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WAYS OF USING EDUCATIONAL MATERIALS ON ALTERNATIVE ENERGY SOURCES AT NATURAL LESSONS

Abstract: this article explores the possibility of interdisciplinary integration in education, it shows the possibility of the integration of teaching materials of alternative energy sources in the natural sciences, and proven alternative energy solves environmental problems and others.

Keywords: interdisciplinary integration, types of natural energy, types of alternative energy sources, natural problems, education system.

At present, the education system, based on the objectives of each subject, provides a variety of training scientific-theoretical and scientific-technical concepts. During the lesson, there is the need for continuous review of students with modern achievements of science and technology.

When learning the exact and natural sciences, the use of interdisciplinary integration, the improvement is that science education system. In education, the natural sciences acquire important qualities: value, meaning and content. In the process of the formation of teachers and students express their knowledge, abilities and skills through a variety of educational methods in the forms of comparison, generalization, definitions, analysis, synthesis, deduction, induction. In the process of formation of the methods used, the methods and forms of education are diverse.

It has been proved in practice that using interdisciplinary integration you can achieve positive results in the course of the lesson. The concept of interdisciplinary integration is interpreted in different literature, as well as various methods of pedagogy and learning [2, B. 32]. In some sources, it is treated as an interdisciplinary relationship technology, synergistic technologies, and interdisciplinary integration.

Using interdisciplinary integration in the educational process accelerates knowledge generalization arising in the minds of students and presentation. As a result, data generated development skills, their self-awareness and logical discussion. If, to use interdisciplinary integration in presenting a new theme, this will increase the interest of students to the subject matter and level of performance.

In teaching methods, interdisciplinary integration is treated as a means, methods, and conditions that allow in a perfect cognition features, quality and nature of learning objects.

As a result of interdisciplinary integration, the teacher not only to update their knowledge, but also get the opportunity to work more on themselves, to increase their theoretical knowledge.

On the "Ecology" lessons using interdisciplinary integration can provide data on the areas of scientific and research work on the natural environment protection, which are conducted at the present time; on natural resources and their varieties; on natural resources and the problems of their use; questions about the protection of nature; the main directions of environmental challenges to address these problems, etc.

In the theme "Natural resources and their species" ecology of the subject, said that the natural resources on Earth is limited, and that they decrease each time, is one of the global problems of human civilization today. That is why the problem of the need to address the issues of rational management of these resources, are very relevant. Addressing these issues requires not only a broad and thorough knowledge of all the vital functions of ecosystems and Legislation of orders, but also purposeful formation known moral foundations of society [4, 6. 121]. Modern man must realize his oneness with nature, it must understand that simply need to restructure the system of social production and consumption. Rational use of natural resources is a peculiar feature of modern society. Saving man civilization simply requires a rational use of available natural resources.

In this lesson, with the above-mentioned theme will be appropriate and effective use of the following information on alternative energy sources:

– Today, the resulting energy is produced on the basis of organic waste: coal, peat, oil, natural gas and others. The use of these energy sources has its advantages and disadvantages. Firstly, the earth energy reserves such sources are very limited and they decrease with time. Secondly, the use of these energy sources are emitted into the environment different waste.

Generally used natural power sources can be divided into two groups. Alternative (reducing) energy and renewable energy sources. For renewable energy sources are: the sun, the wind, flowing water sources, power lifting or lowering of water of the oceans and seas, geothermal energy, obtained from the soil, biogas and municipal waste – gas; and to non-recoverable include: oil, coal, natural gas, nuclear power plants.

The use of alternative energy sources leads to intensive development of many countries. The increase in population, the reduction of many fossil fuel reserves, price increases with respect to hydrocarbon lead to an increase in the use of new energy sources.

The term “alternative energy” refers to energy sources that are continually recovered by natural flow of natural processes. These include solar energy, wind energy, hydrodynamic water energy, geothermal energy, heat the soil, rivers and natural ponds. In addition, anthropogenic sources of primary energy reserves: fuel derived from biomass, biogas and other organic waste.

During the lesson, the examples can be explained that the rapid development of science and technology, an increase in the world's population every day lead to the fact that there are food problems, as well as the energy, environmental, economic and social problems. Experts strongly concerned about the occurrence of the above problems, it is possible to tell the disciples on at natural subjects learned, widely using, relevant issues, terms. The use of alternative energy sources will provide clean environment preservation and prevent energy shortages [3, P. 61].

It should be noted that it is necessary to expand the use of clean, alternative and renewable energy sources to meet energy needs, and it becomes important. That is why, throughout the world, in different sectors of the economy, paying great attention to the use of alternative energy sources (Figure. 1). Renewable energy has great potential, creates great opportunities in the preservation of a clean environment, creating new jobs to meet the demand for energy.

At present time, when intertwined energy and environmental issues, it will be timely to explain the urgency of the problem, students in continuing education.

To solve the above problems, it is necessary in the population, particularly the young, to form at the appropriate level, a culture of energy efficiency. In addition, for this purpose, in a continuous system of education, in learning natural sciences, will provide relevant information about the energy deficit in the society, about how to abolish these problems.

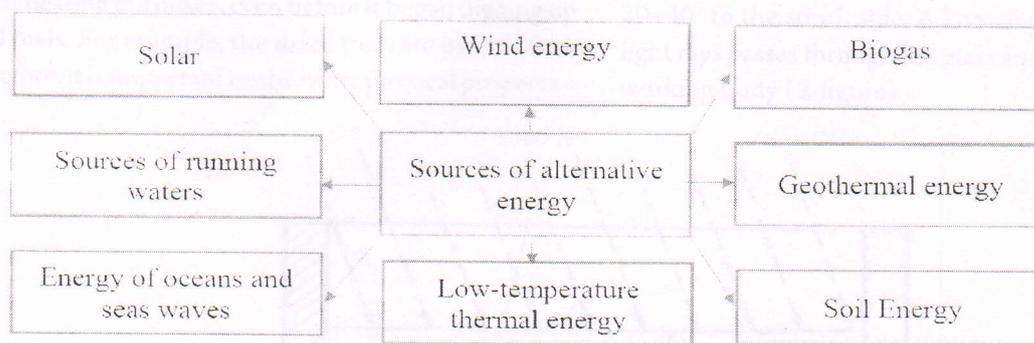


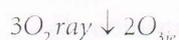
Figure 1. Types of alternative energy sources

Among the alternative energy sources, the use of solar energy is much more convenient than other forms of energy. Alternative energy is considered to be permanently restored and the never-ending worldwide, in the Earth's biosphere, the source. The main utility of alternative energy is its endlessness and environmental friendliness. Its use does not affect the energy balance of the planet, and therefore, will not affect natural processes.

In addition, in the course of the topics: "Chemical and biological effects of light", it is possible to use training materials for one of the types of alternative energy-solar energy. The molecules of the substance, swallowing light energy can be cleaved or transformed into another molecule.

This molecule conversion is a chemical process.

When exposed to sunlight, oxygen molecules of the atmosphere will turn into ozone molecules. This process is as follows:

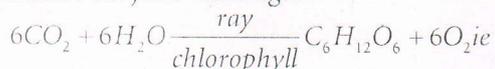


In the process of explaining this example, we recall the knowledge obtained by students in the chemistry lessons; also, the teacher uses examples for the passage of chemical processes.

Leaves of plants, from the viewpoint of optics, have a complex structure composed of a homogeneous opaque sphere. The leaves of a plant cell passes the process of photosynthesis. The leaves of the plant by photosynthesis provided nutrients carbonate anhydride absorb, emit oxygen into the environment.

The basic equation of photosynthesis is happening at the expense of solar energy:

In biology class, referring to the foregoing process, remind these subjects "cleavage".



Photosynthesis is a complex, multistep process. Organic matter of green leaves, chlorophyll is essential in this process. Energy photosynthesis, humanity may enjoy for heating purposes, even before it began digging up fossil fuels. For example, the dried trees are used as fuel. Therefore, it is important to study the physical properties

of plant leaves, the physical processes that occur in these leaves [1, P. 48].

Information about alternative energy sources also can be used at lessons of chemistry and biology.

Taking into account the above, in professional colleges, physics lessons, in accordance with each topic, you need to give information on solar technology, this will help strengthen knowledge about the possibilities of using solar energy, and contribute to independent thinking.

In the process of carrying out the topics "The Law of Reflection and Refraction of Light", "Lenses and Thin Lenses Formula", "Full Internal Return", you can use solar engineering elements.

There are many examples of the law of refraction of light. Low-temperature solar devices are covered with glass or polyethylene film. Therefore, solar energy penetrates into the device through refraction.

Solar devices such as a "warm box" that do not work by collecting energy from the sun's rays are called low-temperature solar devices.

Low-temperature solar devices include: 1) solar water desalination; 2) solar water heaters; 3) solar greenhouses; 4) solar dryers; 5) solar refrigerators.

These devices work based on the principle of the work of "warm boxes", so let us look at the principle of its operation. It consists of wood, metal or concrete box. Made of black metal plate, mountain stones, a working body is installed, which absorbs water, rays of light. The upper part is covered with glass or polyethylene film.

The manufactured box is installed at an angle of 20–40° to the south side. A known part of the incident light rays passes through the glass and is absorbed by the working body (2-figure).

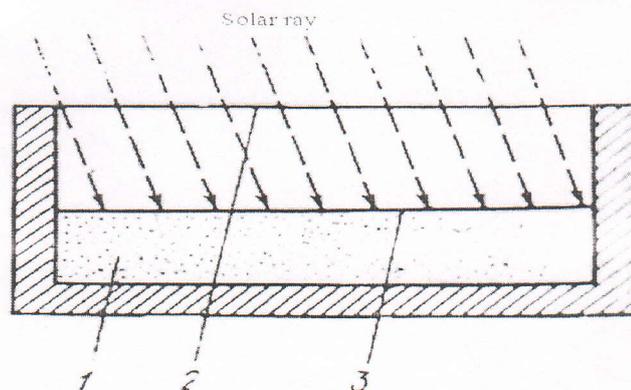


Figure 2. "Warm box" and its device: 1 – metal or concrete box, 2 – mirror, 3 – bottom drawer

The reason for raising the temperature is in the greenhouse effect. The physical explanation for this process is this: we know that the higher the body temperature rises, the shorter the wavelength of light emanating from it.

The wavelength of the rays emanating from the Sun is short, the glass conducts such waves well. Under the influence of absorbed rays, because of the low temperature, long warm waves emanate from the warmed working medium. Such waves, glass does not hold well. As a result, the box will turn into a cage holding light. Inside it rises the temperature. This phenomenon is called the "greenhouse effect" [5, B. 115].

The loss of the "retained" energy in the surroundings and the efficiency factors passing through the glass and the energy incident on the solar device are determined by the following formulas:

$$Q_{ret} = \beta Q_{inc}$$

$$Q_{ret} = Q_{dis.in.env.} + Q_{us.en.} + Q_{lost}$$

Here: Q_{inc} is the solar energy of the rays incident on the device; β is coefficient of glass radioconductivity, depends on the angle of incidence of the beam; $Q_{dis.in.env.}$ is energy, which is dispersed into the environment from the device; $Q_{us.en.}$ is use ful energy that performs work in the device; Q_{lost} is the amount of energy lost from the device.

As an example, refraction of rays from the transparent surface of devices similar to solar hotbeds, solar air heaters can be cited; Solar water heaters; Solar houses.

When teaching the natural sciences, the application of interdisciplinary integration raises the student's learning achievement, strengthens their knowledge, develops the abilities of logical and creative thinking, improves the educational process and its optimal organization.

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