

STEAM TECHNOLOGY IN TEACHING THE TOPIC” LAWS OF ABSOLUTE BLACK BODY RADIATION”

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Abstract: the laws of Absolute Black body radiation play an important role in their understanding of early data in the study of quantum mechanics. Also, mastering it will help students understand the history of the creation of quantum mechanics, basic concepts, understand their essence. This article discusses the observed effectiveness of training “laws of absolute blackbody radiation” in interdisciplinary integration in STEAM technology in students.

Keywords: thermal radiation, STEAM technology, I-spring suite test program, absolute black body, Planck formula, graph imaging, valtablack.

INTRODUCTION

As the most important social institution, the school reflects and influences the state and trends of the development of society. Changes in the system of social relations, in turn, show an active impact on education and require new historical stage tasks, mobility and adequate responses. Section II, paragraph two of the “program of measures for the further improvement of the public education system in 2019-2021” approved by the decree of the president of the Republic of Uzbekistan” on measures to introduce new principles of management into the public education system” dated September 5, 2018 PQ-3931. In order to accomplish this task, teaching classes in schools in STEAM technology is becoming a requirement today. The strong importance of fundamental knowledge in the study of quantum mechanics, even in the higher education system, has a positive effect on the acquisition of this science, which finds practical confirmation in many studies.

As well as a number of important issues of teaching quantum physics in schools:

-how to teach the “quantum physics” department in schools in a holistic, logically consistent, integration?

-how to use modern ideas of quantum physics in the process of teaching in the formation of the scientific worldview of schoolchildren?

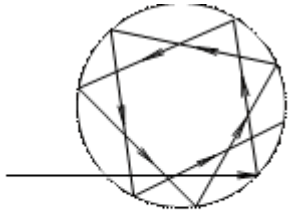
-how to expand the concepts of quantum mechanics under study without overloading students?

On the first issue, about the principle “consistency in the formation and development of quantum imaginations in the system of Continuing Education” S.Matchanov's study reflected. We can therefore see the benefits of training in STEAM technology as a satisfactory solution to the above issues.

Methodology.

The term STEAM was first produced in the United States, with STEM and STEAM technology taking root today and developing as a positive way of action to truly meet the needs of XXIasr. STEAM u is a new educational approach that involves students simultaneously in five - Natural

Sciences (Science), Technology (Technology), Engineering (Engineering), Fine Arts (Art), Mathematics (Mathematics). STEAM technology may have covered this interdisciplinary link-i.e., any visual or performance art, such as burraqs, design, Picture photography, and writing. STEAM technology is a thematic integration. This technology serves to develop students' cognitive skills and competencies and to enhance their creative thinking, creativity, activism, and of course scientific literacy.



1-rasm. Absolyut qora jism modeli.

Studying the topic of the laws of absolute black body radiation, quantum mechanics can be the basis in understanding the history and laws of scattering. In the study of the laws of absolute black body radiation, the integration of physics in the fields of thermodynamics, optics, spectroscopy, atomic nuclear particle physics and in connection with the topics of Mathematics, Computer Science, fine arts increases the effectiveness of the lesson. Therefore, teaching the topic of the laws of

the absolute black body through STEAM technology has helped reduce the difficulties that arise in students. For example, thermodynamic appearance-thermal radiation, equilibrium, temperature; application; optical appearance-infrared, reddish, Emerald appearance, energetic brightness, radiation flux, refractive laws of light, absorption coefficient, refractive coefficient, refractive coefficient, refractive coefficient, refractive index, transparent bodies, absolute black body, absolute white body, gray body; astronomy-the sun is an absolute black body, its structure; Fine Arts-graphics, drawing rates, imaging, reasoning, tassawing, color comparison; mathematical appearance-win's sliding law, relay-gender formula, Stefan-Bolstman's law, inducing them using Planck's formula, solving practical problems; use of Informatics-explaining the topic on an electronic board, taking tests in the ispring test program.

The field of application of the laws of thermal radiation is very wide. It is applied to thermodynamics, classical and quantum systems, matter and area, first to the electromagnetic field of radiation. Thermal radiation theory is considered to be one of the largest independent sections of Theoretical Physics. The most common type of thermal radiation is radiation that occurs when heating bodies. For example, radiation emitted from the human body, radiation emitted when we cook chicken in the oven, radiation emitted by intense heating of iron, radiation emitted from the surface of the moon, etc. Thermal radiation is electromagnetic radiation emitted at the expense of the internal energy of the body. Thermal radiation occurs at an arbitrary temperature and manifests itself in the form of infrared light at low temperatures, and in the form of reddish yellow and white light rays at high temperatures. The process of thermal radiation occurs in an equilibrium state with the temperature of the body. As the temperature of the body increases, its intensity of radiation also increases. The laws of thermodynamics can be applied to states and processes in equilibrium.

Among the bodies in the Solar System, The "Sun" is an absolute black body. The sun, under the same conditions, secretes much more heat than other bodies. The model of an absolute black body is a closed sphere with a small hole (Figure 1).

Radiation spectrum-the wavelength dependence of the spectral density of the energetic luminosity:

$$r_{\lambda} = f(\lambda)$$

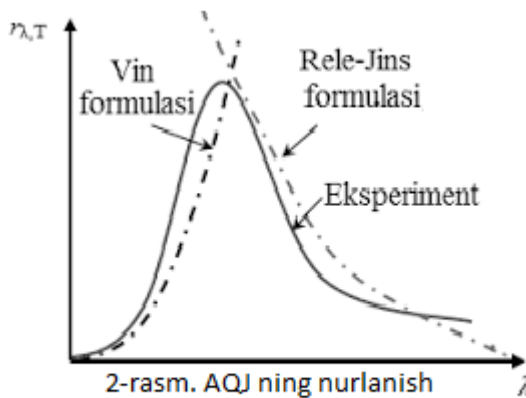
Spectral density depends on the chemical composition of the body, as well as λ va T : $R_e = \int_0^{\infty} r_{\lambda} d\lambda$

The VIN displacement law $b = \lambda_m T$ where $b = 2,9 * 10^{-3} m * K$. The British engineering firm Survey Nanosystems has demonstrated the latest version of the body that has been designated as the blackest material in the world called Vantablack. The Material absorbs 99.965 percent of the

incoming light, including visible light, microwaves and radio waves. The result is such a black color that it looks like a bottomless pit. Black coal, on the other hand, absorbs 96% of the falling light.

Discussion and analysis.

The information, as shown above, was explained to students in the form of a presentation through an electronic whiteboard, and from them the ability to learn their computer technology was developed by taking tests on the topic in the iSpring suite test program. The use of computer technology also helps to save time and has allowed more information to be learned and further developed students ' interests. During the reinforcement phase, each student was asked 10 Questions in the ispring test program as follows.



2-rasm. AQJ ning nurlanish spektrining to'liqin uzunlikka bog'liqligi.

Question 1 of 2 Point Value: 10 | Total Points: 0 out of 10

Reley -Jins qonuniga bo'ysunuvchi chiziqni ko'rsating.

5000K

1000 2000 3000

Wavelength of radiation in nm

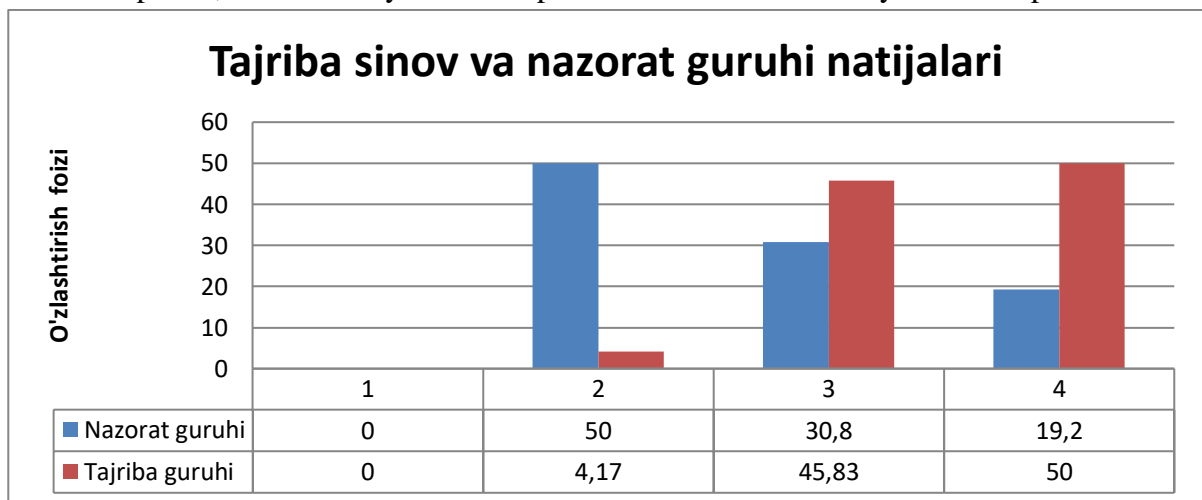
Clear Submit

In order to conduct pilot work and determine its effectiveness, pilot and control groups were separated. In control groups, the process of passing classes to students was carried out as usual. In the Experimental Test teams, however, STEAM was implemented using technology. The lessons in the experimental test and control phase were the same, except that the lessons differed in teaching methodology. Pedagogical experiment-when conducting a test, we checked the results of the experiment-test carried out in students of the 11th grade of the Nukus economized State

Comprehensive School No. 1 using statistical methods. There were 24 students in the pilot group and 26 students in the control groups. Each student was given 10 minutes for 10 Questions in the ispring test program. 68% of students answered picture questions correctly. I observed that the questions asked in the form of pictures, graphs are easy for readers to understand. It has been observed that students in the pilot group have significantly higher learning skills based on knowledge levels and continuity. We list the results of the experiment - test we conducted in the table below.

Groups	Students	Degree of acquisition			
		«unsatisfactory»	«satisfactory»	«good»	«well»
Control group	26	0	13	8	5
Experimental group	24	0	1	11	12

We have determined the results of the experimental test with an excellent level of 4 points, a good level of 3 points, a satisfactory level of 2 points and an unsatisfactory level of 1 point.



Conclusion.

In conclusion, as can be seen from the diagram presented above, the use of training in interdisciplinary integration in STEAM technology in teaching the topic “laws of absolute black body radiation” of the Department of quantum physics in Physics at the school leads to the following effectiveness: in experimental-test groups, the “excellent” rating was on average 50% (more than 30.8% the number of students who received a “satisfactory” grade was 4.17% (45.83% compared to the control group), at. This means that the statistics in question are the basis for us to conclude that in the integration of topics in STEAM technology, developed on our side and tested in practice, active teaching methods are effective in comparison with the current traditional teaching methodology. This suggests that the work carried out in experimental groups on the methodology of integrated teaching of the science of “Physics” on topics in STEAM technology is effective.

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