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ORGANIZATION OF THE EDUCATIONAL PROCESS IN THE LABORATORY OF CHEMISTRY USING THE CLUSTER METHOD

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Abstract
Through the cluster approach to the organization of laboratory work in chemistry in general secondary schools; we explain the main essence of laboratory work through the method of interconnection of the given topics, creating a basis for students to understand the following topics. At the same time, even in schools where the raw material base (reagents) is not enough, we will be able to explain several topics in relation to each other through the chemicals that are present in our daily lives. For example, crystalline soda, which is familiar through the subject of carbon, and mineral fertilizers on the subject of nitrogen and phosphorus, which are easy for us to find in the economy and do not require additional equipment in the reaction process, as well as in the minds of students. It provides a demonstration view of the process rather than a virtual laboratory view. As a result, through practice, students will be able to master and analyze more than one topic, and will be able to analyze chemical reagents through sensory receptors when they encounter them in their daily lives. At the same time, the clustering method of laboratory training does not require the phrase "jet shortage or lack of equipment", and it is easy to integrate and master several topics.

Keywords: Cluster teaching of laboratory classes, virtual laboratory, crystal soda, mineral fertilizers.

Introduction

Education is a conscious and planned effort to create a good learning process for students to develop their abilities. In general secondary schools, student engagement is an important part of the learning process. Students show behavior, positive emotions and self-motivation during the performance of learning tasks in the classroom, while boredom during the performance of tasks, learning tasks: the emergence of negative emotions associated with the abandonment of old or constantly repetitive methods [1]. Education in Uzbekistan is well integrated and needs to be further developed. The system of continuing education should be closely linked to the curriculum used. The current curriculum requires students to have a scientific approach to learning. The scientific approach helps students to understand the concepts of natural science, so that they realize that they can experiment to apply their concepts and notions in the study of natural sciences, such as chemistry, physics, biology. Personal skills, emotions and positive actions are the three main components of scientific relationships, which can be applied through the use of scientific methods to form active, independent, critically-logically

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formed forms of thinking. Scientific attitude is a relationship that can be applied to scientific work, such as honesty, responsibility and discipline. A scientific approach helps students to carry out scientific activities or scientific processes. The organization of laboratory work in chemistry at school, if it is considered the first prelude to scientific research, the ability to analyze the processes is a necessary element of the study of this science. Due to the lack of equipment and reagents in school laboratories with disabilities, it is difficult for students to conduct laboratory classes individually or collectively, to develop practical skills, to observe events and draw appropriate conclusions based on experience[2]. In addition, there is a risk of injury if many laboratories do not follow safety rules. The risk of injury arises from the violation of the following standards: non-compliance with the rules of technical safety when working with toxic, flammable, volatile, explosive and radioactive substances [3].

At the same time, laboratory work imposes a number of obligations, such as strict attention to technical and technological factors, a sense of responsibility for the health of ourselves and those around us [4]. Similarly, in order to avoid technical and technological factors, many foreign countries have decided to use virtual laboratories in chemistry laboratories. Applying to virtual laboratories in the organization of laboratory work in chemistry is a modern requirement. In a number of developed countries, we are witnessing the creation of the basis for high efficiency through the organization of the teaching process through virtual laboratories. Virtual laboratories allow students to enrich their understanding of the process and to witness clearly what is happening. As chemistry is one of the experimental sciences, knowledge and skills are further strengthened in laboratory classes [5]. Laboratory work often requires the use of toxic, flammable and explosive reagents, complex instruments and equipment. Before starting the laboratory work, it is possible to view it in a virtual state with the help of a computer - to save reagents, to ensure safety, to increase the efficiency of the educational process. For this reason, many virtual laboratories in chemistry have been developed [6]. Our main goal is also to save material resources and achieve effective results. The possibilities of the virtual laboratory are very wide, which ensures high quality and efficiency of the teaching process, but it should be borne in mind that if students do it with their own hands and directly observe the results of the process, the science Increases stimulation, which hinders learning, expands the worldview[7].

Each method chosen should be effective in the process of education and development of student consciousness. The topic should be taught using a number of interrelated methods. The method of teaching is chosen by the teacher and used. In the classroom, the teacher is an important factor in teaching, especially when the teacher is the basis for educating the students. The main task of the teacher is to choose the most effective methods of teaching and developing students [8].

The cluster method is a specific form of pedagogical, didactic strategy, which helps learners to create conditions for free, open thinking and free expression of ideas on voluntary problems (topics). This method requires the identification of a structure that allows you to think about the connections between different ideas. This method serves to ensure that the thinking activity is consistent until the subject is deeply and thoroughly mastered by the learners [9].

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Discussion and Results

In the following work, we want to achieve high efficiency through the use of the educational cluster in the laboratory. That is, using the reagents available in the laboratory, to cover several topics on the same topic, and thus to fully disclose the topics, for example: let's take the reaction between baking soda and ammonium nitrate,

NH_4NO_3+ $NaHCO_3$ → .....

Pic-2. Sodium bicarbonate or baking soda, in its usual form, is a white crystalline powder. Used in industry, food industry, medicine with concentrated acids to neutralize chemical burns of the skin and mucous membranes and reduce the acidity of gastric juice. It is also used in the preparation of buffer solutions.

Pic-1. Ammonium nitrate or ammonium nitrate. White crystalline substance. Used in industry as an explosive and mineral fertilizer.

Pic-3. Let's consider the process of interaction of baking soda and ammonium nitrate.

1. We can explain the process of obtaining NH_3 as a result of this reaction:

$$NaHCO_3 + NH_4NO_3 \rightarrow$$
$$NaNO_3 + CO_2\uparrow + NH_3\uparrow + H_2O$$

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At the same time, students witness the release of a sharp-smelling, colorless gas. In the laboratory, the process of obtaining NH_3 is carried out using ammonium salts.

2. If we focus on the products of the reaction, we can focus on the products of the reaction

$$NH_4NO_3+NaHCO_3= NaNO_3+ [NH_4HCO_3]$$

$$NH_3 \quad H_2O \quad CO_2$$

3. NH_4HCO_3 is an unstable substance formed from a weak base and a weak acid. This substance dissociates rapidly. This means that through this laboratory work we will be able to inform students about the process of dissociation.

The following conditions must be met for chemical reactions to occur:

a) gas release as a result of the reaction
b) sedimentation as a result of the reaction
c) the reaction produces less dissociable substances
d) discoloration of the solution as a result of the reaction
e) heat or light emission

From the above experiment, we can show the first three conditions for the reaction to occur.

2. The fact that the ammonium bicarbonate formed as a result of the reaction is an unstable substance can also be characterized by the process of irreversible hydrolysis in an aqueous solution.

$$NH_4HCO_3 + H_2O = NH_3 + H_2O + CO_2$$

3. In addition, we once again focus on the products of our experiment: NH_3, CO_2, H_2O va $NaNO_3$.

Pic-5. The simplest compound formed by nitrogen with hydrogen; A pungent odorless, colorless, toxic gas. Aqueous solution of ammonia has a weak basic property. A solution of ammonia in water is called novshadil alcohol. Ammonia is mainly used as a

Pic-4. Carbon dioxide or carbon monoxide, a colorless gas under normal conditions, almost odorless (sour "carbonated

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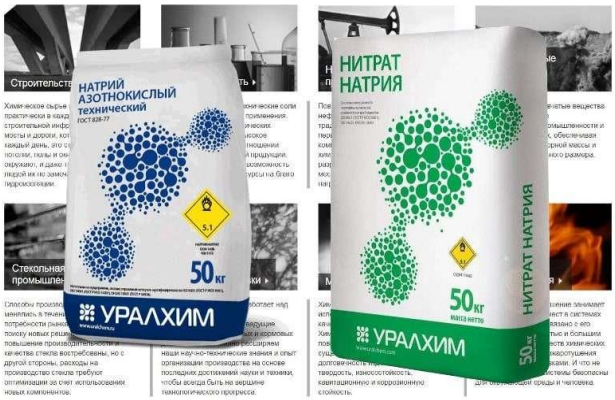

Pic-6. Sodium nitrate, or sodium nitrate, is also known as Chile nitrate. A colorless crystalline substance, soluble in water. Sodium nitrate is a non-combustible solid, but it can accelerate the oxidation or combustion of flammable materials. It is therefore widely used in the destruction of rodents and other small mammals in pyrotechnics, explosives, matches, and some types of pesticides.

Gaseous products of our products are released from the system, leaving water and $NaNO_3$ in solution. Sodium nitrate is a nitrogen fertilizer. It is also called Chilean saltpetre. As a result of the experiment, we will be able to show the method of obtaining Chilean nitrate.

Conclusion

From this experience, it can be concluded that the aim is to improve students' scientific attitude and critical thinking in science, and to teach laboratory work in this regard not only through observation, but also through chemical processes that take place in our environment. And the introduction of teaching in similar ways. Reforms in education call for a deeper understanding of the possibilities of chemistry and its achievements. A full understanding of chemistry can be achieved mainly through the full implementation of laboratory classes and an understanding of the nature of the process. Therefore, it is envisaged that the organization of laboratory classes in chemistry in secondary schools will be strengthened by linking topics through the cluster method, and thus significantly achieve the quality of education.

References

1. S.X. Mullaboyeva, D.A. Shayzakova, M.M. Jo‘rayev, M.B. Sultonova, S.O. Po‘latova, “The importance of using dialogic methods in teaching chemistry at school”. Academicia Globe: Inderscience Research, page 72-74
2. Ерохин, Ю. М. Химия: учеб. для средних проф. учеб. Заведений, Ю. М. Ерохин. - 13-е изд., стер. - М.: Академия ИЦ, 2009. 395 с. vv–ISBN 978-5-7695-6329-4
3. Maykl L. Matson; Jeffri P. Fitsjerald; Shirli Lin (2007 yil 1 oktyabr). "Laboratoriya xavfsizligi uchun moslashtirilgan, tegishli va qiziqarli videolarni yaratish". Kimyoviy ta`lim jurnali. 84 (10): 1727. Bibcode:2007JChEd..84.1727M. doi:10.1021 / ed084p1727.
4. Burress, Charlz (1997 yil 22-dekabr). "Berkli shahridagi Tinkerer jannat / Yosh, keksa ixtirochilarga vositalar, uslublar va ilhom taklif etiladi". SF yilnomasi
5. Davron Bekchanov, Tohir Rakhimov, Mukhtar Mukhamediev, Eshchanov Ruzumboy, Khasanov Shadlik “ICT resources in chemistry: impact on the structure of education in Uzbekistan” Philosophical Readings XIII.4 (2021), pp. 2650-2655. 2655

ISSN: 2776-1010 Volume 3, Issue 6, June, 2022

6. M.H.Hamidova kimyo fanini virtual laboratoriyalardan va kompyuter dasturlaridan foydalanib o`qitishning ahamiyati Текст научной статьи по специальности «Науки о Земле и смежные экологические науки
7. H.N. Rustamova, A.D. Kurbanova, K.U. Komilov, D.A. Eshtursunov, “The role of information and communication technologies in teaching general and inorganic chemistry” Economy and society, page 84
8. S.X. Mullaboyeva, D.A. Shayzakova, S.Yu. Khushvaqtov, D.S. Murodullayeva, “Explain the topic of hybridization to schoolchildren in a systematic way”. Academicia Globe: Inderscience Research, page 298-301
9. Л.В. Голиш, Д. М. Файзуллаева «педагогик технологияларни лойиҳалаштириш ва режалаштири»