

INTEGRATION OF PHYSICAL AND ENVIRONMENTAL SCIENCES

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Abstract. *In the article, the laws of nature are important in teaching physics to students in revealing the scientific foundations of modern technology and technology. It helps them understand the role of laws in understanding the world around us. Environmental problems are increasing year by year due to people's wasteful use of natural resources and environmental pollution. This causes material, moral and economic problems in our society. analysis from the point of view and participation in testing these in practice will help to correct these shortcomings. In particular, as a result of the study of the physical foundations of the country's ecology and the solution to many issues related to the laws of nature, it is possible to conduct many experiments related to physical science in the field conditions of the students. In the article, 11 issues of environmental content from physics are shown and can be used in the selection of educational materials. It will be appropriate if the school uses the issues mentioned in the article in the work of every physics teacher. Using materials related to the ecology of the country, students can enrich their knowledge about their country, learn the scientific foundations of the ecology of the country, arouse interest, acquire theoretical knowledge, and practically allows students to apply their skills and abilities in practice for specific conditions. By choosing and solving problems from physics with ecological content, students will learn in-depth the physical essence of what ecological events and processes occur in the environment and attract their attention to business issues. In this regard, it is of scientific-theoretical importance to develop the criteria for choosing problems from physics in environmental content and the method of solving them in general secondary education schools.*

Keywords: *nature, physics, ecology, education, environment, country, formula, entrepreneurship.*

INTRODUCTION

Time demands the social, economic, material, and spiritual development of our society, and the improvement of the content of general education, particularly the content of physics education. it relies not only on previously acquired knowledge but also on knowledge obtained from concrete and natural sciences. For example, trigonometric functions from the math course to study mechanical vibration and waves, study electrolysis - from the chemistry course to the theory of electrolytic dissociation, and from the concepts of valence to explain the development of heat and electricity laws - to learn about the phenomena of convection and earth magnetism in nature, if attention is paid to the knowledge from the geography course, in environmental education, it is a system of knowledge about nature that should be given to young people.

Connecting the physics course with other academic subjects implies the following goals:

- formation of a unified view of nature based on the dialectical unity of natural and scientific knowledge;
- systematization of knowledge;

- formation of skills and competencies in young people to establish a comprehensive connection between events, concepts, and theories;
- to explain that interdisciplinarity is a reason for deepening knowledge;
- formation of skills and abilities to solve problems of practical content theoretically and technically appropriately, to understand the tasks of the national economy from a technical and economic point of view, based on the theoretical knowledge, practical skills, and qualifications acquired in the study of various educational subjects and labor;

In creating the content of environmental education for young people, using the continuity and systematicity of education, the materials selected from ecology should be suitable for young people and meet their practical requirements, while taking into account the characteristics of other disciplines. The content of such environmental materials will cover several disciplines. will be available.

The students' theoretical knowledge in particular subjects is used to ensure a high level of science and production, to increase the quality of products, to reduce their cost, to increase labor productivity, to create safe techniques and technologies, to protect the environment, and other creative directions are rich in content and essence. It is aimed at restoring our social and economic heritage, studying our values and spirituality more widely, and directing and promoting them. To attract the young generation, who are our future heirs, to entrepreneurship activities based on the formation of feelings of understanding and attitude towards knowledge and studies, to provide them with knowledge and understanding for self-employment. it is important to be deep and qualitative.

The history of entrepreneurship dates back to the distant past. The concept of entrepreneurship appeared in the 18th century and is one of the important factors of economy and production along with unique skills, land, labor, capital, and information. Entrepreneurship as a business mainly takes place in the industrial, agrarian, and service sectors, therefore it is considered a very complex activity and requires a special talent, knowledge, business skills, preparation, and experience. Therefore, teaching physics in connection with other subjects form the first concepts of entrepreneurship in young people.

Studying the laws of physics will closely help students to reveal the scientific foundations of modern technology and technology, to understand the laws of the environment, and to understand their place in it. students have difficulty fully understanding the importance of physics in learning about the laws of nature.

This, in turn, reduces the level of students' knowledge and interest in physics. Rural schoolchildren's interest in the ecological situation of their country, their participation in the analysis of environmental ecology from the point of view of physical processes, and their practical testing will help to correct these shortcomings. there is a need to improve the development and progress of society, the content of general education, in particular, the content of physical education.

I.D. Zverev, A.N. Zakhlebnyy, E.O.Turdigulovs, P.Yoldoshev in their scientific research works. Young people maturing in family, kindergarten, school, secondary and higher education institutions, production, and public places to consciously solve the issues of efficient use of natural resources, and nature protection, which have been shown in scientific research works to help them become highly qualified specialists for the national economy in the future. they must thoroughly learn the secrets of nature and the forms and methods of its use. Because the future is in the hands

of young people. For this reason, they should be scientifically formed with the knowledge of protecting nature and the economical use of its resources in such a way that they will be able to protect natural resources and use them in a planned manner in the future. environmental problems have arisen. The ecological problem is one of the important problems of physical science.

METHODS AND METHODS

In the selection of materials related to ecology and its scientific methodical systematization, the age characteristics of students, level of knowledge, interests, requirements of the era, and the most important physical issues of ecology were taken into account. it is obtained as a result of its implementation. A clear example of this is the fact that our scientists, relying on the foundations of science, deeply study natural resources and widely use them for the benefit of society. Scientists are making significant progress in researching land, water, air, plant, and climate resources and their systematic, rational use.

Currently, one of the important tasks facing general secondary schools is to connect physics education with everyday life. In this process, students learn to think independently, and their speech develops. Studying the laws of physics will help students to reveal the scientific foundations of modern technology and techniques, explain the laws of development of nature, and understand their place in it.

Educating students who have achieved modern science and technology, have a profession, and think creatively takes an important place. Nowadays, in a time when ecological disasters are occurring in all sectors of the national economy of our country and throughout the world, studying the physical foundations of the country's ecology remains one of the most urgent problems. In particular, it is possible to solve environmental problems as a result of studying the physical foundations of the country's ecology and solving many issues related to the laws of nature.

The connection of students with agriculture is shown by the example of solving issues of ecological content, and accordingly, the selection of educational materials and the methodology of its teaching are developed. In the teaching of physics in general secondary schools, environmental issues are rarely used in schools. It will be appropriate if the school uses it in educational work, and in the activities of every physics teacher. The study of the physical foundations of the country's ecology is carried out in the educational process together with other principles of didactics in harmony with the principle of the country's ecology.

In the lesson on solving problems, the teacher uses the local area materials related to the country's ecology to explain the laws and phenomena, forms a scientific worldview with the students, and has the opportunity to use the method of knowledge of dialectics in understanding the world. The types of environmental physics problems can vary in difficulty. Using materials related to the ecology of the country from physics, allows students to enrich their knowledge about their country, arouse interest in learning the scientific foundations of the ecology of the country, and apply the acquired theoretical knowledge, practical skills, and qualifications to specific conditions in practice. - they will learn in-depth the physical essence of what ecological phenomena and processes occur in the environment.

It is advisable to recommend several selected and structured problems from physics in environmental content in grades 9-11. Students know the need for direct theoretical knowledge to solve structured physics problems related to the ecology of the country. In the system of various forms of connection of physics education with the ecology of the country, the selection and solution of such issues are considered important links of connection of theory and practice.

The process of teaching physics problems based on the ecology of the country, allows students to be introduced to various interconnected processes or the ecology of the country. The first part consists of explaining physical processes and the content of the issue, the state of the country's ecology, determining the numerical relationship between certain quantities, writing the appropriate formulas, and drawing up equations based on one or another theoretical and experimental data. to find the magnitude consists of solving the equation as well as calculating.

Here are some examples of environmental problems used in physics textbooks.

Issue 1. Both chains of a chain tractor with a mass of 600 kg have a base surface of 1.5 m². Determine the pressure exerted by this tractor on the soil. If the mass remains constant and the surface of the chain is equal to 1 m², explain the change in the physical-mechanical, physical-biological properties of the soil from an ecological point of view

Issue 2. The mass of a wheeled tractor is 3.2 t. The total surface area of its 3 wheels is 0.5 m². Find the pressure exerted by this tractor on the soil. Explain the difference between the pressure exerted by the tractor when it has four wheels and relate it to soil ecology.

Issue 3. Determine the pressure exerted on the soil if the volume of the soil is 7 m³ on a 4 m² surface during tillage. Explain the change in density from an ecological point of view.

Issue 4. Crops can be planted to desalinate the soil, even the upper part of the seepage waters.

Issue 5. Taking into account cotton production technology and its environmental condition, what is the amount of charge when the electric field strength between two cotton bolls with a distance between the rows of 90 cm and a dielectric constant of 8 will be 4200 V/m?

Issue 6. To prevent the occurrence of processes related to the ecology of cotton growing in agriculture, vines are applied to cotton. At what height will the resistance of cotton be $0.7 \cdot 10^{11}$ Ohm, and its conductivity will be 10^{-11} Ohm⁻¹ m⁻¹?

Issue 7. It is very convenient to determine the coefficient of fading of cotton under the influence of electric current. If the surface area of a cotton leaf is 35 cm², the current density in it is $4.2 \cdot 10^{-8}$ A/m², and the resistance is $5.5 \cdot 10^{-10}$ Ohm, what is the current strength?

Issue 8. To determine whether the cotton is thirsty for water, it is exposed to a vine. If the surface of the cotton leaf exposed to the current is 35 cm², the current density is $4.2 \cdot 10^{-8}$ A/m², and the current power is $1188.5 \cdot 10^{10}$ W, what is the resistance?

Issue 9. The salt concentration of 15 cm thick soil in 2 hectares of the saline meadow is 0.80%. This soil density is equal to 1.2 t/m³. Find the mass of salt in the soil.

Issue 10: Why can't water be sprayed on plants when the sun is shining? Explain from an ecophysical perspective

Issue 11. According to which law of physics, the oil extracted from the seed is refined, and explain its ecological importance?

The above-mentioned issues are used in the course of the lesson on relevant topics. To determine how many physical issues of ecological content are mastered by young people, oral question-answer, 15-minute dictation method, and 20-minute written work method also have a qualitative effect. ecological knowledge teaches the efficient use, reproduction, protection, and preservation of natural resources for future generations.

RESULTS AND CONCLUSIONS

In educational institutions, it was found that the above-mentioned issues are effective tools for improving the quality of knowledge of young people, and the content of the educational

materials selected by connecting the physics course with environmental issues should be simple, rich in content, and understandable for the age of the students, their ability to think, and their ability to imagine events. Students' knowledge and skills developed while learning to solve environmental problems based on physical laws and phenomena. It was found that the method of solving the physics problems of environmental content created and selected during the lessons has a positive effect on the student's mastery of the program materials from physics. are effective tools in improving the quality of knowledge of young people.

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