

THE PROBLEM IN BIOLOGICAL EDUCATION AND THE METHODOLOGICAL SYSTEM OF FORMATION OF SKILLS FOR SOLVING EXERCISES

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ANNOTATION

The formation of the content of interdisciplinary interaction in the context of the development of methods for solving problems and exercises in biological sciences in the system of continuing education is the basis for ensuring the continuity of biological knowledge, skills and abilities of students. This article highlights a specific methodological system for teaching students to use tasks and exercises of a logical orientation in all forms of biology education in order to develop skills of independent and creative thinking in the classroom, in extracurricular work and in extracurricular activities, which can be used as a methodological basis by biology teachers of secondary school.

Keywords: Problem and Exercises, Creative, Motivational, Integration Approach, Biological Concepts, Theories, Law, Logic, Creative, Independent Thinking

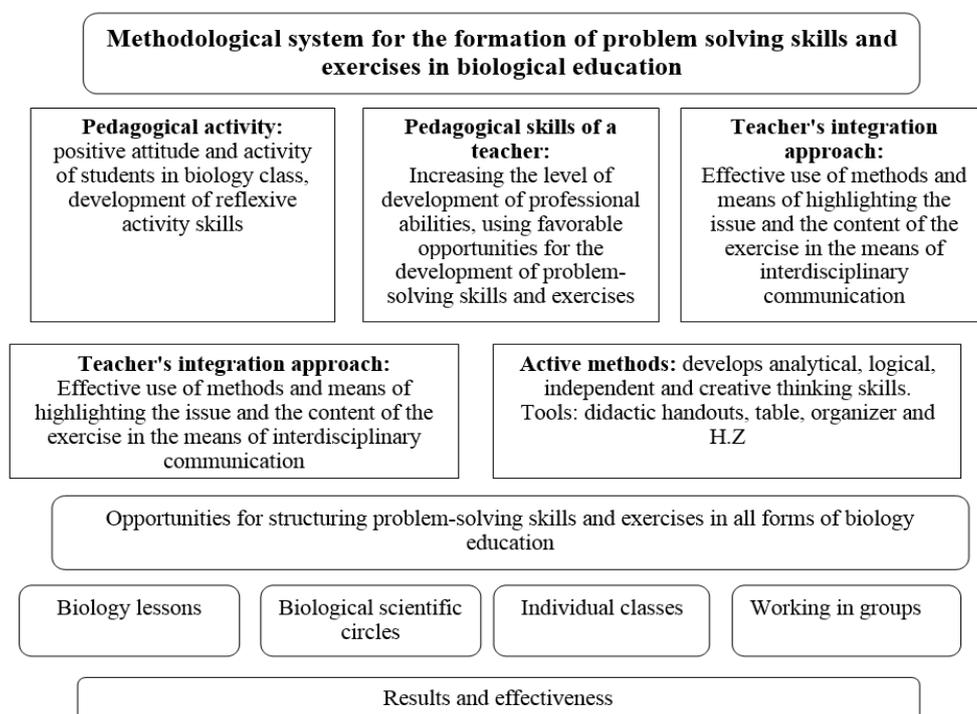
The President of the Republic of Uzbekistan Sh.M.Mirziyoyev noted that the development of chemistry and biological sciences in our country, improving the quality of education and the effectiveness of science in these areas, in-depth training of our sons and daughters in chemistry and biology, the creation of new production enterprises in the regions, the development of pharmaceutical, oil and gas, chemical, mining, food and other industries, creating high added value. It stimulates the accelerated development of the food industry and, ultimately, it lays a solid foundation for improving the living conditions and incomes of our people [1]. In the content of the requirements for teaching biology at all levels of continuing education, the implementation of such tasks as improving the quality and effectiveness of training, establishing innovative and integrative activities is of great importance. To this end, it is advisable to improve the methodological system of biological education, to form a scientific worldview of students in combination with effective methods of educational and cognitive activity, to develop and put into practice a set of tasks and exercises of a creative and motivational approach. This requires a biology teacher to have scientific potential, creativity, innovative activity, initiative and creativity.

From the analysis of the studied scientific and pedagogical literature, it became clear that solutions to problems and exercises in biological education are presented in most scientific literature, however, the development of a scientific and methodological system and the recommendation as a methodological guide for biology teachers of favorable opportunities for the content of problem solving skills and exercises in students determined the content of our

research work. In the content of our research work, the methodological system for building problem solving skills and exercises in biological education is justified as follows (Fig.1).

When teaching biology, it is necessary that students, in the process of developing activities for solving problems and exercises, can return the studied material, apply it to further study of biological theory and apply it to solving problems. To memorize new knowledge, it is necessary to use various perception techniques: auditory (the speech of the teacher and students), visual: videos, multimedia, the use of drawings, reading books, writing in notebooks, visual aids, attentive memorization is also facilitated by the speech of students, which ensures the creativity of the student [2].

Figure 1



In biological education, one of the most effective methods of acquiring biological knowledge by students is to highlight the content of the topic with the help of questions. An important task currently facing biology teachers, as well as any school teacher, is the development of students' skills of independent cognition of biological concepts through their logical thinking, awareness of the causal relationships of previously acquired knowledge with new material, comparison, generalization. When organizing the cognitive activity of students, it should be noted that the educational process should be carried out in a holistic, systemic state, knowledge, skills and abilities should be formed in harmony with each other. In this process, it is advisable to use questions and exercises from biology that encourage logical and analytical thinking. The task is to solve the supposed unknown with the help of certain learning methods. Independent work

on the issues allows you to develop educational and cognitive activity for each student. In any question, there are difficulties of a certain level that students must overcome using previously mastered knowledge, skills and abilities.

On the other hand, the widespread use of exercises in educational, extracurricular work on teaching biology and in scientific circles is becoming important. This situation makes it possible to consolidate the knowledge previously acquired by students, to form skills and abilities [3].

As a result of the use of biology issues and exercises, as well as various tasks:

- a) the work and cognitive activity of students on themselves is activated;
 - increased interest in learning the basics of science, theoretical and practical skills;
 - develops the scientific worldview and logical thinking of students;
 - the knowledge gained during the training course will be consolidated;
- b) the essence of biological processes and phenomena is revealed;
 - application of previously acquired knowledge in new situations;
 - implementation of interdisciplinary links;
 - it is possible to ensure the harmony of theory and practice.

Despite the fact that the question and exercises in biology are of great scientific and practical importance, this problem is theoretically not solved to such an extent as to please all biology teachers. The nature of the guidance of students' cognitive activity the use of questions and exercises during reading and learning is to establish the independence of students' thinking and behavior, as well as the level of their activity [4].

Allows students to independently explore the problem and exercises that can be obtained mainly as evidence confirming and clarifying the acquired knowledge, or in a ready-made form. The task and exercises aimed at making students think more independently assume that students themselves gain new knowledge by making observations, logical reasoning and drawing conclusions. The questions and exercises used in biology teaching teach scientific concepts to be systematic, consciously relate to the protection of nature and the environment, apply industrial and agricultural, medical and general biological knowledge. Performing various tasks, consistently preparing answers to questions, allows you to consistently study general biological concepts, laws, theories and views set out in the program.

According to the teaching methods used in the process of solving problems and exercises by students used in teaching biology:

- a) logical task and exercises;
- b) creative consists of research tasks and learning paths.

The specific methodological foundations for solving logical tasks and exercises are as follows: determining the direction of the content of the educational material, teaches students to identify the main idea, the ability to compare, generalize, master the techniques of mental activity, develop abstract thinking, comprehend cause-and-effect relationships [5].

According to the task and didactic purpose of the exercises:

- a) Systematization of knowledge previously acquired by students;
- b) Acquisition of new knowledge and skills using previously mastered knowledge, skills and abilities;
- c) Consolidation of acquired knowledge, skills and abilities, their application in practice;
- d) Monitoring and evaluation of acquired knowledge, skills and abilities;
- e) Comparison of the previously studied object with the studied one is divided into tasks and exercises designed to identify similarities and differences.

The didactic purpose of the task and the exercises determine its content. When drawing up a task and exercises, the teacher, along with establishing its explanation, content and conditions, must take into account the practical, educational, as well as problem solving and exercise skills available to students, and avoid mental overstrain of students.

Solving problems in biology lessons has an educational value. Problem solving helps students apply their theoretical knowledge in practice, develops their thinking skills and subject competencies. Students fully perceive the essence of the task and exercises through certain patterns and algorithmic dualities. In addition, biological science is being integrated with mathematics, physics and chemistry [6]. Teaching a teacher to solve a problem, exercises should begin with providing them with thorough and detailed knowledge. In order for students to master the knowledge that meets the requirements of the program, when passing each topic, the teacher must not only give ready-made knowledge by showing a table, a filmstrip or a video tutorial, but also increase their activity by breaking the educational material into parts (fragments). It is important to ask problematic questions, conduct a lesson in the form of a dialogue, make extensive use of the board, for example, so that the parent and hybrids record the genotype and phenotype of different pairs, extract gametes from mono-di-poly hybrids, analyze the diversity between hybrids on the board or explain the mechanism of gene interaction by recording. The degree of assimilation of an academic subject is determined not only by theoretical knowledge, but also by the ability to apply the acquired knowledge in various conditions. If a student does not know how to solve math problems, it shows that he does not know mathematics. Even if he knows all the theorems and laws. Unfortunately, many people do not understand that this also applies to biology. The knowledge acquired by students is determined not by the number of biological terms that we often require from students, but by their ability to apply them in problematic situations. Questions and exercises occupy the main place in the formation of mental activity, scientific outlook of students. Working on tasks-exercises and tasks for mastering the subject of zoology, students acquire a complete assimilation of the text of the topic being studied, depending on biological concepts. The task

and exercises teach students to systematize their scientific concepts, properly relate to nature conservation, apply their knowledge to production and agriculture, healthcare, general biological and at the same time zoological. Performing various tasks, consistently preparing answers to questions allows you to consistently study general biological and zoological concepts, laws, theories and views set out in the program. He also forms such traits as resourcefulness, tact, love for mother nature and work, interest in a profession related to biology. The task and exercises that are given in biology require a creative approach and integration.



Creative exercises: The word Creative in Latin means “to create” – a creation expressing a person's ability to create, to create. Creative task-exercises used in biology develop not only the creative, creative activity of the student, but also play an important role in the formation of the ability to think independently [7]. Below are some creative type exercises.



1. The dragon tree (dracaena) is found on one of the Canary Islands - Tenerife, Icod de los Vinos. It is believed that it is about 650 to 1500 thousand years old, but experts find it difficult to make an accurate conclusion because it does not have a single stem. It consists of small rods connected to each other as they grow towards the top. It has a dark canopy consisting of leaves, and got this name because of the glue that the bark or leaf separates when cut. Residents believe that this is dried dragon's blood, and have long used it to treat various diseases. What other rare plants similar to the dragon tree do you know?

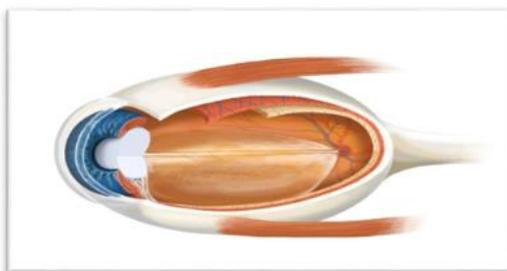
Answer: baobab, Thule tree, Wollemia, Southern Agathis, banyan

2. Scientists have found out that the average life age of a fish can range from 2-3 years (carbon) to 150-200 years (osiotriaceae), depending on its species. When determining their age, the number of people on their coins is usually taken into account. What other

organisms do you know to determine the age in nature? Which organs should I pay attention to when determining their age?

Answer: on trees, counting their annual numbers, on turtles, looking at their bowl

Integration issues: Integration comes from the Latin word "integration", which means restoration, replenishment. Integrative tasks-exercises used in biology, provide a process of convergence and interaction of sciences, create the possibility of interdisciplinary connections. Integrative type task-examples of exercises include the following tasks.



1. There is a vitreous body filled with liquid in the eyeball. Explain the importance of filling this vitreous body with liquid. What a change would happen if the vitreous body were filled with air.

Answer: a light beam is passed through the eyeball by filling the vitreous body located in the eyeball with liquid. As a result, the receptors of the eye are excited. The ability of the eye to refract light would not be provided if the vitreous body was filled with air, not liquid.

2. Ma The lum was equalized by placing a leaf branch of one tree in a container with water, dripping oil into this water and placing the Scales in the contour, and the packaging was placed in the second contour. After 10 days, the package was reduced to 400 grams to align the contours. If 0.8% of the water evaporating per day from a tree when this branch is not cut is separated from this branch, then determine the amount of water evaporating from this tree for 3 days. (consider that the same amount of water evaporates every day)

Answer:

1. 400gr ----- 10day
40gr=x-----1day
2. 40gr-----0,8%
50000gr=x-----100%
3. 1 day-----50000gr
3 day-----x=150000gr



When teaching biology, equipping students with biological knowledge includes tasks such as giving them theoretical and practical understanding. The important thing in this process is that the biology teacher develops the student's interest in the subject, carries out on the basis of a certain system the development of his problem-solving skills and exercises based on the means of interdisciplinary communication. It is established that the formulation of tasks and exercises in the process of research in a creative, tabular, illustrative and logically interpretive manner based on the cognitive activity of the student allows them to fully assimilate the content of the subject and increase the effectiveness of educational cognitive activity through interdisciplinary interaction.

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