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Relationship of Mathematics with other Disciplines

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Annotation:
This article deals with interdisciplinary issues. It is difficult to clearly state in the syllabus the use of other subjects in mathematics lessons, which is up to the teacher, which the teacher must take into account when planning the teaching material and preparing for the lesson.

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Our great ancestors Al-Khwarizmi and Abu Rayhan Beruni did not study the separate types of sciences as they do now, but studied them as a whole and in connection with each other. In particular, the scope of scientific activity of modern world thinkers is much wider, from natural sciences such as mathematics, physics, astronomy, chemistry to medicine, philosophy, music, law, writing or poetry and professions. such people were called "scholars."

From the revival period of our history, science and crafts began to develop extensively. By the eighteenth and nineteenth centuries, there was a separation of disciplines, that is, differentiation into scientific mathematics, physics, chemistry, biology, astronomy, and other sciences. As the emerging independent sciences perfected and came to a logical conclusion, they began to find their application in life. This means that each science in the nature-mathematics cycle has studied the properties of the real world in its own way.[1]

The work of Galileo, Newton, Descartes, Leibniz, Bernoulli, Gauss, Euler, Copernicus, and other world-renowned scientists led to the development of mathematics, astronomy, physics, and other individual sciences.

Medicine - The medical sciences are becoming more and more equipped with differentiating properties, and the mathematical ease with which they can study the interconnected properties of the stone world and reliably separate them from each other. Along with the process of differentiation of sciences, there is a need for an organization to study the universe in depth without breaking its interrelationships.

As a result, there is a need for the sciences to be applied together in order to study the properties of an object in depth, that is, to realize the interdependence of the sciences. Accordingly, as a result of the interaction of scientists working in different fields, new sciences began to emerge within their boundaries.

The differentiation of the sciences, in turn, led to their integration. As a result of the integration of sciences, hundreds of modern sciences have emerged, such as mathematics-physics, crystallography, crystallography-physics, crystal-chemistry, theoretical mechanics, biochemistry, biophysics, bio-cybernetics, geochemistry,

geophysics, astrophysics, radio engineering, cybernetics. and it is impossible to imagine the development of technology.

The development of the natural sciences, in turn, had a positive effect on the development of mathematics. Many physical concepts and ideas began to be used in the context of mathematics. Many concepts, such as the mechanical meaning of a product, harmonic oscillations, and crystal lattices, are reflected in some areas of mathematics. There are different interpretations of the term "integration", which means that the parts, the parts come together. The key issue in integrating academic disciplines in the educational process is to ensure the coherence of tasks, first of all, to determine the goals, methods, forms, tools and observed results.

Mathematics of knowledge plays an important role in the integration of sciences.

The 5th-6th grade math course combines elements of arithmetic, algebra, and geometry. Therefore, these textbooks have been used in practice as an example of integrative textbooks. Applying the coordinate method causes the algebra and geometry courses to overlap.

The introduction of vectors allows the study of geometric materials by means of algebra, which ultimately led to the convergence of these two courses. In order to determine the extent to which mathematical knowledge, skills and abilities are used in the study of physics and chemistry, and vice versa, to determine the level of application of this knowledge in the study of mathematics, we can make the following analysis of topics in mathematics, physics and chemistry textbooks.

№	Physics	Mathematics
1	Mass and size of molecules. Avogadro soni Humidity	The standard form of the number. Diameter
2	The speed of motion of gas molecules	Percent
3	Mechanical properties of solids	Cylindrical, geometric objects.
4	Laws of refraction and refraction of light	Graph of a function
5	Convex and concave lenses.	Angle, angle of rotation
6	Inorganic chemistry	Spherical surface, convex, concave, parallel rays.
7	Solving chemical problems	Mathematics
8	Isotopes, isobars	Proportion, percent
9	Crystal lattices	Ability to be

1. The mass and size of molecules. Avogadro number The standard form of the number. Diameter
2. Humidity Percent
3. Velocity of gas molecules Cylindrical, geometric bodies.
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5. Laws of refraction and refraction of light Angle, angle of return
6. Convex and concave lenses. Spherical surface, convex, concave, parallel rays.

Inorganic Chemistry Mathematics

1. Solving Chemical Problems Proportion, Percent
2. Isotopes, isobars
3. Crystal Grids Polygons.[2]

Functional connection is a widely used relationship in physics. A student who is well versed in a function, its graph, two realities, the relationship between sets, compatibility, and its properties will quickly master the functional connections in physics.

"Linear motion" in physics is a linear function in mathematics:. “Straight line acceleration is like a function. In a physics course or

formulas represent relationships that are directly related to the topics of equations and proportions in mathematics.

Chemistry course:Here are some examples of the connection between mathematics and physics:

1) The body moves around the axis according to the law. Find the angular velocity at any time and = 4.
2) An object of mass 2 kg moves in a straight line according to the law.
3) Find the force acting on the body.
4) Find the kinetic energy of the body 2 seconds after it starts moving.

Here are some questions about the relationship between mathematics and chemistry:

1. Two pieces of copper weigh 30 kg. The first block contains 5 kg and the second block contains 4 kg of pure copper. If the amount of copper in the second section is 15% more than in the first section, what is the percentage of copper in the first section?

2. To a solution containing 40 grams of salt was added 200 grams of water, after which its concentration was reduced by 10%. How much water was in the solution and what was its concentration?

Similarly, teaching students to solve practical problems will increase their interest in mathematics. 1. One side of a rectangular plot of land set aside for a plot of land is 10 m longer than the other and should be surrounded by a retaining wall. If the area of the plot is 1200 m2, find the length of the retaining wall.

2. Find the distance between the given points in the coordinate plane below:

a) A (2; 5) and V (-1; 1)

b) A (-1; 0) and V (1; 0)

g) C (7; 9) and D (-5; 4)

d) C (0.4; 2.54) and D (-0.56; 1.54).

In short, the integration of education increases students' enthusiasm and interest in learning sciences. Increases the level of knowledge in academic disciplines, develops their intellectual activity. He learns the connection in nature through the connection between the sciences. Continuity of education in an integrated lesson and the practical application of the acquired knowledge will make it easier for students.

Young learners are introduced to mathematics from the earliest days of school. And that opens the door to all science. We cover mathematics in all the subjects we study. For young learners, mathematics opens the door to knowledge of the world and can give new tasks to their learners almost every day. It is important for the teacher to take this into account in order to make interdisciplinary connections.

It is very easy to make interdisciplinary connections in elementary school. Because all subjects are taught by one teacher, so interdisciplinary links are opened for him. Elementary school subjects provide a clear idea of the events and phenomena around them and their properties. The proud feature of mathematics is that it is abstracted at the same time as the study of objective being in relation to everything that does not belong to the most general aspects of the material world being studied, to its quantitative aspects, and to spatial forms and relations. That is, it recognizes the abstraction and generality of concepts. Expresses and teaches the connections between them, based on general activities, notions about numbers, arithmetic operations and elementary concepts, various skills and abilities, types of activities, forms and methods of teaching.

Socio-economic relations in our country, changes in the system of public education, as reflected in the laws "On Education" and the "National Program of Personnel Training" puts an important task in front of the inner class teacher. This task allows us to distinguish the specific links for primary education, which are the introduction of education in different curricula, curricula, textbooks, as well as a network in the methodological system. can be formed. State educational standards provide ample opportunities for the development of curricula in science. It also serves to ensure the interdependence of disciplines and interdisciplinary connections based on the principles of interdisciplinary communication and knowledge coordination. When it comes to the methodological and mathematical training of teachers in the primary grades, it is important to understand that it is inextricably linked with scientific, pedagogical and mathematical training.

Interdisciplinary communication poses several challenges to mathematics teaching methods:

implementation of educational and practical tasks;

cover the process of studying the system of theoretical knowledge;

teaching students how to shape their worldview;

humanization of education;

to teach people to love work, to cultivate self-esteem and mutual respect in the process of teaching mathematics;

the teaching methodology is related to the content of Grades 5-6 Mathematics, which is a continuation of Grades 1-4 Mathematics.[3]

Mathematics has a special place in primary education, because it not only develops children's calculation skills, but also develops their worldview, introduces them to the various concepts and quantities of life. In solving all the examples and problems given in the textbooks, we try to identify interdisciplinary connections and connect them with life. In recent years, the whole system of teaching mathematics in primary schools of the country has undergone significant changes in terms of scale and importance.

In accordance with the Decree of the President of the Republic of Uzbekistan on measures to improve the quality of education and research in mathematics, mathematics has been identified as one of the priorities for the development of science in the country in 2020.

The introduction of new tasks in the school has led to a radical change in the content of teaching mathematics.

One of the most interesting lessons in elementary school is math. In order for students to think and keep up with the times, they need to be introduced to mathematics, the "father of science," from an early age. Mathematics, in turn, is inextricably linked with all the subjects studied. Didactic games are used to teach mathematics in the classroom. Sometimes it is necessary to cover several subjects in one course. The level of organization of the lessons also depends on the creativity of the teacher. Math games and picture puzzles add to the fun of everyday lessons.

In order for primary school students to master the basic mathematical concepts, the teacher must choose the most appropriate method and form of lessons. Didactic games play an important role in this. Indeed, play is one of the traditional and tried and tested ways of educating kindergarten and school-age children and adolescents. Students should not only master the program materials in mathematics, but also try to observe, compare, think, justify their conclusions, and speak mathematical language about the environment, events, and processes.

Didactic games provide an opportunity to individualize the work in the classroom, to assign tasks to the strength of each student, to maximize their abilities. Through play, students reinforce what they have learned

in class and prepare to apply it in their lives. It is a good idea to use puzzle games to teach first graders numbers from 11 to 20.

Mathematics and physics. is also closely related to drawing, chemistry, and astronomy. There are two ways in which mathematics interacts with other disciplines:

1) Adapt the reading curriculum without compromising the integrity of the mathematical system.

2) Use of materials related to the study of mathematical laws, formulas, theorems in other disciplines in mathematics.[4]

At present, the problem of adapting the mathematics program with other disciplines has been solved quite successfully.

For example, some of the information used in physics about functions and their graphical representation begins in the seventh grade.

Much of the knowledge of geometric constructions taught in Grade VIII will be rich material for the science of drawing, and the task of drawing will be to combine this knowledge by performing various drawing tasks.

It is difficult to clearly state in the syllabus the use of other subjects in mathematics lessons, which is up to the teacher, who must take this into account when planning the teaching material and preparing for the lesson.

For example, in the study of equations, the equations that reflect the relationships between physical quantities, that is, the heat balance equation.

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