

METHODS FOR SOLVING CERTAIN LOGICAL PROBLEMS IN PRIMARY EDUCATION

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Abstract. This article is devoted to the methodological foundations of teaching students to solve logical problems in primary school. Developing mathematical reasoning and logical thinking in pupils during problem-solving processes plays a crucial role in their intellectual growth. The paper discusses the step-by-step formation of the concept of a logical problem, the use of visual methods, and lesson organization considering students' individual characteristics. It also highlights methods that foster curiosity and independent reasoning in students.

Keywords: logical problems, logical reasoning, analysis, synthesis, comparison, creative thinking, mathematical thinking, problem-solving methods, development of thought, concentration, independent thinking, learning activity, cognitive process, problem situation, knowledge and skills, learner engagement, teacher's role.

Introduction

Primary education represents the most significant stage in the intellectual and logical development of a child's personality. It is during this period that learners begin to acquire essential cognitive processes such as independent thinking, analysis, reasoning, and argumentation. Solving logical problems deepens students' reasoning, prepares them for mathematical thinking, and teaches them to make rational decisions in everyday life. Therefore, the role of a primary school teacher is not merely to transmit knowledge but to guide learners toward thinking, exploring, questioning, and discovering answers independently. In this process, logical problems occupy an essential place. They serve as an effective methodological tool to develop mathematical reasoning, direct students toward logical analysis, and train them to draw independent conclusions.[1]

Main Part

1. The Role of Logical Problems in Student Thinking

Logical problems compel students to think critically, analyze information, and draw correct conclusions. Through such problems, students develop the following abilities:

- To comprehend a problem accurately and identify its goal;
- To distinguish relevant information from irrelevant data;
- To identify cause-and-effect relationships;
- To derive new conclusions from known facts;

- To justify and clearly express their reasoning.[2]

2. Types of Logical Problems and Their Application in Teaching

In primary school mathematics, the following types of logical problems are considered effective:

a) Comparison problems – e.g., “Who is taller?”, “Which animal is faster?” These help develop comparison and differentiation skills.

b) Sequence and order problems – e.g., “In what order are the colors arranged?”, “How does the number sequence continue?” These enhance observation and pattern recognition.

c) Deductive reasoning problems – e.g., “If Anvar runs faster than Kamol, but slower than Dilshod, who is the fastest?” These promote analytical thinking.[3]

3. Stages of Solving Logical Problems

The teacher should follow these methodological stages when teaching logical problem-solving:

A. Problem Analysis – Read the problem carefully and discuss its meaning. Ask: What is known? What is unknown? What is being asked?

B. Extracting and Representing Data – Present information via tables, diagrams, or drawings.

C. Identifying Logical Connections – Encourage students to find cause-and-effect relationships.

D. Drawing Conclusions – Students verify their answers and justify their reasoning.

4. Teaching Methods in the Classroom

The following instructional methods have proven effective in teaching logical problem-solving:

- Game-based method: Using games like “Guess Who,” “Logic Chain,” or “True or False” keeps students engaged

- Demonstration method: The teacher visually illustrates the problem.

- Problem-situation method: The teacher poses indirect questions to encourage discovery.

- Group work: Small groups collaborate to find collective solutions.[4]

5. Examples of Logical Problems

Problem 1: Aziz defeated Behruz, and Behruz defeated Doniyor. Who is the strongest?

Solution: Aziz is the strongest.

Problem 2: A girl has two brothers. Each brother has one sister. How many children are in the family?

Solution: Two brothers and one sister make three children.

6. The Teacher's Role

When teaching logical problem-solving, the teacher should:

- Consider students' cognitive characteristics;
- Gradually increase problem complexity;
- Organize lessons through dialogue and reasoning;

Encourage all students to express their opinions freely and not fear mistakes, as this builds creative and critical thinking.[5]

Conclusion

Teaching logical problem-solving in primary education strengthens not only mathematical knowledge but also students' reasoning, intellectual culture, and real-life problem-solving skills. By selecting effective teaching methods, applying game-based learning, and providing consistent explanations, teachers can successfully cultivate logical and independent thinking among students.

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