual potential, fostering their skills in independent thinking, analytical approach, and drawing logical conclusions. Such problems teach students not only to find the correct answer but also to analyze the process deeply and logically justify each step. This develops students' scientific thinking, argumentation skills, and communication culture.

Research shows that in lessons utilizing logical problems, students not only reinforce their mathematical knowledge but also learn to approach real-life problems creatively and systematically. Through the process of solving logical problems, students master the stages of reasoning, analysis, identifying cause-and-effect relationships, and decision-making.

The teacher plays a guiding role in this process: they create opportunities for students to think independently, analyze in a logical sequence, and express their thoughts with justification. Through this, the student actively participates as a subject in the educational process, which enhances the effectiveness of education.

In conclusion, solving logical problems in mathematics is of paramount importance not only within the scope of the subject but also in developing a person's general thinking and the ability to make correct decisions in problematic situations. Therefore, an in-depth study and widespread practical application of the scientific and methodological foundations of teaching logical problem-solving is one of the urgent tasks of today's education system.

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