

## METHODS OF TEACHING BIOLOGY

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### ANNOTATION:

This article describes the methods of teaching biology, the content of biological sciences, the development of the content, forms, means and methods of teaching sciences that help them to develop as a fully developed person, to provide in-depth knowledge of biological sciences.

**Keywords:** *research, subject of study, pedagogical knowledge, level of development, dynamic, audio.*

### INTRODUCTION

The methodology of teaching biology is the science of teaching, processes, principles and laws related to the basics of biological science. Knowledge of these principles and laws allows the teacher to organize and manage the educational process associated with the course of school biology in accordance with modern requirements.

The methodology of teaching biology aims to introduce the content of biological sciences, its forms, methods and tools of teaching.

The main task of biology teaching methods is to provide students with in-depth knowledge of biological sciences, to develop the content, forms, means and methods of teaching subjects that will help them to develop as a comprehensively developed person. Any science is related to the research activities of man, which is aimed at gaining knowledge about things and events, as well as the research is aimed at gaining a complete and in-depth knowledge of events. The main function of science is research [2].

The methodology of teaching biology as a science aims to study theoretically and practically the knowledge, upbringing and development of students related to this subject. The main feature of science is the accuracy of the purpose, the subject of study, the methods and forms of knowledge. At the same time, it is important to know the history of the development of science, the discoveries that led to its enrichment.

Methods of teaching biology are part of pedagogical disciplines. Therefore, the goals and tasks before him also stem from the general pedagogical goals and objectives. The methodology of teaching biology is aimed at the application of pedagogical rules, which apply to all disciplines, to the biological teaching material. At the same time, the methodology of teaching biology combines natural, scientific, biological, psychological, pedagogical knowledge.

The methodology of teaching biology determines the purpose of teaching biology, the content, the principle of selection of biological knowledge.

The effectiveness of biology teaching at the present time is determined by the fact that students have acquired the biological knowledge, skills, abilities necessary for participation in learning, work and social activities. They, in turn, are reflected in the students' upbringing, attitudes, beliefs, attitudes towards nature, society and the individual. The level of development of students is characterized by their ability, need for physical and mental improvement. The purpose of teaching biology stems from the factors mentioned above. Knowing the goals of teaching biology allows the teacher to manage the teaching process. The tasks of biology teaching methods as a science are as follows[1]:

- 1. Teaching and educating students, the science of reading in maturity
- determine the location;

- 2. On improving school curricula and textbooks
- development of recommendations and their implementation in school practice;
- 3. The content of academic subjects in accordance with the age of students
- 4. Taking into account the peculiarities of the biological sciences
- case, development of teaching methods, organizational forms;
- 5. Identify the equipment needed for use in the training process.

Biology room is a living corner, the organization of experimental land area, the use of natural, visual, dynamic, audio, video tools. The object of teaching methods in biology is the educational process associated with this subject.

The subject of biology teaching methods is the purpose, content, teaching methods, forms of biology, education and development of students.

Depending on the subject taught in schools, the subject "Methods of teaching biology", "General methods of teaching biology", "Methods of teaching botany", "Methods of teaching zoology", "Methods of teaching man and his health" and finally "Methods of teaching general biology" private teaching is divided into methodological disciplines[2]. The general methodology of teaching biology covers such issues as the purpose, tasks, content, principles, methods, tools, forms, history and stages of teaching biology in all biological sciences. Private methodologies focus on the content of a subject, age-related lessons, extracurricular activities, extracurricular activities, excursions, organization of practical and laboratory classes, equipment.

At the present stage of the socio-economic development of society, fundamental changes have been made to the goals of personal development, which led to the emergence of new categories, methodological approaches and goals in many areas of activity. Higher pedagogical education, in particular the professional methodological unit, cannot remain aloof from these trends.

Thus, the goals of the biology teaching methodology at the present stage can be formulated as follows[3]:

- to ensure the mastery of basic knowledge of the fundamentals of biological science;
- to form an orientation in the main methodological problems of biology and modern natural science in general;
- introduce linear and integrated biology courses in various educational systems;
- to develop the concept of the forms and methods of the subject educational process in the system of general education;
- to teach the skills of compiling a system of lessons, individual topics of lessons, excursions;
- to ensure the mastery of methodological skills for conducting a demonstration and laboratory school experiment;
- to form the skill of analyzing the concepts of curricula and the content of various textbooks, teaching aids, workbooks and other materials;
- prepare the development of training manuals that provide visibility in teaching.

The objectives of the methodology for teaching biology at the present stage of development of society are:

- the study of ways of knowing the world from the point of view of science, art and religion; their consideration when getting acquainted with objects and phenomena in the course of biology;
- mutual complementation of tendencies of humanization and technologization in society and the education system; their implementation in subject education;

- determination of the moral and material values of the modern world, as well as the role of natural sciences in the creation of universal human values;

– conveying natural science information to students and identifying their professional inclinations in subject education;

- modernization of school biological education, due to modern achievements of science and practice in the field of biology;

– formation of environmental education as an integrating component in natural science education.

The methodology of teaching biology, based on numerous pedagogical studies, characterizes the various types and types of education that have historically developed in the national school. N. V. Bordovskaya in the book “Dialectics of Pedagogical Research. Logical and methodological problems” (St. Petersburg, 2001) names and describes seven types of education in the national school.

The first historically established type of education - Socratic education - is named after the ancient Greek philosopher Socrates. The learning process went with the help of leading questions to search for the truth. It is believed that Socrates widely used this type of teaching, which is used in school today[4].

Dogmatic learning - mechanical memorization from the words of a teacher or from a book and verbatim reproduction of a heard or read text. This type of education appeared at school back in the days of V.F. Zuev is still used in biology lessons.

Developing education is the comprehensive development of students, the development of independence in obtaining knowledge and skills. The teacher is the organizer of the search process, activating the cognitive activity of students. In addition, the teacher, together with the students, participates in the formulation of theoretical positions, hypotheses, versions when considering individual facts. This type of teaching is widely used by experienced, creative biology teachers.

Explanatory-illustrative education, which is sometimes called passive-contemplative, is the transfer, assimilation of knowledge and their application in practice. The main responsibility of the teacher is to present the educational content using visual and illustrative materials and ensure their assimilation at the level of reproduction and application in solving practical problems. This method is widely used in teaching biology.

Problem-based learning is a type of learning based on the idea of psychologist S. L. Rubinshtein about the method of developing human consciousness through the resolution of cognitive problems. Therefore, this type of learning is implemented by setting (by the teacher) and resolving (by the student) a problematic issue, a problematic task and a problematic situation.

A problematic question in itself does not have a problematic content, but involves, with its help, the organization of the search for truth and different answers.

A problematic task is an educational and cognitive task, which is based on a contradiction between the knowledge available and the knowledge necessary to solve the problem[3].

A problem situation arises when a student seeks to solve a difficult problem, but he does not have enough data, and he must look for them himself.

Programmed learning is a type of knowledge acquisition based on the cybernetic approach, according to which learning is considered as a dynamic system, the control of which consists of two main operations - the transmission of commands from the teacher, the computer and the student's response (self-assessment or action).

Biology as an academic subject is a system of concepts that develop in a logical sequence and are interconnected. The whole system of concepts is determined by the composition of the basic sciences included in the school subject. Therefore, the basic concepts are morphological, anatomical, physiological, ecological, etc.

These concepts can be simple or complex, as well as special or general biological. A simple concept includes one element of knowledge, but, gradually as it gets more complicated, it gets more complicated. For example, the simple concept of "leaf" (shape, color) turns into a complex concept with all its constituent components (anatomical, morphological, cytological, etc.).

The concepts of "flower", "fruit" undergo the same development. In the course of zoology, the concept of each animal also combines the concept of morphology, anatomy, physiology, ecology and, in parallel, develops the concept of the evolutionary complication of organisms[1].

In anatomy and physiology, simple concepts are combined with complex concepts about the anatomy of each organ, for example, heart, lung, brain, etc.

Special concepts are concepts that develop within the same course. Among them there are local concepts - within the same topic. For example, "mineral nutrition of plants" (botany).

Special concepts:

- a) botany - "photosynthesis", "morphology of the root, leaf", etc.;
- b) zoology - "animal structure", "animal ecology";
- c) anatomy, physiology - "cellular structure", "structure of human organs", etc.;
- d) general biology - "ATP", "autoreproduction", "genotype", etc.

Classification of special concepts:

- concepts about objects, individual organisms or organs;
- concepts of physiological processes;
- concepts of relationships (ecological, phylogenetic, physiological, structure and function, etc.)[2].

General biological concepts generalize special concepts.

For example, a cell - as a unit of life, the unity of the structure and function of organs, the relationship of the organism and the environment, metabolism, energy conversion. The task of teaching is the systematic formation and development of concepts.

## **FEATURES OF THE FORMATION OF CONCEPTS.**

In botany - special botanical concepts give rise to general biological ones, therefore they must be clearly marked. It is necessary to note the development, the complication of organisms in the process of evolution.

In zoology, when studying each main representative of a type or class, a complete sum of concepts about an animal is provided (external and internal structure, vital functions, lifestyle, habitat, place in the animal world system). The concept of the cellular structure of organisms, ecology is expanding.

Anatomy and physiology - concepts of anatomy and physiology, morphology, histology, medicine and hygiene, and physical culture are being developed. Many concepts of anatomy and physiology originated in botany and zoology.

General biology - the concepts obtained in previously studied courses are developed, enriched and abstracted from facts to general concepts. For example, "fitness", "variability", etc. Each concept should be mastered so that students can freely operate with them.

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