



## DEVELOPING LEARNING IN CHEMISTRY LESSONS

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<b>Received:</b> 4 <sup>th</sup> September 2022 <b>Accepted:</b> 4 <sup>th</sup> October 2022 <b>Published:</b> 11 <sup>th</sup> November 2022	This article discusses the essence of problematic nature as the laws of cognition, the definition of its role in learning and the introduction of didactics in future chemistry teachers. The objectives of the problem type of training are considered, not only the assimilation of the results of scientific knowledge, but also the knowledge system, the formation of the cognitive initiative of the student and the development of his creative abilities.
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Modern society often gets into situations where challenges confront us. Because of these difficulties, we understand that in the world around us there are still many unknown faces. Therefore, people need a deep knowledge of the surrounding world, new processes and properties are constantly being opened, new processes and properties are constantly being opened. Consequently, the creation of intellectual activity culture of students has always been and remains one of the main training and general educational tasks. The development of intelligence is an important aspect of the younger generation preparation. His success should be achieved, first, in the lesson, when the teacher is left alone with his students. And the interest of students to study, their immediate level of knowledge, their readiness for constant self-education, that is, their intellectual development, which is convincingly proved by modern psychology and pedagogy, depends on skills in organizing activities.

Nowadays, when the scientific and technical component of the modern world is constantly evolving, the requirements for the developing function of learning do not stop growing. The actual task of our time is the search for people who can creatively approach what is happening around them and can solve the tasks assigned to them. That is why education cannot be limited only to the transfer of any amount of knowledge. Another important task is the need to form the dialectical, systemic thinking of the student in the learning process. The most appropriate of the existing approaches is problem-based learning. Most modern publications on the theory of learning are related to the idea of activating the educational process and educational activities of students [1].

The goal of activation through problem-based learning is not to teach individual thinking operations, but a system of mental actions for solving non-stereotypical tasks. This activity lies in the fact that the student, analyzing, comparing, synthesizing, generalizing, specifying the actual material, will receive new information. In other words, this is an expansion, deepening of knowledge with the help of previously acquired knowledge or a new application of previous knowledge. Neither the teacher nor the book can give a new application of the previous knowledge; they are sought and found by the student who is put in the appropriate situation. High learning outcomes cannot be achieved without the active cognitive work of the students themselves, without focusing their attention on the subject being studied, without no desire to know the unknown. Thinking begins with a question that needs to be resolved. Therefore, for the student to begin to think actively, a cognitive task should be set for him. Moreover, it should be recognized as really requiring clarification, and this process of finding out new things should be of personal interest to him. Problem situations enable, based on the involuntary attention of students, gradually develop arbitrary attention to the object of study, the desire to master the subject, despite the difficulties [2].

Problem-based learning is developmental learning, because a person begins to think at the moment when he needs to understand something. Under the problem-based learning, such a need arises more often and better. That is, we can conclude that the teacher is faced with the task of determining how and when to use problem-based learning. Pupils must solve the problems that the teacher sets for them. An important aspect of problem-based learning is the analysis of the content in order to detect problems in the future, and then build them in the order of submission to each other. In such a situation, the Problem-based learning has the property of consistency, which is necessary for the development of thinking. Problem learning is not called because all the teaching material students learn solving problems only by independently and discovering new concepts. Here is the explanation of the teacher, and the reproductive activities of students, setting goals and students performing exercises. However, the organization of the educational process is based on the principle of problem, and the systematic solution of educational problems is a characteristic feature of this type of training. Since the entire system of methods is aimed at the comprehensive development of the student, the development of his cognitive needs, for the formation of an intellectually active personality problem-based learning is a truly developing learning.

Problem-based learning is for everyone, not just successful students. The problematic approach is intended to interest all schoolchildren in the upcoming problem, allows to manage students' thoughts, quickly receive information from students and respond quickly to it. The most effective application of the Problem-based learning methods is possible in cases where the content of the educational material is aimed at the formation of concepts, laws and theories in the relevant field of science; when the content of the educational material is not fundamentally new, but logically continues the previously studied materials on the basis of which, students can take independent steps in the search for knowledge; when the content is available for independent student searches [3].

Problem-based learning presupposes not only the internalizing of the scientific knowledge results, but also the way of cognition and creative activity. It is based on the personality - activity principle of the organization of the learning process, the priority of the search educational and cognitive activity of students. The positive line of the problematic approach includes its developmental character. For example, there are always problems in life, but in educational activities they sometimes have to be modeled. In the 8th grade, for the first time, students learn how to solve problems using the concepts of "Amount of Substance" and "Molar Volume of Gases". These are theoretical topics, often poorly understood by students. This lesson can be started by showing some samples on the table: samples of a certain mass (64 g) of sulfur, a certain amount of water in a graduated cylinder (45 ml), a flask with air (50 ml). These samples will be useful for solving problems. We start the conversation with a sample of sulfur: "Can we measure the weight of this sample?" - "Yes, with the help of weights." - "And what about the number of molecules, taking into account the composition of S<sub>8</sub>?" And the number of sulfur atoms? - No, the students do not yet have the necessary knowledge. There is an explanation of the concepts of "amount of matter", 1 mol. of substance, familiarity with the formulas for calculating the amount of substance, the concepts of "Avogadro number", "molar mass", "molar volume of gases". Having become acquainted with this, students can independently formulate the purpose of the lesson and the strategy for the development of the lesson: "Learn to calculate the number of formula units (molecules, atoms, ions) if the mass of a substance or volume is known (for gases). This is possible using the concept of "amount of substance", which also allows solving inverse problems - finding the mass, volume, if the number of molecules or atoms is known. A teacher with problematic presentation of the material manages the cognitive process of students, sets questions that draw students' attention to the contradictory nature of the phenomenon being studied, and makes them think. Before the teacher answers the question, the students can already give an answer to themselves and compare it with the course of the teacher's judgments and conclusions. Each teacher wants students to not sit with bored looks at the lessons, but strive to learn something new, argue, draw conclusions and come to new discoveries. As a rule, the teacher believes that for this the student should listen carefully, learn paragraphs, solve problems and do exercises. We expect students to be active in the lesson, but instead get reproductive activity, memorization of the material and, as a result, a complete misunderstanding of the subject and its meaning. The solution to the problem is to use the appropriate technologies. A problem statement is appropriate when students do not have sufficient knowledge when they first encounter a problem. In this case, the teacher himself carries out the search for truth.

New living conditions put forward their own requirements for school graduates. They should be able to think independently, acquire and apply knowledge, carefully consider decisions and clearly plan actions, creatively solve tasks, be open to new contacts and cultural ties, take the initiative. Therefore, the modern stage of studying the basics of sciences in secondary school is associated with the widespread introduction of the leading ideas of the theory of developmental learning into the learning process of schoolchildren, which is understood as an active-activity way of learning. Developmental training is aimed at the development of the entire holistic set of personality qualities.

Students are forced to think creatively, dialectically and learn to search. Learning using this approach is more emotional, it helps to increase interest in the learning process and has an educational effect, because it helps to form beliefs and, as a result, worldview, helps to ensure the strength of knowledge, since the knowledge that the student has gained through an independent search is usually held by the subconscious longer than the knowledge obtained in the finished form. As a result of the problematic approach, students gain new knowledge, can establish new connections between already known and unknown concepts and facts [4].

Problem-based learning is for everyone, not just successful students. The problematic approach is intended to interest all schoolchildren in the upcoming problem, it allows you to manage students' thoughts, quickly receive information from students and respond quickly to it. Poor students need a special approach. When setting problem tasks, it is necessary to involve them in answers to easier questions, encouraging their answers and thereby creating incentives for further participation in reflection on more complex problems [5].

The most effective application of problem-based learning methods is possible in those cases where the content of the educational material is aimed at the formation of concepts, laws and theories in the corresponding field of science. When the content of the educational material is not fundamentally new, but logically continues the previously studied on the basis of which, students can take independent steps in the search for knowledge. When content is available for independent searches of the students.

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