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Scientific Pedagogical Basis of Formation of Chemical Concepts for Students

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Annotation: *This article mainly presents the theoretical basis of the methods of using innovative experiments in the teaching of chemistry.*

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The school chemistry course consists of a system of actions, concepts, theories, and rules that reveal the nature of substances and changes that occur in water.

Concepts are the ultimate product of mind, which is the ultimate product of matter.

The process of forming chemical concepts is generally based on students' consistent transition from live observation to abstract thinking and from practice to practical application and creation of scientific theories.

Live observation is based on direct observation of substances and phenomena. In this way, students enrich their perceptive abilities with the help of all sense organs.

The teacher should take concrete examples (oxygen, hydrogen, water, ammonia) to draw students' attention to the processes and connections between the observed aspects of the studied substances (smell, color, aggregate state) and other aspects of the phenomena.

The first stage of forming chemical concepts is the direct observation of substances and phenomena, starting from familiarization with nature and observing all the changes that occur in it. Students need to explain their distribution in nature, their structure, what chemical elements and atoms they are made of when forming concepts about substances. After that, the substances are directed to the understanding of the possibilities of forming compounds. After the concepts of chemical substances and compounds are brought to the students, the knowledge is generalized and the students have the first ideas about the substance. Then, the theory of the structure of atoms and molecules, as well as the periodic law and the periodic system of elements, are of great importance in learning the concept of chemical elements. In this, students enrich their ability to observe with the help of all

sense organs. The teacher draws students' attention to the connections between the observed aspects of the studied substances and phenomena and other aspects. He gradually leads the students to master the substances or phenomena as a whole. puts it clearly in front of him and leads the interpretation and analysis of specific materials to be mastered. The theoretical foundations of the second stage of forming chemical concepts are based on deepening the substance and its properties. In this, the students' knowledge of substances and their properties will improve only when they are introduced to the atomic-molecular theory in time. this leads to learning the concept of a chemical element. At the same time, D. I. Mendilev's periodic law and the periodic system of elements are also of great importance. Based on the periodic system of elements, substances are By explaining the composition of chemicals, chemical elements, molecules, atoms, and particles, protons, neutrons, and electrons, he developed the properties of substances depending on these properties by explaining the properties of oxygen, hydrogen, chlorine, and metals.

The most important chemical concept is explained in the processes that take place in solution. Because the students cannot imagine the reactions that take place when a substance dissolves or in a solution, because it is a colorless solution, and the processes that take place in ions. This requires a thorough understanding of the theory of indicators in explaining the theories of solution and electrolytic dissociation. For example: If a solution of potassium hydroxide is given, the student can see that this solution is colorless, but by dropping the indicator solution, the color of the solution is reddened due to the presence of hydroxyl ions. In order to further develop this, the theory of indicators is formed by explaining to the students the types of indicators and the reasons for color formation, showing the types and solutions of indicators through paper indicators, and conducting separate experiments for each. The study of M. Butlerov's theory of chemical structure is taken as the basis for studying all organic and inorganic substances. At the main stages of forming chemical concepts, various classical methods and methods that help to consciously, deeply and thoroughly master the chemistry course, as well as pedagogical, it is implemented with the use of educational, innovative and information technologies and interactive methods.

When organizing chemistry lessons, it is necessary for a Methodist teacher to organize them on the basis of the following plan, based on his own methodology. 1. The topic is selected based on the state educational standard. 2. A list of the main chemical concepts presented in the topic is formed. .Selection of educational materials related to the subject. 5.The lesson is based on the selection of methods and methods on a scientific basis.

In the process of forming chemical concepts, it is mainly based on the scientific introduction of three important concepts: matter, chemical reaction, and the basics of valency. Methodist teachers explain the concept of chemical reactions in the process of establishing substances in their previous lessons. It is based on imparting knowledge about methods. Later, chemical reactions are characterized by their characteristic signs: a). Heat, cold (sometimes light) emission, b). Precipitation, c). gas release, g). to color change, d). In order to create an idea about the appearance of a characteristic odor or the disappearance of such an odor, students' understanding of chemical reactions is formed by showing a specially selected experiment for students. For this purpose, the teacher is recommended to organize several experiments on the demonstration table, to try these experiments together with the students once, and after gaining confidence, they can apply them to the teaching process.

For example: 1. Ammonium bichromate is poured into different asbestos sitka and burned, as a result, they see the formation of green chromium(111) oxide. Through this experiment, they see that a red substance changes to green as a result of the reaction, which leads to the formation of ideas about the formation of new substances in the course of a chemical reaction . The teacher explains additional information about this experiment, that is, this reaction is called a volcanic reaction in

chemistry, and several new substances, chromium(111) oxide, nitrogen and water molecules are formed, and gives the reaction equations.

2. Decomposition of mercury (11) radanite: In this, the Methodist teacher takes a little bit of mercury radanite from the salt and puts it on the asbestos sheet, and by burning it, he explains to the students that a black snake is formed, gives the reaction equations, and it is justified that a new substance is formed as a result.

3. Take a large glass, fill it half with water and put calcium oxide on it. As a result, the reaction is intense and the formation of a new milky substance is explained by giving reaction equations, in which students develop concepts about chemical reactions in solution.

4. Put copper sulfate from a pink solution in a glass and slowly drop it in a colorless sodium hydroxide solution, and see if a pink precipitate is formed. students acquire skills in the types of chemical reactions. After that, students are brought to believe that any substances can be qualitatively determined by showing experiments related to the qualitative determination of new substances. For this, the following experiment can be shown: Put sodium carbonate solution in a large glass and put it on top of it It is recommended that the presence of carbonate anions from any chemical reactions can be qualitatively determined by this method by showing that a white precipitate is formed by dropping from a solution of silver nitrate or barium chloride available in laboratory conditions. After that, the Methodist teacher the experiment is explained from a theoretical point of view, what types of reactions took place and the basis for the formation of the precipitate is given. Thus, after further developing the chemical concept formed on the basis of the experiment, after explaining that it is not soluble in water, but soluble in acids from a theoretical point of view, by writing down the reaction equations, through the experiment, in the beaker filter the sediment and divide it into several test tubes, and when hydrochloric acid and acetic acid are applied to them, gas is released, the solution turns into a clear state, and chloride is formed again in the solution. Through this, the students learn that any sediment is composed of some substances and can enter into chemical reactions new chemical concepts are formed. After the students have seen the demonstration experiments related to substances and chemical reactions, it is necessary to create opportunities for them to perform them themselves, because performing the students themselves will make the experiment their own. By seeing with yourself and smelling the smell and color of the released substance through your organs, you will learn about chemical reactions. Today's methodist teachers should organize experiments based on the following methods when teaching students.

Recommendation on the methodology of conducting the experiment:

1. To study the general properties of the substance obtained for the reaction (color, aggregate state, smell and other properties).
2. To know the theoretical basis of the types of reactions.
3. Reaction conditions (heating, catalyst exposure, cooling, recrystallization);
4. Observed changes (color change, gas release, light emission, etc.);
5. The essence of the observed phenomenon (explaining, drawing pictures, writing equations of chemical reactions);
6. Learning the methodology of conducting experiments;
7. On the basis of the obtained results, general conclusions on substances and chemical reactions are directed. Formation of general drawing skills;

In the formation of chemical concepts in students, the methodist teacher implements the use of interactive methods from classical methods and pedagogical technologies.

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