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EXPERIMENT AS A SPECIFIC METHOD OF TEACHING CHEMISTRY

Annotation. *The article discusses the role of chemical experiments in teaching chemistry. An important advantage of chemical experiments is that students include almost all emotions in the cognitive process compared to the demonstration experience, which contributes to a stable and deep assimilation of the material.*

Key words: *chemical experiments, chemistry, lesson, development of students, skills*

«If you want to study chemistry, you should do more experiments»

Jabir ibn Hayyan

Chemical experiments play an important role in the process of learning and assimilation of various topics. This allows students to combine their theoretical knowledge with practice. Conducting chemical experiments, first of all, has a positive effect on their ability to understand and think.

Chemical experiment performs a threefold educational function (training, education and development of students). In the process of learning, a chemical experiment serves as a source of knowledge, performs the function of a method (cognition of chemical objects, solving educational problems, testing educational

hypotheses), the function of a means of teaching (illustrations, research, etc.), as well as a means of educating and developing students [3, p.117].

Laboratory and practical classes, which are an important source of learning new materials, also contribute to the formation and improvement of students' skills and practical skills. Chemical experiment solves various educational tasks (labor, economic, cultural, logical, aesthetic, ideological, environmental, etc.) and developmental (thinking, thinking, emotions, worldview, relationships, independence, etc.). The main task of the educational process is to provide all students with reagents, utensils and equipment, as well as compliance with safety regulations by all students.

Performing laboratory experiments and practical work, students independently investigate chemical phenomena and patterns, while forming experimental skills and skills in handling reagents and equipment. All this contributes to the improvement of theoretical knowledge and polytechnic training of students. Particular attention is paid to the technique of performing the work: the processes of dissolving substances, heating in a test tube or flask, checking the medium of solutions with indicator solutions, conducting qualitative reactions, etc. [2, p.76].

Naturally, this practical activity of students cannot be carried out without the guidance of a teacher. It is important to ensure that students are creative during experiments, that is, apply their knowledge in new contexts. An important advantage of this type of training is that students include almost all emotions in the cognitive process compared to the demonstration experience, which contributes to a stable and deep assimilation of the material. Laboratory experiments have specific goals:

Firstly, it consolidates knowledge of chemistry, including basic experimental materials, by independently conducting some experiments by students. Secondly, further development of practical skills and mastery of chemical testing methods.

Thirdly, the creative application of knowledge is carried out in the process of practical problem solving and experimental work, which is aimed at developing the ability to use knowledge in an active form, expanding students' knowledge about the use of chemistry in life.

According to the nature of the impact on the thinking of students, a chemical experiment is divided into a research and illustrative experiment. The nature of the experiment is provided by the methodology used by the teacher to conduct it (research or illustrative). The research methodology can be implemented in various forms. A chemical experiment using a research technique can serve as an object of observation already at the very beginning of the cognitive process. The teacher, through the word, directs the observations of students in such a way that they themselves extract knowledge about the directly perceived properties of the observed object. For example, a demonstration of hydrochloric acid, the results of observation of students - a liquid, colorless, transparent, well soluble in water, acting on indicators. Such a combination of a teacher's word with a chemical experiment is defined in the literature as the first form of combining a word with visual aids [3, p.118].

When introducing the chemical properties of alkali and alkali metals, it is important to emphasize that the alkali metals lithium, sodium, potassium, rubidium and cesium are very active metals. These metals are able to oxidize quickly in the air and therefore keep them under kerosene.

$$4Li + O_2 = 2Li_2O$$

$$4Na + O_2 = 2Na_2O$$

In laboratory conditions, it is possible to demonstrate the interaction of lithium or sodium with water. Here we explain to students that experiments should be carried out in compliance with safety regulations. To conduct the experiment, cut off a small amount (for example, a pea) of lithium metal or sodium and dry it between filter paper to remove traces of kerosene. In a glass vessel (crystallizer), we collect less water and slowly insert the chopped metal into it. The metal reacts with water to release a certain amount of hydrogen. A small amount of phenolphthalein is added to the resulting solution, which turns pink, indicating that an alkali is formed as a result of the reaction.

$$2Li + 2H_2O = 2LiOH + H_2 \uparrow$$

$$2Na + 2H_2O = 2NaOH + H_2 \uparrow$$

With the alkali solution formed as a result of this reaction, another chemical experiment can be carried out. In a small test tube (3-4 ml) with an alkaline solution, to which a solution of phenolphthalein was added, an acid solution (hydrochloric or sulfuric) is added and the solution discolors.

$$LiOH + HCl = LiCl + H_2O$$

$$NaOH + HCl = NaCl + H_2O$$

$$2LiOH + H_2SO_4 = Li_2SO_4 + 2H_2O$$

$$2NaOH + H_2SO_4 = Na_2SO_4 + 2H_2O$$

It is also possible to show the effect of the interaction of sodium with alcohol. We take a test tube with alcohol, insert a piece of metallic sodium into it and observe the formation of hydrogen gas.

$$2Na + 2C_2H_5OH = 2C_2H_5ONa + H_2 \uparrow$$

From the above it can be seen that chemical experiments make a significant contribution to the study of the chemical properties of substances. Because pedagogical science has proved that the contribution of observation to the process of understanding the essence of the object of study is unique.

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