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Development of Logical Thinking in Mathematics Lessons in Primary Classes

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Abstract:

Logic is the science of the laws and forms of correct thinking. She studies forms of reasoning, abstracting from specific content, establishes what follows from what, and seeks an answer to the question: how do we reason? The founder of logic as a science is the ancient Greek philosopher and scientist Aristotle. He first developed the theory of logical inference.

The article talks about methods of logical thinking in elementary mathematics lessons.

Keywords: logic, critical, thinking, education, method, technologies, mathematics, creative task.

Introduction. One of the important tasks of every teacher is the ability to draw a reasonable conclusion and creatively approach problem solving, teaching students independent thinking in the educational process. An interesting task, logical and non-standard tasks play an important role in the implementation of these tasks.

The term “logic” comes from the Greek word “lotus”, which means “to think”, “reason”.

Logical thinking is understood as the ability and ability of a child of primary school age to independently perform simple logical actions (analysis, synthesis, comparison, generalization, specification), as well as compound logical operations (construction of negation, affirmation and refutation as the construction of reasoning using various logical schemes - inductive or deductive

The main goal of working on the development of logical thinking is for children to learn to draw conclusions from those judgments that are offered to them as initial ones. The successful implementation of this task largely depends on the formation of cognitive interests in students. Mathematics provides real prerequisites for the development of logical thinking. My task is to make fuller use of these opportunities when teaching children mathematics. However, there is no specific program of logical thinking techniques that should be formed when studying this subject. As a

result, work on the development of logical thinking proceeds without knowledge of the system of necessary techniques, without knowledge of their content and sequence of formation.

Learning is a two-way process: children work, the teacher works; he leads students, directs their mental activity, organizes and directs.

The main tasks of the logical development of children are as follows:

- to develop the ability to independently apply available methods of cognition (comparison, measurement, classification, etc.) in order to master the dependencies between objects and numbers;
- construct simple statements about the essence of the action performed;
- find the right way to complete a task, leading to the result in the most economical way;
- actively participate in a collective game, propose non-standard ways to solve game problems;
- talk freely with adults about games, creative tasks and ways to solve them.

It is more expedient to develop logical thinking in line with mathematical knowledge. Mathematics, like no other science, provides the opportunity for a deep and meaningful transition from visual-effective to figurative, and then to logical thinking. Objects of mathematical inferences and the rules for their construction accepted in mathematics contribute to the formation in an individual of the ability to formulate clear definitions, substantiate judgments, and develop logical intuition.

Methods. The most effective means of developing logical thinking are didactic games, intellectual warm-ups, logical search tasks, tests and other entertaining exercises, the varied presentation of which has an emotional impact on children. Additional information activates students, since it involves a change in children's activities: they listen, think, answer questions, count, make up expressions, find their meanings and write down the results, learn interesting facts; which not only promotes the interconnection of subjects studied at school, but also broadens one's horizons and encourages independent learning of new things.

From the above it follows that already in elementary school children must master the elements of logical actions (comparisons, classifications, generalizations, etc.). Therefore, one of the most important tasks facing a primary school teacher is the development of all qualities and types of thinking that would allow children to build inferences, draw conclusions, justify their judgments, and, ultimately, independently acquire knowledge and solve emerging problems.

Naturally, you cannot start work with any logical technique, since within the system of logical thinking techniques there is a strictly defined sequence, one technique is built on another.

The system of work I outlined for developing students' logical thinking is aimed at shaping the mental activity of children. Children learn to identify mathematical patterns and relationships, perform feasible generalizations, and draw conclusions. As a result of systematic work on the development of logical thinking, the educational activities of my students intensified, and the quality of their knowledge increased noticeably.

In the first grade, I offer tasks aimed at developing observation skills, which are closely related to such techniques of logical thinking as analysis, comparison, and generalization syntheses. For example. In the first grade, students usually identify only two or three properties in a subject, while in each subject there is an infinite number of different properties. I propose to name the properties of the cube. Small, red, wooden - these are the properties that the children were able to name. I show another group of objects: an apple, cotton wool, glass, a weight. After comparing these objects with the cube, the children were able to name several more properties of the cube: hard, opaque, inedible, light. We come to the conclusion that we use the method of comparison to highlight the properties of an object.

When the children learned to identify properties when comparing objects, I began to formulate the concept of common and distinctive features of objects.

I propose to compare three objects: a ruler, pencil triangles - and highlight common and distinctive properties. Children name the general characteristics of objects: all are made of wood and are used for drawing; distinctive properties - shape of objects and size. After the children have learned to compare specific objects, I offer cards. Without taking into account the images of objects and geometric shapes, children must say where there are more of them and where there are fewer. Then I invite students to choose the objects in which they want to highlight the properties. Children name objects and all their properties.

1. Method of comparing objects. During reception training, children must master the following skills:

a) feature extraction;

b) establishment of general characteristics;

c) highlighting the basis for comparison;

d) comparison on this basis.

The comparison can go

according to quality characteristics (color, shape)

according to quantitative characteristics: more - less, longer - shorter, higher - lower, etc.

This technique can be used at any stage of the lesson.

2. Technique of analysis and synthesis

Analysis is the mental dissection of an object or phenomenon into its constituent parts, the identification of individual parts, features and properties in it. Synthesis is the mental combination of individual elements, parts and characteristics into a single whole. Mainly used in problem solving.

3. Generalization technique.

Skills required to master this technique:

Attribute a specific object to a class given by adults and, conversely, concretize a general concept through singular ones (the action of attribution),

Group an object based on independently found common features and designate the formed group with a word (actions of generalization and designation) grouping in the mind.

Students mentally combine objects and phenomena into groups according to those common and essential features that are highlighted in the process of abstraction.

4. Method of classification.

The use of classification techniques in mathematics lessons contributes to the formation of positive motives in educational activities, since such work contains elements of a game and elements of search activity, which increases the activity of students and ensures independent completion of work

5. Pattern.

To successfully solve such problems, it is necessary to develop in children the ability to generalize the features of one row and compare these features with the generalized features of objects of the

second row. In the process of performing these operations, the search for a solution to the problem is carried out. It is important to pay attention to the child's development of the ability to justify his decision, prove the correctness or error of this decision, put forward and test his own assumptions (hypotheses).

Results. Organization of various forms of work with logical tasks

The main work for the development of logical thinking should be carried out with a task. Any task contains great opportunities for the development of logical thinking

Non-standard logic problems are an excellent tool for such development.

The main goal of mathematics education should be the development of the ability to mathematically, and it turns out, logically and consciously investigate the phenomena of the real world. The realization of this goal can and should be facilitated by solving various kinds of non-standard logical problems in mathematics lessons. Therefore, the use of these tasks by a school teacher in mathematics lessons is not only desirable, but even a necessary element of teaching mathematics.

Non-standard tasks can be introduced as early as 1st grade. The use of such problems expands the mathematical horizons of younger schoolchildren, promotes mathematical development and improves the quality of mathematical preparedness.

By offering students non-standard tasks, we develop their ability to perform logical operations and at the same time develop them. The criterion for selecting such tasks is their educational purpose; correspondence to the topic of the lesson or series of lessons. Such problems can be solved both when explaining new material and when consolidating what has been covered.

When solving entertaining problems, the following goals are pursued:

formation and development of mental operations: analysis and synthesis; comparisons, analogies, generalizations, etc.;

development and training of thinking in general and creative thinking in particular;

maintaining interest in the subject, in educational activities (the uniqueness of an entertaining task serves as a motive for educational activities);

development of qualities of a creative personality, such as cognitive activity, perseverance, perseverance in achieving goals, independence;

preparing students for creative activity (creative assimilation of knowledge, methods of action, the ability to transfer knowledge and methods of action to unfamiliar situations and see new functions of an object).

There are several methods for finding solutions to problems that contribute to the formation and development of logical thinking in younger schoolchildren.

Discussion. The most important task of mathematical education is to equip students with general thinking techniques, spatial imagination, develop the ability to understand the meaning of the task, the ability to reason logically, and acquire algorithmic thinking skills. It is important for everyone to learn to analyze, to distinguish a hypothesis from a fact, to clearly express one's thoughts, and on the other hand, to develop imagination and intuition (spatial representation, the ability to foresee the result and predict the path to a solution). It is mathematics that provides favorable opportunities for developing willpower, hard work, perseverance in overcoming difficulties, and perseverance in achieving goals.

I believe that the forms and methods I have chosen for developing the logical thinking of primary school students in mathematics lessons are capable of developing independence in the logic of

thinking, which would allow children to build conclusions, provide evidence, statements that are logically related to each other, draw conclusions, justifying their judgments, and, in ultimately, independently acquire knowledge, as well as more actively use this knowledge in everyday life.

Therefore, the use by a primary school teacher of these forms and methods of developing logical thinking in mathematics lessons is not only desirable, but even a necessary element of teaching mathematics.

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