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TEACHING FUTURE CHEMISTRY TEACHERS THE METHODOLOGY OF CONDUCTING EXPERIMENTAL EXPERIMENTS DURING THE 4+2 PRACTICAL PROCESS

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Abstract: This article is based on the development of methodical, professional and creative abilities of future chemistry teachers in the 4+2 practical process, teaching them the methodology of conducting experimental experiments, and the methodological foundations of the science of pedagogy and the need for pedagogical skills. will go.

Keywords: pedagogy, pedagogical skill, 4+2 practice, experiment, experimental experience

A new approach to the professional training of students in chemistry and pedagogy education, which is continuously developing in accordance with modern development, and to direct future teachers to pedagogical, cultural-educational, scientific-research activities; shows the need to ensure the achievement of educational results by acquiring general cultural, general professional, scientific competences. Therefore, a teacher who has pedagogical knowledge and skills should first of all know the methodological foundations of the science of pedagogy, the laws and factors of personal development, the essence, goals and tasks of the national personnel training program. Most of the pedagogues working in the educational system are increasingly realizing the necessity and importance of pedagogical skills in the process of education and upbringing.

In chemistry, the study of something or an object, or substances and processes, is conducted based on the analysis of experimental results and summarized through theoretical explanation. If the results obtained from the experiment can be explained on the basis of existing laws and theories, the obtained results serve to strengthen them. Explaining the facts obtained as a result of experiments or experiments with existing theories if it is not possible, then new laws and theories are created to explain it. Scientists create hypotheses to explain facts and test them with

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experiments. If the results of the experiment confirm the hypothesis, it becomes a theory. A new theory is created when a large number of facts collected with the development of experimental techniques contradict the theory. In the teaching of chemistry, which is an experimental and theoretical science, the educational experiment occupies the highest place.

Currently, in the formation of important concepts of chemistry education in school, it is required to implement theory by organizing it in relation to practice. For this reason, the 4+2 practice has been introduced in Pedagogical higher educational institutions in our country since 2022 with the initiative of the President. During this 4+2 practice process, future young specialists learn the process of teaching the knowledge they have learned in higher education to the younger generation directly in schools.

Professor V. N. Verkhovsky was the first to provide information about the "structure of the chemical laboratory and general methods of work" and the details of the experiments in the manual entitled "Techniques of conducting chemical experiments and methods" conducted at the school for the first time. In this, he shows from a scientific point of view that the skill of experimenting a teacher is not a gift given by nature: this skill is formed behind practice. It is mainly based on the fact that a young specialist teacher pays attention to the following when conducting an experimental experiment at school:

1. Proper organization of the chemistry room. This is the correct organization of what materials and equipment will be in the laboratory based on state educational standards.
2. Having the skills to work with materials and equipment.
3. Must have skills in working with materials and equipment.
4. Conformity of the substance obtained as a result of the experiment to the topic and complete mastery of the methods of its analysis.
5. The young teacher should practice the methods of filtration, sedimentation, recrystallization, sublimation, extraction, driving, and cleaning of dishes by himself.

4+2 pedagogical practice is an integral part of the preparation of future chemistry teachers. In fact, during this period, students will have the opportunity to apply their theoretical knowledge in practice, to interact with students and colleagues, and to understand the unique characteristics of the teaching profession. The quality of

pedagogical training largely determines the future teacher's professional competence and success in his work.

In the modern world, the requirements for a chemistry teacher are constantly increasing. A modern teacher should not only have in-depth knowledge of chemistry, but should also have the ability to effectively organize the educational process, use innovative teaching methods, and motivate students to learn. should be Pedagogical practice should be aimed at forming such competencies in future teachers.

Goals of 4+2 pedagogical practice

• Strengthening theoretical knowledge: Students will strengthen their knowledge of chemistry, pedagogy and methods of teaching chemistry that they received at the university.

• Formation of practical skills and competences: Students master various methods and principles of teaching chemistry, perform laboratory work, develop curricula and programs.

• Adaptation to professional activity: Students will learn the specifics of teaching and interact with colleagues and school administration.

• Development of professional competencies: Competencies such as communication, creativity, reflection and self-development skills are formed in students.

The main directions of pedagogical training

• Learning the school's chemistry lesson program: Students get acquainted with the school's chemistry lesson program, curriculum and programs, textbooks and other didactic materials.

• Mastering methods and principles of teaching chemistry: Students learn different methods and principles of teaching chemistry (verbal, demonstrative, practical), as well as different forms of organizing educational activities (lectures, seminars, laboratory work, practical training).

• Development of educational materials: Students develop various educational materials (presentations, workbooks, tests, tasks for independent work).

• Conduct training sessions: Students will gradually take on more responsibilities by conducting training sessions under the guidance of an experienced teacher.

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• Analysis of their activities: Students analyze their pedagogical activities, determine their strengths and weaknesses, and create professional development plans.

Criteria for evaluating pedagogical practice:

•Evaluation of pedagogical practice should be comprehensive and take into account the following criteria:

• Knowledge of science: The depth and completeness of the student's knowledge of chemistry.

• Methodical training: Student's ability to use various methods and principles of teaching chemistry.

• Communication skills: Student's ability to interact with students and colleagues.

• Organizational ability: Student's ability to organize the learning process.

• Reflexive skills: The student's ability to analyze his own work and draw conclusions.

Based on these scientific theories, conducting experimental experiments in school chemistry courses mainly depends on the methodology chosen by the methodical teacher, in which the experiments should be gradually directed from simple to complex. We recommend the following experiments for this.

1. Knowing the theoretical basis of the reaction method, dry and wet method.
2. Knowing the general properties of the substance used in the experiment, that is, its physical aspects.
3. Knowing the technique and methodology of conducting the experiment.
4. To know the theoretical basis of the methods of conducting the experiment.
5. To know the methods of forming a solution and fully proving its processes based on the theory of indicators.
6. Knowing the types of indicators and what kind of ions they detect in determining the solution environment from a theoretical and practical point of view.
7. Knowledge of the methods of washing and drying sediment formed on the basis of experience. 8. Full knowledge of the theoretical basis of qualitative determination of gas substances formed as a result of the experiment.
9. To know how to filter, wash and dry the sediments formed.
10. He should know the methods of driving substances in a vacuum.

In teaching students' chemical experimental experiments, it is especially based on teaching the methods of obtaining substances and their chemical properties and

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qualitative reactions. The main role of chemistry teachers in forming creative and innovative abilities of pupils and students is not only general cultural and general professional subjects, but also requires the acquisition of scientific competences based on the specific characteristics of special chemistry. should lead to the formation of chemical concepts by coming.

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