

Introduction to Solving Logical Problems in General Education Schools

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Abstract

The reports in this article are based on the regional characteristics of some regions and cities of the Republic of Kazakhstan. Solving problems by conducting a deep analysis of a given problem condition without using memorized formulas in solving logical problems helps to improve students' thinking skills. The compiled reports correspond to the content of education in the 6th grade of a general education school. Mathematical model of a text problem by finding a part of a number, finding a number by part, Euler-Venn diagram, calculation of proportion, path, speed, drawing up a scheme, a student gets used to creating a problem. Since the reports are about the nature of their land, they arouse students' interest and contribute to becoming Patriots of their country.

Keywords— Euler-Venn diagram, logic, mathematical model, proportion, text tasks, scheme.

I. INTRODUCTION

In this scientific project, the method of transmitting logical problems to students is unique. I considered the problems of developing logical thinking of a student in connection with the regional characteristics of our country. This project has a lot to give to students. Reports based on regional characteristics have a very high spiritual and educational significance. First of all, in the process of completing these tasks, a student gets acquainted with beautiful places of our country. Secondly, it is obvious that a student who knows the richness of his native land will feel a sense of love, and pride for his homeland, so he will become a patriot of his homeland. Third, of course, a patriot becomes a great person who makes a huge contribution to the prosperity and development of his country.

II. MAIN PART

Logical problems based on local features that develop the ability to think logically will be easier for students not only to develop mathematical logic, but also to reproduce it. Because in Kazakhstan, where he was born and lives, it is not difficult to imagine and understand things, objects that he fully knows.

Currently, Kazakhstan is divided into fourteen regions. There are three cities of national significance in the country. These are Nur-Sultan, Almaty and Shymkent.

It is obvious that this will be a novelty for pupils in solving problems in special places located on the territory of Regions and megacities of national significance.

Task 1. The Almaty city.

The length of the suspension track at the ski resort "Shymbulak", located in the Trans-Ili Alatau Gorge, is 4.5km. With the suspension line, you can climb to the base in 15 minutes. How far can you go in 1 hour, counting on the suspension road?



Picture 1 - Shymbulak ski resort

Resolution: 1 hour = 60 Minutes
 60: 15=4 (rises once)
 $4.5 \cdot 4 = 18$ (km).
 Answer: 18 km. [9].

Task 2. West Kazakhstan region.

The Urals is a river that separates Europe and Asia. The Ural River, which originates in Bashkortostan and stretches across the territory of Kazakhstan, flows into the Caspian Sea. The length of this river, which flows through the West Kazakhstan region, Uralsk, Aktobe, Atyrau, is 1084 km in Kazakhstan. In the spring months, the river flows rate is 10 km/h. it will go up. After leaving the Caspian Sea and sailing along the Ural River for 7 hours at a speed of 42 km/h, the boat will stop for 1 hour and continue its journey, increasing its speed to 8 km/h. How many hours does the boat take to leave the territory of Kazakhstan?



Picture 2- Ural River

Solution:

$v = 42 - 10 = 32$ (km/h) swim against the current, because it swims in the opposite direction;
 $S = 32 \cdot 7 = 224$ (km) swimming path to the stop;
 $S = 1084 - 224 = 860$ (km) the rest of the way;
 $v = 32 + 8 = 40$ (km / h)
 $t = 860 : 40 = 21.5$ (H)
 $t = 21.5 + 7 + 1 = 29.5$ (H)
 Answer: 29.5 hours. [9].

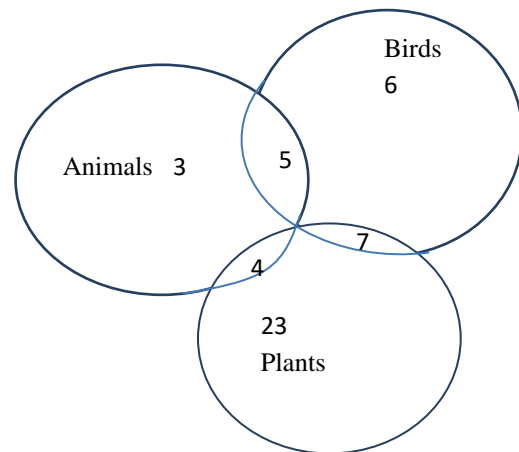
Task 3. Mangystau region.

The Ustyurt Reserve in Mangystau region is the largest reserve located in the desert zone. This reserve contains 336 species of plants, 45 species of animals and 166 species of birds. Of the researchers who visited the Ustyurt nature reserve, 12 study animals, 18-birds, and 34-plants. 5 of them study birds and animals, 7 study birds and plants, and 4 study plants and animals.

- 1) How many researchers are there in total in the Reserve?
- 2) how many people study only animals?

Solution:

Let's draw on the Euler diagram.



Picture 3 – Euler circles method

We see on the Euler diagram there are 48 researchers in total. There are 3 researchers study only animals.

Answer: There are in all 48 researchers and 3 researchers study only animals.[9].

Task 4. Atyrau region.

The average depth of the Caspian Sea is 1025 meters, and the bathyscaphe was lowered to

reach the bottom. How many seconds will it be on the surface of the water if the bathyscaphe rises to the surface of the sea at a speed of 1.8 km/h from the depth of the sea?

Solution: $1.8 \text{ km} / \text{s} = 1.8 \cdot \frac{1000}{3600} = 0.5 \text{ (m / s)}$

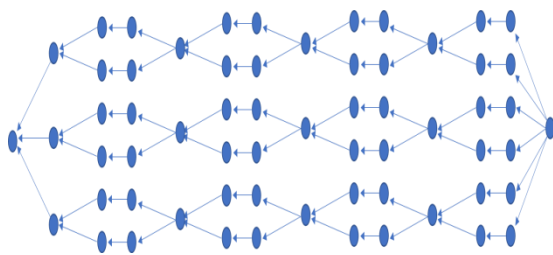
$1025:0,5=2050 \text{ (s)}$

Answer: 2050 second. [3].

Task 5. North Kazakhstan region.

There are 62 large lakes in the North Kazakhstan region. From one lake on the east side of these lakes, a group of 6 researchers came out in six directions to the west. Each of them meets each other in every third lake next to each other. They say: if it is known that groups 1 and 2, 3 and 4, 5 and 6 meet, how many times do 1 and 2, 3 and 4, 5 and 6 meet when they reach the last Lake?

Solution: we show it as a scheme.



Picture 4 – Scheme of solution

According to the condition of the task, we draw groups and their meetings.

And so we see from the scheme that the tourists met 4 times

Answer: 4 times. [9].

Task 6. East Kazakhstan region.

One of the relict ribbon Pine chalk, which is found only in two places in the world, is distributed from the East Kazakhstan region to the Altai territory, and the other in Canada. Three Irtysh Pine Bors with a length of 115 km each cover an area of 150 thousand hectares, 210 thousand hectares and 220 thousand hectares. Well, 1 ha of forest absorbs 280 kg of carbon dioxide and releases 220 kg of oxygen. How much carbon dioxide does it absorb and release oxygen, including all the parts of this boron?

Solution: $150\,000 + 210\,000 + 220\,000 = 580\,000 \text{ (Ga)}$

$580\,000 \cdot 280 = 162\,400\,000 \text{ (kg)}$

$580\,000 \cdot 220 = 127\,600\,000 \text{ (kg)}$

Answer: 162.4 million.kg of carbon dioxide absorbed 127.6 million.kg releases oxygen. [9].



Picture 5 – Pine forest

Task 7. Almaty region

Charyn canyon, located in Almaty region, stretches along the Charyn river with a length of 154 km. How many hours do travelers spend shooting videos from a height, shooting a conch with a drone flying at a high speed of 70 km/h?



Picture 6 – Charyn canyon

Resolution: $154:70=2.2 \text{ (h)}$

Answer: 2.2 hours. [9].

Objectives of the study

The purpose of the study is to instill students' love for nature, the country and the land

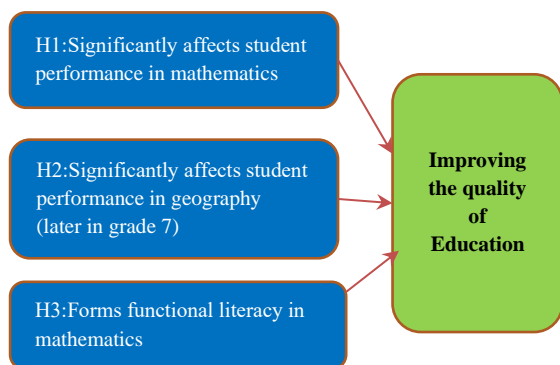
Specific objectives were to:

1. Familiarization of students with the features of Kazakhstan.
2. Teach yiu how solve text problems logically.

Hypotheses

- 1) Significantly affects student performance in mathematics.
- 2) Significantly affects student performance in geography (later in grade 7)
- 3) Forms functional literacy in mathematics.

Model



III. RESEARCH METHOD

The study used complementary system methods:

Theoretical: analysis of psychological, pedagogical and methodological literature, analysis, generalization, systematization of factual data; control method.

Experimental: the stage of analysis, identification, formation and control of pedagogical and psychological documents, methods of processing results (quantitative and qualitative analysis of the data obtained).

IV. DATA COLLECTION

In the collection of the material, the Encyclopedia of Kazakhstan and passports of each region were used.

V. CONCLUSION

Today, in general, due to the rapid development of new technologies, no matter what industry we take, we need innovative ideas and methods. The teacher must first instill in the student invaluable, immeasurable values. It should be noted that humanity, patriotism, kindness, truthfulness, punctuality and many other qualities. Mathematic has a special place in science and in the comprehensive development of human thought. The basis of mathematic has never changed, but the requirements for its effective teaching are high for modern pedagogy. Therefore, the teacher should always be on the lookout and has high demands on the students who are brought up before him. And the impact of logical problems in mathematic on the development of students' thinking is huge. This is because these calculations require

thinking in a different way than standard calculations.

VI. RECOMMENDATIONS

Based on the results obtained, it is better to take as a basis interdisciplinary continuity in high school mathematics. The use of nature, homeland, and regional features at every lesson to improve students' cognitive activity allows you to conduct math lesson more interestingly and effectively. It is necessary to develop the skills of logical output text problems.

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CONFLICT OF INTERESTS

The authors have no conflicts between themselves. The order of authorship is agreed in advance.

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