UDC: 539.46.38

ABOUT INTEGRATION OF DISCIPLINES IN PHYSICS EDUCATION

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Annotatsiya.*Maqolada ta'lim tizimiga fanlararo integratsiya muammosi o'rganilgan. Fanlararo integratsiya talabalarning mustaqil ijodiy qobiliyatlarini oshirish, ularning dunyoqarashi va ilmiy tafakkurini oshirish va shakllantirish, pirovardida butun ta'lim jarayonini takomillashtirish vositasi sifatida ko'rsatilishi ko'rsatildi.*

Kalit so'zlar*: fanlararo integratsiya, fizika, kimyo, matematika.*

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Аннотация. *В работе изучена проблема междисциплинарной интеграции в образовательной системе. Было показано, что междисциплинарная интеграция представлена как средство повышения самостоятельных творческих способностей студентов, повышения и формирования их мировоззрения и научного мышления и, в конечном итоге, улучшения всего учебного процесса.*

Ключевые слова: *междисциплинарная интеграция, физика, химия, математика.*

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Abstract.*The problem of interdisciplinary integration in the educational system is investigated. It was shown that interdisciplinary integration is presented as a means of increasing students' independent creative abilities, increasing and shaping their worldview and scientific thinking, and ultimately improving the entire educational process.*

Key words: *Interdisciplinary integration, physics, chemistry, mathematics.*

The problem of interdisciplinary integration is one of the main problems of pedagogy, which contributes to the comprehensive development of the general worldview of future specialists, will improve the quality of scientific knowledge, the systematic mobility of education. The methodological basis of interdisciplinary integration is the integrity of the material world, the unity of theory and practice, the transformation and development of the universe, society and thinking, and the psychophysiological foundations of human thinking or the nature of thinking. This makes it possible to study new aspects of the studied disciplines and has wide coverage and the acquisition of knowledge, skills and practice in the form of a deep, essentially integrated system, to form the basis for the formation of personal qualities.

Since the beginning of the last century, theoretical and experimental research methods have provided fundamental scientific results for many natural sciences, including chemistry, medicine, mathematics, astronomy and biology. The inventions created in a long time in physics led to the appearance of a completely new and modern science. An example of this is electrical engineering, radio engineering, electronics, automation of technological processes, nuclear energy, nanophysics, synergetics and many others. The role and importance of physical science in achieving the above factors is invaluable. It should be noted that with such a rapid rising of development of science and technology, it is very important to ensure the integration or interconnection between academic disciplines.

It is well known that natural subjects like physics, mathematics, computer science, electronics, geology, geography, chemistry and biology form the basis for the development of the national economy and industry. As a result of introducing the latest advances in physics into practice, great progress has been made in the fields of energy, industry, information and communication technologies. In the development of physics a huge role was played by his close connection with other sciences.

For example, the visual relationship between physics and chemistry can be traced in the preparation and use of galvanic cells or batteries in chemical laboratory work. It is known that when a zinc plate dissolves in sulfuric acid, zinc leaves two electrons on the plate and turns into a positive ion. On the plate itself, free electrons increase and become negatively charged. Thus, the metal becomes negative, and the melt remains positively charged. This indicates that in a closed system a galvanic cell is associated with physical processes, that is, electric current.

The close connection between physics and biology can be clearly seen in the process of photosynthesis. Photosynthesis is a process that occurs in plant cells up to 1 micron in size. It is worth noting that, simultaneously with photosynthesis, the processes of respiration of cells cause many decay and synthesis reactions, which are separated by target atoms. As a result of photosynthesis, carbon water can also form amino acids at the same time. It was established that the formation of fat, carbon, water and protein as a result of photosynthesis depends on the spectrum of light rays. As you can see, the use of radioactivity and labeled atoms in a physics course allows us to study the processes occurring in plant physiology.

The interconnection of physics and mathematics is manifested in the definition of certain physical quantities, as well as in the mathematical expressions of physical laws. When we talk about physical measurements like length, surface, volume, mass, temperature, path, time, it is first carefully studied and refined. Measurement of physical quantities, determination of units of measure is carried

out by performing mathematical operations. For example, in a course in electrodynamics, electric and magnetic fields are described by a lot and complex mathematical formulas. This course contains not only differential and integral actions, but also such actions as divergence or rotor, etc. This indicates a connection between two disciplines - mathematics and physics.

Mastery of these two disciplines contributes to the development of students' analytical and mathematical thinking and is an important factor in the analysis of various data and to draw conclusions, helping them to creatively solve complex problems facing them. Based on the foregoing, it can be concluded that the practical application of the interdisciplinary nature of the natural sciences in education can help achieve the best results.

Thus, interdisciplinary integration can be represented as a means of increasing students' independent creative abilities, increasing and shaping their worldview and scientific thinking, and ultimately improving the entire educational process. Interdisciplinary integration in the learning process allows:

- increase the scientific level of knowledge through a comprehensive and deeper study of the phenomena and properties of bodies;
- to shape the worldview of students through the disclosure of the unity of the material world, the interconnectedness and interdependence of phenomena;
- develop the thinking and creative abilities of students, since the establishment of intersystemic associations in the process of implementing intersubject integration leads to changes in the mental activity of students: thinking becomes more flexible, mobile, generalized.

Thus, we can conclude that the use of intersubject integration in the educational process gives a qualitatively new specificity of the educational and cognitive activity of students in the educational system.

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