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WAYS AND MEANS OF USING THE LABORATORY DURING THE CHEMISTRY LESSON

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СПОСОБЫ И СРЕДСТВА ИСПОЛЬЗОВАНИЯ ЛАБОРАТОРИИ НА УРОКЕ ХИМИИ

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Abstract. This article reveals the meaning, methods and means of laboratory classes on the subject of chemistry, namely: the main ways of learning the basics of chemistry, the significance of the experimental results obtained by students, stimulating their thinking, forcing them to discuss with each other and draw conclusions together, satisfying their interest students, it is always believed that scientific research is the best opportunity for the researcher, the role of the teacher and laboratory experiments are necessary experiments in order for students to live and work independently in the future.

Аннотация. Раскрываются смысл, методы и средства лабораторных занятий по предмету химия, а именно: основные способы изучения основ химии, значение экспериментальных результатов, получаемых учащимися, стимулирующих их мышление, заставляющих обсуждать друг с другом и вместе делать выводы, удовлетворяя их интерес учащимся, всегда считается, что научные исследования — лучшая возможность для исследователя, роль преподавателя и лабораторные эксперименты — необходимые эксперименты для того, чтобы учащиеся могли жить и работать самостоятельно в будущем.

Keywords: chemistry, laboratory, experiment, education.

Ключевые слова: химия, лаборатория, эксперимент, образование.

The subject "Chemistry" is a part of natural sciences. This field of education is aimed at forming the following competencies: knowledge of natural sciences, scientific explanation of phenomena, use of scientific evidence. Certain subjects and integrated courses in the field of natural science education provide an understanding of the unity and diversity of animate and inanimate nature [1].

Chemistry is one of the most difficult general subjects taught in secondary schools. It is not easy for students to successfully master even the basic level of school chemistry. Therefore, our task as teachers is to engage in active activities that ensure the formation and development of cognitive activity of each student, to increase students' interest in chemistry. Because the quality of students' education is determined by their interest in chemistry in most cases. As the subject of chemistry is an experimental science, demonstration experiments should be carried out more intensively in educational programs, and more time should be allocated to various practical and laboratory activities [1].

Experimentation is one of the main ways for students to understand the principles of

chemistry. The results of the experiments obtained by the students in laboratory lessons stimulate their thinking, create an opportunity to discuss with each other, and force them to draw conclusions together. All these actions together optimize the learning process. Every topic covered in chemistry class may be new to children, but if we look at it from a different perspective, it all turns out to be experiences that we use in everyday life. Using very simple, elementary tools, for example: substances and mixtures in the 8th grade chemistry class, separation of mixtures, identification of physical and chemical phenomena, etc. Facilitates and teaches new topics by combining practical examples and laboratory experiments to demonstrate new topics. The textbooks on the subject of chemistry are divided into sections, and after completing each section, laboratory experiments and practical work are added to strengthen it. Laboratory experiences include laboratory activities related to each of the new topics. We can achieve the goal of the lesson by completing all these tasks on time and in full. If the tasks given in laboratory work are not done correctly from the beginning, then it becomes difficult for students to read and understand the next material, because in the absence of connection with previous information, it becomes difficult for students to think, they believe in the topic, and it weakens their interest in scientific facts. The process of understanding the lesson really decreases for the students, they lose interest, the effectiveness of the knowledge gained after passing the theoretical course is lost, and learning begins to seem difficult. Laboratory work is the best opportunity to satisfy the interest of students who are always doing scientific research. Students have the opportunity to check the correctness of theoretical content while performing laboratory work, increase their level of thinking and interest in science. In the laboratory, each student can feel his service, compare it with others and achieve the best result. Unfortunately, the lack of sufficient laboratory conditions in each high school for practical and laboratory work, the lack of necessary reagents, not only lowers the quality of teaching, but also weakens the practical skills of students. Iran, which is one of the leading countries in the world in terms of laboratory conditions, that is, in terms of the production of medicines, has separate physical, chemical, biological and geological laboratories in some schools for exact and natural sciences classes, and classes are held using them [2].

The chemistry laboratory should be an independent laboratory complete with all necessary equipment and equipped with chemical racks, laboratory and chemical dishwashers. The laboratory should also be equipped with safety equipment such as a fire extinguisher and a first aid kit, and they should be in a condition where they can be used in case of danger. Along with it, there should be laboratory tables for teachers. If the experiment is hazardous to health, or the experiment requires serious attention, or expensive materials are used in the process of conducting the experiment, then the teacher himself conducts the experiment and shows it to the students. For example: According to the calendar plan in the textbook of 9th grades in secondary schools, on the topic of Alkali metals, as a laboratory experiment, the reactions of Rubidium Cesium metals with water are explosive. Taking into account the safety of students, the work will be done on the part of the teacher. Another example involves the loss of the gold form during the process of dissolving gold in royal vodka. In this case, it should be done by the teacher. Many experiments are done by groups of students. During them, students record their observations in their tables, and they can monitor the performance of the experiment by the teacher. Before starting the experiment, the teacher reminds the students of the necessary safety rules in the chemistry classroom. Sometimes the teacher can use virtual methods instead of laboratory work, using films and other video materials. Such methods are allowed, for example, when there is a lack of time or materials for laboratory work [3].

Students today have access to all the books they need to study theoretical chemistry, but often fail to properly connect theory with practice. The skills that will help to apply the theoretical

knowledge acquired at school and explain certain phenomena can only be acquired in the laboratory. Thus, the need to use appropriate methods to understand the theoretical content of lessons is clearly visible. Some of the concepts of chemistry become easier to understand thanks to various experiments.

The experience of developed countries shows that it is not enough to learn a subject only from textbooks for students to get a full-fledged education. Such a method cannot cover all the goals of scientific education. Always read in combination with other literature. However, this lack, of course, does not exclude the study of theoretical material. Laboratory experiments are a necessary experiment for them to be able to live and work independently in the future.

Today, along with educational materials, there are various media resources, video materials, computers, laboratory equipment, etc. is being used. These universal methods help the learning process, increase the speed of consciousness and motivation, which leads to an increase in the quality of learning. These methods can be called tools used to educate students. Proper use of these tools in combination with theoretical study material and laboratory work will allow students to better understand chemistry.

Scientific courses should be organized for teachers in the field of education and training for proper performance of laboratory work and proper control of students' work.

Laboratory work is a multi-functional phenomenon. The main tasks of laboratory work are:

- to strengthen theoretical knowledge in the learning process;
- increase the ability of scientific thinking;
- awakening students' interest in empirical knowledge;
- creation of working skills in solving problems in everyday life; - creating a sense of cooperation;
- learning through active and effective actions rather than mechanical memorization, modeling the use of innovative technologies and production methods;
- to increase the level of education and practical skills of teachers, to ensure a deep understanding of the subject.

The main purpose of laboratory testing and research is to prove in practice what students have learned from textbooks. Often the teacher spends several hours explaining the topic in class, but the result is not satisfactory. In this case, reinforcing the content with a simple experiment will optimize the result. Many topics in the chemistry curriculum can be easily completed with laboratory work. For example, determining the group of properties of elements and periodic properties; Simple experiments on the determination of electrical conductivity of aqueous solutions, ionic compounds, and cations will greatly help in learning.

The main requirements for the chemistry course are as follows:

- aimed at ensuring the education, education and development of students:
- scientific content: theoretically and methodologically correct disclosure of theories, laws, concepts, facts on chemistry presented in the school curriculum;
- clearly defined ideological direction of the lesson, its content and influence on the formation of personality traits of students;
- the ability to use teaching methods and means depending on the content in order to develop the student's interest in learning;
- teaching taking into account intersubject connections;
- implementation of didactic principles as much as possible in each lesson;
- passing in combination with the performance of laboratory work specified in the textbooks in each new topic;
- creating conditions for the discovery of learning abilities of each student;

- ensuring the integrity of the lesson in all subjects, i.e. exact execution of each element of the structure of the lesson, sequence of each other;
- formation of students' independence skills in frontal, group and individual forms of the lesson;
- accurate execution of homework assignments and availability of the method of execution to students;
- the presence of a comfortable emotional state of the teacher and the student in order to successfully achieve the goal of the lesson, etc. [2].

Teachers should recognize and use didactic techniques that students use for chemical concepts in laboratory activities. General preparation for the subject of chemistry relies on laboratory experiments, as chemistry is one of the greatest achievements of the observational branches of science. To understand the surrounding world, students are helped by test results and skills that answer many questions observed in nature, the universe, the structure and properties of substances, physical and chemical laws and phenomena [3].

John Holman in his article "Science Education's Real-Life Coordinates" says: "If education is close to real life, students will be motivated to learn, and adults will be educated." Science lessons should include laboratory work in subjects such as chemistry and physics.

2000 World Olympiad bronze medalist Mohammed Asadallaghi says about the impact of practical lessons in chemistry: "Tests in the Chemistry Olympiad took place in two stages: theory and practice, so the practical part was more difficult for us. He said that the preparation needed to participate in the Olympics should be comprehensive, it should include more practical lessons than theory, and students should try the theory in practice. It was easy for the participants of the Iranian team to master the theory, but it was very difficult to deal with the practice and laboratory tests [4].

In order to conduct an experiment, it is first necessary to provide the necessary equipment and materials necessary for preparation. After that, it is continued with the experiment and its repetition. In conclusion, the experiment empowers the students, they acquire different skills and develop ingenuity. Experiments can make your chemistry class fun. In addition to testing theory, practical interest will help you acquire much-needed skills. I would like to complete this article with the Kyrgyz proverb "One sight is better than a thousand hearings".

References:

1. Zhakysheva, B. Sh., Abdykerimova, K. Sh., & Nasirdinova, G. K. (2019). Formirovanie predmetnykh kompetentnostei pri obuchenii khimii. *Izvestiya Kyrgyzskoi akademii obrazovaniya*, (1), 56-61. (in Russian).
2. Chorov, M. Zh., Moldoshev, A. M., & Zhakysheva, B. Sh. (2016). Interaktivnye tekhnologii v protsesse obucheniya kursu khimii. *Mezhdunarodnyi zhurnal prikladnykh i fundamental'nykh issledovaniy*, (7-5), 891-894. (in Russian).
3. Dzhuraeva, D. (2023). Obuchenie metodam effektivnogo ispol'zovaniya virtual'nykh laboratorii v khimii. *Innovatsionnye issledovaniya v sovremennom mire: teoriya i praktika*, 2(15), 16-19. (in Russian). <https://doi.org/10.5281/zenodo.7866075>
4. Ardisoni, M. S. (2013). Rol' laboratorii dlya obucheniya khimii. *Molodoi uchenyi*, (2), 328-330. (in Russian).

Список литературы:

1. Жакышова Б. Ш., Абдыкеримова К. Ш., Насирдинова Г. К. Формирование предметных компетентностей при обучении химии // Известия Кыргызской академии образования. 2019. №1. С. 56-61.

2. Чоров М. Ж., Молдошев А. М., Жакышова Б. Ш. Интерактивные технологии в процессе обучения курсу химии // Международный журнал прикладных и фундаментальных исследований. 2016. №7-5. С. 891-894.

3. Джураева Д. Обучение методам эффективного использования виртуальных лабораторий в химии // Инновационные исследования в современном мире: теория и практика. 2023. Т. 2. №15. С. 16-19. <https://doi.org/10.5281/zenodo.7866075>

4. Ардистони М. С. Роль лаборатории для обучения химии // Молодой ученый. 2013. №2. С. 328-330.

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