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METHODOLOGY OF TEACHING THE "ATOMIC PHYSICS" DEPARTMENT OF PHYSICS IN ACADEMIC LYCEUMS BASED ON MODERN TECHNOLOGIES

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Annotation: This article analyzes the role of modern pedagogical technology in the educational process, especially its importance in effectively presenting to students topics that include complex and abstract elements, such as atomic physics.

Key words. education, training, methodology, student, atom, model, experience, conclusion, modeling, mastery, efficiency.

An atom is a fundamental particle that possesses all the properties of a chemical element. This particle, once called "indivisible", has a very complex internal structure. An atom consists of a positively charged nucleus and electrons orbiting around it. The positively charged nucleus, where all the mass is concentrated, is located in the center of the atom; electrons orbit around it, forming electron shells with dimensions of about 10^{-8} cm, corresponding to the size of the atom. The atomic nucleus consists of protons and neutrons. The structure of atoms and the arrangement of electrons determine their chemical properties.

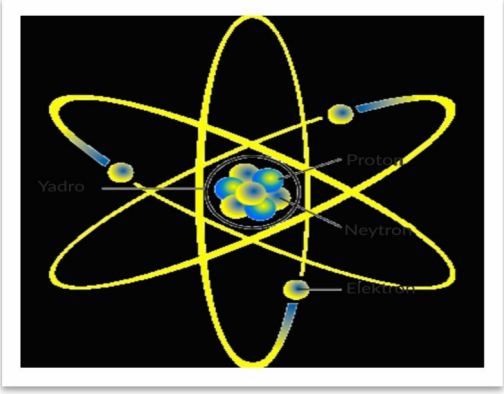

Figure 1. Demonstration of atomic structure

The Thomson model is one of the historical scientific representations of the atom. Originally proposed by J. Thomson. After Thomson discovered the electron in 1904, but before he had discovered the atomic nucleus, the model attempted to explain two established aspects of atoms: the negative charge of electrons and the neutrality of atoms. Thomson's model is known as the "apricot pudding model". It postulates the existence of a positively charged "plum" inside which electrons of equivalent charge move. For many years, it was established that atoms contain negatively charged subatomic particles. Thomson called them "corpuscles" (particles), but they are more commonly known as "electrons", a term coined in 1891 by G.J. Stoney to denote the "fundamental unit of electrical energy". It has long been known that atoms

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have no electric charge. Thomson argued that atoms must have a positive charge to balance the negative charge of their electrons. Thomson published his proposed model in the March 1904 issue of The Philosophical Journal, a prestigious British scientific journal. Thomson stated: "The atoms of the elements consist of a number of negatively charged corpuscles surrounded by a uniform sphere of positive electricity."

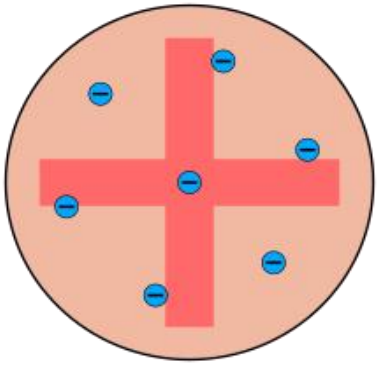

Figure 2. Thomson's model of the atom

Thomson's model provided the basis for defining the specific internal structure of the atom; however, its initial description lacked mathematical formulas. This was followed by the work of William Thomson, who in 1867 proposed the vortex atom hypothesis. In 1890, J.J. Thomson, influenced by the vortex theory of the atom, which argued that atoms were composed of immaterial components, rejected the concept of a "cloud atom" and proposed a parallel arrangement of chemical elements and a configuration of chemical elements. Thomson's atomic model effectively mirrored the approach of Kelvin, who had proposed a positively spherical atom a year earlier, based on the experimental evidence available at the time. Thomson's proposal, based on Kelvin's positive volume charge model, was subject to further testing. After the initial release of Thomson's model, the main goal was to explain the electrically neutral and chemically unstable states of the atom. In classical mechanics, electron orbits were predetermined. As an electron moves away from the center of a positively charged sphere, it experiences a net positive internal force due to the increase in the positive charges around it. The electrons were allowed to rotate in rings stabilized by their interactions, and spectroscopic measurements were calibrated to take into account the energy changes associated with the specific electron rings. Thomson argued that the properties of matter arose from electrical interactions.

In the modern educational process, the use of innovative technologies and interactive methods is important for increasing students' interest in the lesson and consolidating their knowledge. Kahoot is an online interactive platform based on the principles of gamification in education, and is an effective tool for explaining and consolidating physics, especially such a complex section as atomic physics.

Using Kahoot is a great way to reinforce a new topic. To create a Kahoot quiz on the topics of "Structure of the Atom," "Thomson's Model," and "Lasers," follow these steps:
Create a Kahoot account or log in: Go to kahoot.com and register (or log in if you have already registered). Create a new quiz by clicking the "Create" button.

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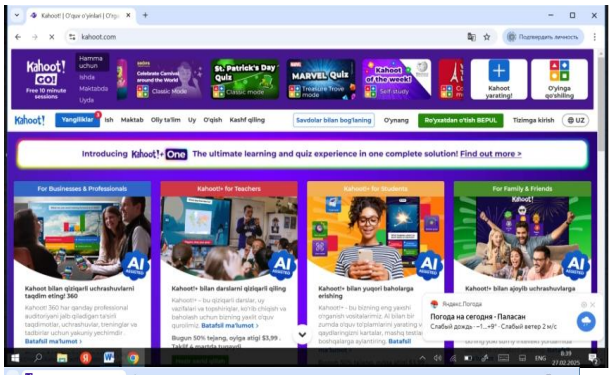

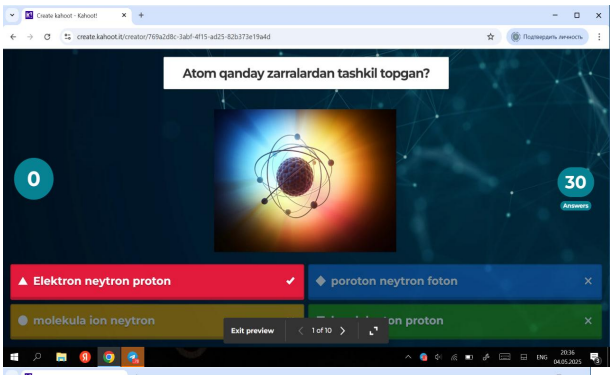

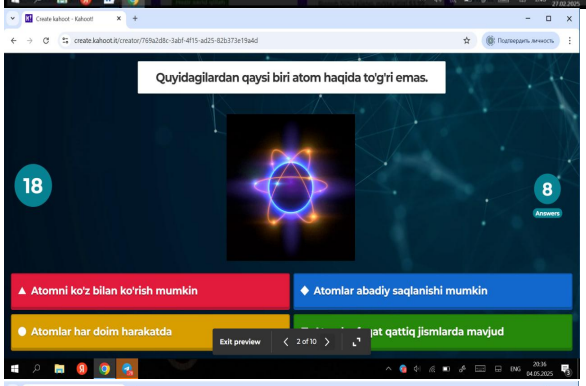

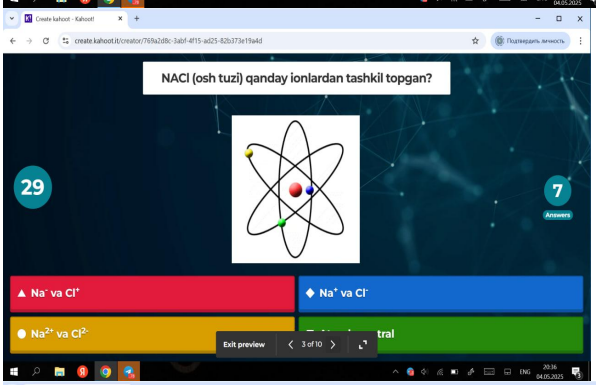

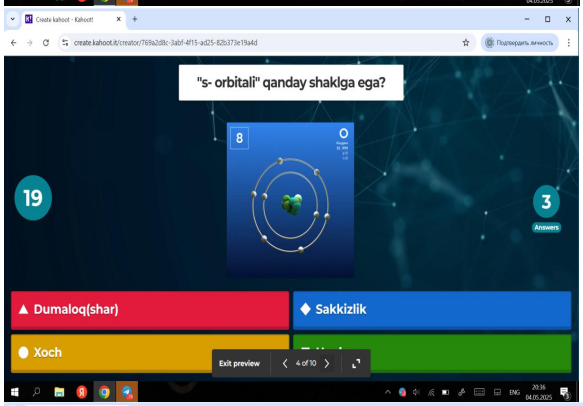

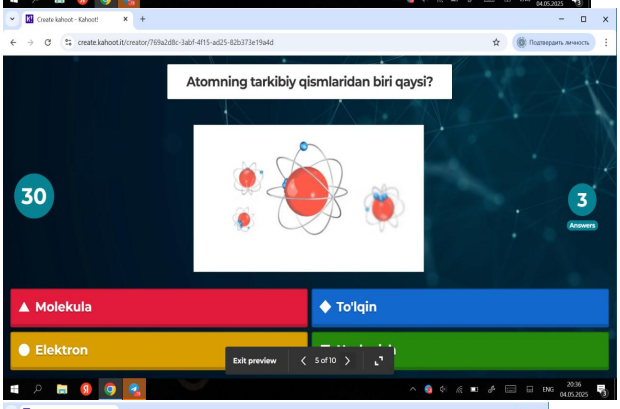

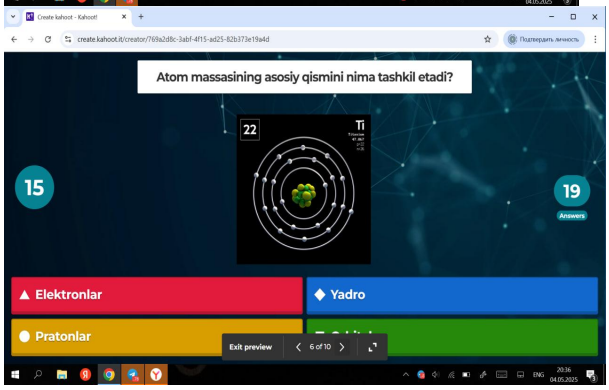

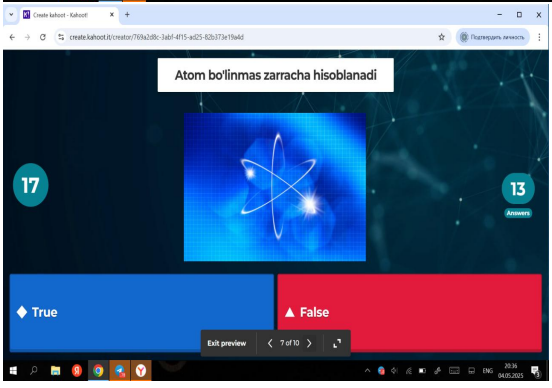

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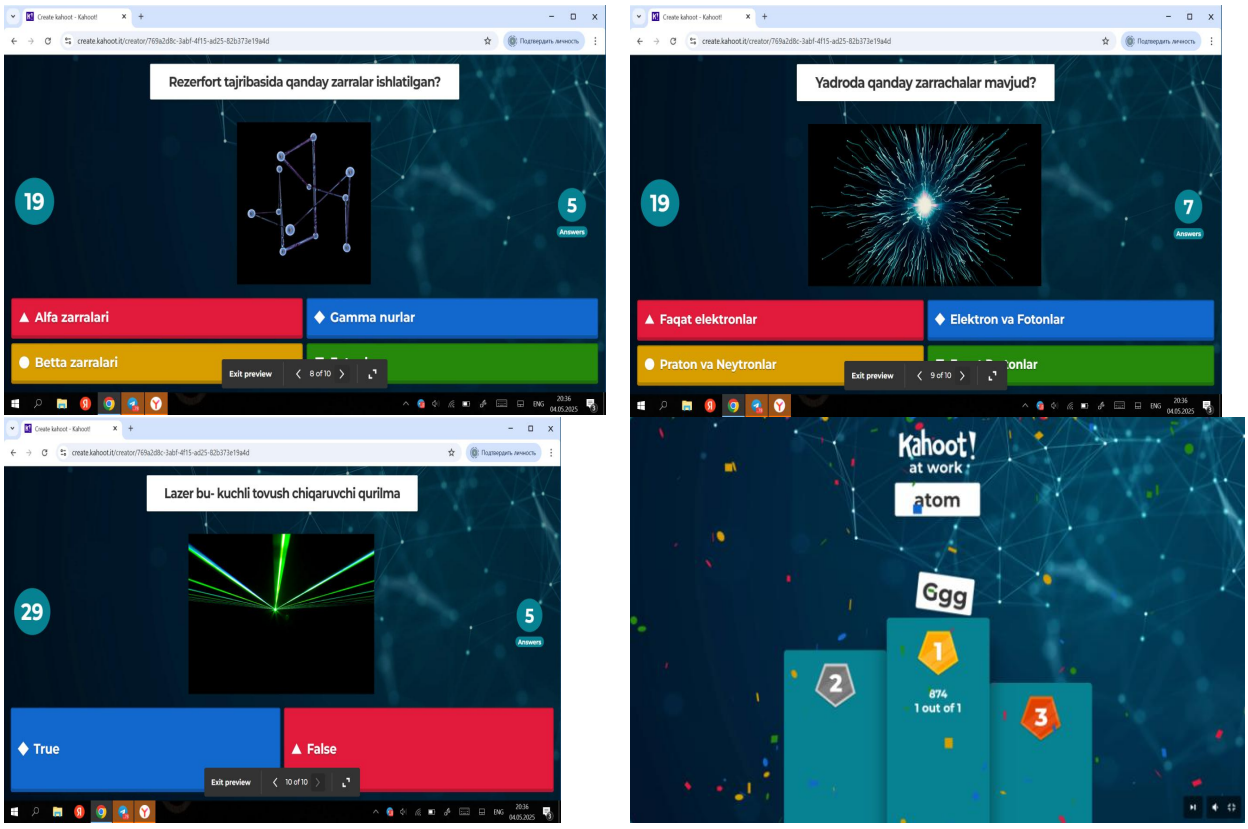

Figure 3. Kahoot program window

After the Kahoot test, it is helpful to discuss the results and review any areas of understanding with students.

Expected results

- Students will gain a deeper understanding of atomic physics;
- Understand the basic principles of the Thomson model and know how to distinguish it from other models;
- Understand the working principle of lasers and their importance in everyday life;
- Through practical training, they will have the opportunity to strengthen their knowledge.

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