EXPERIENCES IN USING STEAM APPROACHES IN FORMING STUDENTS' DESIGN SKILLS

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Abstract. *This article describes the issues of using STEAM approaches in the formation of students' design skills*

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One of the innovations in the education system is the use of design technology in the continuous education system. Currently, the design technology is successfully used in educational institutions of several developed countries. J.Dew proposed to organize teaching by activating the activities of students directed to a specific goal, taking into account the interest and needs of students. For this, he taught that students should apply the acquired knowledge, skills and abilities in practice, show ways to use them in the future, that is, teach theoretical knowledge in connection with practice. In this process, students acquire new knowledge, skills, and abilities by solving important problems in a familiar situation by applying previously acquired knowledge and skills to practice. In order for students to successfully solve problems, the teacher should give them appropriate instructions, recommend the resources to be used, show ways to achieve the intended result from teaching, and for this purpose, design the activities of students in solving the problem. The main idea of design technology is to achieve the desired result in the process of solving a problem of practical or theoretical importance. If it is necessary to design a theoretical problem, its exact solution, if it is a practical problem, it is necessary to develop specific recommendations on the issue of practical application. In order to achieve this result, students must acquire the skills of independent thinking, understand the problem and look for ways to solve it, use their previously acquired knowledge in this regard, conduct research in various fields of science, predict the results to be obtained, It is necessary to develop options in the solution, to imagine causal connections. The main essence of the design technology is to increase the interest of students by creating a certain problem situation, to form design activities, to acquire relevant knowledge, and to make interdisciplinary connections. The main idea of design technology: "I know why I need the knowledge and skills I am learning and where and how to use them." This idea helps students to consciously master the basics of science, adapt to life and get the goal right. In the teaching of biology, the teacher should use design technology, taking into account the interests and abilities of students, not only to solve educational problems in the lesson, but also to solve creative problems in the classroom and outside the classroom. In this, students perform educational projects.

A student doing project work:

it is necessary to think independently, to understand the problem, to look for ways to solve the problem, to use previously acquired knowledge, to predict the results, to develop options for different solutions, to imagine cause-and-effect relationships.

The educational project is organized in the following stages.

1. The use of design technology allows students to have an individual and differentiated approach. Determining the project category, topic and number of participants;

2. Determination of the project problem, subject, tasks

3. Compile assignments for project participants and distribute them among members;

4. Organization of students' independent research on the project;

5. Determining the expected results of the project, formalizing it and defining its presentation;

6. Completing project work, determining evaluation criteria and ways to draw conclusions.

One of the innovations in the education system is the introduction of STEAM education into the continuing education system. STEAM - educational technology is a new method of teaching schoolchildren and is an alternative system to the traditional education system. Acquiring, processing, and applying information is the foundation of a STEAM education program.

This technology is based on the system of simultaneously teaching students Science (natural sciences), Technology (technology), Engineering (engineering), Art (art) and Mathematics (mathematics), in which students learn practical and learn through fun project activities. STEAM education technology is a method of teaching students based on the integration of natural sciences, technology, art, and mathematics, and it forms the skills of applying scientific and technical knowledge in real life with the help of practical training. . In this case, educational programs written in harmony with each other complement each other and together create creativity in the student. The main idea of the STEAM approach is as follows: practice is as important as theoretical knowledge. Students use their minds and hands to effectively learn most subjects, acquire knowledge independently, students conduct experiments in educational activities, construct models, independently create music and movies, build robots, etc. implement their ideas and create products. STEAM education is based on the application of a practical approach and the integration of all five areas into a single educational system. In it, training is aimed at integration of subjects, not academic subjects.

STEAM education was developed in America. Currently, STEAM education technologies are effectively used in the educational system of America, Singapore, Israel, China, Finland and Turkey.

The use of STEAM educational technologies provides students with strong knowledge in the direction they are interested in, while developing their creativity and creativity.

The use of STEAM approaches in the formation of design skills makes it possible to search for talented students, identify their talents early, select them, train them, develop them, and direct them to production. In order to use STEAM approaches, it is necessary to organize mathematics, music, visual arts, science (physics, chemistry, biology laboratories), robotics, mechatronics, 3D modeling, computer graphics designer circles in school and extracurricular educational cooperation. Talented students use the digitized technologies of science and technology in these STEAM labs to implement goal-oriented projects like real engineers.

In traditional education, subjects and topics are studied separately. The trainings are aimed at studying the objects and acquiring the necessary knowledge, and are not directed at using the acquired knowledge and skills and applying them in practice. In the teaching system based on STEAM technology, interdisciplinary communication and design method are combined. Children acquire knowledge during training and learn to use it immediately. As they grow, they develop the

critical thinking and problem-solving skills they need to overcome the challenges they face in their daily lives. Able to adapt to a rapidly changing world.

The combined teaching of five subjects develops students' logical and creative thinking, teamwork skills, adaptability and the ability to find innovative solutions.

In order to effectively introduce this system in our country, it is necessary to start teaching preschool education organizations to work on the basis of simple projects during the educational process.

The purpose of STEAM education in primary education is to develop students' interest in natural and technical sciences. It serves as a basis for acquiring knowledge and doing the work you do with love, and developing your interests.

Since STEAM classes are very dynamic and interesting, children do not get bored during the class and do not notice how time has passed. In Science (natural sciences) lessons, if the topics related to plants are studied, the models of plants are made, the location of leaves, branches, stems, the effects of sunlight, moisture, and nutrients on them are studied, then students study nature as a whole system.

They get used to learning, they use their hands and their minds at the same time, thus their creativity is formed.

Let's get acquainted with the methodology of teaching the topic "Subtraction system" in the upper 8th grade natural science classes.

Project work.

Stage 1. Determining the topic of the project and the number of participants.

Subject. "Subtraction system". Participants. There are 30 students in the class. 5 groups of 6 students.

Stage 2. Determining the project problem, subject, tasks

Project problem: Study the function of the subtraction system.

Project tasks: getting to know the process of urine formation

Stage 3. Compile tasks for the project participants and distribute them among the members. Making a heart shape out of cardboard. Work collaboratively based on the following recommendation.

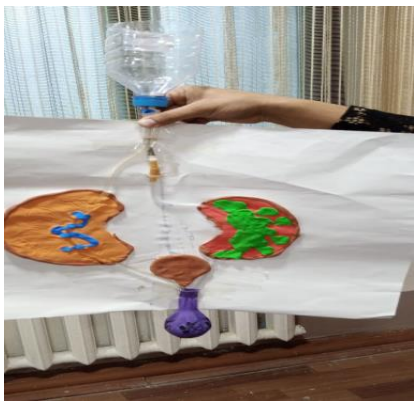
After studying the theoretical materials about the excretory system, students are divided into groups and begin to study the physiology of the kidney and the process of urine formation in it. For this, you will need plastic, balloon, drip system, syringe, paper in A3 format, paint, water, baking paper.

First, he makes 2 kidney shapes from plastic on A3 cardboard. A half-cut baklashka is installed from its upper part. 2 syringes are installed by piercing its cover, and the system is connected to them so that it reaches the kidney. The system is placed along the kidney and reaches the bladder, that is, a balloon is used for the bladder. The subtraction system has been prepared.

Stage 4. Organization of students' independent research on the project. Now we will get acquainted with the process of urine formation.

For this, dye is added to the water to create colored water. Carefully pour the colored water from the bowl.

Colored water moves through the system and collects in a ball, that is, in a bladder that we have made.



Stage 5. Determining the expected results from the project, defining its formalization and presentation, drawing up conclusions.

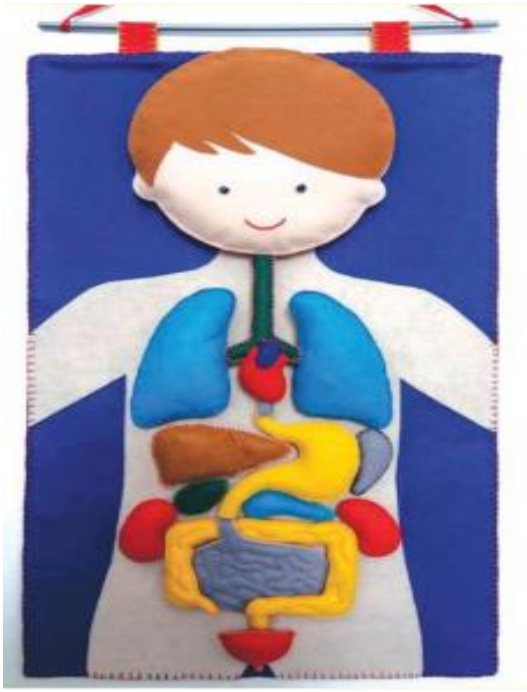
So, through this project work, we showed students how to form an idea about the process of urine formation in the kidney and its collection in the bladder. When they perform this task in groups, they develop the skills of working on the basis of projects, applying the knowledge gained in creative thinking in practice, using their hands and minds at the same time.

In the 8th grade biology classes, the passage of topics related to the study of the human organism can be organized as follows. Through modeling, students learn the interdependence of plant and human organs as a whole organism.

Necessary equipment: cardboard (A3), plasticine, colored papers, scissors, glue, paper, colored pencils.

Order of work

1. Make a model of human internal organs from plasticine.
2. Draw a silhouette of a person on cardboard.
3. Arrange the plasticine bodies on the cardboard.
4. Cut labels from colored papers and write the names of the organs on them, then glue them to the cardboard.
5. Based on the model, organize a group discussion about the functions of human organs and how organs work in relation to each other.



In the 9th grade biology classes, they make a cell model while teaching topics about the structure of the cell, they learn exactly the processes that take place in the cell, the function and structure of its organoids, and their location in the cell.

One type of continuous education system is extracurricular education, but there is a need to combine general secondary education with school lessons. When we get acquainted with the educational systems of developed countries, students prepare products in the extracurricular education system based on the topics and projects learned in school. STEAM allows students to conduct projects and educational research activities in and out of school.

STEAM education provides students with hands-on learning explorations, hands-on experiences in classroom activities and everyday activities outside of school by showing how knowledge, skills, and abilities are scientifically relevant to everyday life. Rish is aimed at nurturing creativity focused on designing, developing their interest in creating news. In this way, the student develops his scientific curiosity and creativity by identifying the interests of young people early and directing them to the development of their talent and creativity, implementing innovations. In this educational program, students learn to independently perform practical exercises and laboratory work designed to work with tasks that meet the requirements of the international assessment program (PISA, TIMSS) aimed at forming students' logical thinking and practical skills.

In short, STEAM encourages students to experiment, construct models, independently create music and movies, realize their ideas, and create products. This approach to teaching allows children to effectively implement their theoretical knowledge and practical skills. It increases students' creativity, develops design skills, and becomes a solid foundation for the training of highly qualified, up-to-date personnel.

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