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THE IMPORTANCE OF THE METHODOLOGY OF USING CHEMICAL LABORATORY EQUIPMENT

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Abstract

An understanding of the methodology of using a chemical laboratory, this article provides general information about the methodology of using a chemical laboratory. This methodology is used for organization of laboratory processes, testing and identification of chemical materials, mainly for chemical analysis. The methodology provides the basic rules and procedures needed to perform laboratory work. The methodology includes the organization of the chemical laboratory, events, products, technological processes and support.

Key words

instruction, student experiment, visual experience, oral presentations, reagent, experimental problems, practical training, practice.

Аннотация

Понимание методологии использования химической лаборатории. В данной статье представлены общие сведения о методологии использования химической лаборатории. Данная методика используется для организации лабораторных процессов, испытаний и идентификации химических материалов, преимущественно для химического анализа. В методике предусмотрены основные правила и процедуры, необходимые для выполнения лабораторных работ. Методика включает в себя организацию химической лаборатории, мероприятий, продуктов, технологических процессов и сопровождения.

Ключевые слова

инструкция, ученический эксперимент, наглядный эксперимент, устные выставки, реагент, экспериментальные вопросы, практические занятия, практика.

Annotation

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instruction, student experiment, visual experiment, oral exhibitions, reagent, experimental questions, practical exercises, practice.

Enter. Laboratory experiments of chemistry students are carried out individually, in groups or as a team.

Laboratory equipment and a work table (laboratory table) will be allocated to students in advance for conducting experiments in the laboratory rooms where the laboratory training is held. Laboratory experiments are conducted after the content of the new material is explained.

Practical trainings are held at the end of studying certain topics for the purpose of strengthening, improving, summarizing the acquired knowledge and improving skills and competencies. Experiments conducted together with the teacher help to improve the technical skills of students. The purpose of educational experiments conducted before learning new educational material is to prepare students for new knowledge, to remind and clarify the concepts developed in the same lesson. In such a lesson, students learn to compare, consolidate and summarize the acquired knowledge and skills.

Methodology. After completing a part of the chemistry course, there are laboratory experiments consists of tests, practical exercises and practice. The purpose of the laboratory experiment is to gain new knowledge, study a new topic. Laboratory experiments are more important when learning new educational material is used, it helps in the acquisition of skills and competencies of students . Characteristics of laboratory tests:

individual (single in order);

group (students sitting at the same table perform the same experiment , but the tasks in between are divided);

the team (students sitting at different tables perform different experiments, discuss the results in class and draw conclusions as a team) [1-2].

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The success of the laboratory experience in the classroom depends on the preparation of the necessary equipment and chemicals for the laboratory. First of all, it is necessary to think about the selection of necessary equipment for each laboratory table and its placement. Missing a test tube or a tripod from the equipment that is a part of the instrument, etc., derails the whole class work. The reagents in the containers must be checked by the instructor. If a part if you need to pour reagents into test tubes, number them, and write down on the board what substance is in which test tube. In order to work according to the rules of safety technology, it is better for students to perform some complex experiments not individually, but in groups (2-3 people) [3].

During the experiment, the performance of the students should be managed, who is performing well, the safety techniques and the results should be monitored.

At the end of the work, it is necessary to take a few minutes to prepare the food. After the work is completed, its results are analyzed and written in a notebook [4].

After completing some subjects, the students of practical trainings perform tasks, that is, after the completion of the topic, they need to reduce and improve their knowledge, clarify and form practical skills, which students have. It is held to improve the skills and qualifications [5].

So, laboratory experiment and practical training differ from each other according to the didactic purpose.

The new programs, the main goal of which is to apply the knowledge acquired by students, to acquire the necessary information, to develop the ability to solve qualitative and quantitative problems by means of experience) takes place in alo hi [6].

Practical training in chemistry is the main factor in the formation of knowledge skills of pupils and students. He pays great attention to the formation of skills and competencies in practical training.

Practical training starts from the 7th grade. During each practical training, technical rules for working with reactive equipment and chemical equipment, paying special attention to handling skills, and following the rules of safety techniques are required. Practical training takes two forms: training based on given instructions and experiments related to solving experimental problems [7-8].

Instruction is a guided experiment. Each step of the experiments will be given in writing. They are written in the textbook.

Experimental problems - the condition of the problem is given without instructions. Based on this condition, the student performs creatively and

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independently. When solving an experimental problem, following the rules of safety technology, the necessary reagents are poured onto the table. At the end of the experiments, reports are written in a special notebook. Reports are kept in the chemistry room. The form of the report can be as follows: 1) class; 2) student FISH; 3) science; 4) subject of work; 5) the name of education; 6) the purpose of the experiment; 7) order of execution; 8) equipment drawing and observation conclusions; 9) summary and reaction equations [9-10].

The teaching method: A normal organized educational process requires the use of all available methods in chemistry, rather than a universal method. Each method is selected depending on the content and general nature of the educational material, the level and preparation of students, and the school (whether it has a chemistry laboratory or not) [11].

Practical classes in chemistry at the school are conducted in specially equipped rooms. The purpose of conducting such practical training is to learn the nature of phenomena occurring in nature with the help of various equipment and chemical substances, and to develop skills and abilities in applying the acquired theoretical knowledge. Practical training classes are organized in order to strengthen the acquired knowledge on the topics covered, to ensure that students can perform experiments independently. In the school chemistry course, great importance is attached to practical exercises and laboratory work with students, to solving questions and tasks related to each topic, and after completing the relevant sections, the theoretical knowledge gained is strengthened by taking tests. Practical classes in the school are organized based on the curriculum of the general high school in chemistry and based on the capabilities of the chemical laboratory [12-13].

In the organization of practical training, the properties of simple and complex substances depend on their composition and structure, fields of application, as well as the use of chemical educational laboratory equipment, tools and equipment, performing experimental work, drawing conclusions based on their results, special attention is paid to the formation of skills of compliance with safety rules and the practical importance of each chemical reaction [14]. Class hours allocated for practical training are approximate and may be replaced by another laboratory training of equal strength if there are not enough tools to perform some of the laboratory work. It is necessary to observe the rules of safety techniques when performing exhibitions and experiments and performing laboratory work [15]. Students can further consolidate the knowledge they have acquired in chemistry lessons in a practical way on an excursion. The topic and object of the excursion is determined by the teacher.

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Experience - allows to separate and study the topic or its most important aspects with the help of various tools and technical means [16]. If necessary, the experiment can be repeated by the researcher. This largely determines the main task of the scientific experiment to obtain reliable evidence about the existence that surrounds us. The difference between an educational experiment and a scientific experiment is that its outcome is known in advance. The learning experience is technically relatively simple and usually timed . Educational experience is a unique learning object, research method, tool and source of new knowledge in the school chemistry course [17].

The school chemical experiment performs three main tasks: Teaching, gaining knowledge, setting and solving practical problems to master the basics of chemistry, and determining the importance of chemistry in modern life.

The task of development consists in acquiring and improving general, scientific and practical knowledge and skills [18].

One of the main tasks of the chemical experiment is to organize observation towards the goal, to form observation skills, to explain the results of observation, and to store the acquired information in memory. In addition, it is to be able to explain the educational material, to determine the laws of the dependence of the cause on the result, the fundamental essence of the studied subject [19].

In the practice of teaching chemistry, chemical experiments are divided into two types:

Demonstration experiment - performed by the teacher. Educational experience is carried out by the students themselves in the form of laboratory experiments, practical training, practice, solving experimental problems. This classification is based on the activities of teachers and students. Demonstration experiments are first conducted when the students are not familiar with the topic and reality they will study in advance and are not ready to observe. At such a time, the teacher should not only show the topic to be studied, but also organize observation and direct it in the right direction. During the chemical experiment , the teacher organizes student observation, shows the correct use of laboratory equipment. Readers' attention is drawn to the conditions of the experiment, its expediency and effectiveness, and safety techniques [20]. A chemical experiment is a unique visual tool and guide, and a lot of the teacher's time is spent during the learning process for its preparation. The key role of the chemical experiment, which requires 2-3 times more time than the time allocated according to the curriculum, retains its power even in the independent experiments of students . The teacher must conduct demonstration experiments even when the well-equipped chemistry cabin makes it

difficult to carry out such experiments due to the lack of necessary equipment for students' independent experiments [21].

Oral presentation - students' practical activities are understood based on practical methods. In this activity, the teacher's guidance is definitely a guiding activity. Students' independent work is done in different ways [22-23] . These forms are: team, group, individual. Their types are also different. For example: student experiments (laboratory experiments, practical exercises), solving chemical problems, working with literature, performing creative tasks, (construction of devices, making models), performing control tasks, independent work, students acquire new knowledge, skills and It is considered the most important field in the formation of skills and learning science [24].

It will be effective if the acquired knowledge, skills, abilities, and activities are applied independently. Independent work fulfills tasks such as education and development of students [25].

REFERENCES:

1. Ergashovich, S.I. (2023). ORGANIZATION OF THE EDUCATIONAL PROCESS BASED ON THE COMPETENCE APPROACH. SCIENTIFIC APPROACH TO THE MODERN EDUCATION SYSTEM, 2(13), 24-29.
2. Ergashovich, S.I. (2023). Development of Functional Literacy Through Creative Thinking Tasks. Journal of Pedagogical Inventions and Practices, 18, 20-25.
3. Ergashovich, S.I. (2022). Preparation Of Future Chemical Chemistry Teachers For Preparation For International Research. Journal of Pedagogical Inventions and Practices, 15, 71-76.
4. Bektosheva, S. & Shernazarov, I. (2022). IMPROVING THE METHODOLOGY OF DEVELOPING FUNCTIONAL LITERACY IN STUDENTS. Science and Innovation, 1(8), 1570-1577.
5. Ergashovich, S.I. (2022, December). PREPARATION OF STUDENTS FOR INTERNATIONAL EXAMINATION STUDIES OF FUTURE CHEMISTRY TEACHERS FORMATION OF SKILLS. In Proceedings of International Conference on Modern Science and Scientific Studies (Vol. 3, pp. 121-125).
6. Ergashovich, S.I. (2022). THE USE OF INTERNATIONAL ASSESSMENT RESEARCH COMPETENCES IN THE FORMATION OF THE LITERACY OF FUTURE CHEMISTRY TEACHERS. Web of Scientist: International Journal of Scientific Research, 3(12), 471-477.

7. Shernazarov, I. & Khodjabayeva, N. (2022). THE IMPORTANCE OF MODERN TECHNOLOGIES IN THE USE OF MATERIALS FROM INTERNATIONAL EVALUATION STUDIES. Science and Innovation, 1(8), 1578-1582.

8. Ergashovich, S.I. (2022). TASKS AND IMPLEMENTATION OF INTERNATIONAL EVALUATION STUDIES IN UZBEKISTAN. PEDAGOGICAL SCIENCES AND TEACHING METHODS, 2(18), 85-90. 9. Ergashovich, SI (2021). Use of integrated technologies in preparing higher educational institution students for international assessment programs on "organic chemistry".

9. ERGASHOVICH, S.I. & ORIFJONOVICH T.N. Clear and Natural in Teaching Higher Education Institution Students on the Basis of the International Stem Education Program Characteristics of Integration of Sciences. JournalNX , 6 (12), 234-237.

10. Ergashovich, S.I. Preparation for the International Assessment System Using Modern Methods in Teaching Students in the General Secondary Education System. International Journal on Integrated Education, 3 (12), 300-305.

11. Ergashovich, S.I. (2021). Use of integrated technologies in preparing higher educational institution students for international assessment programs on "organic chemistry". Emergent: Journal of Educational Discoveries and Lifelong Learning, 2 (1), 1-4.

12. Berdikulov, R. Sultanova, S. & Berdikulov, O. (2023). SPECIFIC CHARACTERISTICS OF STUDENTS' PERCEPTION OF CHEMISTRY. Science and innovation, 2 (B4), 182-185.

13. Berdikulov R. Sh., Alimova F. A., Mirkamilov Sh. M. VOZMOJNOSTI KOMPYUTERNYX TECHNOLOGIY PRI IZUCHENII OSNOV TECHNOLOGIChESKIH PROTESSOV KHIMIChESKOGO PROIZVODSTVA //Voprosy humanatirynyx nauk. – 2010. – no. 2. - S. 207-211.

14. Azamjonovich, I.S. (2022, May). IMPROVING THE METHODS OF PROBLEM SOLVING RELATED TO SOLUTIONS IN 11TH GRADES. In E Conference Zone (pp. 152-153).

15. Iskanderov, A.Y. & Makkamov, N. (2021). Chemical problem solving as a method of increasing students' cognitive activities.

16. Azamjonovich, I.S. (2021). The importance of using Chemical Transformation by future Chemistry Teachers. International Journal on Integrated Education, 4 (3), 240-244.

17. Kultaev, K.K. THE APPLICATION OF INTERACTIVE METHODS TO THE SUBJECT OF HYDROCARBONS. MU ALLIM OEo' M WITHOUT MALICIOUSNESS EDUCATIONAL ², 92.

18. Iskanderov, A.Y. Shomurotova, S.X., & Kamalova, N. (2020). Forming a methodology for developing students' creativity using creative methods in teaching chemistry to future chemistry teachers. International journal of discourse on innovation, integration and education, 1 (2), 1-5.

19. Kazakbayevich, K.K. (2022). ACETYLENE ALCOHOL BROMINATION REACTION.

20. Berdikulov, R. (2022). DEDUCTIVE ANALYSIS CHEMISTRY OF EDUCATION LOGICAL BASIS AS . Science and innovation, 1(B8), 1109-1114.

21. Sapayeva, S.O. (2021). CONCEPTUAL METAPHORS OF THE CONCEPT OF "TIME" IN ENGLISH AND UZBEK LANGUAGES. Herald pedagogy. Science and Practice, 1 (2).

22. Ergashevich, R.U. (2019). Cognitive tasks in educational-upbringing process on biology. International scientific review, (LVII), 60-61.

23. Shakhmurova, G.A. Rakhmatov, UE, & Saidjanova, US A complex of entertaining tasks and exercises on Biology as one means of enhancing the cognitive skills of students. Asian life sciences, 30 (1), 87-97.

24. Shakhmurova, G.A. Azimov, IT, Rakhmatov, UE, & Akhmadaliyeva, BS Solution of biological problems and exercises (human and health). Teaching-methodological guidance." Literature sparks.

25. Shakhmurova, G.A. & Azimov T, RU Problem solving from biology (zoology). Teaching-methodological guidance. Brock Class Service LLC.