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The Importance Of Laboratory Training In Biological Science Teaching

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Abstract: The article presents the practical importance of pedagogical technologies in the organization of laboratory classes in biological sciences.

Key words: Lobarator, experimental, pedagogical technological.

Biology studies the diversity of the structure and function of living organisms, their development, and their interaction with their environment. The plant and animal world, fungi, microorganisms, man, their organs and tissues, their function, chemical composition, life processes in them, individual and historical development of organisms is the research field of biological science.

It should be emphasized that it is important to study biological sciences on a more practical basis, based on theoretical knowledge. The success of laboratory training in all departments depends largely on the teacher's content and organization. When conducting laboratory training, students should first have a thorough theoretical knowledge of the topics [1].

In the laboratory classes, it is envisaged to study new material, observe, and implement the method of wide use of natural objects. Such trainings are held in order to gather real knowledge, to form practical skills and abilities. Usually, they embody the purpose of the work, and include the work plan and tasks.

It is very important for students to develop the skills and abilities to work with various tools (scalpel, tweezers, preparation knife, scissors and other tools) and laboratory equipment in the formation of knowledge.

There are usually several requirements for a biology classroom. The biology room should consist of 2 rooms: a classroom, a laboratory, and a living nature corner.

Directed to perform the main tasks in the biology room:

✓ □ to provide equipment necessary for organizing the educational process in order to increase the effectiveness of education;

✓ □ use of technical means of teaching in lessons and other forms of educational process;

✓ □ use of laboratory and practical training, laboratory equipment, exhibition tools;

✓ □ provision of necessary equipment for conducting classroom and extracurricular activities in biology;

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The surface of the classroom should be around 70 m2, and the laboratory room should be 35-40 m2. The biology classroom is equipped with the following necessary furniture and special equipment: a blackboard, a teacher's desk and chair, a display table, a desk and chair for students, separate cabinets for storing preparations and samples, aesthetic requirements should be given importance in the decoration of the biology classroom. The history of the evolutionary development of flora and fauna, portraits of prominent biologists should be placed on the walls of the room. All the equipment of the biology room should be adapted to conducting experiments, practical work and observations during the lesson, timely presentation of tables, video film slides, didactic and handout materials, as well as distribution and collection of tools in practical work. The laboratory room is considered an integral part of the biology room, where teaching aids, tools, utensils, that is, all the manuals necessary to organize the teaching process, are stored in it. Instructions and instructions for conducting laboratory and practical training are included in the bibliographic card system compiled on a specific topic. Necessary materials for conducting experiments are prepared at the table in the laboratory room, exhibitions are repaired. There will be a water faucet on the table. It is used for washing dishes. Conducting laboratory training requires thorough preparation from the teacher. Usually, laboratory training is conducted under the guidance of a teacher, and special attention is paid to the safety of equipment [2].

The effectiveness of laboratory training is closely related to the methodology of its organization and conduct.

First, the purpose of the laboratory exercise should be clear and students should be able to achieve it.

Secondly, all objects and equipment necessary for conducting laboratory training must be ready.

Thirdly, there should be a teacher's verbal and written explanation (instruction) for conducting laboratory training.

Fourthly, it is necessary for each student to be active during the laboratory session.

Fifth, cleanliness should be observed during laboratory training, aesthetic taste and feelings of cultural performance should be formed in students.

Sixth, it is necessary to ask the student to cover the details of the observation and experiment during the laboratory training in a special notebook.

Seventh, the work, observation, and experience of each student should be monitored by the teacher, and the teacher should give guidance when necessary.

Eighth, it is required to objectively evaluate the work, observation, and experiment results of each student during laboratory training.

According to its content, the laboratory training is devoted to the study of living organisms, the internal and external structure of some of their parts, and the life processes that take place in it. Conducting laboratory training is important in connecting students' theoretical knowledge with practice, clarifying it, forming and developing educational skills specified in the program [3].

For this reason, it is the need of the hour to have the appropriate knowledge, skills, and

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qualifications to organize, conduct, and complete laboratory training, and to conduct practical training at the required level.

Below we will introduce one of the pedagogical technologies used in the laboratory session:

Method of working in small groups of cooperative learning technology.

The course of the laboratory session:

• Organizational part.

• Acquaint students with the purpose, course, and independently completed educational tasks of the laboratory session.

• Introduction to the content and essence of the state educational standard of zoology.

• To study the minimum and maximum requirements for the acquired knowledge and skills of students given in the state educational standard of zoology.

• Analysis of zoology curriculum and textbooks of general secondary schools.

• Completion of the laboratory exercise.

7th grade Zoology. Topic: Unicellular (simple) animals

Laboratory exercise 1.

Microscopic observation of the movement, structure, and effects of the living Infusoria tufelka (Paramaecium caudatum).

Expected results.

Knowledge: Infusoria slipper (Paramaecium caudatum) (common amoeba, green euglena) will learn and study their structural features through a micropreparation.

Skill: The student observes the structure and lifestyle of single-celled animals, their movement.

Qualification: prepares an independent micropreparation and works with a microscope. A simple amoeba, green euglena and infusoria can compare the cellular structure of a slipper.

Equipment needed: aquarium water with shoe hay or one-week-old banana pods, microscope, watch glass, slide glass, cover glass, dropper, Congo red dye, glass rod, thinly cut filter paper, methyl green and acetic acid in a 1:1 ratio aqueous solution.

The order of work:

Job 1. With the help of a dropper, 15-20 drops are taken from the hay mixture that is being propagated or from the aquarium water with a week-old banana pod, dripped onto the glass of the watch, and a little red congo dye is added to it and mixed with a glass stick (the congo dye mixture should be a light reddish color). With the help of a dropper, one drop is taken from the paint solution and dripped onto the glass of the object. Ivitma may also contain hay bacillus bacteria. The shoe is made of large, shoe-shaped bacteria. It is necessary to distinguish between bacteria and shoes. To slow down the movement of the shoe, a few pieces of cotton are placed on the drop. The top of the droplet is covered with a cover glass and the water from the edges is carefully blotted on a filter paper. The drug prepared in this way is first observed in the small lens of the microscope, and then in the large lens. Usually, shoes tend to clump together around organic particles or fibers. One of the collected shoes is observed in the large lens of the microscope. The front and back sides of the shoe body are defined. A pre-oral fossa located on the side of its body, two contractile vacuoles on the anterior and posterior sides are found and

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observed. The uniform movement of the cilia creates a flow of water near the body of the shoe, and especially around its mouth. Congo red dye moves with the mouth into the digestive vacuoles, staining them red. Under the microscope, the movement of the cilia of the shoe, nutrition, digestion vacuoles and cytoplasm flow are observed. There is one shrinking vacuole on the front and back side of the shoe. Each vacuole consists of several long and thin tubes that collect fluid from the cytoplasm, a fluid collecting vesicle, and a separation tube. Contractile vacuoles contract alternately. For several minutes, the vacuole is filled with water and emptied.

Case 2. Monitoring the exposure of the shoe. A drop of clean water and infusoria hay syrup are dripped into the product window. These two drops are connected by a thin channel. A few small particles of table salt are thrown into a drop of shoestring hay syrup. In the small lens of the microscope, the transition of the shoes from the salted water to a drop of clean water is observed.

Case 3. Shoot the sensitive rods of the shoe and

track cores. Hay with shoes on the item window

it drips from the ivitma. A drop of a solution of a mixture of acetic acid and methyl green dye in water is added to this drop. The droplet is covered with a glass cover and observed under a large lens of a microscope. When exposed to acetic acid, the shoe shoots out its sensitive rods and dies. Methyl green dye stains the cores of the shoe green. In the large lens of the microscope, rods are found on the surface of the body of the shoe. These rods appear as thin threads that are irregularly arranged on the shoe. A large bean-shaped nucleus and a small nucleus located on its concave side are found in that preparation. Draw a picture of the shoe and record the body parts.

Assignment 1:

Comparative descriptions of the structure of simple animals

It is recommended to organize the laboratory training using the partial-research method. At the beginning of the laboratory session, the students' knowledge of the chapter was activated with the help of questions from the quiz [4].

In order to create a problematic situation, students are addressed with a problematic question:

1. Which substance in food undergoes a chemical change under the influence of saliva? How to research it?

Pupils try to get out of the problem situation using their acquired knowledge reserves. The beginning of laboratory training in this way enables students to consciously perform work and make correct conclusions while activating their knowledge. After that, the laboratory work is started. The teacher should make good use of the 30 minutes that should be expected during the laboratory work, distribute the following didactic cards to the students and organize an educational debate between small groups [5].

To sum up, the use of demonstration methods in the teaching of biological sciences, the use of advanced pedagogical technologies will cause students to thoroughly master biological sciences, the formation and development of natural-scientific literacy in them, and the clarification of their ideas about living nature.

The organization of laboratory classes on the basis of new pedagogical technologies serves to systematically organize the teaching process, to increase the activity of students and to quickly and qualitatively master the content of the subject.

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