

IMPORTANCE OF SOIL MOISTURE IN AGRICULTURE

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Abstract. *The article provides basic information about some methods of physical research, helping the students to study the laws of physics in-depth, and carry out laboratory work of ecological content. In addition, performing laboratory work plays an important role in students' polytechnic education and labor education.*

The correct organization and conduct of laboratory work in the general secondary education school in an ecological context is a reason for creating a creative situation and interest in physics classes to a large extent.

It is necessary to organize laboratory work in an ecological context in such a way that they can independently analyze the results obtained during the educational experiment and find the causes of the incident. Carrying out laboratory work in the ecological content of physics provides an opportunity to deepen the knowledge of students and introduce them to the basis of various laws in nature. Environmental problems have arisen due to the depletion of natural resources and the problems of environmental pollution. imparting knowledge is one of the important problems of physics. One of the important tasks facing schools at the moment is to connect physics education with everyday life. Conducted scientific and research works, work experiences of advanced and creative physics teachers show that in the process of teaching physics, materials related to ecology are appropriate. to be able to use it, to better understand the laws of physics, to educate them in the spirit of respect for the nature of the country where they live, as well as to help them solve the problems of career guidance. At present, when private ownership of farms and private ownership is implemented in the management of agriculture in our country, one of the main factors that cause a positive change in the environment is the ability of students to apply theoretical knowledge acquired from each educational subject, especially physics. Therefore, an example of laboratory work with ecological content is shown so that every schoolchild can relate physics to ecology and apply it to agricultural production.

Keywords: *physics, ecology, laboratory, nature, school, country, knowledge.*

INTRODUCTION

Because the problem of the interaction of nature and society in the conditions of scientific and technical revolution has not been fully solved theoretically, some laws of biosphere development have not been thoroughly studied until now. The analysis of the problem of the interaction of society and nature from the point of view of the level of development of productive forces and the development of science and technology will clarify the reasons why the ecological problem is now taking on a wide range. was an important factor. However, the harmony between nature and society began to deteriorate in the same period.

The second stage of interaction between nature and society is characterized by a certain level of development of productive forces. By this time, great changes took place in the natural environment. Certain works on purposeful change of nature have been carried out. The third stage is described as the age of steam, then electricity, and then nuclear energy. Accordingly, qualitative changes in production are important signs of this period.

Such aggravation of the conflict between nature and society has led to the deterioration of the ecological situation.

The health of the ecological situation depends on social, economic, political and other factors.

At present, the main task is to bring up well-educated, humane, and patriotic students. Solving these tasks is one of the main problems of the educational content, and the content of the educational process and teaching methods should be revised taking into account the social, political and cultural changes taking place in our society. requires construction. It became clear that the difficulties that arose during the market economy of our country exist not only in the economic sphere but also in the sphere of culture and education.

The above-mentioned problems are directly derived from life experience and needs, and their solution cannot be delayed in the conditions of the market system. In this regard, it is time to fundamentally update or improve the content of physics education, and if necessary, change it. These requirements are the training and retraining of pedagogical personnel, lessons It relies on the accumulated experience of teaching and training many students. It should not be considered a coincidence that the radical change in education is on today's agenda. Focusing educational work on solving environmental problems is one of the urgent problems of the present time.

It helps students learn about the laws of physics that occur in nature, for example, the amount of moisture and salt in the soil, its importance, the effect of solar energy on plants, sudden changes in climate, increased precipitation, and increased drought.

L. Khudoyberdiyev and E. Khakimov analyzed issues of ecological content in the teaching of natural sciences. It has been shown that it is of great importance from the point of view of training students in foreign scientific research, introducing them to the physical foundations of technology, and polytechnic education.

Thanks to this, in the works of A. N. Zakhlebniy, I. T. Suravegina, N. S. Nazarova, E. B. Knorre, the purpose and main tasks of environmental education were defined and widely covered.

In the scientific research work of H. Dusyarov entitled "Methodology of studying applied physics in secondary schools ", much attention is paid to the study of applied physics of agrochemical content in laboratory classes. The requirements for the performance of laboratory work are mentioned.

Laboratory works of the physical practicum type were selected, but the ecological content in the interdisciplinary connection was not covered.

M.I.Nazarov's scientific research work "Ecological Education of students of secondary vocational schools in the process of teaching physics" shows conducting laboratory work in an ecological direction. The laboratory work carried out, in this case, was selected related to agricultural machinery. In the scientific research works of S. Fayzullaev, Sh. Avazov, laboratory works of ecological content are shown as examples. But the interdisciplinarity of ecological content is left aside.

MATERIALS AND METHODS

From physics, we know the content of laboratory work in an ecological context, that teaching physics in educational institutions is close to the goal if it is based on experiments, that is, it is necessary to teach physics as an experimental science. Experimental education, in particular, means to observe and analyze the studied process, which allows one to observe the progress of the physical process, and repeat it at any time under certain conditions. At the moment,

there is such an idea in the teaching methodology of physics, in which great importance is attached to the independent performance of the educational experiment of the students. The main types of educational experiments in physics in educational institutions consist of demonstration experiments, frontal laboratory work, physical practicum, home experiments and observations.

Carrying out laboratory work helps students to deepen their study of the laws of physics and provides basic information about some methods of physical research. In addition, performing laboratory work plays an important role in students' polytechnic education and labour education. The correct organization and conduct of laboratory work at school are reasons for creating a creative situation and interest in physics classes.

It is necessary to organize the performance of laboratory work in such a way that they can independently analyze the results obtained during the educational experiment and find the causes of the incident. Carrying out laboratory work in physics provides an opportunity to deepen the knowledge of students, to introduce them to the basis of various phenomena in nature. Particular attention is paid to organizing the basis of the current educational process based on practical training.

Since doing laboratory work is the main tool for learning the nature of physical phenomena in the in-depth mastery of physics, it is necessary to pay serious attention to conducting such activities well and to achieve that students diligently and consciously do practical work.

It is necessary to take into account the size, content, forms and methods of the laboratory works in the ecological context, the age characteristics of the students, as well as their psychological-pedagogical compatibility with the program materials.

The task of the teacher is to be able to arouse interest in students to learn from physics in the activities of performing laboratory work in an ecological context, to study their physical, chemical, and biological essences based on didactic principles. Carrying out laboratory work in physics with ecological content will form a scientific worldview in students and allow them to know the world dialectically. It reveals the essence of the phenomena and processes of the surrounding world and the laws of their development interdisciplinary.

From physics ecological laboratory work in content perform q in the house to opportunities has:

- correct interpretation of the interdependence of natural phenomena;
- in students a sense of confidence in scientific knowledge of the laws of nature and their correct and rational use in practice;
- scientific disclosure of the inter-functional connection of the development of nature
- science - technology; scientific explanation of the harmony of theory and practice to students.

Carrying out laboratory work in an ecological context in physics lessons and extracurricular activities helps students to develop practical skills and competencies. In the process of performing interdisciplinary laboratory work in physics, the student's interest in studying the physical foundations of the ecology of the country where he lives, his aspiration, and worldview is important, and it arouses the feeling of having a positive attitude towards doing laboratory work in an ecological context.

If the laboratory works of environmental content from physics are difficult or abstract, then the student will not immediately understand the essence of such laboratory works. To help the

student, it is appropriate for the teacher to demonstrate the completion of some laboratory work in physics and environmental content, and then assign some tasks to be completed at home.

It is known that performing laboratory work teaches students the acquired theoretical knowledge, forms practical skills and competencies necessary for life and work, and helps them to choose a profession.

The teacher should always supervise when performing laboratory work from physics to environmental content. Because after the student has independently completed several environmental laboratory works in physics with the help of the teacher, he will be sure of his knowledge. In the next lesson, the student will be able to overcome fear and uncertainty and successfully perform more complex laboratory work from physics in an interdisciplinary environmental context. After the student has completed the laboratory work in physics with environmental content, it becomes interesting for him to do this work, and he begins to understand some problems in the process of training. After the student has an idea of how to perform the laboratory work, he tries to find alternative options for doing this work. Such approaches to performing laboratory work from physics in an interdisciplinary environmental context help students to consciously master the importance of the laws of nature in human life. In the process of students' active participation in agricultural work, it is important to perform laboratory work from physics to environmental content. If the student learns how to protect the plant from frostbite, what kind of temperature regime is necessary for its germination, and how to effectively use agricultural equipment in different conditions, his knowledge from the point of view of ecology will be deep and thorough. Below are some of the laboratory works from physics to environmental content:

Soil moisture depends on its mechanical composition and the amount of humus in the soil. The more silt particles and organic matter in the soil, the higher the capacity of the soil.

Soil moisture is held by a variety of natural forces, including gravity and molecular attraction in the solid phase of the soil, and molecular attraction between water molecules.

Agricultural workers plough the land in the fall, knowing the soil moisture on a scientific basis. It is natural to ask why the land is not ploughed in the spring but ploughed in the fall. In fact, in this regard, there is a proverb of the Uzbek people: "If you plough the land, you will plough it in the fall, if you don't plough it in the fall, you will plough it in the fall."

1. The capillarity of soil ploughed in autumn improves due to freezing in winter.
2. The aeration of the soil improves, microbiological processes are activated, and the conversion of humus organic matter into mineral fertilizer is accelerated.
3. When the land is ploughed in the fall, the sowing of the crop is optimal and short-term, compared to the spring ploughing, the yield of cotton increases by 15 per cent, 80-85 per cent of the harvest is accepted as the first variety, and the cost of the product is reduced.

Moisture in the soil accumulates due to atmospheric precipitation, seepage water, condensation of water vapour in the atmosphere, and irrigation water. In non-irrigated conditions, the main source of soil moisture is atmospheric precipitation.

The growth and development of plants, the activity of microorganisms, all chemical processes in the soil, as well as human production activities aimed at increasing crop yield and soil fertility, are determined by the amount and quality of water in the soil. When the tissues of plants are sufficiently saturated with water, the processes necessary for their life take place in moderation.

In dry land, seeds do not germinate, if there is not enough water in the soil, plants develop poorly and give a low yield.

If students learn how to determine soil moisture, the school can be of great help to farm managers in the micro-experiment plot, as well as in the fields, in determining the timing of irrigation for cotton and other crops. This helps to save water and prevents excess water wastage.

Moisture is important in agriculture, including cotton farming. For example, when ploughing the land, and planting seeds, it is important to take into account the depth of planting, as well as air humidity. If the seed is planted without knowing the soil moisture, then a huge amount of money will be wasted in the republic. This hurts national income.

As a result of the work on determining soil moisture, students expand their theoretical knowledge about the importance of water for plant, animal and human organisms.

The content of the work

The ability of the soil to retain moisture depends on its moisture capacity, which is divided into the following types according to the distribution of water in the soil:

1. If all the spaces between the soil particles are filled with water, the full moisture capacity of the soil is called.

2. The ability of the soil to retain the maximum amount of moisture under natural conditions without transferring it to the lower layers is called its field moisture capacity.

3. The ability of soil capillaries to absorb a certain amount of moisture and keep it in this place is called the capillary moisture capacity of the soil.

To determine the level of moisture, the soil sample is heated to a temperature of 105 - 110 ° C until it reaches a constant mass, and then the water that makes up the full moisture capacity of the soil, the field moisture capacity and the capillary moisture capacity evaporate completely.

Most plants grow and develop normally in conditions with a field moisture capacity of 65-70 per cent, that is, 18-20 per cent moisture relative to dry soil mass. In fields, the water needs of plants are sometimes determined by their appearance. In this method, irrigation periods are often incorrectly determined. Irrigation is delayed and spillage of cotton bolls is observed.

The method of determining soil moisture is very simple, and they can make several analyzes in a short time. In addition, students will be able to construct charts to help them predict cotton irrigation timings in certain fields by examining how soil moisture declines from irrigation to irrigation in different sections of their fields.

This method of determining soil moisture is based on accurately measuring, mixing a soil sample taken from the depth of the soil layer in 3 ml of water, making a clay ball from it, and measuring the diameter of the ball, to determine the percentage of moisture in the soil compared to the field moisture capacity.

TOOLS AND EQUIPMENT REQUIRED:

Porcelain cup or bowl; distilled water; measuring cylinders or a test tube with a measuring mark (5 ml), a knife; teaspoon; a ruler, a rectangular wooden or matchbox, scales and scale stones.

Soil sampling: to determine the time of the first watering of cotton, a soil sample is taken from a depth of 15-20 cm of the tillage layer, and to determine the periods of the second and subsequent irrigations, a soil sample is taken from a depth of 30 cm.

Order of work

The teacher took a soil sample from the depth indicated by the teacher. For this purpose, the ground is dug to the specified depth with a shovel, and the bottom of the pit is cleaned from the soil spilt from above, then it is softened with a knife to a depth of 3-4 cm.

Accurately measure 3 ml of distilled water using a measuring cylinder or test tube, put it in a porcelain cup or bowl and sprinkle it with a little of the soil sample and mix it with your fingers. After the mixture becomes elastic (stretchy dough), it is rolled between the palms and made into a ball. If the dough is soft, add more soil to it; adding it and turning it between the palms until small cracks are formed on its surface.

One of the rectangular pieces of wood is installed on the line showing a certain cm on the gauge, one side of the wall is poured into its wall, and the second wall of the wall is approached by pouring the second wood. After that, taking the log, and measuring the distance between each two pieces of wood, it is determined how many cm it is, and based on this, the diameter of the log is found in mm.

If the total mass of soil m_0 after drying is taken as m , then the mass of evaporated water is $\Delta m = m_0 - m$.

When describing soil moisture, it is denoted as x . $x = \frac{\Delta m}{m} \cdot 100\%$ value determines soil moisture level.

Determining the moisture level of the soil is of great importance in agriculture. Because the plants' need for water, irrigation periods and other agrotechnical and agrochemical measures are determined by the soil moisture level.

RESULTS AND CONCLUSIONS

Therefore, it is important to carry out laboratory work according to the instructions that we offer, with the following advantages:

Students are thoroughly prepared for laboratory work. The shortage of time is eliminated, and all time is spent on doing laboratory work. The instruction only accelerates the preparation for the laboratory work without distracting the students.

When writing a report, it serves as an exhibition of the finished report to the students, ensuring the perfection of the written report. Increases students' ability to work with tables and graphic literacy. Applying the theoretical knowledge acquired in practice forms the skills and competencies of the students.

In our research work, among the types of educational experiments, it is envisaged to organize laboratory works in the context of interdisciplinary ecology from physics in classes and extracurricular activities. Studying the physical foundations of our country's ecology through the example of laboratory work is one of the urgent problems in the period of current environmental catastrophes. It is desirable to carry out systematic and planned laboratory work from physics to environmental content.

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