TEACHING METHODOLOGY OF THE TOPIC "WAVE PROPERTIES OF LIGHT" IN ACADEMIC LYCEUMS AND VOCATIONAL COLLEGES

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Annotation: *This article highlights effective teaching methodologies for the topic* ***"Wave Properties of Light,"*** *which is one of the important sections of physics taught in academic lyceums and vocational colleges. It examines the significance of this topic in developing students' scientific thinking, observation skills, and analytical reasoning. The article also analyzes the role of experiments, interactive methods, and information technologies during the lesson. In addition, it describes ways to organize practical activities, conduct experiments, assess students' knowledge [1], and develop their independent learning skills.*

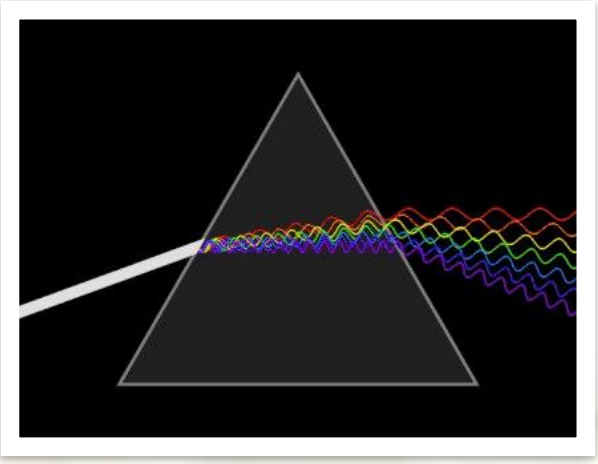
Keywords: *light, wave properties, interference, diffraction, polarization, methodology, experiment, interactive learning, physics teaching.*

Introduction:

Physics is one of the sciences that reveals the most fundamental laws of natural phenomena and connects them with practical life. Studying the wave properties of light is one of the most important topics within this science, as it explains to students the nature of light and the laws of its propagation [2] as an electromagnetic wave. In academic lyceums and vocational colleges, teaching this topic helps students develop not only theoretical knowledge but also skills in conducting experiments, analyzing results, and drawing practical conclusions.

For example, if we consider glass as a special kind of filter, this filter does not transmit all colors equally. Some colors pass through more strongly, while others

pass through less. Another analogy can be made with “the change of color of clothes when immersed in water”.



pic1. Dispersion of light is the phenomenon of white light splitting into different colors, caused by the different refraction of the colors (wavelengths) in glass

When clothes are placed in water, the water itself absorbs some of the color, causing a change in the color of the clothes. Similarly, the colors of light change as it passes through glass (**pic1)**.

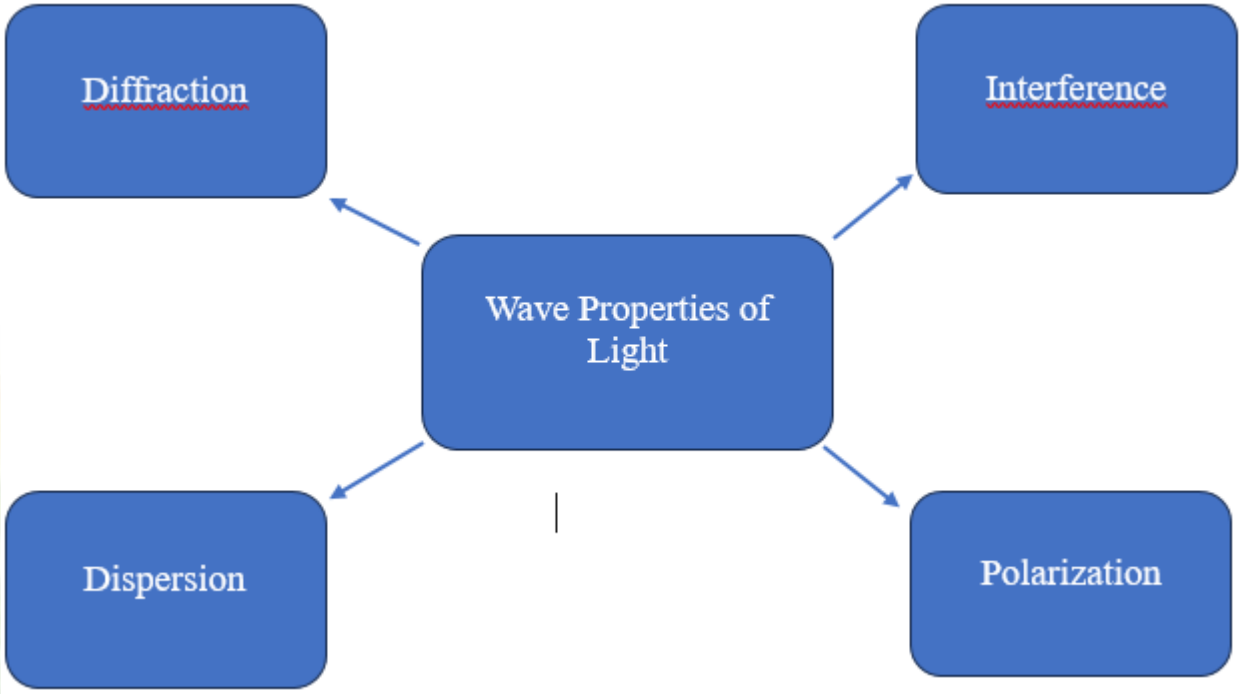
Main Part:

The main goal of the topic is to explain to students the wave properties of light—interference, diffraction, and polarization—on a scientific basis. It also aims to help students understand their applications in everyday life, such as in color images, optical instruments, laser technology, or mirrors, and to explain the role of light in these phenomena. Knowledge of the wave properties of light broadens students’ scientific worldview, as light waves form the foundation for many natural processes[4], including the propagation of light, color formation, diffraction gratings, and interference phenomena.

During lessons, teachers can stimulate students’ thinking through problem-based questions, for example: “Why does a soap bubble appear in different colors?” or “Why does light spread when it encounters an obstacle?” Such approaches activate students and strengthen independent thinking.

Experiment-based approaches are crucial in teaching this topic. For instance, models of Young’s experiment can be used to demonstrate interference, diffraction can be observed with a laser beam, and polarization can be shown using polaroid

plates or special filters. In laboratory sessions, students conduct experiments independently and present results in tables and graphs, which develops their scientific research skills.



The use of information and communication technologies enhances lesson effectiveness. Interactive programs like PhET and OpticsLab can virtually demonstrate interference and diffraction processes, increasing student interest and helping them visually understand complex phenomena. Additionally, multimedia presentations, video animations[5], and electronic tests make lessons more engaging and comprehensible.

Interactive teaching methods are also important. Techniques like “Brainstorming,” “Quick Survey,” “Insert,” and “Cluster” engage students actively. Group work allows students to share experiences, analyze phenomena, and draw conclusions, fostering communication skills and teamwork.

Teaching this topic develops several competencies in students: applying theoretical concepts in practice, conducting experiments and analyzing results, drawing scientific conclusions, and processing and presenting information. Teachers should evaluate not only tests or written work but also students’ reasoning and experiment-based activities.

A methodically well-organized teaching of "Wave Properties of Light" ensures deep understanding of physics. Enriching lessons with practical examples, experiments, videos, and simulations helps students not only memorize the material but also connect it with real-life processes. This approach guides students toward scientific thinking, analytical approaches, and independent research, providing them with fundamental knowledge needed in future technical and scientific fields.

The combination of problem-based learning, research-oriented approaches, laboratory work, and interactive methods yields the best results in teaching the wave properties of light. These approaches increase student engagement, foster creativity, and prepare them for practical activities[4]. Therefore, teachers should organize lessons not only to provide knowledge but also to encourage students to think, explore, and discover.

Conclusion. In conclusion, teaching "Wave Properties of Light" in academic lyceums and vocational colleges deepens students' physics knowledge and directs them toward scientific research. Experiments, technology, interactive methods, and real-life examples increase students' interest in physics, which plays a crucial role in their future professional development.

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