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USE OF INNOVATIVE PEDAGOGICAL TECHNOLOGIES IN TEACHING LABORATORY TRAINING IN ASTRONOMY

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Abstract: This article describes the methods of using innovative modern pedagogical technologies in the teaching of laboratory classes in astronomy.
Keywords: education, astronomy, laboratory work, pedagogy, methodology, innovation, celestial sphere.

Introduction

In our country, special attention is paid to the education of the younger generation. Efforts are being made to create the necessary conditions for boys and girls to receive modern education and grow up with high spirituality. Therefore, it is necessary to ensure the smoothness of the educational process, to improve the curriculum.

Another important issue that we are always thinking about is the morals, the behavior of our young people, in a word, their worldview, he said. Times are changing fast today. Young people are the ones who feel these changes the most. May the youth meet the requirements of their time. But at the same time, don't forget about yourself. May the call of who we are and what a generation of great people always resonate in their hearts and motivate them to remain true to themselves. How do we achieve this? Upbringing, upbringing and only at the expense of upbringing, the President said.

Of course, these responsibilities place a great responsibility on the school, the family, the community, and the community as a whole. The work carried out in our country to improve the system of pre-school education, school, secondary special and higher education, the construction of new institutions and the renovation of existing ones in all spheres of education - youth to bear fruit in maturity, no doubt.

It is known that a draft presidential decree has been developed to further improve the education system of the country and accelerate the development of science. The draft decree sets goals that will address the current challenges in education, show results in the next five years, and determine the level of further development.

In particular, raising the prestige and status of teachers in society, a complete overhaul of curricula and methodologies, linking the school with the next stages of education, the elimination of excessive paperwork for teachers. solutions to such issues as creating conditions and encouraging people to work harder on themselves, improving the infrastructure of educational institutions and the spiritual environment in it are clearly defined. most importantly, mechanisms are being introduced to radically change the approach and focus of local leaders, as well as local councils, on their responsibilities, accountability and accountability.

The following is a laboratory example of astronomy, and it is advisable to use innovative pedagogical technologies in its teaching. This will make it easier to understand the topic.

Laboratory subject: Basic elements of the sky sphere

Objective: To get acquainted with the main points, lines and circles of the celestial sphere, to teach them to use them in the study of the sky.

Required tools and manuals: Model of the celestial sphere, globe, posters with the basic elements of the celestial sphere.

A brief theory. Mathematical construction of the phenomenon of diurnal rotation of the sky – the celestial sphere, i.e. the

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hypothetical sphere, the radius of which is arbitrarily chosen and located at the center of observation, is called the celestial sphere. On the surface of this sphere, the visible positions of all the lights are drawn, and a number of points and lines are drawn to facilitate measurements. For example, a line passing through an observer and connecting the northern point of the universe Z (zenith) and the southern point of the universe Z′ (nadir) is called a perpendicular line. The perpendicular line is the plane of the horizon perpendicular to ZZ` (NESW), which is an attempt at the point of observation of the Earth's surface. The plane of the horizon divides the surface of the celestial sphere into two: visible hemispheres with all points above the horizon and invisible hemispheres below the horizon.

The axis of rotation of the celestial sphere, which connects the two poles of the universe (P and P`) and passes through the observer (C), is called the axis of the universe (Figure 1). For any observer of the Earth's axis, the north point N is located on the horizon below the Earth's north pole, and the south point S is located at the point diametrically opposite to this point. `will be complained. The NS line is called the dream line.

The annual apparent motion of the sun is called the ecliptic. The circle of the ecliptic forms an angle ε=23º26' with the celestial equator (P, P`). Circles whose planes are parallel to the plane of the mathematical horizon are called diamonds. The circle formed by joining the points Z, P, N, Q, E, P ', S, Q', E ', Z "of the celestial sphere is called the celestial meridian. The process by which light crosses the celestial meridian is called the culmination. As the lights cross the celestial meridian twice, the culmination is twofold. 1) High culmination for the Sun (ε') Summer Solar Stand. 2) The lower culmination for the Sun (ε) is the winter solstice. Finally, the plane passing through the center of the sphere and perpendicular to the axis of the universe forms the plane of the celestial equator, parallel to the plane of the Earth's equator. The celestial equator divides the surface of the celestial sphere into two hemispheres: the northern hemisphere, the apex facing the north pole, and the southern hemisphere.

A large circle formed by the intersection of a celestial sphere with a plane perpendicular to a vertical line from its center is called a mathematical horizon. Circles formed by the intersection of a sphere with planes parallel to the plane of the mathematical horizon are called diamonds. Large circles formed by the intersection of a sphere with planes passing through a vertical axis are called vertical circles. The points and lines mentioned above change as the observer changes his position on Earth. There are points and lines in the celestial sphere that are connected to the main lines and points of the globe that do not change even when observed from anywhere on Earth. The poles of the universe, the axis of the universe, the celestial equator, and the ecliptic are among such points and lines. The points where the earth's axis intersects with the celestial sphere are called the poles of the universe.

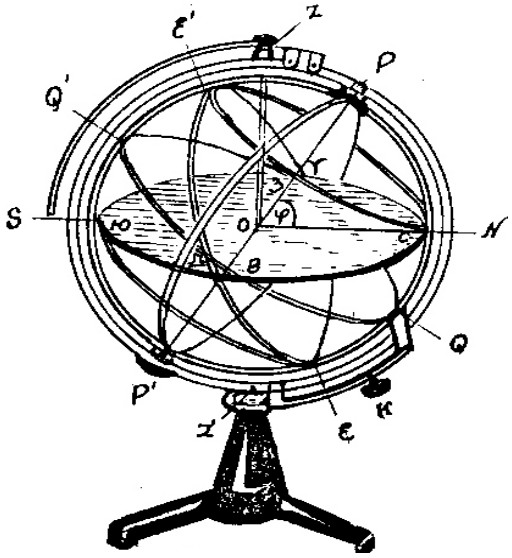

Figure 1. Sky sphere model

Procedure

1. From the celestial sphere model (Figure 1), find the principal points, lines, and circles of the celestial sphere, and the north, south, west, and east points of the ecliptic.

2. Adapt the model of the celestial sphere to the latitude in which you live, and determine the elements of the celestial sphere, the angles formed by the plane of the celestial equator.

3. Turn the K-screw of the model of the celestial sphere and adjust it to the widths 90º, 60º, 0º, 40º and determine the change of the elements of the celestial sphere with the change in latitude.

4. Get acquainted with the main points, lines and circles of the celestial sphere.

Control questions

1. What is the celestial sphere?
2. What is the ecliptic?
3. What is a dream line?
4. What is the angle between the celestial equator and the ecliptic?
5. What is the angle between the celestial equator and the axis of the universe?

When teaching this topic, it is advisable for the teacher to use the “Interdisciplinary” (mathematics and geometry) method of the lesson.

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