IMPROVING STUDENTS' KNOWLEDGE OF SOLAR PHYSICS BASED ON AN INTEGRATIVE APPROACH

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Abstract. *In this article, the improvement of students' knowledge of subjects studied by the subjects "Natural Sciences", "Physics", "Astronomy" of solar physics based on an integrative approach is methodically investigated. The methodological possibilities of an integrative approach in improving the quality and efficiency of education are substantiated.*

Keywords: *integration, secondary schools, Earth, Moon, Astronomy, structure of the Sun, natural sciences, stars and planets, Solar corona.*

INTRODUCTION

Humanity has stepped into the period of further intensification of globalization processes in the 21st century. The fact that the international community cannot imagine itself without promising inter-country and inter-national cooperation is reflected in the development trends of recent years and many scientific studies. At the level of state policy, attention is being paid to the issue of creating a national education system that can withstand today's fierce competition on a global scale, and the consistent application of innovative pedagogical technologies to teaching processes, in particular, physics and astronomy education. This can be clearly seen in the adoption of the President's Resolution PR-5052 on March 19, 2021 "On measures to improve the quality of education in the field of physics and develop scientific researches".

It is known that the integrative approach is effectively used in the educational process. Because integration is the source of new knowledge arising as a result of the mutual synthesis of the system of various sciences and fields, and the activity aimed at determining commonalities between existing knowledge. The approach to creating these aspects is called an integrative approach. In the process of physics and astronomy education, there is a need to increase the possibilities of using an integrative approach.

RESEARCH MATERIALS AND METHODOLOGY

Acquisition of the knowledge of the science of "Astrophysics" as a result of the application of the laws, methods and principles of physics to astronomy and mastering the results of experimental observations about the Sun, theories about the nature of the physical processes taking place in it and their use in physics education processes play an important role in the formation of students' scientific outlook [4]. This, in turn, expands the possibilities of effective integration of science and education. Because the science of "Astrophysics" has been created as a result of interdisciplinary integration, therefore, it is the most correct method from the scientific and methodological point of view to convey the nature of this integrative nature to students in the process of teaching physics. Although the knowledge related to astrophysics is not specifically covered in school physics, knowledge about the structure of the Sun, the physical processes taking place in it, and the effect of these processes on the Earth has been obtained as a result of astrophysical research. In fact, knowledge of solar physics is the core of astronomical knowledge in physics taught in the general secondary education system.

DISCUSSION

In this article, we present methodological recommendations for teaching knowledge of solar physics at general secondary schools based on an integrative approach.

The 26th topic of the "Physics" textbook for the 7th grade of general secondary schools is called "The Universal Law of Gravitation", which discusses the discovery that the nature of Newton's gravitational force is not only the attraction between the Earth and the Moon, but it also applies to the attraction between the Sun and the Earth, and the Sun with other planets, the bodies around us and the Earth. In addition, information is provided on the use of rounded, approximate values of quantities when using quantities related to the Earth, Moon and Sun in solving tasks related to the law of universal gravitation [1].

Subject 51 of the "Physics" textbook for the 8th grade of general secondary schools is called "Earth's magnetic field", it describes the causes of the formation of polar ice, the Earth's protective properties of the Earth's magnetic field, in which the picture of interaction of rays of the Sun with the Earth's magnetic field is briefly revealed. In our opinion, providing information about the changes that occur in animate and inanimate systems on the surface of the Earth as a result of the interaction of the Sun's rays with the Earth's magnetic field is important in increasing students' attention to the processes in nature. As a result, students' interest and desire to know the nature of these processes will develop [2].

Topic 27 in the "Physics" textbook for the 11th grade of general secondary schools is called "Light dispersion. Spectral analysis" and it initially contains information about the mechanism of the formation of the color of substances, the phenomenon of dispersion, its essence, the spectral structure of white light from the Sun, and the types of spectra of the Sun and other illuminants. Brief information on how the chemical composition of the Sun and stars can be determined with the help of spectral analysis is presented. Using the spectral analysis method in physics, the chemical composition and many other astrophysical parameters of the celestial bodies, which are the observation objects of astrophysics, are measured with great accuracy [3].

In topic 34 of the above textbook "Emergence of Quantum Physics", Wien's shift law is explained, which expresses the dependence of this quantity on the radiation wavelength when determining the temperature of radiating bodies, in particular the Sun. Some experimental measurement results are presented. In particular, the maximum radiation energy of the Sun (λ = 470 nm) corresponds to green rays, and according to Winn's law, it follows that its temperature is 6300 K.Ba’zi eksperimental o‘lchash natijalari keltirilgan. Here we can see that the method of determining the specific parameters of astronomical objects directly with physical laws is used, that is, the consistent integration of physics and astrophysics knowledge is clearly demonstrated [3].

CONCLUSION

In short, the effective use of an integrative approach in providing students with astronomical knowledge of solar physics in secondary schools is of great importance in the development of students' integrative thinking skills. This requires increasing the effectiveness of pedagogical research on expanding the scope of using the integrative approach in the educational process.

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