AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Research in Humanities and Social Sciences
ISSN (E): 2832-8019 Volume 4, | Sep., 2022

DEVELOPMENT OF TECHNICAL CREATIVITY OF STUDENTS IN PHYSICS LESSONS USING DEVICES OF ALTERNATIVE ENERGY SOURCES

Khamdamova Nozima Muqimovna
Associate Professor of the Bukhara State Pedagogical Institute,
Doctor of Philosophy (PhD) Pedagogical Sciences

ABSTRACT

This article describes the possibilities of using alternative energy sources in the development of technical creativity of students in physics circles, the procedure for implementing the plan for designing devices in a circle. Also, a calendar-thematic plan of a physics circle was developed to develop the technical creativity of students based on alternative energy sources, the possibility of developing technical creativity of students on the example of a project to provide energy at home based on solar panels.

KEYWORDS

technical creativity, circle activity, alternative energy sources, device, design, solar panel

Introduction

Today, there is a need to use the latest information so that the product of technical creativity is at the level of modern requirements. Therefore, in the process of mastering the technology of creativity, in addition to informing students about the latest achievements of science and technology, one of the topical issues is to familiarize them with socio-economic, environmental and energy problems [3, p. . 177].

When using devices of alternative energy sources in the development of technical creativity of students in physics lessons, it is necessary to pay attention to the following:

- Draw students' attention to the possibility of using technical goals in physical phenomena and processes of the device under study;
- Providing students with examples of the use of alternative energy sources in everyday life;
- Conducting a discussion on topical issues in everyday life, technologies of use in the presented material;
- Orientation towards the integration of practical work with the studied materials in physics using devices of alternative energy sources;
- Organization of training using technical documents, animations of devices, visual aids, layouts and models, equipment and tools available in the laboratory;
- Prospects for the development of technologies for alternative energy sources, research conducted in this area, presentation of achievements achieved using modern methods and technologies, holding round tables with the participation of industry scientists [5, p. . 266].

The possibilities for the development of students' technical creativity using alternative energy sources devices in grade 8 physics lessons are shown in the table.

T/r	Topic in the program	The subject is taught on the basis of interdisciplinary integration	Study tool
one.	Electricity concept	Electricity generation based on alternative energy sources	Solar panel, wind generator, small hydroelectric model, diagram and other devices pictures, diagrams
2.	Current sources	Solar panels used for electricity supply	
3.	Electrical voltage and its measurement	Control of energy produced on the basis of alternative energy sources and the use of electrical measuring instruments	
four.	Current strength and its measurement		
5.	Assembly of an electrical circuit, measurement of current and voltage in its various parts		Measuring the current generated in a solar panel, wind turbine
6.	Serial connection of consumers	Connecting consumers to solar photovoltaic panels	Solar panel
7.	Parallel connection of consumers		Solar panel
eight.	Connecting power supplies. Serial and parallel connection of current sources.	Connecting consumers to solar photovoltaic panels	Consumers of solar photovoltaic panels
9.	Learning to connect conductors in series and in parallel	Acquaintance with the scheme of the solar device	Types of solar panels
ten.	Electric current power	Controlling the power consumed by the solar panel	Solar photovoltaic systems
eleven	Electrical circuits and connections in apartments	Solar panels used for power supply	Solar photovoltaic systems
12.	educational trip	A trip to landfills powered by alternative energy sources	Alternative energy sources

8th grade Alternative energy sources devices can be used as a teaching aid in the process of conveying information to students on the subject "Energy Sources" in physics. To do this, first of all, it is necessary to know the electrical conductivity of semiconductors, their structure and the connection of atoms with each other, their chemical properties. In this case, it is necessary to recall the knowledge gained by students in chemistry.

There are many ways to use solar energy, one of which is to generate electricity using semiconductor solar cells. [1, p. 143] . The process of converting solar energy into electricity is carried out due to the photoelectric effect. It is formed in the form of free electrons with a thickness of 2-3 *microns* in the surface layers of semiconductors. When free electrons appear on the surface of a semiconductor and there is a difference in

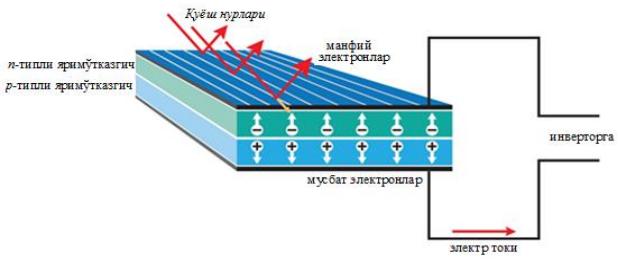

Figure 1. The process of generating electricity in a silicon solar cell.

electric potentials, an electric current arises in it. The potential difference between the emitting surface and the shadow side of the semiconductor arises due to the introduction of special additives into its surface layers. One of the additives (*n*- type) creates additional electrons and a negative surface charge, and the other (*p*- type) creates a lack of electrons, i.e. a positive charge (Fig. 2).

Silicon solar cells are mainly used. Silicon is the most abundant element on earth. Elements are obtained by melting silicon and then growing crystalline silicon in the form of a sterlet with a diameter of 5-10 *cm.* To obtain direct semiconductors, these rods are cut into thin plates with a thickness of about 300 *microns.* They are the main part of photovoltaic cells.

The manufacturing technology of solar cells is as follows: by installing a silicon wafer in a high-temperature electric furnace, it is heated p or n a type of semiconductor material is introduced into a vacuum by diffusion [4, p. 128] . The main advantages of solar panels are large FIC, long-term operation, simplicity, high specific power (the ratio of power to the mass of the cell), but relatively high cost and the need for an additional energy source are one of the disadvantages of solar panels (Fig. 2).

Figure 2. Solar battery from silicon photocells

When using semiconductor photocells as solar cells, knowledge of the spectral structure of solar radiation is one of the main aspects of the issue [2, p. 83] . Therefore, it is necessary to select a semiconductor material knowing the optical properties of the semiconductor, which indicate which parts of the solar spectrum can be used in the manufacture of a solar cell, and electrical properties, which describe the ability to efficiently convert the sun's rays. energy into electricity.

Students are taught to first use a computer program to draw a project for providing electricity to the house based on solar panels (Fig. 4). After the project is ready in a computer program, it will be possible to make a model based on it. It is possible to show the possibility of using alternative energy sources in the development of technical creative competencies of students [6, p. 195].

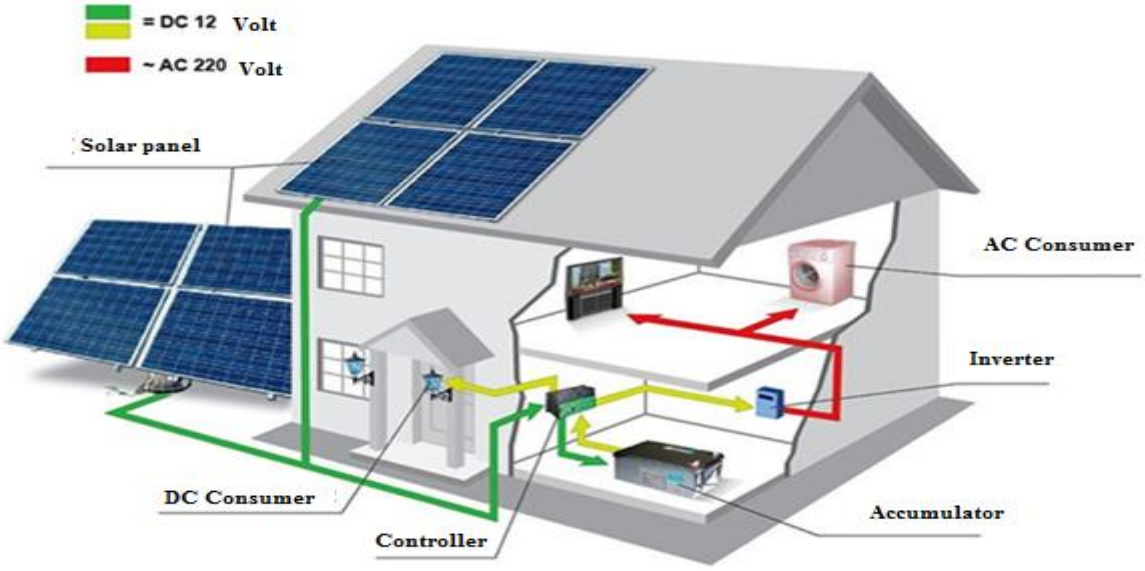

Figure 3. Provision of domestic energy supply based on solar panels.

If the above design and manufacture of models of various devices is initially carried out under the guidance of a teacher, then after sufficient development of the technical creative competencies of students, they will be able to independently manufacture various devices based on modern technologies. It is important for them to become specialists in the field of technology.

REFERENCES

1. Хайриддинов Б., Содиқов Т., Нуриддинов Б. Ўрта мактабда гелиотехника элементлари. –Т.: Фан, 1995. – 192 б.
2. Juraev Kh.O. Ways of Using Educational Materials on Alternative Energy Sources at Physics Lessons // Eastern European Scientific Journal. – Düsseldorf, 2017. № 2. – P. 83–86.
3. Juraev Kh.O. Ways of using educational materials on alternative energy sources at natural lessons // European Science Review. – Austria, 2018. № 1–2. – Б. 177–180.
4. Juraev Kh.O. Training Materials for Alternative Energy Sources in Education // Eastern European Scientific Journal. –Düsseldorf, 2017. № 1. –P. 127–131.
5. Khamdamova N.M. Use Of Alternative Energy Sources In Explaning Materials On Interdisciplinary Integration To Students// International Journal of Future Generation Communication and Networking. –Taiwan, 2020. Vol. 13, - №. 4. –P. 2667- 2672.
6. Xayriddinov B.E., Xolmirzayev N.S., Sattorov B.N. Quyosh energiyasidan foydalanishning fizik asoslari. O’quv-uslubiy qo’llanma. – T.: Fan, 2011. – 240 b.