ETHIOPIAN INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

eISSN: 2349-5715 pISSN: 2349-5707

Volume: 10, Issue 09, Sep-2023 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980

METHODS OF TEACHING MATHEMATICS IN ELEMENTARY SCHOOL

Mahfuza Abbosovna Gafurova

Fergana State University Doctor of Philosophy in Educational Sciences (PhD)

mahfuzagafurova73@gmail.com

Abstract: This article highlights the ways of creative approaches to solving problems in elementary school. Introduction to teaching methods. Characteristics of cognitive methods. Methods of problem-dialogical learning Description of the methods used at different stages of learning new material.

Key words: teaching methods, Characteristics of methods of knowledge, Methods of problem-dialogical learning Description of methods for learning new material.

Teaching methods methods of problem-dialogical learning

One of the important tasks of teaching is the formation of cognitive independence among schoolchildren, which means that cognitive methods become relevant, allowing, on the one hand, to train schoolchildren, including them in the research process, introducing them to research activities, on the other hand, equip them with the methods necessary for independent knowledge. One of the most universal mathematical methods of cognition is the method of mathematical models (mathematical modeling). A mathematical model is a description of some class of real world phenomena in the language of mathematics. The modeling method makes it possible to apply the mathematical apparatus to solving practical problems. The concepts of number, geometric figure, equation, inequality, are examples

mathematical models. Modern technologies widely use the modeling method in the course of mathematics in elementary grades. The method of mathematical modeling in the educational process is used when solving any problem with practical content. To solve such a problem by mathematical means, it is gradually translated into the language of mathematics, moving from a verbal model to a graphic one, and then to a symbolic one. The last model is the mathematical model of the situation described in the problem. In the process of mathematical modeling, coding of the situation and decoding of the constructed model, abstractions, and generalizations are widely used. Based on the tasks facing the modern school, where education is aimed not only at communicating ready-made knowledge, but also at developing cognitive methods in children that ensure the formation of educational independence, the use of empirical methods of cognition in teaching becomes especially relevant.

Observation, experience and measurements should be aimed at creating special situations in the process of teaching mathematics and providing students with the opportunity to extract from them obvious patterns, geometric facts, ideas for the simplest proofs. Most often, the results of observation, experience and measurements serve as premises of inductive conclusions, with the help of which new truths are discovered. Therefore, observation, experience and measurement are also referred to as heuristic methods of learning, i.e., to methods that contribute to discoveries. Let us illustrate this application of observation, experience, and measurement with a few examples. Considering various figures, including the objects around us, it can be established that among them there are figures that have axial symmetry. Observation of these figures allows us to notice that each of the "symmetrical"

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figures is divided by some line into two parts so that if the figure is bent along this line, one of its parts completely overlaps the other. For each of the "asymmetric" figures, such a straight line cannot be found. After observing "symmetrical" figures in the surrounding space (architectural decorations, building and other details, some leaves on trees, etc.), one can proceed to further study of axial symmetry using a special experiment (experiment).

Each student is asked to bend a sheet of paper so that one part of the sheet falls on the other and a fold line is formed. Then it is proposed to straighten the sheet again and mark an arbitrary point A on it that does not lie on the fold line, then bend the sheet again along the same fold line and determine, looking at the light through the folded sheet, with which point point A coincided. Let this be the point A1. Students are told that points A and A1 are called symmetrical with respect to the straight line l (fold line), called the axis of symmetry of these points. For another point B, lying on the other side of the fold line than point A, it is proposed to determine (experimentally, by bending the sheet) a point symmetrical to it with respect to the same axis l. We notice that if we take point C on the fold line, it remains stationary when the sheet is folded, that is, it does not coincide with any other point of the sheet. We say that any point of the axis of symmetry (fold line) is symmetrical to itself.

Consider an example of applying experience to discover the commutative property of addition. Let's assume that in One box contains m blue sticks and the other box contains n red sticks. One box needs to be released. We can do this in two ways. You can pour all the red sticks into the box where the blue sticks are, and then there will be (m + n) sticks in it. But

you can pour all the blue sticks into the box where the red sticks are, and then there will be (n + m) sticks in it. But in both cases we have in the box the same set

sticks. Therefore, m + n = n + m.

1. a) are compared without performing calculations.

☐ 6+2 2+6

☐ 5+4 4+5

b) fill in the missing numbers to get the correct entries.

☐ 7+ = 2+7

☐☐ 4+ = +4

It is important to note that with the help of empirical methods (observation, experience, measurements) only the initial stage of work on the mathematical description of real situations is performed. The resulting mathematical material (intuitive concepts, hypotheses, sets of mathematical sentences) is subject to further processing by other methods

Comparison and analogy are logical methods of thinking used both in scientific research and in teaching as a method. With the help of comparison, the similarity and difference of the compared objects are revealed, that is, they have common and different properties. For example, comparing a triangle and a quadrilateral reveals their common properties: the presence of sides, vertices, corners, as many vertices and corners as there are sides. A difference is also established: a triangle has three vertices (sides), a quadrilateral has four.

2. Find three triangles.

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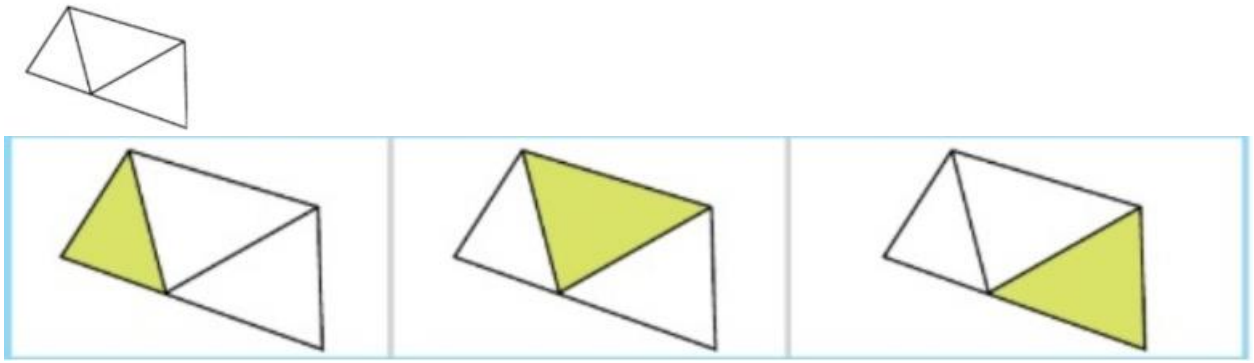
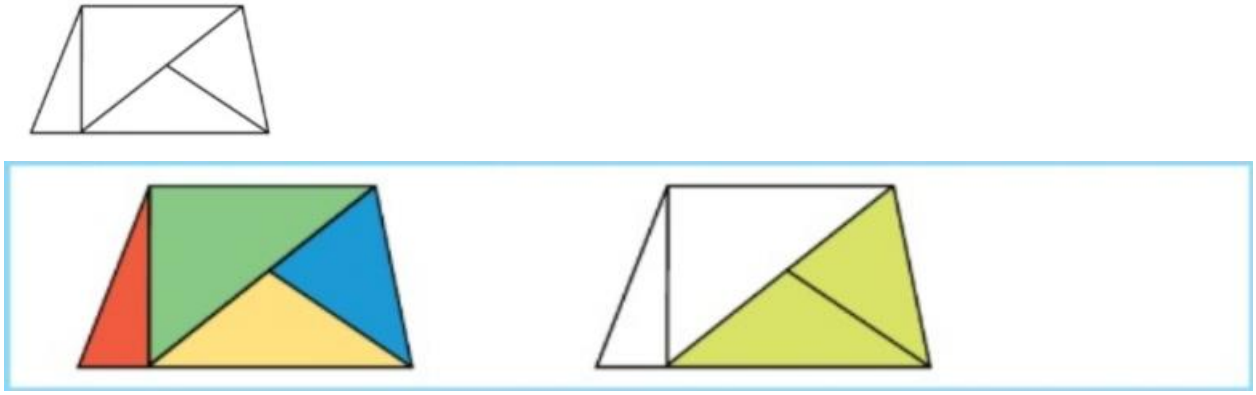


3. How many triangles?



In the elementary mathematics course, there are similar questions (for example, the commutative property of addition and multiplication) and there are opposite ones (for example, addition and subtraction). When familiarizing yourself with new material that is similar to what has already been studied, it is necessary to select exercises in such a way as to reveal new material in comparison with similar, i.e. compare

new material, highlighting the essential common. When revealing opposite concepts, it is necessary to select exercises in such a way that one can use the method of opposition, i.e. highlight significant differences. Methods of comparison and opposition help the correct generalization of the formed knowledge, prevent their confusion. When getting acquainted with practical questions that are introduced on the basis of theoretical knowledge (familiarization with many computational techniques, with solving equations, etc.), a heuristic conversation is also used, but providing a deductive way of reasoning: from the general position to the particular.

In elementary education, the inductive-deductive method is most effective, when from considering particular cases (tasks, expressions) a transition is made to general conclusions and rules, and then other particular facts are comprehended on the basis of general provisions. For example, the concept of the type of task is formed inductively: students solve a number of tasks of this type, highlighting the essential, typical in them. Then, encountering a problem, the student, when analyzing its content, finds in it those essential features that are characteristic of problems of this type, relates it to this type and finds the correct way to solve it.

4. Solve the equations and check.

$8+x=7+5$ $y+6=8+3$

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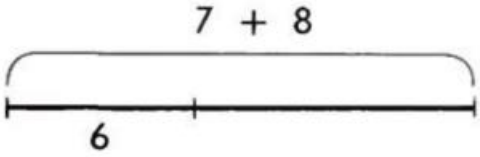
5. What two different tasks can you come up with according to the scheme?



Generalization and abstraction are two logical devices that are almost always used together in the process of cognition. Generalization is a mental selection, fixation of any common essential properties that belong only to a given class of objects or relations.

Abstraction is a mental abstraction, the separation of general, essential properties, identified as a result of generalization, from other non-essential or various properties of the objects or relations under consideration, and the rejection (within the framework of our study) of the latter.

From the above brief explanation, it follows that abstraction cannot be carried out without generalization, without highlighting the general, essential that is subject to abstraction. Generalization and abstraction are invariably used in the process of concept formation, in the transition from ideas to concepts. In this case, they are considered as heuristic methods. Generalization is understood as the transition from the singular to the general, from the less general to the more general, and specification is understood as the reverse transition - from the more general to the less general, from the general to the singular. If generalization is used in the formation of concepts, then concretization is used in the description of specific situations with the help of previously formed concepts. Consider the transition from the singular to the general. For example, the formation of the concept of "square" at an early stage of learning begins with showing a variety of objects that differ from each other in shape, size, color, material from which they are made. Children, after they are shown one of these figures and told that it is a square, unmistakably select from the set of figures all those that have the same shape, neglecting differences in size, color, material. Here, a subset is selected from a set of objects according to one feature that has not yet been sufficiently analyzed - by shape. Children do not yet know the properties of a square, they recognize it only by its shape. Further work on the formation of the concept of a square consists in the analysis of this form in order to identify its properties. It is established that all squares have 4 vertices and 4 sides. But some shapes that we didn't classify as squares also have 4 vertices and 4 sides. It turns out that a square has all sides equal and all angles are right. Students are invited by observation to find what all the selected square-shaped figures have in common, how they differ from the rest.

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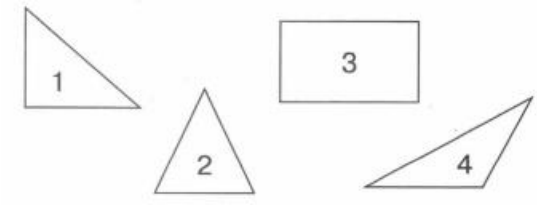
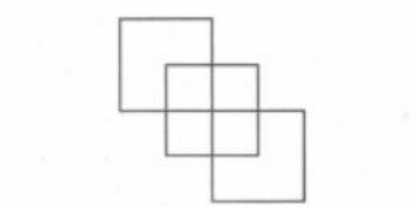
1. Write down the number of the extra figure:



Ответ: 3

2. Сколько квадратов на этом рисунке?



Ответ: 7

3. Определи, какие двузначные числа скриваются за значками.

Ответ: ○ — 68 △ — 22 □ — 89

In the theory of knowledge, a method is defined as a system of sequential actions that lead to the achievement of a result corresponding to the intended goal. Teaching methods are ways of interaction between a teacher and students, aimed at achieving the goals of education, upbringing and development of students in the course of education.

In pedagogy, various methods are considered that are used in primary school when teaching any subject. Let us dwell on the description of those methods that allow the formation of educational independence in children, as well as methods that make it possible to implement

problem-dialogical learning, characteristic of modern learning. Note that the selection of teaching methods is determined by many factors: the general objectives of teaching, the content of the material being studied, the level of readiness of children to master the relevant material, and the age characteristics of students. Thus, the main task of the teacher is to build an educational process in which students could establish close relationships between all stages and be able to see the final result of their work.

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