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Improving the Methodology of Teaching Physics Based on Information Technology in Secondary Educational Schools

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Abstract:

This article discusses the issues of teaching physics in academic lyceums using information technology and the organization of the educational process on this basis, the development of pedagogical principles of open source platforms and the formation of practical skills in the process of creating a distance e-learning course.
Keywords: 3D models, e-learning, integrative approach, Electronic resource, IT, teaching methodology, multimedia, open source platform, simulation models.

Introduction

Scientific and research work is being done on the development and introduction of computer simulation models, multimedia electronic resources, and virtual educational technologies in order to improve the system of organizing the education and upbringing of students in general education schools throughout the world. In order to teach students the natural sciences, foster their creativity, sharpen their logical thinking, and build the theoretical-methodological and methodological underpinnings of systematizing education, general education relies on the use of contemporary ICTs and pedagogical technologies. enhances.

Globally, scientific study is being conducted to investigate the organizational-methodical foundations of teaching physics to students. This research aims to introduce interactive techniques with an integrated perspective, didactic electronic learning materials, and computer simulation models. The study's findings include scientific advancements in the field of simulation model educational material design for use in physics instruction for general education schoolchildren, as well as the structuring of classrooms using instrumental and practical computer software and multimedia electronic resources. Improving lami is critically necessary. A great deal of effort is being put into developing curricula and programs for the teaching of students in general education schools, as well as utilizing cutting edge pedagogical tools. Researching novel methods for utilizing information technology to instruct students in physics is also necessary. The statement "in the process of inclusive education, the formation of healthy, strong and effective motivation of students to study ; On the basis of inclusive educational programs, priority tasks such as creating modern textbooks, educational manuals, multimedia applications with the introduction of information and communication technologies" [1] has been defined in the Decision on measures to further improve the education system for children with special educational needs. In this sense,

it is deemed necessary to enhance the phases and specifications of the creation of didactic educational instruments for the general education classroom, to create scientific and methodological recommendations regarding the organization of students' independent work in physics.

An original and cutting-edge method for diagnosing the educational process is the integration of cutting-edge pedagogical tools. Because, while acknowledging the principles of didactics, pedagogical technology and interactive approaches based on it necessitate a new way of organizing the educational process in many ways. Supporters of this approach specifically attack the conventional approaches of establishing the lesson's goal based on the subject matter of the teaching materials, the teacher's activity, and the student's activity. Fostering pupils' creative thinking is one of the interactive teaching strategies [2].

By using simulation models to teach students about "Aggregate states of matter" in physics, we may help them develop their logical and logical thinking ability.

Figure 1. Aggregate states of matter.

Under normal circumstances, matter can exist in the states of solid, liquid, or gas as well as in the plasma form. With the use of simulation models, we will present these scenarios to the pupils. Everything is composed of molecules, and the arrangement and interactions between those molecules determine the physical characteristics of the object. under daily existence, or under typical circumstances, we see three distinct aggregation states of substances: solid, liquid, and gaseous forms. Since the experts have a very clear understanding of these scenarios, it is not acceptable to teach students these concepts just through verbal instruction. Instead, simulation models should be created utilizing information technologies and presented to the students. It takes into account the demonstration approaches the best in teaching.

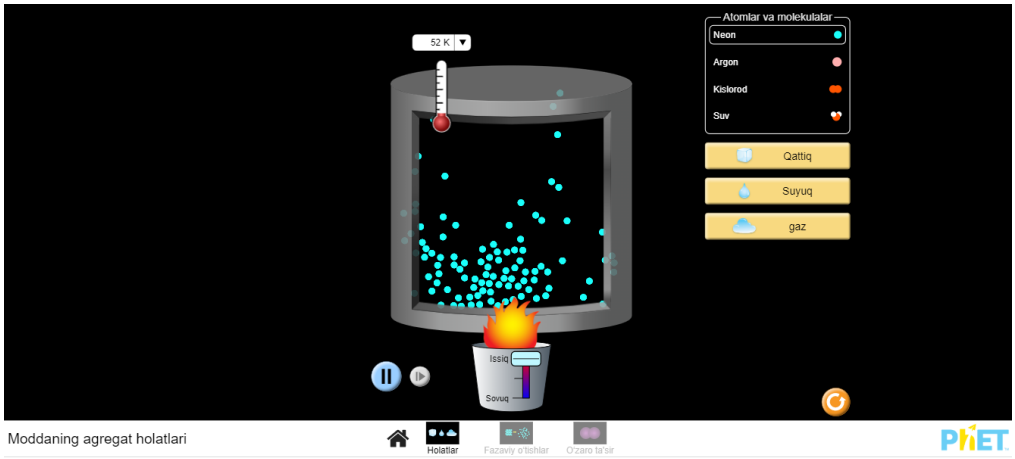

Figure 2. The gaseous state of matter.

The gas expands until the volume it occupies is filled to capacity. When examining a gas material at the molecular level, we observe a vast number of molecules traveling aimlessly in all directions and sometimes colliding. However, there isn't much interaction between these molecules. The molecules will spread uniformly in the new volume whether the volume is increased or decreased. The link between the molecular characteristics of gases and their macroscopic characteristics, such temperature and pressure, is examined by molecular-kinetic theory.

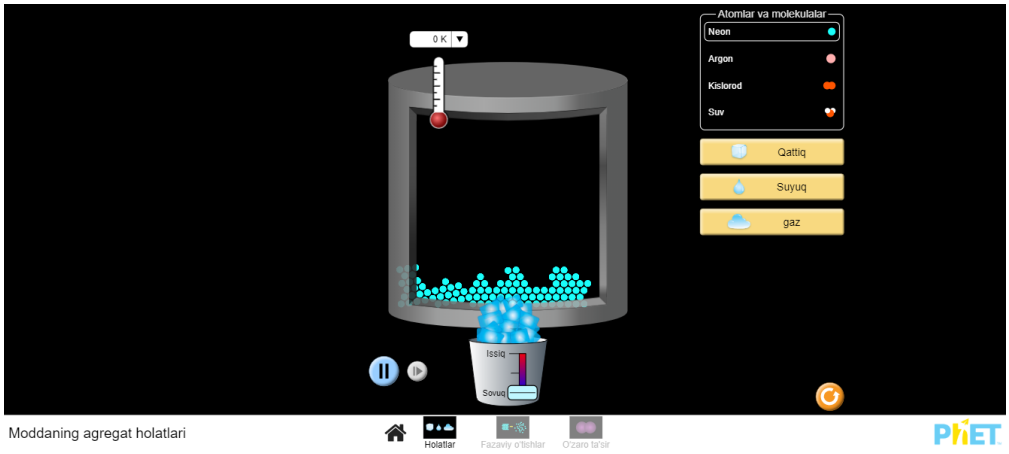

Figure 3. Liquid state of matter.

A liquid, in contrast to a gas, occupies a definite volume at a particular temperature; yet, it enters the bottom section of the vessel from the surface. Liquid molecules are conveniently thought of as spheres from a molecular perspective. That is, they will have the freedom to move around inside the material even if they are inextricably linked to one another. You know that when you pour liquid into a container, it takes on the shape of the container since you have done this several times.

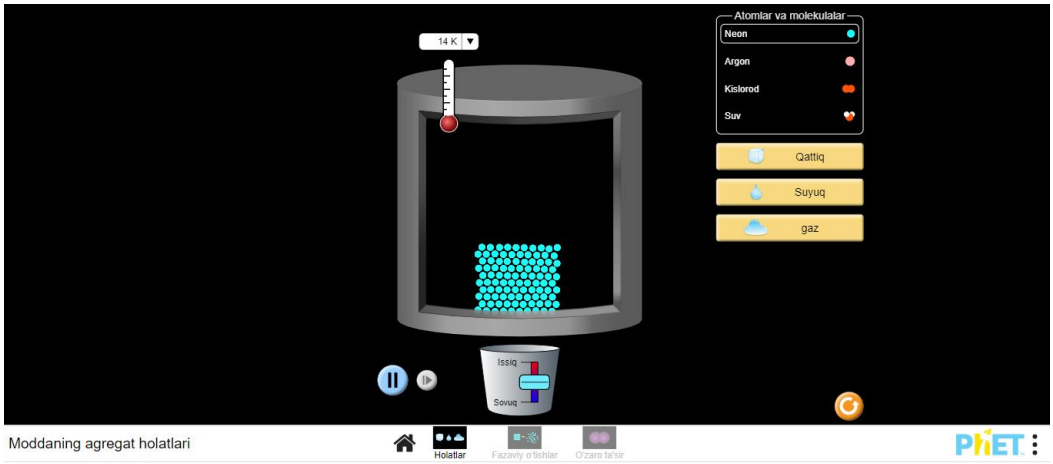

Figure 4. Solid state of matter.

A material that is solid has a fixed volume and independent form. It stays inside the form of the vessel and does not spread over its capacity. The atoms of a solid material are tightly bound to one another by powerful chemical bonds, and their locations remain constant when seen at the microscopic level. On the other hand, there are two kinds of interior structures in solids. A crystal lattice structure made of certain substances may be incredibly rigid, strong, and organized. Other solid forms that have relatively disorganized atoms are referred to as amorphous substances. The term classical aggregate states of matter refers to these three conditions.

The interest in and focus on utilizing interactive techniques (new pedagogies and information technologies) to improve the effectiveness of instruction is growing daily in the physical science classroom these days [3, 823-p.

In addition, youth-oriented training programs that use information technology fulfill the need of youth to voice their opinions on significant life events and issues and provide them a chance to consider and defend their positions. We need people who can take in new information and independently assess what they have learned, who can make the required decisions, and who can think freely and independently in order to solve the problems the educational system is facing in the innovative processes now underway. As a result, contemporary instructional strategies, interactive techniques, and cutting-edge information technology have an unmatched role and significance in educational institutions.

In conclusion, an educational system is now being developed in our nation with the goal of integrating it into the new global information-educational environment. The advent of contemporary information technology in the sphere of education allows for the qualitative facilitation and modification of educational approaches and the organizational structures of the teaching process on the basis of novel ideas.

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