



**EFFECTIVE WAYS OF TEACHING BIOLOGY IN
CONNECTION WITH PHYSICAL SCIENCE
(IN THE EXAMPLE OF CLASS VII)**

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Abstract

This article provides information on the effectiveness of using issues related to physics in the process of teaching biology.

Keywords: TIMSS, PISA, PIRLS and STEAM, media resources and information-communication.

In the 21st century, education is recognized as the main factor ensuring sustainable development, and in the international concept of education established until 2030¹, quality education and stimulation of creative abilities are defined as an urgent task. Today, the process of providing quality education is taking place on a global scale. In this regard, in the improvement of the general secondary education curricula and programs of our country, in addition to the national pedagogical experience, the contents of the TIMSS, PISA, PIRLS and STEAM international educational programs were adapted. These international educational programs provide students with in-depth education, first of all, in natural and exact sciences. Decree of the President of the Republic of Uzbekistan No. PF-6108 of November 6, 2020 on measures to develop the fields of education and science in the period of new development of Uzbekistan establishes a national education system that can withstand today's fierce competition on a global scale put is highlighted. For this reason, it is one of the important tasks to raise the teaching of academic subjects, including natural sciences, to a new level in terms of quality [1].

The study of pedagogical sources and research showed that the set of natural-scientific knowledge consists of:

- 1) to have a scientific understanding of nature and existence;
- 2) acquisition of concepts about natural phenomena;
- 3) to be sufficiently knowledgeable about the world of animals and plants.

¹ Incheon declaration/Education 2030: Towards inclusive and equitable quality education and lifelong learning for all (Word Education Forum, 19-22 may 2015, Incheon, Republic of Korea).

On the basis of such an approach, natural-scientific knowledge is formed in a person at the expected level. This approach was adopted as a methodological basis in our research, and the main attention was paid to this issue in the analysis. The structure of natural-scientific knowledge emphasized in this respect is reflected in the educational subjects of Biology.

One of the main tasks in this regard today is to improve the methodology of teaching natural and scientific knowledge to students based on the competence approach. The analysis of available scientific sources shows that there are different approaches to educational content and teaching methodology.

We focused on the analysis of a number of approaches that served as a methodological basis for choosing the content of education that is used in schools of Uzbekistan today. When choosing educational tasks, it is necessary to pay attention to the fact that they can serve to form certain competencies in students. For example: When the external structure of fish is explained in the 7th grade Biology lessons by integrating it with physics:

- students to understand the external structure of fish and the adaptation problems that arise in the aquatic environment, tasks that serve to form the ability to solve them;
- presentation of assignments that serve to form students' competencies in a clear, understandable manner;
- analysis of the methods and methods used in the process of completing tasks;
- interpretation of the obtained results based on the given problem;
- tasks that serve to form and record the final solution of the problems.

Currently, various problems arising in nature require the formation of the skill of a conscious attitude towards it in the young generation. In particular, it is important to form intolerance in students to negative situations, such as pollution of clean water, excessive dumping of waste into water, movement of fish, negative effects not only on morphological and physiological processes, but also rude treatment of nature's blessings [2; 3;].

The daily increasing needs of people create the need to familiarize students with natural-scientific knowledge in order to be careful about the use of natural resources (water, air, soil, energy) [8]. All changes and events in nature are based on certain laws. The importance of interrelationships between the main natural resources air, water, soil, and light for the occurrence of natural phenomena is conveyed to students as natural-scientific knowledge. Water is one of the most important natural resources. Fishes are the main living organisms in water and are important in the food industry.

For this, it is necessary to pay more attention to the use of various didactic tools and educational materials. In teaching 7th grade students about the diversity of fish, such didactic tools include, in addition to educational and methodical manuals, pictorial tables, maps, globes, aquariums, didactic tests, tasks, crossword puzzles, and even multimedia electronic tools, i.e., currently developing computer technology tools. , educational slide films representing nature and its phenomena can also be included. During the 1-hour lesson, the teacher guides the students to use such tools and knowledge on the subject, to apply the acquired knowledge, skills and abilities on the basis of practical work. This process involves the formation of activities based on the competency approach. This activity forms students independence, active citizenship position, initiative, ability to use media resources and information and communication technologies wisely in their activities, conscious choice of profession, healthy competition and general cultural skills and competence. The task of organizing fish and their diversity on the basis of an integrated approach with physics and biochemistry requires direct creative activity from the teacher and the student. The main professional-normative indicator for a creative teacher and student is, first of all, it is important to feel one's place as a creative creator in the pedagogical process. The use of issues related to physics in the process of teaching biology also gives positive results [4; 5;].

Issue 1. If the length of the fish is up to 1 meter, and the weight is about 10 kg, if its skeleton is $\frac{1}{6}$ of the body mass, what is the weight of the skeleton of the fish?

Issue 2. In 15 minutes, a bream fish can cover a distance of 1000 meters, and an electric cat can cover a distance of 150 meters. Find the speed of these fish?

The scope of using problems connecting physics and biology to test students' knowledge of biology and physics increases their interest in biology and physics. Such issues first teach children not to forget physics when they go to biology.

It is one of the necessary requirements to ensure that our students retain knowledge in the educational process. Retention of educational materials depends on the systematic and conscious assimilation of the educational materials presented during the course of the lesson. The knowledge, skills, and abilities acquired in the previous trainings serve as a foundation for mastering more complex material. That is why the lack of thoroughness of the knowledge base causes the new knowledge to be learned to be weak. Well-learned, strengthened knowledge serves as a basis for learning and strengthening further new knowledge.

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