

METHODOLOGY OF TEACHING BIOLOGY BASED ON HEURISTIC EDUCATIONAL TECHNOLOGIES

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Abstract. *The article describes the specific pedagogical features of the methodology of teaching biology based on heuristic teaching technologies, methods of organizing educational activities based on teaching logical, analytical thinking and self-control, organizing creative work and didactic goals.*

Keywords: *heuristic learning technologies, the content of logical work, its forms, methods, teaching aids, methods of "Interview", "Narrative", "Panel discussion", "Eureka", "Verbal discussion", "My discovery", "Modeling".*

The policy of the education system of the developed countries of the world determines the need for students to acquire knowledge and master new innovations, the need to improve the quality and efficiency of basic educational, scientific, independent and creative processes

thinking with the aim of forming educational, scientific, independent and creative thinking of a versatile personality.

Heuristic and research methods require that students have the skills and competencies to be able to organize high-level cognitive activities that are creative in nature. This technology is intended for high school students. In ancient Greece, heuristics was understood as a learning system taught by Socrates, that is, the teacher focused the student on thinking in order to solve the problem on their own.

Heuristic learning allows the student to gain not only knowledge, but also the achievement of personal goals in the lessons, ways of mastering the subject being studied, forms of expression and evaluation of learning outcomes.

Heuristic learning aims to solve a problem faster or find an approximate solution using methods when heuristic (Greek for "find, discover") technology optimization methods are very slow. This technology is more relevant for natural and exact sciences. In particular, in the heuristic search hypothesis (Allen Newell and Herbert A. Simon) the system of physical symbols is repeated over and over again until the structure being built matches the structure of the solution.

The goal of heuristic learning technology is to form a versatile personality in students by developing logical, critical, analytical, creative thinking of biological concepts. This technology is distinguished by optimality, completeness, accuracy and speed.

Research methods in heuristic technologies represent a high level of cognitive activity, which acquires a creative character among students. Heuristic technology is focused on independent work, independent acquisition of new knowledge.

In heuristic teaching, the teacher is faced with the task of finding the most important aspects of each topic and creating conditions for the student's initial creative search. It is only after the student has created his own concepts, assumptions, and original products of knowledge that he is invited to become acquainted with the achievements of mankind on these problems. And here the

student does not just receive ready-made knowledge, but compares them with the results of his own experience.

In the formation of critical thinking among students: firstly, in modern education, the main emphasis should be on the selection of educational materials that form the critical thinking of students, and secondly, in the didactic design of the educational process, innovative methods should be used that improve students. Thirdly, it is necessary to take into account the special importance of the most important psychological qualities of students (after all, critical thinking is inevitably reflected in the field of mental activity, interest, attitude, external forms of behavior, socio-ethics).

The limits of application of heuristic learning are determined by the teacher. Practice shows that the study of any subject of the curriculum can be organized as a creative activity for students of any age. Students usually welcome the opportunity to express themselves creatively and exceed established educational requirements and standards.

Since the imagination is limitless and its manifestations are unique for each person, the teacher is faced with the task of making the learning process bright, dynamic, and interesting through creative activity.

The heuristic learning technology uses the methods Interview, Storytelling, Panel Discussion, Eureka, Verbal Debate, My Discovery, Simulation. Using these methods "Eureka", "Interview", "Storytelling" in biology education gives effective results during the lesson.

Eureka method.

In this method, students are encouraged to find a solution to the problem using an electronic library, laboratory practice, extracurricular activities (wildlife corner and experimental zone a) and various books, resources. The role of the teacher is to manage the learning process and the students act independently throughout the process. Using creative thinking and the power of imagination, they try to find suitable solutions based on some kind of logic. They share their experience. This learning strategy describes:

1. Develop an approach to solving a thematic problem.
2. Development of a scientific approach to the problem.
3. Develop the ability to express yourself.

Its main principles:

1. Give as much time as possible to each student at a time.
2. Encourage the student to learn as much as possible on their own.
3. Give advice on choosing the most appropriate solution to the problem.
4. The problem is related to the lesson and curriculum.
5. Set aside a specific amount of time to complete your research.
6. When identifying problems, the abilities, interests and choice of topic of students should

be taken into account.

Based on the above considerations, it is worth teaching students to work on the following tasks related to logical, analytical thinking using this method.

Homework. Place the following plants in the table according to their life forms.

1) hawthorn; 2) strawberries; 3) wild rose; 4) yaloko; 5) cinquefoil; 6) rose; 7) apricot; 8) almonds; 9) pear; 10) blackberry; 11) quince; 12) gray blackberry; 13) cherry; 14) spirea; 15) cherry; 16) cotoneaster; 17) peach; 18) cherry plum.

Plants related to Rosaceae		
perennial herbs	shrubs	Trees

Exercise. Read the topic and complete the table.

Special features of rosaceous plants	
Number of orders and species on earth	
Number of orders and species in Uzbekistan	
life forms	
Root	
Stem	
Leaves	
Flowers	
Fetus	
flower formula	

Advantages method Eureka:

1. Helps achieve cognitive, affective and psychomotor goals, i.e. helps the child develop all around.

2. Independent study of the situation by the student. This is sure to develop students' self-confidence.

3. Helps develop students' scientific thinking and creativity.

4. The teacher encourages students to explore the environment by solving problems. Thus, they discover some new knowledge for themselves.

5. The teacher is always ready to give individual instructions for solving problems. In this method, the interaction between the teacher and the student takes place in a comfortable atmosphere of cooperation.

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