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IMPROVING THE TEACHING OF THE LAWS OF LIGHT REFLECTION AND REFRACTION BASED ON MULTIMEDIA

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Annotation

The article discusses the method of mastering the topic of the laws of light reflection and refraction based on multimedia. In the teaching of this topic, using multimedia tools, the organization of the lesson process is intended to show the process of explaining the laws of light reflection and refraction with the help of multimedia.

The urgency of the issue. In general secondary schools, the 9th grade of "Physics" aims to study the topics of the laws of light reflection and refraction using modern information technologies on the basis of multimedia tools. It is intended to master the topics of light beam, propagation of light along a straight line, independence of light, return of light, law of refraction of light. In the teaching of these subjects, using multimedia tools of modern computer and information technologies, it is effective to organize the lesson process.

The topics of the laws of reflection and refraction of light in 9th grade "Physics" are important for every general secondary school student today. For this reason, it is appropriate to develop the topics of the laws of reflection and refraction of light, which are one of the important links of the science of "Physics", and the methodology of teaching them using multimedia tools based on modern information technologies. At first, we focused on the topic of fluid properties and the issue of creating a methodology for teaching them using multimedia tools. Now let's look at the method of teaching using multimedia tools to study the subject of the laws of reflection and refraction of light. In the teaching of these software tools, educational materials are usually explained using a textbook or a study guide based on the traditional methodology. Based on the educational materials, students study the topics of the laws of reflection and refraction of light in laboratory classes. In the traditional teaching method, educational materials are presented to students in the form of text, slides or images. Therefore, regardless of how many hours are allocated to teaching

these subjects, students face difficulties. In contrast to the traditional methodology, we present the methodology of teaching the process of studying the subject of the laws of reflection and refraction of light in the hours of the "Physics" subject in the working program based on multimedia developments. In this methodology, the process of studying the subject of the laws of light reflection and refraction is shown and explained to students by means of a computer simulation model that performs its tasks through sequential actions [5].

The light coming from the sun, lamps and other sources is reflected from the walls, the Earth and objects. When the reflected light hits our eyes, we perceive its shape and color.

If the surface is uneven, the beam will scatter at the boundary of the surface. Light rays returning from the surface begin to spread in different directions. This return of light is called scattered return or diffuse return (Fig. 1).

A smooth surface that reflects light well is called a mirror. If the surface of the mirror is flat, it is called a plane mirror. A bundle of parallel rays falling on a flat mirror remains in the form of a bundle of parallel mirrors even after returning (Fig. 1). Such a return of light is called flat return or specular return (see Figure 1).

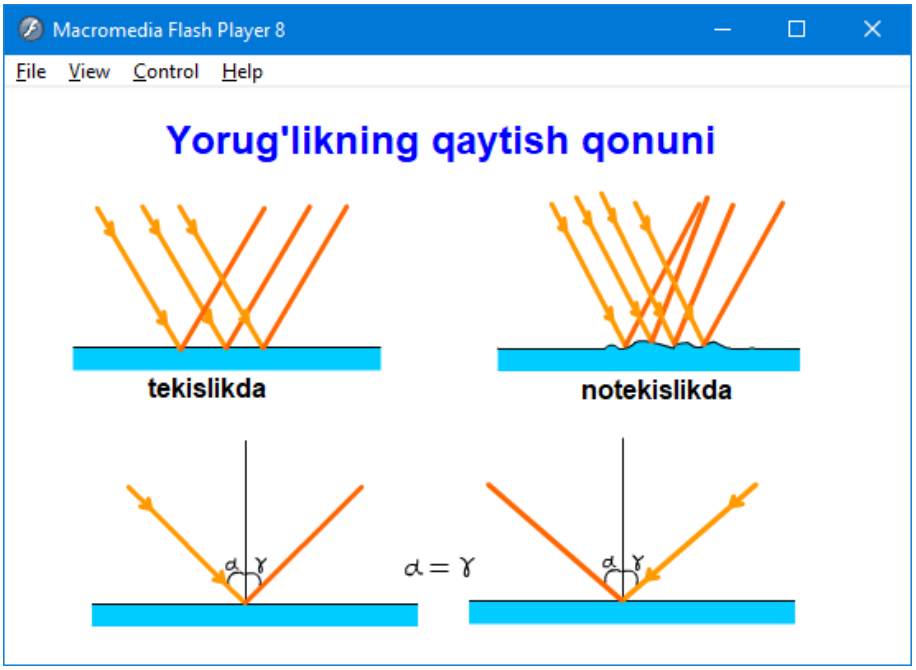

Figure 1. The law of return of light

Seeing the reflection of an object through a flat mirror is based on the law of reflection of light.

The beam of light reflects from the surface of glass, water and other transparent substances, and refracts and passes into the second medium. The refraction of mime at the boundary between two media obeys the following law of refraction. In many cases, the absolute refractive index is used instead of the relative refractive index.

The speed of light in air can be considered approximately equal to the speed in vacuum. Therefore, in practice, the refractive index of the substance is taken not in relation to vacuum, but in relation to air.

When light is directed from a medium with a high refractive index to a medium with a low refractive index, when the angle of incidence is greater than a certain angle, the light will

completely return from the boundary of the two media.

The total internal return phenomenon is used to deflect the light rays or to change the position of the beam (see Figure 2).

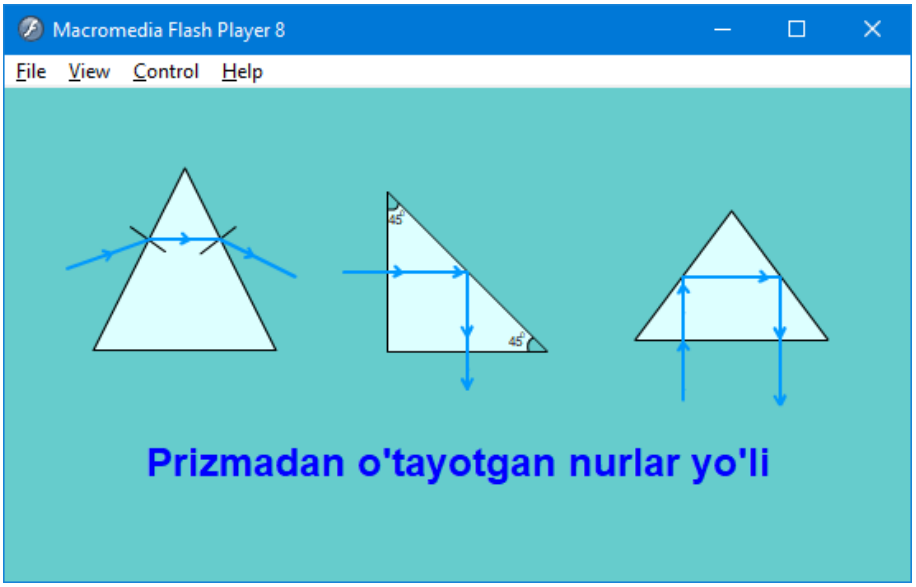

Figure 2. Path of light passing through a prism

The diameter of the fiber core is from several microns to hundreds of microns, and the thickness of the shell is from tens to hundreds of microns. If a signal (image) is sent from one end of such a cable, the same signal can be received from the other end. The signal sent through fiber optic cables is transmitted over long distances with extremely low loss and high quality.

Optical fiber communication cables were laid under the waters of the Pacific and Atlantic oceans. Currently, cables connect Asia and Europe with the American continent, and Europe with China through Uzbekistan.

Fiber optics are also widely used in medicine. With the help of a fiber optic cable, it is possible to see and take pictures of the internal organs of a person.

In this case, a fiber optic cable is lowered into the stomach through the esophagus. Light is transmitted from one fiber in the cable, and light reflected from the walls of the stomach is received from the other.

A transparent body bounded by a spherical surface on one or both sides is called a Lens.

Lenses are convex or concave. If the middle part is thicker than the outer parts, it is called a convex lens, and if it is thin, it is called a concave lens. There are three types of each type of lens.

If we direct rays parallel to its main optical axis to a convex lens, the rays passing through the lens will be collected at one point on the main optical axis. This point F is called the prime focus of the lens. A convex lens is also called a converging lens because it has the property of focusing the beam to a single point.

If, instead of a convex lens, a ray of light is directed to a concave lens in the same way, the light passing through the lens will be scattered uniformly. Therefore, a concave lens is also called a diverging lens. If the rays passed through the diffusing lens are continued in the opposite direction, they intersect at one point of the main optical axis. This point F is called the abstract focus of a concave lens [1].

Lenses have two focal points, which lie at the same distance from the center on both sides of the lens. The distance from the center of the lens to the focus is called the focal length of the lens and is denoted by the letter F (see Figure 3).
The inverse of the focal length is called the optical power of the lens and is denoted by the letter D.

Figure 3. Determining the focal length and optical power of a lens

Above, the process of learning to determine the focal length and optical power of a lens is explained on the basis of a multimedia electronic manual. In the same way, the rest of the topics in the 9th grade "Physics" textbook of general secondary schools and their explanatory processes are explained on the basis of a multimedia electronic manual.
In secondary schools of general education, special attention is paid to the level of understanding of the educational materials in the educational part of multimedia electronic manuals. The presented educational materials should be simple, convenient, illustrative and explanatory information recommended for good learning for students, as well as the necessary definitions, key phrases, key words in the educational materials. Additional opportunities will be created when applying to them.
In conclusion, it can be said that the use of a computer simulation model in teaching the subjects of the 9th grade "Physics" textbook of general secondary schools not only increases the efficiency of students' learning, but also increases their opportunities for independent work.
It is clear from this that presentation of 9th grade "Physics" subject in general secondary education schools in the form of multimedia on the basis of software tools of information technologies is one of the urgent problems. Presentation of information in the form of multimedia on the basis of modern information technologies, without raising the level of figurative thinking and intellectual development, leads to a change in the ratio between

multimedia and traditional education.

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