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## THE IMPORTANCE OF EXERCISE IN TEACHING LOGICAL PROBLEM SOLVING

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### Abstract

This article discusses the methods of solving logical problems related to work and productivity included in elementary school mathematics textbooks. The article considers a demonstrative method of solving logical problems. The differences in working with similar problems in the upper grades and elementary grades are shown.

**Keywords:** mathematics, logical, work, productivity, problem, demonstrativeness, analysis, synthesis, thinking, ability.

### MANTIQUIY MASALALAR YECHISHNI O'RGATISHDA KO'RGAZMALILIKNING AHAMIYATI

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### Annotatsiya:

Ushbu maqolada boshlang'ich sinf matematika darsliklariga kiritilgan ishga doir, unumdorlikka doir mantiqiy masalalarni yechish usullari haqida yozilgan. Maqolada mantiqiy masalalar yechishning ko'rgazmali usuli ko'rib chiqiladi. Shu tipdagi masalalarni yuqori sinfda va boshlang'ich sinfda ishlashdagi farqlar ko'rsatib berilgan.

**Kalit so'zlar:** matematika, mantiqiy, ish, unumdorlik, masala, ko'rgazmalilik, analiz, sintez, fikirlash, qobiliyat.



Problems are a useful tool for developing children's thinking skills and usually contain some knowledge. The search for this knowledge requires the problem solver to resort to analysis and synthesis, compare facts, generalize, etc. Teaching these methods of knowledge is one of the important goals of teaching mathematics. Solving problems develops interest in the subject, and in general, independence, freedom, demandingness, diligence, and goal-orientedness develop.

In elementary mathematics lessons, the preparation of problem sets, multimedia and graphic tools in order to use pedagogical technologies used in solving text problems by developing students' computational skills in solving problems will give positive results in increasing the effectiveness of elementary mathematics education.

Logical thinking plays an important role in solving various problems that a person faces in life. The development of logical thinking in primary school students is important for the following reasons: it helps students develop the ability to think independently, analyze, draw conclusions and solve problems, expand their creative thinking, develop skills for deep understanding and analysis of the problem, develop a creative approach, strengthen memory and attention, and increase interest in mathematics and other subjects. Mathematical and logical problems are one of the main tools in this process. Primary school students do not yet fully possess abstract thinking, so it is very important to explain real-life situations to them through problems. In the process of working on a problem, students acquire the following skills - seeing similarities and differences, analyzing and synthesizing, understanding relationships, and taking a creative approach. Different types of problems are used in the school program to develop logical thinking. Below we will get acquainted with them in detail.

**Interesting logical problems** - such problems require analysis and unconventional thinking, not simple mathematical calculations.

Problem 1: There are five brothers: Alisher, Dilshod, Kamol, Bakhtiyor and Sardar. Sardar is the youngest, Bakhtiyor is not the oldest. Dilshod is older than Kamol, but younger than Alisher. Kamol is taller than Bakhtiyor. Who is the oldest of them?



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Answer: Alisher > Dilshod > Kamol > Bakhtiyor > Sardar.

Life problems - when children solve logical problems related to life, they learn to understand real-life problems.

Problem 2: A farmer wants to transport a wolf, a goat and a cabbage across a river. But he can only fit one thing in his boat. If he leaves the wolf and the goat together, the wolf will eat the goat. If he leaves the goat and the cabbage together, the goat will eat the cabbage. How should the farmer get them safely?

Answer: 1. First, he takes the goat across the river and leaves it on the other side of the river. 2. Then he takes the wolf across, but leaves it behind and brings the goat back. 3. He takes the cabbage across and leaves it with the wolf. 4. Finally, he takes the goat across again and brings them all safely.

Problems that develop geometric and spatial thinking - these types of problems increase the child's ability to understand shape, size, and location. Problem 3: How many corners are formed if we cut off 4 corners of a square? Answer: When 4 corners are cut off, 8 corners are formed.

Problems related to numbers and sequences - Correctly understanding the sequence of numbers and finding its regularity helps develop logical thinking.

Problem 4: Find the unknown number in the sequence 2, 6, 12, 20, ?, 42. Answer: 30 (each subsequent number is formed by adding 4, 6, 8, 10 to the previous one). One of the difficult issues for students is the methodology of working on logical problems with text.

- text analysis, which includes: getting acquainted with the content, visualizing it, separating the conditions and requirements (questions);
- building an auxiliary model;
- organizing the search for a solution by building a search scheme (analytical - from question to data, synthetic - from data to question or mixed, including the first and second elements);
- planning solutions, equipment (according to actions with explanations, in the form of a numerical expression, a plan and a solution or writing down the solution with questions);
- checking the correctness of the completed solution (determining the compliance of the obtained result with the data of the conditions, by formulating a problem opposite to the one given in another way or method, if any);



After the work plan on the task is drawn up, students are invited to implement the plan. This allows you to partially avoid possible errors when solving the problem. We have solved the following logical problem given in the 3rd grade mathematics textbook in a demonstrative manner as follows.

Problem. A horse eats a pile of hay in 1 month, a goat in 2 months, a sheep in 3 months, and a rabbit in 6 months. How long will it take all the animals to eat this hay together. [5]

If this problem were given in higher grades, it would be solved as follows. It is solved like a work problem.

Solution.

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \frac{1}{x}$$

We calculate the left side of the equation by reducing it to a common denominator and we get the following equation.

$$\frac{12}{6} = \frac{1}{x}$$

From this equation, we have the solution  $x=1/2$ .

That is, since the quantities in our problem are given in months, the number  $1/2$  means half a month. Since 1 month consists of 30 days, we take half a month as 15 days. So the answer can be given as 15 days or half a month.

Considering that this problem is given in a primary school mathematics textbook, let's approach how a primary school student can solve this problem. In primary school, a demonstration is more effective.

We will solve the problem in the following steps:

We determine which animal eats the fastest. That is, the horse eats the hay faster than everyone else, that is, it finishes it in 1 month. It can be seen from this that if they all eat the hay together, they will finish it in less than 1 month. Therefore, converting months to days is much more convenient for calculation.

We divide the total hay into equal parts depending on how many days the animal that ate the slowest ate it. That is, the slowest ate animal is the rabbit. He ate the hay in 180 days. Therefore, we divide the hay into 180 equal parts.



To make the calculation easier, we will depict the parts in the drawing. And we will indicate how many parts each animal ate in a day. To find out how many parts it ate in a day, we divide the total number of 180 parts by how many days each one ate in total.

**Solution.**

We express the time each animal spent eating hay in days.

Horse - 1 month - 30 days

Goat - 2 months - 60 days

Sheep - 3 months - 90 days

Rabbit - 6 months - 180 days

From this, knowing that the slowest animal is the rabbit, we divide the entire amount of hay into 180 parts, that is, parts. And to make it easier to understand how it started eating all at once and how many days it took to eat, we will draw the following diagram. We draw 18 pieces in width and 10 in height, making a total of 180 pieces. And we place the animals in different places on the drawing. To find out how many pieces they ate in a day, we divide the total number of pieces by the total number of days each one ate. In a day:

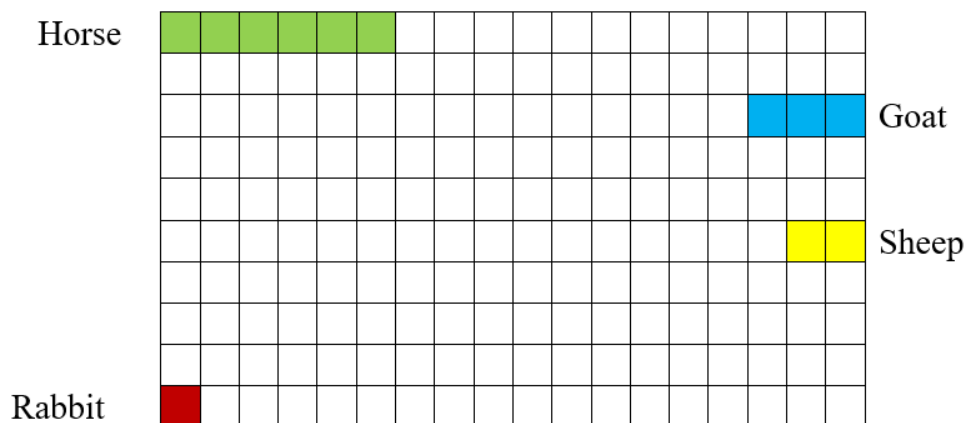
horse  $180:30=6$  pieces

goat  $180:60=3$  pieces

sheep  $180:90=2$  pieces

rabbit  $180:180=1$  piece

Based on the drawing, we can conclude that in 1 day, all the animals eat 12 pieces of hay. Since the total hay consists of 180 pieces, we can find out how long it took all the animals to eat the hay by dividing 180 by 12 (Figure 1).



Picture 1



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180:12=15

So, according to the problem question, we have the solution that all the animals will eat this hay together in 15 days.

Answer. 15 days or half a month.

### **Conclusion**

Mathematical logic problems are an important part of learning mathematics in primary grades. They teach them to think mathematically, help them think logically and solve problems. These problems help students develop their analytical thinking and problem-solving skills. Teaching mathematical logic through demonstrations is very interesting and useful for primary school students.

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