



TEACHING THE SUBJECT OF DRAFTING POLYHEDRA AND THEIR SIMPLE SECTIONS USING INTERACTIVE METHODS

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Abstract

The main goal of pedagogical technologies in education is to place the student at the center of the educational process in the educational system, to move students away from simple memorization and automatic repetition of educational materials, to develop their independent and creative activity, and to turn them into active participants in the lesson. Only then will students have their own opinions about important life achievements and problems, the practical application of the topics covered, and they will be able to justify their point of view. This article provides some comments and guidelines for the topic "Drafting of polyhedra and their simple sections," known from a high school mathematics course.

Keywords: Independent and creative activity, Brainstorming, find a match, Mill method.

INTRODUCTION

One of the important requirements for the organization of modern education is to achieve high results in a short time, without spending too much mental and physical effort. The teacher's responsibilities include conveying to students certain theoretical knowledge in a short time, developing their skills and competencies for certain activities, as well as monitoring students' activities and assessing their level of knowledge, skills and abilities. and the competencies they acquire require high pedagogical skills and a new approach to the educational process.

Pedagogical technology is inherently subjective. Regardless of the form, method and means of organization, technology: increases the effectiveness of teaching activities; make decisions about cooperation between teachers; ensures that students receive in-depth knowledge of academic subjects; develops students' independent, free and creative thinking skills; creates the necessary conditions for students to realize their potential; it is necessary to guarantee the priority of democratic and humanitarian ideas in the pedagogical process.

Currently, when it comes to introducing new methods or innovations into the educational process, it is understood that interactive methods are used in the





educational process. Interactivity is the activity of two people, that is, the educational and cognitive process takes place in the form of dialogue (computer communication) or based on the interaction of a student and a teacher. Interactivity – joint activity, action, efficiency. This happens in the dialogue between the student and the teacher. The main goal of the interactive method is to create an environment for active, free-thinking of the student by creating the most favorable situation for the learning process.

This article provides some comments and guidelines for teaching the topic “Polyhedra and their simple sections,” known from a high school mathematics course.

Literary analysis.

The article [1] in the concept of development of the higher education system of Uzbekistan until 2030 lists instructions regarding the study of advanced foreign experience and its application in the conditions of higher educational institutions of the republic. The issue of organizing lectures, practical and independent study sessions in higher educational institutions of developed countries is analyzed and their role in the effective organization of study sessions is shown. Based on foreign experience, several methodological recommendations have been developed to improve the quality of education.

In article [2], using the example of mathematics, recommendations were developed for the development of independent and creative thinking of mathematics students of state educational institutions.

The article [3] considers the process of raising the creative activity of students when studying mathematics, issues of solving current problems faced by modern school mathematics teachers. Considering that these questions are one of the important tools in the education and development of students' mathematical skills, the article presents guidelines for preparing for mathematics Olympiads and some examples of organizing classes using interactive methods.

Article [4] contains methodological recommendations for teaching the section “Functions with limited variation,” which is one of the important sections of mathematical analysis, functional analysis and selected chapters of mathematical analysis. Describes information about functions with limited variation and full variation, as well as the basic properties of calculating total variation. For future mathematics teachers, using these articles, a number of interactive methods and their application are considered to determine the level of students' proficiency in the subject in school lessons.



It is known that the problems of determining when the surface or volume of polynomials and their simple sections are largest and smallest are reduced to solving modular equations and inequalities. Interactive methods for teaching such issues are described in detail in the articles. and in scientific research in the field of a regular polyhedron (parallelepiped) in space, mixed-type differential equations, which are mathematical models of biological processes, were studied, and the uniqueness and existence of their solutions were proved. Brief information about the areas of application of polynomials in the classroom (even if the essence of the issue is not fully disclosed) arouses great interest among schoolchildren and students.

MAIN PART

We know well from the school mathematics course that the topic “Drawing up polyhedra and their simple sections” is a topic that comes after the topic “Straight lines and planes in space”, and the student has detailed knowledge about straight lines and their location, planes, planes and straight lines, it will not be difficult for him to master the subject of polyhedra and their simple sections. In this case, before moving on to presenting a new topic, using the “Brainstorming” method, you can refer to the judgment of the students from the previous lesson:

- 1) What are intersecting lines?
- 2) Define intersecting lines.
- 3) What are parallel lines?
- 4) When is a straight line called parallel to a plane?
- 5) In what case can one plane be drawn through 3 points?
- 6) If 2 points of a line lie in 1 plane,....

Students take turns answering the 6 questions listed above. In this case, the teacher can make comments and additions depending on the correct or incorrect answer.

It is also effective to use the “Find a Match” method when repeating a topic. In this method, unlike the Brainstorming method, the answers are reflected in the table, although they are mixed. This gives students a small chance to remember the correct answers or think logically. Because in many cases, comparing answers is useful for consolidating knowledge and reinforcing concepts.

Mixed schedule for students:

**1-table:**

1.	Intersecting lines	A	Then one plane can pass through them.
2.	Parallel lines	B	Then all its points lie in this plane
3.	Intersection of lines	C	Straight lines lying in the same plane and not intersecting each other
4.	If 3 points do not lie on the same line,	D	Lines lying in the same plane and having only one common point.
5.	If 2 points of a line lie in the same plane, then	E	2 straight lines that do not lie in the same plane of space

Students freely express their opinions, complement each other's answers and exercise self-control.

The correct answers to the mixed table presented by the students are:

2-table:

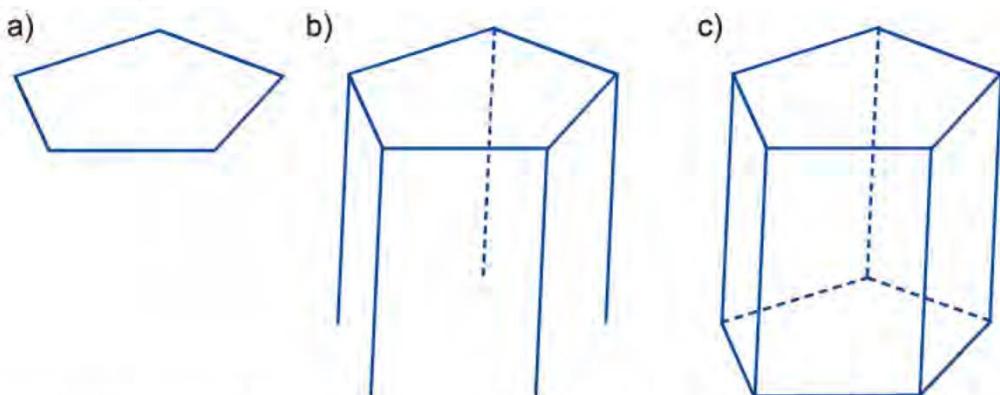
1.	Intersecting lines	A	Lines lying in the same plane and having only one common point.
2.	Parallel lines	B	Straight lines lying in the same plane and not intersecting each other
3.	Intersection of lines	C	2 straight lines that do not lie in the same plane of space
4.	If 3 points do not lie on the same line,	D	Then one plane can pass through them.
5.	If 2 points of a line lie in the same plane, then	E	Then all its points lie in this plane

When solving geometric problems, it is very important to draw a suitable design. Sometimes a correct drawing is equated to a "half solution" to a problem. In stereometry, it is extremely important to correctly draw the picture of the problem; this is an extremely responsible and sometimes difficult task. Since stereometric figures are three-dimensional, they must be depicted on a plane, on a notebook page. An incorrect drawing leads to an incorrect solution or a dead end.

New topic:

The prism is depicted in the following order (Fig. 1): first, one of its polygonal bases is drawn, then parallel and equal sections are drawn from each end, i.e., the components of the prism. sections are connected accordingly. This reveals the second basis. In the drawing, the invisible edges of the prism are drawn with a dotted line.





Picture 1.

The description of the pyramid is carried out in a similar way.

First, a polygonal base is drawn. The top of the pyramid is then marked and this point is connected to each end of the base. The edges of the pyramid that are invisible in the drawing are drawn with dotted lines (Fig. 2).

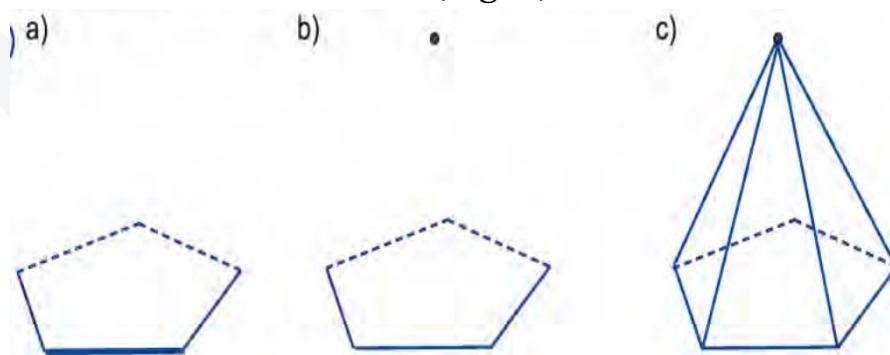


Figure 2

It will be possible to draw a drawing of spatial geometric figures correctly only when we correctly imagine its relative position. When one of the spatial figures is a polyhedron and the other is a plane, you will have to draw different sections. Below we will create sections of polygons. Let's say a polyhedron intersects a plane. An edge of a polyhedron is a geometric figure consisting of points of a polyhedron corresponding to a cutting plane. A section plane intersects the surface of a polyhedron in sections, and a section of a polyhedron consists of one or more polygons. Figure 3 shows a heptagonal cross-section of a pentagonal prism.

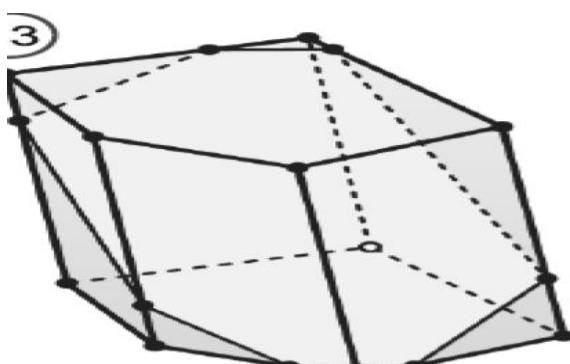


Figure 3

After information on a new topic is given, they are used to analyze the examples presented in the textbook. Before the end of the lesson, in order to determine the students' level of mastery of the topic, we can use the "Mill" method to find out through questions and tasks how much the students have mastered the topic (Fig. 4).

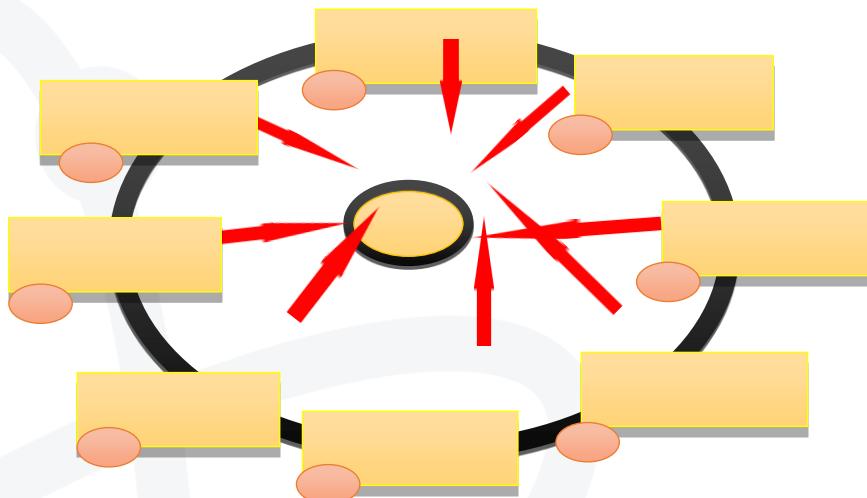


Figure 4

Rules of the game

To implement this game, students are first divided into 2 groups. The names of the groups are named by the students. In the game "Mill", students from each group take turns going to the board and turning the mill over. After the mill stops, no matter what number the arrow points to, the question under that number is taken and an example is worked out. The student who completes the example correctly receives an incentive card. Will be continued. At the end, whichever group collects the most incentives, that group will receive a diamond.



Game "Fishing".

At the same time, members of each group catch fish from the river and collect them in their aquarium. The group that collects the most fish in their aquarium wins. Students who catch fish also receive reward cards.

In conclusion, in the process of teaching schoolchildren the subject of the mathematics course "Polyhedra and their simple sections", using the information presented in the article, in the lesson you can repeat the previous topic, explain a new topic, consolidate the knowledge acquired on the topic, you can effectively organize the lesson. Overall, various interactive teaching methods can be used to make the lesson more effective, productive, and interesting.

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