

CREATIVE GAME AND PROJECT-BASED EDUCATION IN PHYSICS CLASSES

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Abstract: A game to teach schoolchildren to solve physical problems The problem of using technologies is discussed. Organization of game learning activities. The possibilities of the virtual environment are considered.

Keywords: teaching physics, solving physics problems, game learning technologies, virtual gaming environment, development of digital games, educational resources in physics

Introduction. In modern education, along with deep understanding of academic subjects, it is becoming increasingly important to develop students' practical skills and independent thinking. Especially in teaching physics, moving beyond traditional lecture-based methods and incorporating creative, interactive, and project-based approaches enhances the quality of the lessons. Such methods encourage students to analyze real-life situations through the principles of physics and to develop their own ideas and projects.

Findings, Suggestions, and Recommendations. A game is not only a meaningful way for students to spend their free time, but also a natural and effective element of the learning process. Using game-based methods in education increases students' interest in knowledge, activates their participation in lessons, and significantly improves their level of understanding. In physics in particular, the role of games is invaluable when it comes to explaining abstract and complex theoretical concepts in a simple, memorable, and relatable way. This is because physics often seems to students like a dry set of formulas and rules. In such cases, creative games can help break this stereotype and engage the student as an active participant in the learning process.

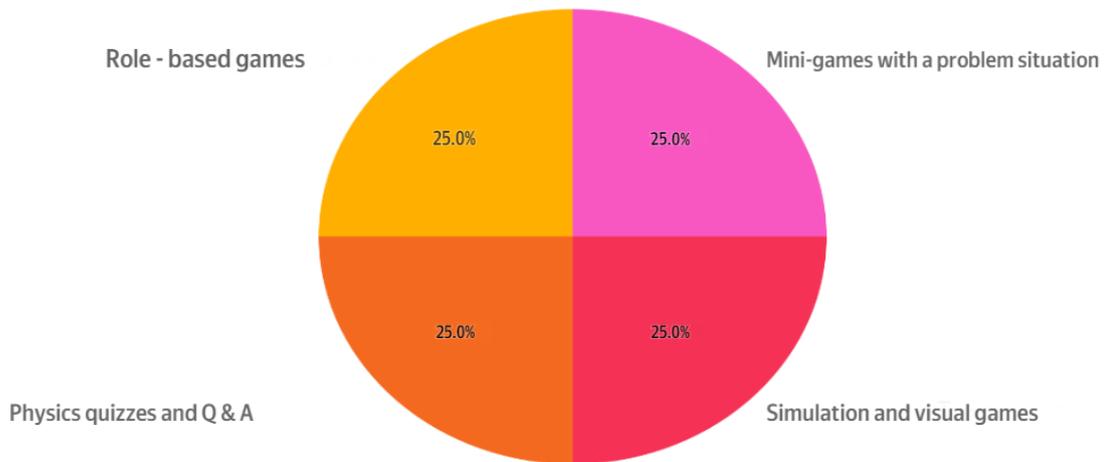
Using game-based methods, it is possible to develop students' abilities to concentrate, activate prior knowledge, think creatively, and make independent decisions. Additionally, games help students build skills in communication, teamwork, idea sharing, and reaching compromises. These skills are valuable not only in the classroom, but also in everyday life.

Creative games that can be used in physics lessons may take various forms and carry diverse content. For example, role-playing games contribute to the development of students' imagination and figurative thinking. By assigning roles such as "laboratory scientist," "researcher," or "energy engineer" during the lesson, students can be placed into specific scenarios and encouraged to independently find solutions to problems. In such games, students connect theoretical knowledge with real-life situations.

Physics quizzes and question-and-answer competitions serve as effective tools for testing students' knowledge, motivating them, and making the lesson more engaging. For example, games like "Who Answers Faster?", "Physics Aphorisms," and "Interesting Facts" allow students to test and strengthen their understanding.

Simulation-based and visual games developed using modern technologies—such as

Types Of Creative Games In Physics Lessons



PhET Interactive Simulations (a project of the University of Colorado), Algodoo, and Crocodile Physics—allow students to conduct physics experiments in a safe and visual manner. Through these games, students can observe the operation of electric circuits, the relationship between force and motion, or phenomena like refraction and interference of light through lifelike animations. This, in turn, improves their understanding and helps them grasp cause-and-effect relationships. In addition, problem-based mini-games are also highly significant. These types of games develop students' logical thinking and their ability to solve problems using physical laws. For example, presenting students with questions like “Why does light bend when it enters water?”, “Why does heat spread faster through metal?”, or “Why does a person feel pressed down when the elevator accelerates?” in the form of a game can encourage them to think critically and find explanations based on experimentation.

Creative games not only capture students' attention, but also help them grasp complex physics concepts through real-life examples. Knowledge acquired through play tends to be retained for a long time, as it is tied to emotional experiences. Psychological research shows that learning based on emotional engagement is more permanent and deeply absorbed. Therefore, the inclusion of game elements in lessons revitalizes the learning process, contributes to the formation of modern competencies, and fosters a positive attitude toward physics among students.

In conclusion, implementing game-based technologies in physics lessons is not simply about making the class “fun,” but rather about making it more effective, meaningful, and modern. Creative games transform the student into an active participant in the learning process, spark interest in science and technology, and empower them to propose new ideas based on their own knowledge.

Project-based learning is an approach in which students learn through independent work focused on solving real-world problems and involving elements of research. In physics



education, this approach is especially important, as it enables students to connect theoretical knowledge with real-life contexts.

Examples of physics-related project work: A project on the use of solar energy; A simplified experiment on heat exchange; Mechanical models demonstrating the laws of motion; Building a simple generator based on electromagnetic induction.

Such projects help develop students' analytical thinking, planning skills, teamwork, creative approach, and sense of responsibility.

Integrating games and project-based learning in physics lessons ensures maximum pedagogical effectiveness. In the introductory part of the lesson, interest in the topic is sparked through a game; during the main part, project-based activities are carried out; and at the end, an assessment and discussion process takes place.

➤ **For example, when studying the topic “Law of Conservation of Energy”:**

Game: “Find the Energy” quiz.

➤ Project: Building a simplified heat measurement module.

Conclusion: Group presentation and discussion.

Conclusion. Teaching physics through creative games and project-based approaches is an innovative method aligned with modern educational principles. These methods help shape students into active, independent, creative, and responsible individuals. They also enhance the quality of education, reinforce comprehension, and stimulate students' interest in science and technology.

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