NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 6, ISSUE 12, Dec. -2020

CLEAR AND NATURAL IN TEACHING HIGHER EDUCATION INSTITUTION STUDENTS ON THE BASIS OF THE INTERNATIONAL STEM EDUCATION PROGRAM CHARACTERISTICS OF INTEGRATION OF SCIENCES

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ABSTRACT:

The article provides information on teaching based on the integration of the exact and natural sciences as well as the international STEM program.

KEY WORDS: STEM, math, chemistry, integration, CIS, mockup, webinar, online, "blended learning", "flipped classroom", technology.

INTRODUCTION:

The role of interdisciplinary cooperation in the development and improvement of education has been the subject of many scientific and practical works, which in turn are confirmed in practice. In particular, sufficient experience has been accumulated in the study of the relationship between chemistry and mathematics, and some positive solutions have been found in this area, which can serve as initial guidelines for practical teachers. To do this, the teacher should not be limited to the subject materials he teaches, but also be interested in the main content of other subjects, find more of their interrelated points and use them in practice.

Along with the increase in the content of education in the teaching of natural sciences in recent years, today's educators have an obligation to address their integration. This means that higher education institutions in teaching the science of chemistry and natural sciences plays an important role in the integration. If we approach this issue in the example of chemistry, it is important to fully answer the questions of today's intelligent students in the process of teaching a subject in the educational process, to increase their interest in science and to explain it with real-life examples.

The mutual integration of the exact and natural sciences is beneficial to both fields. At the same time, not only the development of science, but also the system of teaching this science will be improved. As mathematics enters science, that science develops along a geometric progression. Today, all the natural sciences and their research methods are able to see future events through mathematical modeling. Therefore, based on the above tasks, the creation of a system of interdisciplinary links and integration and its implementation in practice is of particular scientific and practical importance. Now it is not just a question of how to master one subject, but also the need to deal with two or more disciplines at the same time.

Performing mathematical calculations in chemistry requires sufficient knowledge of mathematics. Chemistry, mathematical methods in teaching, information technology and chemical tie chemical processes in the teaching of mathematics and mathematics teaching in the direction of increasing the

efficiency of professional training of specialists on the basis of positive results.

Today, most developed countries (USA, China, Israel, Finland, Australia, Malaysia, Germany, France, Italy, Austria, etc.) and some CIS countries (Russia, Kazakhstan) have a relatively new direction in education - STEM(Science) – natural sciences. Technology - technologies, Engineering - engineering, Mathematics - mathematics) through the widespread introduction of technologies to form the knowledge and skills necessary for the prospects of students, thereby paying great attention to the development of human thinking.

METHODS:

In international STEM training programs, initial skills and competencies applied in real life can be formed. For example: making and launching a space rocket model, designing and maintaining a bridge model, refining and separating fractions, assembling and controlling a robot, making equipment needed for chemical experiments, and so on. This student pm, a deeper understanding of the natural and exact sciences, to increase interest in and knowledge of science, played a strong knowledge of modern technologies and the potential for the formation of Teaching.

Students develop not only curiosity and interest in the practical application of promising technologies, but also ideas, desires and goals to engage in all areas of chemistry.

2019 of the President of the Republic of Uzbekistan on October 8 quivering of the Republic of Uzbekistan approval of the Concept of development of the higher education system by 2030 'UP-5847 amended by the Decree on the implementation of improved health in concept to set the priorities for structural reform of higher education in the Republic of Uzbekistan, modern In order to raise the process of training highly qualified personnel with independent knowledge and high moral and ethical qualities to a qualitatively new level, modernization of higher education, development of social and economic sectors based on advanced educational technologies :

In the Concept of Development of the Higher Education System of the Republic of Uzbekistan until 2030, based on international experience, the introduction of advanced standards of higher education, including the gradual transition from education aimed at acquiring theoretical knowledge in the curriculum;

To raise the content of higher education to a qualitatively new level, to establish a system of training highly qualified personnel who can find their place in the labor market; Transformation of the higher education system of Uzbekistan into a "hub" for the implementation of international educational programs in Central Asia; Increasing the investment attractiveness of higher education, attracting foreign educational and scientific technologies; Ensuring a strong integration of modern information and communication technologies and educational technologies, creating additional conditions for the continuous development of professional skills of teachers in this regard; Individualization of educational processes on the basis of digital technologies, development of distance learning services, widespread introduction of webinar, online, "blended learning", "flipped classroom" technologies; organization of distance learning programs on the basis of modern information and communication technologies.

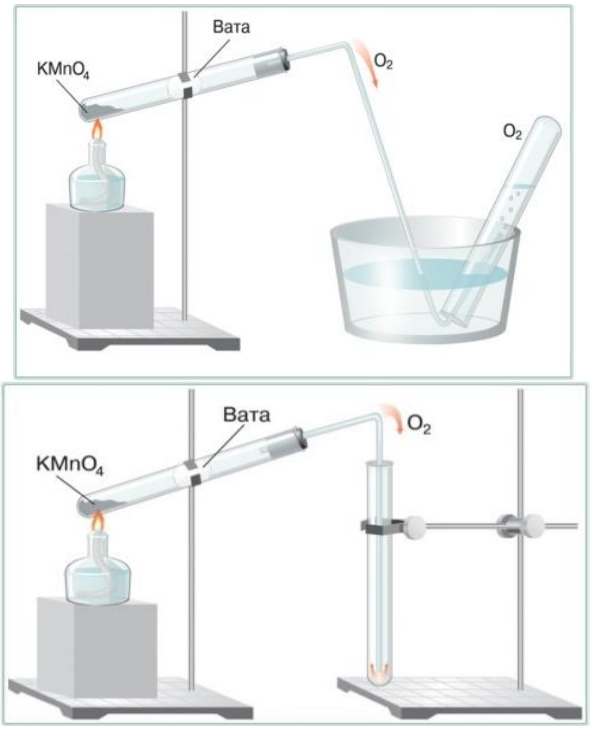
At the same time, international experience will be studied and the best and most effective solutions will be applied in practice. The reform chemical science in higher

education institutions in accordance with international programs and the integration of natural sciences teaching and the teaching of the use of innovative technologies, scientific outlook, together with the expansion of the use of technologies, sciences maintenance continuity of scientific literacy to help.

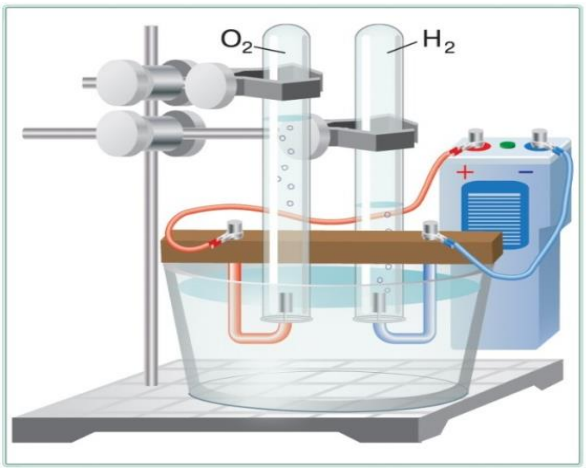
RESULTS:

The collection of chemical laboratory equipment and the preparation of their models in the teaching of students on the basis of the international STEM educational program contributes to the formation of basic skills and competencies in chemistry. For example, a chemistry teacher instructed students to make a laboratory instrument from equipment to obtain oxygen in the laboratory and to isolate oxygen in the laboratory and study its properties. At the same time, students from a number of (test tube, alcohol lamp, the state of the equipment, glass, akkummulyatori) using the following equipment easily making.

a) The collapse of the influence of the temperature in the laboratory of potassium permanganate oxygen laboratory equipment are encouraged to paint.

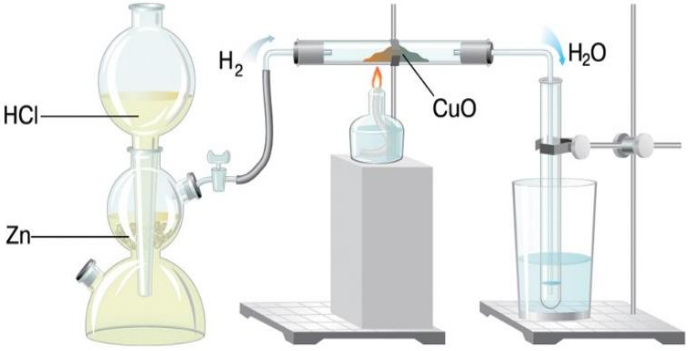


b) They can make an electrolyzer device to get hydrogen and oxygen by electrolyzing water in the laboratory.



To make exactly the same laboratory equipment, you will need the science of mathematics. Because we also need to use mathematics to place the solutions in the laboratory and to calculate the volume, mass, quantity, and number of molecules of the gaseous substances released as a result of the laboratory.

The integration of several disciplines can also be used to explain laboratory processes to students. For example: in the practice of hydrogen separation in the laboratory:



In the study of the chemical properties of hydrogen;

In the study of the composition and mass of solids formed as a result of a chemical process;

In the study of the properties of all substances formed;

In the study of its biological significance;
Experience and experience in the academic study of the nature of the substances sightings;

In the study of laboratory equipment and their composition;

In the manufacture of laboratory equipment based on drawings and models;

In the study of the energy released and absorbed in the performance of experiments, the organization of lessons by the teacher is very important, with the integration of chemistry, mathematics, physics, biology, ecology, agro chemistry, chemical technology.

CONCLUSION:

In conclusion, STEM is an acronym for science, technology, engineering and mathematics. It is an innovative approach to learning and development that combines science, technology, engineering and mathematics. In addition, this integration is an integrated learning model based on real-world applications.

Over the years, students have studied science, technology, engineering, and mathematics as four separate subjects in school. However, STEM is paying more attention to the connections between these four directions. If we look at a real-life example, science relies on technology, engineering, and math.

STEM-based curricula can be delivered from preschool through master's programs and are now available not only in the U.S. but in many countries. In addition, the main purpose of STEM is to provide students with the opportunity to learn a variety of learning methods and problems, as well as to increase their interest in pursuing higher education and careers in science, technology, engineering and mathematics.

While STEM has many advantages, it has one major drawback. This is a lack of focus on other areas such as literature, art, music and writing. In addition, students will study the issue of chemical knowledge, skills the development of communication skills and the ability to read critically.

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