

ONGOING REFORMS IN PRIMARY SCIENCE EDUCATION

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Abstract: This article examines the reforms carried out in the field of natural sciences in primary education, focusing on their essence and role in improving education quality. It analyzes efforts to update educational standards, introduce modern methodologies, implement the STEAM approach, and enhance teacher qualifications. The article also highlights the effectiveness of interactive methods, experiments, and practical activities in developing scientific thinking among primary school students.

Key words: primary education, natural sciences, reforms, quality of education, methodology, STEAM, innovation.

Аннотация: В статье рассматриваются проводимые реформы в области преподавания естественных наук в начальном образовании, их содержание и роль в повышении качества обучения. Проанализированы обновление образовательных стандартов, внедрение современных методик, применение подхода STEAM и повышение квалификации педагогов. Особое внимание уделено эффективности интерактивных методов, опытов и практических занятий в формировании естественно-научного мышления учащихся начальных классов.

Ключевые слова: начальное образование, естественные науки, реформы, качество образования, методика, STEAM, инновации.

In recent years, large-scale reforms in the education system of Uzbekistan are aimed at forming a modern, educated, creative and competitive generation in line with the socio-economic development of the country. In this process, special attention is paid to teaching natural sciences at the primary education stage. Because natural sciences form fundamental skills in children such as understanding the environment, observing, conducting experiments, analyzing, drawing conclusions at an early stage. Therefore, measures are being systematically implemented in this area to improve the content of education, update methodological approaches, improve the skills of teachers, and introduce innovative technologies. First of all, the process of updating state educational standards in natural sciences has become an important component of reforms at the primary stage. The new standards set as a priority the formation of independent thinking, scientific observation, simple experiments, and analysis of their results in students, rather than memorizing ready-made knowledge. This approach is based on the principles of competency-

based education. Now, in science lessons, the focus is not just on memorizing facts, but on understanding them, seeing logical connections, and integrating them with life experience. This increases students' interest in knowledge and makes them active participants.

The STEAM education concept is being gradually introduced to primary schools. The STEAM approach, by integrating science, technology, engineering, art and mathematics, develops children's skills in new approaches to problem situations, creative thinking and innovative solutions. By introducing simple technical experiments, construction work, and projects combined with art elements into the lesson process, students better understand the subject and have the opportunity to apply the knowledge they have gained in real life. For example, by making simple mechanical devices, experimentally studying the states of water, or modeling processes in nature, subjects are taught in an interconnected manner. This approach not only increases interest in natural sciences, but also forms an integral connection with other subjects.

A number of works are also being carried out to improve the skills of teachers in order to effectively teach natural sciences at the primary education level. Special courses, seminars and trainings in natural sciences are being organized in cooperation with the Ministry of Public Education of the Republic of Uzbekistan and higher educational institutions. In these courses, teachers are introduced to modern pedagogical technologies, interactive methods, and methods of organizing laboratory exercises. Also, methods that serve to teach on the basis of experience, involve students in active participation, and develop their scientific thinking are being taught in a practical way. This, in turn, increases the quality of the teaching process and encourages students to be active.

Another important aspect of the reforms is the widespread use of innovative methods in teaching natural sciences. Advanced methods such as laboratory work, small experiments, modeling, clusters, and the project method are being introduced into the teaching process. Such methods help to combine theoretical knowledge with practical activities. For example, activities such as modeling the water cycle using a model, demonstrating simple magnetic phenomena in an experiment, and drawing conclusions based on observing changes in nature broaden children's scientific outlook. These methods also increase students' interest in the lesson and form them as active participants. During the experiment, students learn to ask questions, put forward hypotheses, and draw independent conclusions. Modern technologies are also being used as effective tools in teaching natural sciences. Lessons are being organized in a more lively, understandable, and interesting way using interactive whiteboards, video lessons, virtual laboratories, and multimedia materials. Virtual experimental programs are especially helpful in places where the possibility of conducting experiments is limited. Students understand the essence of natural processes by observing phenomena in an artificial environment. This expands their scientific thinking, which, in turn, creates the opportunity for in-depth mastery of the sciences. As a result of these reforms, wide opportunities are being created for primary school students to understand natural phenomena, develop scientific literacy, and form a conscious attitude to the environment. Students are no longer limited to memorizing ready-made information, but are learning to discover, conduct research, and draw independent conclusions on their own. This creates the foundation for the formation of qualified specialists in the fields of science and technology in the future. Thus, reforms aimed at improving primary education in the natural sciences are becoming an important factor not only in improving the quality of education, but also in developing scientific thinking and a creative approach in the younger generation.

The reforms being carried out in the field of primary education in natural sciences are bringing the modern educational process to a qualitatively new level. Measures in this regard serve to update the content of education, improve pedagogical methods, and direct students to scientific thinking. However, some proposals can be put forward to further increase the effectiveness of the reforms.

First of all, it is necessary to systematically integrate modern scientific achievements and innovative ideas in the development of natural science curricula. The content of textbooks and manuals should be suitable for children's thinking, simple, but scientifically correct and clear. At the same time, it is advisable to introduce more interactive tasks aimed at learning based on experience, taking into account the age characteristics of students.

Secondly, it is important to focus teacher training courses on practice and deepen skills in organizing laboratory work. To this end, it is necessary to popularize advanced pedagogical practices, demonstrate innovative methods through practical exercises, and establish a system of continuous methodological support.

Thirdly, it is recommended to make wider use of the capabilities of digital technologies and virtual laboratories in teaching natural science lessons. In particular, it is necessary to introduce special interactive platforms to form observation, experiment, and analysis skills in children even in conditions of distance learning. This will not only increase the quality of education, but also create equal opportunities in all regions.

Fourthly, it is also relevant to develop project activities that bring students closer to real-life processes. By observing nature, analyzing environmental problems, and preparing small scientific projects, students not only learn more deeply about science, but also form an ecological culture and a sense of responsibility.

In conclusion, the reforms being carried out in the primary education system in natural sciences are not only improving the quality of knowledge provision, but also helping to form scientific thinking, observation, independent research and a creative approach in students. As a result of modern methods, STEAM education, innovative technologies and systematic work aimed at improving the qualifications of teachers, the primary education stage is becoming an important foundation for strengthening the intellectual potential of society. By consistently continuing the reforms being implemented in this direction, further enriching existing experiences and implementing new ideas, it is possible to create a high-quality, modern and innovative primary education system.

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