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THE IMPORTANCE OF OBSERVATION AND EXPERIMENTS IN TEACHING THE FUNGI SECTION IN BOTANY LESSONS

ABSTRACT. This article explores the critical role of observation and experimentation in teaching the topic of fungi within botany lessons. It highlights how experimental methods deepen students' understanding of fungal adaptation to various environmental conditions and the structure of their organs. Through hands-on experiments, students gain a clearer understanding of the vital processes, growth conditions, and adaptability of fungi. The article also outlines two key approaches to conducting experiments: teacher-led demonstrations and independent student experimentation. Emphasizing the significance of practical observations, the study demonstrates how these methods significantly impact students' learning and comprehension in botany.

Keywords: botany, fungus, experiment, observation, demonstration, exhibition.

Introduction. In the practice of teaching biology, various teaching methods have been established, and methods that are directly related to the characteristics of scientific research methods, namely observation and experiments, the study of objects and phenomena of living nature in field conditions and laboratory exercises, are used much more often.

Observation is the perception of phenomena occurring in nature with the senses without interfering with them, or its reproduction in laboratory conditions. In the demonstration method of teaching biology, students' observation differs sharply from the observation in the practical method. In the demonstration method, students observe the tables, experiments, and the like that are presented by the teacher, measure, count, draw mushrooms or their body parts, prepare wet and dry preparations from them.

As a result of this observation, the student can submit material proving the observed phenomenon. Such observations, discoveries, and experiments can be conducted in class, at home, on excursions, and in the school microsite. They can be carried out independently by students in absentia under the direct supervision of the teacher, with oral and written submissions.

In teaching the fungi section of botany, observation and experiments play a crucial role in enhancing students' understanding and engagement with the material. Fungi, as a unique kingdom of organisms, exhibit diverse and complex features that are best understood through hands-on activities and practical engagement. Here are the key reasons why observation and experiments are vital:

Enhancing Conceptual Understanding: Observation allows students to closely examine the structural features of fungi, such as their spores, hyphae, fruiting bodies, and other morphological characteristics. This firsthand experience helps solidify their theoretical knowledge and provides a concrete understanding of fungal anatomy and physiology.

Real-world Connections: By observing fungi in their natural environment or under controlled experimental conditions, students gain a deeper appreciation for the ecological roles fungi play in nutrient cycling, decomposition, and symbiotic relationships with plants. This helps them understand the broader importance of fungi in ecosystems.

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Encouraging Scientific Inquiry: Experiments promote critical thinking, hypothesis testing, and scientific reasoning. Students can design and conduct their own experiments to explore fungal growth under various environmental conditions (e.g., light, temperature, moisture), helping them understand how fungi adapt and respond to different factors.

Experiential Learning: Practical experiments, such as growing fungi on nutrient agar or observing their spore production, give students hands-on experience with fungal reproduction, nutrition, and growth. This experiential approach solidifies theoretical knowledge and fosters a deeper connection to the subject matter.

Demonstration of Fungus Diversity: Demonstrating the diversity of fungi through experiments—such as culturing different species from soil or decaying organic matter—helps students appreciate the vast range of fungal forms and their varying ecological functions. This also helps students understand the taxonomic classification of fungi.

Developing Scientific Skills: Conducting experiments encourages students to refine their scientific skills, including observation, measurement, data collection, and analysis. These skills are not only crucial for understanding fungi but are transferable to other areas of biology and scientific study.

Promoting Independent Learning: Independent experiments and observations allow students to take ownership of their learning. By conducting their own research, students gain confidence in their ability to explore biological concepts and contribute to scientific discussions.

Fostering Interest in Microbiology: Since fungi are often microscopic or require specialized environments for observation, experiments help students develop an interest in microbiology and mycology. It opens up new avenues of exploration and inspires curiosity about these fascinating organisms.

In conclusion, integrating observation and experimental methods into the teaching of fungi in botany lessons not only enhances students' understanding of fungal biology but also fosters a deeper engagement with the scientific process. These practical experiences help students connect theoretical knowledge with real-world phenomena, making learning more meaningful and memorable.

Short-term observations are fully integrated into the structure of the lesson and are carried out with handouts. Students conduct short-term observations on an excursion at the teacher's request. For example; collecting collections of fungi, getting acquainted with information about their external structure, environmental conditions and coming to a certain conclusion are examples of short-term observations.

Long-term observations can be carried out in nature and at the school experimental site. Long-term observations carried out outside the classroom in the corner of living nature are of great importance for in-depth mastering of the issues of biology courses. For example; growing mushrooms through spores in a damp, warm, dark place, observing the development of yeast fungi under a microscope, observing the development of mold fungi in a damp, warm place.

Similar observations can also be given to students as homework and monitored for their accurate implementation. In general, observation is widely used as a research method in science. But observation is also very important as a teaching method. It is widely used in teaching natural sciences: biology, geography, physics. Observation can be carried out in the natural state of objects and phenomena or in their recreated state, as well as in the process of "demonstration". The observation method plays a very large and important role in generating broader and more accurate information about the section on fungi in the school biology course.

Experimental method: in the study of the section on fungi in the botany course of secondary schools, it is advisable to use the experimental method to thoroughly and accurately study the distribution of

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fungi, their adaptation to various conditions, and the structure of their organs. This involves studying the signs of adaptation to various conditions. The experiment can be demonstrated by the teacher or conducted independently by students. The experiment is often conducted to study the diversity of fungi. The experiment can be conducted in two different periods.

1. Short-term experiment.

2. Long-term experiment.

Short-term experiments include observing their spores under a microscope, observing their mycelium, and observing the diversity of stems and caps.

Long-term experiments are not fully conducted in biology lessons, since they require a long and long time, but only the rules of the procedure, time, and conditions for conducting the experiment are explained, and the results are reported in the next lesson after a certain period of time. Typically, students are divided into small groups to conduct experiments, which can be conducted at a training ground or in some natural setting.

Experiments conducted in the experimental field are long-term and require a lot of work. For example: to get acquainted with the life of dung fungus, it is possible to observe humus-filled soils, half of which are observed in natural conditions and half in laboratory conditions.

Changes occurring in natural conditions are observed, controlled, and measured. They are compared with other types. The results of the experiment are recorded in a special diary. Conducting experiments teaches students discipline, patience, and accuracy in conducting research.

Conclusion. Long-term experiments and observations on fungi are associated with the study of their ecological state. These works are also carried out outside of class, but the results of the experiments are used in class. In the botany course, the fungi section allows students to conduct more experiments and increase the conditions for independent work of students. If the experiments were conducted under the guidance of the teacher in the first lessons, then in the subsequent lessons they will independently complete small tasks. In conclusion, the use of the experimental method in studying the botany course at a secondary school deepens and expands the knowledge that students gain about the fungi section. Therefore, we can say that the observations and experiments conducted in the study of the fungi section are of great practical importance.

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