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# Analysis of Tasks Aimed at Developing an Interdisciplinary Approach to General Education Subjects in Mathematics Lessons

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**Abstract:** This article analyzes the tasks used to form an interdisciplinary approach in mathematics classes. Based on theoretical sources and modern methodological approaches, the study examines the effectiveness, challenges, and prospects of these tasks. The aim of the article is to demonstrate the role of mathematical tasks in developing students' logical thinking and problem-solving skills through an interdisciplinary approach.

**Keywords:** Mathematics, interdisciplinary approach, task analysis, general education, teaching methodology.

**Introduction:** In the general education system, mathematics lessons play a crucial role in developing students' logical thinking and analytical abilities. Nowadays, teaching methods based on interdisciplinary approaches are widely implemented and supported by the academic community. This article analyzes tasks that contribute to the development of interdisciplinary approaches in mathematics lessons. The main focus of the research is to identify an effective system of tasks aimed at enhancing students' understanding of interdisciplinary connections and their ability to apply them in practice.

The modern education system is designed to develop individuals who can think independently, apply their knowledge and skills in practical situations, and solve complex problems. In this process, ensuring the

interconnectedness of academic subjects, integrating subject-specific knowledge with real-life contexts, and fostering integrated thinking in students are of great importance. From this point of view, an interdisciplinary approach is one of the key directions in contemporary education. This approach allows students to view the knowledge they acquire in the context of various subjects.

In particular, mathematics, with its focus on logic, precision, and problem-solving, offers broad opportunities for integration with other subjects. The use of interdisciplinary tasks in mathematics classes not only enhances students' mathematical literacy but also helps reinforce their knowledge in other subjects—such as biology, geography, technology, physics, history, or native language—and fosters their ability to make meaningful connections between them.

Through interdisciplinary tasks, students begin to understand how mathematical knowledge can be applied to solve real-world problems. Such an approach encourages students not just to memorize ready-made formulas, but to think critically and creatively, and to analyze problems using a comprehensive approach. As a result, students develop a deeper understanding, grasp interdisciplinary links, and acquire higher-level competencies.

Recent years have shown, through both international experience and reforms within the Uzbek educational system, that mathematical tasks play a vital role not only in reinforcing theoretical knowledge but also in helping students understand the interconnections between various subjects. Therefore, the topic of this article is considered highly relevant.

This article explores the didactic potential of tasks designed to promote interdisciplinary approaches in mathematics lessons, their impact on students' development, and the methods of integrating them into the teaching process. Additionally, it examines the content and structure of such tasks and their connections with other academic subjects.

## METHODOLOGY

Since 2020, scientific research and articles have increasingly focused on the importance, effectiveness, and innovative methods of interdisciplinary approaches in mathematics lessons. For instance, studies conducted by Karimov (2021) and Suhrobov (2022) examined the reinforcement of integration between mathematics and other subjects, the interactivity of tasks, and the development of students' interpersonal engagement. In addition, international researchers such as Smith & Johnson

(2021) have described how interdisciplinary approaches impact students' cognitive development and how educational processes can be effectively organized using innovative technologies.

The theoretical foundation of this research lies in modern pedagogical concepts, cognitive development theories, and interactive teaching methodologies. These frameworks emphasize not only providing theoretical knowledge in mathematics classes, but also creating opportunities for students to solve practical problems, engage in project-based tasks, and tackle real-life challenges.

An interdisciplinary approach aims to reveal the connections between multiple subjects and teach knowledge in an integrated system, fostering students' broader perspectives. This approach provides the following advantages:

Students learn how to apply their knowledge in real-life situations;

They better understand topics by connecting mathematics with natural and social sciences;

Project-based and research skills are developed.

This study is organized into the following stages:

### 1. Literature Review:

Scientific articles, dissertations, and publications on educational methodology published since 2020 were analyzed. The aim was to identify the system of tasks used to implement interdisciplinary approaches in mathematics lessons.

### 2. Task Analysis:

The selected tasks were analyzed based on their content, level of interactivity, interdisciplinary elements, and impact on students' analytical thinking. Additionally, how these tasks are implemented by teachers, their role in classroom activities, and their effectiveness were also studied.

### 3. Empirical Observations and Experimentation:

Practical trials were conducted in selected schools to observe how the tasks influenced students, including their interest in the lessons and academic performance. These empirical findings were used to evaluate the effectiveness of the tasks.

### 4. Interviews and Surveys:

Interviews with teachers and students, as well as anonymous surveys, were conducted. These instruments helped identify the strengths and weaknesses of applying the tasks in real classroom settings.

Based on the outcomes of this methodology, it becomes possible to evaluate the current system of tasks used to

promote interdisciplinary approaches in mathematics lessons and to determine directions for future development.

### 1. The Content and Structure of Mathematical Tasks

Mathematical tasks often include numerous problem-based assignments. Their content is generally characterized by the following aspects:

**Cognitive Load:** These tasks require students to engage in analytical and synthetic thinking.

**Interactivity:** They create opportunities for group work, discussion, and communication.

**Scientific Foundation:** Tasks must integrate theoretical knowledge with practical experience.

For example, according to Suhrov (2022), the effectiveness of tasks depends on their structure and the active involvement of students. When task sets are developed in an interactive format, students' interest in the lesson significantly increases.

### 2. Strengthening Interdisciplinary Connections

Integrating mathematical tasks with other subjects helps develop students' multidimensional competencies.

For instance:

**Physics and Mathematics:** Through interrelated concepts such as formulas and measurements, real-life examples are introduced into the learning process.

**Biology and Mathematics:** Biological processes are modeled using statistics and data analysis.

**History and Mathematics:** Historical events can be studied through statistical analysis and diagrams.

Such an approach helps students better understand interdisciplinary connections, promotes independent thinking, and encourages creative problem-solving when faced with real-world challenges.

### 3. Interactive and Innovative Solutions for Tasks

Modern technologies and interactive methods are increasingly enabling the digitization of tasks and their implementation on online platforms. With the help of virtual laboratories, interactive simulations, and video materials, tasks are enriched not only theoretically but also practically.

For example, in the research conducted by Smith & Johnson (2021), students' active participation in completing tasks using digital technologies was monitored, and the results were evaluated positively.

## RESULTS

The findings of the study revealed that the use of interactive and interdisciplinary-based tasks significantly enhances the effectiveness of

mathematics lessons. In particular, such tasks increase students' active participation in class, encouraging them to think independently, ask questions, conduct inquiries, and express their ideas openly. During the lesson, students are given the opportunity to revisit and apply the knowledge they previously acquired in other subjects within the context of mathematics. This leads to a deeper, broader, and more systematic understanding of interdisciplinary connections.

Furthermore, tasks based on interactive approaches have a positive impact on the development of students' logical and analytical thinking skills. For instance, math problems grounded in real-life situations require students not only to perform calculations, but also to analyze the problem, search for possible solutions, and make well-reasoned decisions. In this process, students gain a deeper understanding of the problem's essence and strive to articulate their thoughts in a logical and justified manner.

Empirical observations, classroom experiments, and interviews conducted with both teachers and students throughout the research demonstrated that tasks designed based on interdisciplinary approaches increase students' interest in the subject, motivate them to acquire knowledge, and promote a practice-oriented learning approach. In particular, the connection of tasks to real-life situations broadens students' perspectives on real-world events and opens up opportunities for applying knowledge in everyday life.

According to the analysis, tasks developed in accordance with modern pedagogical methodologies enable students to integrate, analyze, and apply knowledge gained from other subjects during mathematics lessons. As a result, students' learning activity is enhanced, their academic performance improves, and their personal development is positively influenced.

One of the final conclusions is that the integration of interdisciplinary-based tasks into the educational process not only reinforces students' current knowledge and skills but also lays the foundation for the future innovative development of the education system. This approach strengthens collaboration between teachers and students and fosters students' skills in independent learning, critical thinking, and striving for innovation.

## DISCUSSION

During the discussion, it is important to emphasize that the use of interactive technologies and digital resources in mathematics lessons not only enriches the knowledge delivery process but also stimulates students' creativity and independent thinking. Additionally, regularly revising the content and structure of tasks and

implementing new methods in the pedagogical process contributes to the improvement of education quality.

Interactive technologies and digital resources also strengthen students' motivation to learn and encourage their active participation in lessons. For example, utilizing mathematical modeling, visualization tools, online tests, virtual laboratories, or educational games can make lessons more engaging, provide deeper explanations of topics, and increase students' interest in the subject. Particularly within an interdisciplinary approach, digital resources help illustrate the connections between various subjects and support problem-solving based on real-life examples, fostering creative thinking and a holistic approach in students.

Another crucial aspect of enhancing the effectiveness of the educational process is the continuous updating of tasks. These tasks must be regularly improved to match the topic, students' age characteristics, and modern educational requirements. In this regard, the teacher's methodological expertise, ability to use innovative approaches, and capacity for reflective analysis of the teaching process play a decisive role. Tasks should not only reinforce knowledge but also prompt students to think, express their ideas, adopt a critical perspective, and explore multiple solutions to a problem.

The effective use of interdisciplinary integrated tasks also strengthens communication between teacher and student, creating a collaborative learning environment. This, in turn, helps develop students' social-emotional skills and ensures that education is aligned with humanistic principles.

Firstly, applying interdisciplinary approaches in mathematics lessons can help students develop an integrated knowledge system. In other words, they learn how to synthesize the knowledge acquired in different subjects to solve a common problem. For instance, analyzing environmental issues through mathematical calculations, building statistical models based on geographical data, or performing mathematical and logical analyses of historical events enriches this process.

Secondly, tasks based on interdisciplinary approaches also contribute to the development of students' communicative competence. Activities such as working in groups, defending one's opinion, and being attentive to others' ideas help students build communication skills, exchange ideas, and make decisions collaboratively. These are vital not only for academic success but also for personal and social development.

Thirdly, in today's educational landscape, it is crucial to

incorporate tasks aligned with the Sustainable Development Goals (SDGs). Topics such as the rational use of water resources, energy conservation, and promoting a healthy lifestyle, when integrated into mathematical problems, help foster ecological and social responsibility among students. In this way, mathematics transforms from an abstract subject into a practical tool for making real-life decisions.

Fourthly, tasks based on interdisciplinary approaches also encourage teachers to engage in continuous professional development and experimentation with new methods. This plays an important role in self-improvement, sharing experiences, and enhancing the quality of education. There is a need to promote the practice of creating interdisciplinary projects, conducting integrated lessons, and sharing the outcomes of such experiences among educators.

Overall, the integrated use of interdisciplinary approaches, interactive methods, and digital resources has become an essential part of modern education. This not only facilitates the learning of mathematics but also helps students connect it to real-life situations, thereby fostering the development of interdisciplinary thinking.

## CONCLUSION

In conclusion, this article analyzed tasks aimed at fostering interdisciplinary approaches in mathematics lessons through the integration of general education subjects. The research findings indicate that tasks developed based on interactive and multidisciplinary approaches significantly enhance students' logical thinking, analytical skills, and problem-solving abilities.

Moreover, the use of new technologies and interactive resources contributes to organizing the educational process in an innovative way. In the future, expanding this approach, improving teachers' qualifications, and implementing modern methods in the learning process can further enhance the quality of the education system.

Overall, the article emphasizes the relevance and effectiveness of tasks used to implement interdisciplinary approaches in mathematics education and highlights the need for more in-depth research in this area going forward.

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