USE OF NATURAL SCIENCE AND GEOGRAPHY MATERIALS IN PHYSICS TEACHING

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Abstract. *It is known that from the early period of school education, pupils learn the nature of phenomena, acquire modern innovative knowledge, form and develop skills and abilities to apply in practice, achieve high results in the modernization of the physics education system, general Methodological improvement of the physics education process based on interdisciplinary relations in secondary schools are urgent pedagogical tasks. In this article, the authors discussed the aspects that a physics teacher should take into account when teaching a topic in connection with other science materials, with the aim of further developing the teaching of physics to schoolchildren based on interdisciplinarity. They showed the ways to use the materials of natural science and geography in teaching physics.*

Keywords: *natural sciences, interdisciplinarity, teacher, pupil, science, geography, physics, acquired knowledge.*

In the field of natural sciences, special attention is paid to: to show that the acquired knowledge and skills of pupils are related to everyday life, conducting educational research in lessons and extracurricular activities, perform experiments, to educate creativity and develop interests focused on designing.

Scientists have studied the changes that occur in nature and found out that they all occur based on a certain law, that is, there is always a reason for the phenomenon. For example, the reason why various objects fall to the Earth is the Earth's gravity. The alternation of day and night on Earth is explained by the rotation of the Earth around its axis, and the occurrence of wind is the uneven heating of the air. From the above, it can be seen that the knowledge gained from natural science and geography plays a key role in mastering physics in general secondary schools. First of all, pupils rely on their observations and knowledge based on experience. In order to acquire scientific knowledge, it is necessary to analyze the results of experiments and explain them, to find the causes of the phenomenon. For a pupil who is acquiring basic knowledge of physics, the knowledge obtained from the sciences of natural science and geography will be of great importance and will be further strengthened by studying physics in higher grades.

Each natural science studies different aspects of natural phenomena in its own way. All natural sciences are closely related to each other and together create a general idea of nature. Natural sciences explain phenomena that occur in nature according to their point of view, relying on each other. In this case, the interaction between academic subjects makes an objective connection between different phenomena.

In the teaching of physics based on interdisciplinary connection, first of all, the development of the teacher's knowledge of related subjects, the improvement of the educational process, its integration into the pedagogical process and the pedagogical-psychological environment, free and independent thinking of pupils and young people, awareness of the surrounding reality special importance is attached to the setting of strategic and tactical goals for

the development of qualities such as attitude, involvement and social activity, as well as improving the process of their implementation.

Correct establishment of interdisciplinary communication prevents repetition of educational materials in different subjects and thus allows to save time to a certain extent.

The characteristics of interdisciplinary connection are determined primarily by the goals and objectives of the lesson. Its success depends on the teacher's knowledge and skills. It is necessary for a teacher to constantly grow and improve his knowledge and pedagogical skills, to constantly learn teaching methods and tools, and to successfully use them in training.

In order to teach a subject in connection with other science materials, a physics teacher should take into account the following:

1. Takes into account the time allotted for passing the subject.
2. Identifies other scientific materials related to this topic.
3. Determines pupils' concepts learned from other subjects.
4. They consult with teachers of other subjects.
5. Prepares exhibitions, slides, animations necessary for the lesson.
6. Determines the method and form of education.
7. Most importantly, it is necessary to complete homework using the "Concept Analysis" method (or another similar method can be used).

The importance of interdisciplinary communication in secondary schools is great. The physics course is based on the knowledge learned in other subjects. For example, trigonometric functions from mathematics to study mechanical motion, vibration and waves, concepts of mass of figures, electrolytic dissociation from chemistry to study concepts of electrolysis and thermodynamics, concepts of valence, air humidity, atmospheric pressure, convection, magnetism, etc. In order to study the emergence of the concepts learned from geography, the laws of thermodynamics, the doctrines of heat, electricity and optics, the concepts of the historical conditions of the time, industrial and agricultural development from the history course are necessary [2-5].

Based on the above, it is advisable to always implement and develop interdisciplinary relations. In order to effectively implement the interconnection between natural sciences, geography and physics, the teacher needs to be well prepared for the lesson based on the integration of subjects. It is necessary to determine what should be paid attention to when passing each topic, what should be based on the pupils' previous knowledge. Therefore, we considered it appropriate to show the connection of some topics studied in the physics course in general secondary schools with the sciences of natural science and geography, and we recommend the following table for use [1].

Use of materials related to natural sciences and geography in teaching physics

No.	Physics	Natural science and geography
1.	What does physics do? Body, substance and matter. Observations and experiences. Physics, technology and nature.	Observations and experiences. Bodies and substances.
2.	Molecules. Diffusion. The speed of movement of molecules and the temperature of the body. Mutual attraction	Temperature. Thermometer. Volume change when heated and cooled. Properties of air and water. Crystals. Water soluble and insoluble substances.

	and repulsion of molecules. The three states of matter.	
3.	Speed and its units. Inertia. Interaction of bodies. The mass of the body. Weighing the mass of an object. Density of matter.	Gravitation of bodies to the Earth. Libra. Weighing on a scale. Distance measurement. Plot directions and distance. Targeting in place. Speed measurement.
4.	Pressure. Pascal's law. Pressure in liquids and gases. Connecting vessels. Atmospheric pressure. Barometer aneroid. Manometers. Hydraulic press. Pump. Archimedean force. Conditions for floating bodies. Sailing of ships. Floating in the air.	Vertical and horizontal directions. Connecting vessels. Gateways. Water pipe. Fountain. Floating in the air. Bathyscaphe. Atmosphere. Atmospheric pressure. Changes in atmospheric pressure depending on altitude. Barometer. Height meter.
5.	Mechanical work. Power. Equality of work when using simple mechanisms. The "Golden Rule" of Mechanics. Energy. Potential and kinetic energy. The law of conservation of energy.	The wind. The work of the wind. The work of water. Wind engines. Water cycle in nature.
6.	Temperature. Thermometer. Temperature level. Absolute zero degrees.	The weather. Climate. A small meteorological field near general secondary schools. Thermometer.
7.	Heat action. Internal energy. Methods of changing the internal energy of the body. Thermal conductivity. Convection. Examples of convection phenomena in nature and technology.	The sun. The importance of sunlight and heat for life on Earth. Air heat transfer. Air heating and cooling. Warm and cold currents in the ocean. The wind. Causes of wind. Sea breeze.
8.	Melting of bodies. Specific heat of fusion. Evaporation. Specific heat of vaporization. Boil.	Freezing of water. Melting of ice and snow. Melting point of ice and boiling point of water. Water vapor in the air and precipitation. Formation of hail.
9.	Heat engines. Efficiency of heat engines. Use of heat engines in the national economy.	Human labor in agriculture. Preparing the technician for work. Nature protection.
10.	Combustion heat of fuel.	Natural gas and oil. Coal. Combustible minerals.
11.	Saturated steam. Dependence of saturated vapor pressure on temperature. Boil. Air humidity and devices that measure it. Surface tension. Surface tension force. Capillary phenomena. Getting wet.	Hydrosphere. Water cycle in nature. Oceans. Seas. Armpits. Straits. Continents. Islands and peninsulas. Underground and surface water. Characteristics of local waters. Formation of underground waters, their use. Water reservoirs. Channels. Air saturated and unsaturated with water vapor. Dependence of the amount of water vapor on the Earth's surface and air temperature.

12.	Electrification of bodies. Two types of electric charges. Interaction of charged bodies. Electric field.	Electrical phenomena occurring in nature. Polar precipitation. Lightning. Lightning deflector.
13.	Electric current. Current strength. Current sources. Electric circuits.	Current sources. Electric circuits.
14.	Electricity in different environments.	Electrical phenomena in nature.
15.	Interaction of vines. Magnetic field. Magnetic induction vector.	Magnets. Magnetic deposits. Compass. Determining the directions of the world using a compass.
16.	Transformers. Electricity production and transmission.	Sources of electricity. Electricity generation and use.
17.	Laws of geometric optics.	The effect of sunlight on the Earth's surface. Importance of sunlight.
18.	Photo effect. Laws of the photoeffect. Photocells and their use.	Photocells. Solar batteries.
19.	Fission of uranium nucleus. Nuclear reaction. Use of nuclear energy.	Labor resources. Development of the national economy. Economic development of different districts.

In turn, the knowledge acquired in the course of physics will be useful in learning other subjects. In particular, the concepts and phrases in the above table can be used when studying the relevant subjects of natural sciences and geography.

In the process of demonstrating the types, forms and content of interdisciplinary connections, it is determined to what extent pupils have mastered other disciplines and ensures that they fully and deeply understand the essence of the studied materials [6-13]. Interdisciplinary connections increase the content of knowledge at scientific-theoretical and educational-educational levels, and activate the mental activity of the pupil.

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