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USING MODERN EDUCATIONAL APPROACHES IN CHEMISTRY LESSONS

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Abstract: To increase the effectiveness of teaching the subject of chemistry, it is important to rely on an integrative relationship with other subjects. This article substantiates the theoretical and practical significance of increasing students' interest in science and improving the effectiveness of lessons through chemistry teaching based on the modern STEAM approach.

Keywords: chemistry, STEAM education, method, knowledge, creativity, mathematics, approach, efficiency, theory, integration, practice.

Introduction

In today's rapidly developing world of technology and innovation, the primary goal of teaching students in general education schools is not only to deliver academic knowledge as outlined in state educational standards, but also to teach students how to apply that knowledge to solve real-life problems. Presenting subject material in an engaging, concise, and practical manner — using real-life examples, visual aids, as well as audio and video materials — helps increase students' attention and interest in the lesson. Furthermore, it enables them to independently complete tasks aimed at developing practical competencies based on the knowledge acquired.

This collaborative process between teacher and student contributes significantly to the success of the lesson. A lesson is a complex process that encompasses the spiritual, intellectual, and educational development of each student. It provides opportunities for individual approach and aims to help students apply their acquired knowledge in solving various problem situations.

In the context of modern education, the effectiveness of a lesson depends largely on the teacher's ability to act as a facilitator and choose appropriate methods that encourage students' independent learning activities. However, it is essential to emphasize that the success of a lesson depends not only on the teacher, but also on the collaborative engagement between teacher and student.

Literature Review

Chemistry lessons play a vital role in helping students understand the interconnectedness of humans and nature, and the integration of chemistry with other disciplines such as mathematics, engineering, agrochemistry, and pharmaceuticals. The importance of teaching chemistry based on the integration and continuity of knowledge is considerable.

Numerous scholars have emphasized the application of interdisciplinary connections in the educational process. In particular, the works of P.G. Kulagin, L.V. Zagrekova, G.I. Baturina, N.I. Gorbacheva, I.D. Zverev, D.P. Yerigin, D.M. Kiryushin, and Ye.Ye. Minchenkov are noteworthy in this regard. Studies by I.D. Zverev, Yu.P. Fedulov, N.A. Loshkaryova, V.N. Fedorov, and E.O. Turdiqulov have further contributed to understanding the role of interdisciplinary teaching in enhancing students' independent thinking and practical skills.

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Research Methodology

Considering the ideas mentioned above, it is clear that in order to achieve effective learning outcomes, it is essential to apply modern educational approaches such as STEAM education, which has been increasingly promoted in recent years in many foreign countries as well as in our own republic.

STEAM education (Science, Technology, Engineering, Arts, and Mathematics) is particularly important in demonstrating the relevance of knowledge, skills, and competencies acquired in the natural and economic sciences to real-life situations. This approach involves conducting student research activities, performing experiments, and engaging in project-based learning both during and outside of classroom lessons. STEAM also fosters creativity, encourages innovation, and develops students' interest in discovering new ideas.

Creativism

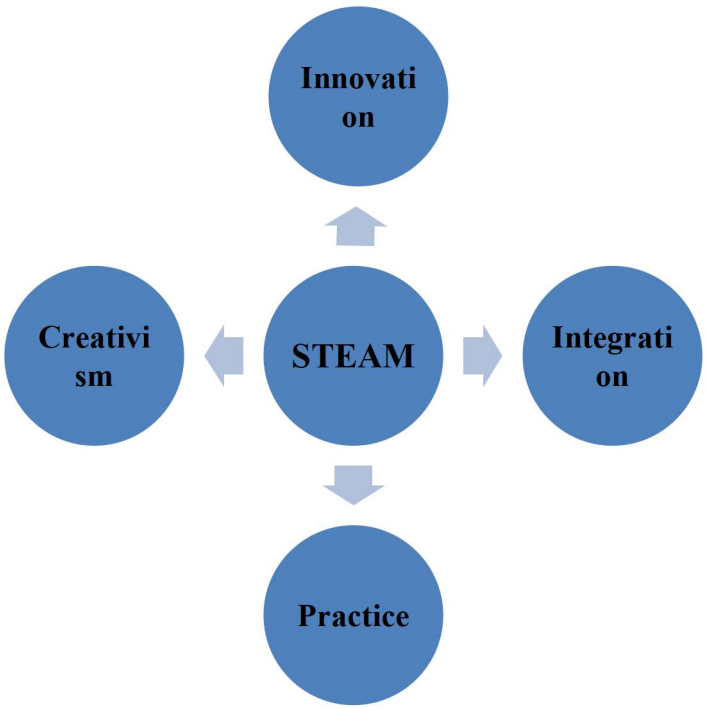

Figure 1. Core Principles of STEAM Education

The consistent use of STEAM-based projects and tasks in lessons — aimed at developing students' logical thinking and practical skills — enables the preparation of a generation that meets the requirements of international assessment programs. In the process of teaching chemistry, including in chemistry classes, it is one of the teacher's key responsibilities to instill in students a mindset geared toward working with tasks that reflect the integration of theoretical and practical knowledge. These include hands-on exercises, laboratory work, and assignments that encourage independent performance and foster creativity and innovative thinking.

The integration of various scientific disciplines should help students perceive nature as a unified entity and understand the interconnectedness of the universe as a whole.

Analysis and Results

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At the same time, lessons should aim to identify and nurture each student's unique talents and abilities, find methods for their development, support their interest in scientific knowledge, and educate them as well-rounded individuals — physically and mentally healthy. In this regard, teaching science subjects based on STEAM methodologies is highly effective.

STEAM education not only facilitates the acquisition of existing knowledge but also enables students to generate new ideas by analyzing and synthesizing learned information. The number of ideas produced by students is not the key metric; rather, the main objective of STEAM education is to foster the development of innovative ideas that can offer non-standard solutions to real-world problems.

Conclusion and Recommendations

The integration of STEAM principles into science education helps students acquire the following knowledge and competencies:

Understand the specific characteristics of various natural phenomena and processes based on the scientific knowledge gained.

Explain and apply natural phenomena observed in daily life using scientific terms, concepts, and general laws from the natural sciences.

Observe natural events, conduct research and experiments, and perform relevant calculations.

Analyze and filter information from various sources and utilize it effectively for educational purposes.

Stay informed about ongoing socio-economic and technological developments and creatively apply this knowledge in their own activities.

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