

## SUBJECT OF MATHEMATICS TEACHING METHODOLOGY

Duzelova Dilnoza,

Djumabekova Zuxra,

Kalenova Muxabbat

Mathematics teachers of the Karakalpak Academic Lyceum of the Ministry of Internal Affairs of the Republic of Uzbekistan

<https://doi.org/10.5281/zenodo.14709898>

**Abstract.** This article discusses the subject and methods of mathematics teaching methodology.

**Keywords:** mathematics, method, form, formula, astronomy.

## ПРЕДМЕТ МЕТОДИКИ ПРЕПОДАВАНИЯ МАТЕМАТИКИ

**Аннотация.** В статье рассматриваются предмет и методы методики преподавания математики.

**Ключевые слова:** математика, метод, форма, формула, астрономия.

The word mathematics is derived from the ancient Greek word mathema, which means "knowledge of science." The object of study of mathematics is the spatial forms of existing objects in matter and the quantitative relationships between them. At present, mathematics is conditionally divided into two: 1) elementary mathematics, 2) higher mathematics. Elementary mathematics is also a science with an independent content, which is built on the basis of elementary data obtained from various branches of higher mathematics, namely theoretical arithmetic, number theory, higher algebra, mathematical analysis and the logical course of geometry. Higher mathematics deals with the study of mathematical laws that fully and deeply reflect the spatial forms of the real world and the quantitative relationships between them. Elementary mathematics forms the basis of the school mathematics course. The goal of the school mathematics course is to convey to students the system of mathematical knowledge through a certain method (methodology), taking into account their psychological characteristics. (The word methodology is a Greek word meaning "without".) Mathematical methodology is one of the main branches of pedagogy and didactics, and is an independent discipline that studies the laws of teaching and learning mathematics that correspond to the goals of education at the level of development of our society.

Mathematics methodology answers the following three questions related to the educational process:

1. Why should we study mathematics?
2. What should we learn from mathematics?
3. How should we study mathematics?

The concept of mathematics methodology was first described in the work of the Swiss pedagogue-mathematician G. Pestalozzi, written in 1803, "The Demonstrative Study of Numbers". From the first half of the 17th century, issues related to the methodology of teaching mathematics were addressed by Russian scientists, including academician S.E. Gurev (1760-1813), and from the first and second half of the 16th century, by N.I. Lobachevsky (1792-1856), LN. Ulyanov (1831-1886). L.N. Tolstoy (1828-1910) and the outstanding methodologist-mathematician S.I. Shokhor-Trotsky (1853-1923), A.N. Ostrogradsky and others were engaged in this, and they looked at mathematics from a scientific point of view and developed its progressive foundations. For example, AN. Ostrogradsky wrote that "Consciousness arises after observation, consciousness is based on the real, existing world."

Later, N.A. Izvolsky, Y.M. Bradis, S.E. Lyapin, I.K. Andronov, N.A. Glagoleva, I.Ya. Dempman, AN. Barsukov, S.I. Novoselov, A.Ya. Khinchin, N.F. Chetverukhin, AN. Kolmogorov, AI. Markushevich, AI. Fetisov and others were engaged in various areas of mathematics teaching methodology. Since 1970, the content of the school mathematics course has been changed based on a new program, as a result of which its teaching methodology has also been developed. The methodology of school mathematics, which is taught based on the current program, was developed by professors Y.M. Kolyagin, R.S. Cherkasov, P.M. Erdniyev, J. Ikramov, N. Gaybullayev, T. Tulaganov, A. Abdukodirov and other methodologists have been and are still working on it. Mathematics teaching methodology is taught in the III-IV courses of pedagogical universities. It is conditionally divided into three according to the nature of its structure.

1. General methodology of teaching mathematics. This section reveals the purpose, content, form, methods and methodological system of mathematics, based on the laws of pedagogy, psychology and didactic principles.

2. Special methodology of teaching mathematics. This section shows the ways of applying the laws and rules of general methodology of teaching mathematics to specific subject materials.

3. Specific methodology of teaching mathematics.

This section consists of two parts:

1. Specific issues of general methodology.
2. Specific issues of special methodology.

For example, if we talk about the methodology of planning and conducting mathematics lessons in the 6th grade, this is a specific issue of general methodology.

As is known, the science of mathematics teaching methodology is a specific section of pedagogical science, which is engaged in the study of the rules of teaching mathematics. Mathematics teaching methodology is closely related to the sciences of pedagogy, logic, psychology, mathematics, linguistics and philosophy in the process of studying the laws of teaching mathematics. In other

words, the problems of teaching mathematics at school are solved in close connection with the sciences of logic, psychology, pedagogy, mathematics and philosophy. The methodological basis of mathematics teaching methodology is based on the theory of knowledge.

The science of mathematics methodology studies the purpose, content, form, method and the laws of applying its tools to the lesson process. Mathematics is also closely related to the sciences of physics, drawing, chemistry and astronomy.

The integral connection of mathematics with other disciplines is achieved in two ways:

- 1) adapting the programs of neighboring disciplines without violating the integrity of the mathematical system;
- 2) using materials in the mathematics course related to the study of mathematical laws, formulas, and theorems in other disciplines.

Currently, the issue of adapting the mathematics program to other subjects has been solved quite successfully. For example, students begin to study some of the information used in physics about functions and their graphical representation starting from the 7th grade. Much of the knowledge about geometric constructions given in the 8th grade will be rich material for the subject of drawing, the task of drawing is to consolidate this knowledge by performing various drawing tasks. It is difficult to clearly indicate the issue of using other subjects in mathematics lessons in the program, this is implemented by the teacher himself, that is, he should take it into account when planning the educational material and preparing for the lesson. For example, during the study of equations, equations reflecting the relationships between physical quantities, namely the heat balance equation, the equation of linear expansion from heat, and equations similar to them, can also be solved.

The percent of the program; It is appropriate to use chemistry and physics problems in studying proportions and other chapters (mixtures, mixtures, and the like), for example: 1) How much work is needed to dissolve 240 g of solute in 240 g of water to form a 20% solution? 2) 400 g of a 5% solution was boiled and brought to 200 g.

Now what is the acidity of the solution? Useful work in mathematics lessons from materials related to neighboring subjects further strengthens the interdisciplinary connection.

## Comparison method

**Definition.** The method that determines the similarities and differences of things in the mathematical object being studied is called the comparison method. The comparison method is also one of the methods of scientific research.

When applying the comparison method to the materials of the subject being studied in mathematics lessons, the following principles are followed:

- 1) the mathematical concepts being compared must be homogeneous;



2) the comparison must be relative to the main properties of the things in the mathematical object being studied.

Example 1. When comparing a triangle and a rectangle, their similar sides are determined: vertices, angles; their different sides:

a) a triangle has three vertices and three sides;

b) it is determined that a rectangle consists of four vertices and four sides. In this example, both principles of comparison are fulfilled, that is, the triangle and the rectangle are homogeneous concepts, both are special cases of a polygon, and the comparison method is applied to the main properties of both figures.

Example 2. In the 8th grade algebra course, deriving the formula for calculating the  $n$ -term of an arithmetic progression is also carried out using the comparison method. Definition. An arithmetic progression is a sequence of numbers formed by adding an odd number to each of the previous terms, starting from the second term.

#### Generalization method

The concept of generalization is also considered one of the scientific research methods in teaching mathematics. The importance of the generalization method is described by the outstanding scientist A.N. Kondakov as follows. "Generalization is a logical method through which one moves from single thoughts to general thoughts."

In the school mathematics course, the concept of generalization is applied as follows: 1) generalization of mathematical concepts; 2) generalization in proving theorems; 3) Generalization in solving problems and issues. Now the applications of generalization will be considered separately.

#### REFERENCES

1. Bikboyeva N. U. va boshqalar «Boshlang'ich sinflarda matematika o'qitish metodikasi», T., «O'qituvchi», 1996.
2. G'aybullayev N., Ortiqov. «Geometriya 7-sinf uchun darslik» T. «O'qituvchi», 1998.
3. O. G'aybullayev N., Ortiqov. «Geometriya 8-sinf uchun darslik» T. «O'qituvchi», 1999.
4. Galitskiy M.A. va boshqalar «Algebra va matematik analiz kursini chuqur o'rganish» T., «O'qituvchi», 1995.
5. Antonov K. P. To'plam. «O'qituvchi», 1975.