USING LOGICAL RULES IN TEACHING CHEMISTRY

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Annotation. This article provides information about the use of logic rules in teaching chemistry in higher education. It formulates questions about the use of the rules of logic in teaching induction, deduction in chemistry.

Keywords. Rules of logic, induction, deduction, general dialectical method, system-structural approach, learning functions.

Currently, wide opportunities are being realized in the field of education. The use of the rules of logic in teaching chemistry is of great importance in order to lead students to logical thinking with a correct understanding of chemical laws and rules and their practical application. Therefore, the topic is relevant. Today's task of education is to teach students to function independently in an ever–growing information and educational environment, to use the information flow rationally. To do this, it is necessary to create the opportunity and conditions for continuous independent work.

The rules of logic are divided into 3 types: the law of contradiction, the law of contradiction, the law of sufficient reason.

The law of nature. Despite the constant variability of objects and phenomena in objective reality, there is a relative stability in them, which finds its expression in the law of nature. The law of nature can be formulated as follows: the same opinion expressed about a particular subject and phenomenon within the same discussion at the same time is equivalent to itself. The significance of the law of nature in cognition is great. Based on this law, it is possible to require the interlocutor to consider the correct opinion. Examples of human law: zinc is an amphoteric metal, gold is a metal. Ozone is an allotropic change in the form of oxygen. When acids dissociate, they dissociate into a hydrogen cation and an acid residue anion. Chlorine is a simple substance. Ribonucleic acids control protein biosynthesis. It consists of the elements carbon, hydrogen, oxygen, nitrogen.

The law of conflict. People in their activities realized that an object and phenomena cannot simultaneously possess and not possess any property in the same conditions. The law of contradiction applies to contradictory and contradictory judgments. The law of contradiction operates in the process of correct thinking. This is a requirement of the law, according to which thought must be free from logical contradictions. Sometimes there may not even be a logical conflict when two opposing ideas are expressed. At the same time, opposing opinions are expressed at different times and in different proportions within the framework of various discussions on the same issue.

The third is the law of exclusion. The third law of exclusion is inextricably linked with the law of contradiction, which expresses the relationship of two opposing opinions. In the process of cognition, we reflect in our thoughts that objects and phenomena in the objective world exist or do not exist at the same time, they have or do not have any peculiarity. The third exclusion law is given by the formula, A and B are not B. For example, if two opposite opinions are given: sodium is a metal, sodium is a nonmetal, one of them is true, and the second is erroneous, then there cannot be a third case. Thirdly, knowledge of the law of exclusion is important for the correct conclusion in the discussion. This law does not allow for the mixing of opposing views.

Idea 1: Salts are electrolytes.
Idea 2: Salts are not electrolytes. One of the two concepts is certainly true. That is, salts are electrolytes.
The law of sufficient reason. Objects and phenomena in nature and society develop in interrelation. The causal relationships between them are the most important links. The existence of one of the objects and phenomena dictates the existence of the other. Just as every object and phenomenon has a real basis, so our opinion, which is their perception, must be justified. This, in turn, constitutes the content of the law of sufficient reason. It should be based on the opinion that is expressed about any subject and phenomenon, as required by law. Various axioms, rules, and laws can be given as justification. The law of sufficient reason is important in reasoning, especially in proof.
The use of the rules of logic in the methodology of teaching chemistry is of great importance for the formation of the scientific worldview of students. The rules of logic are widely used in teaching chemistry induction, deduction.
Induction is the observation of a certain number of individual facts, phenomena and processes in order to draw a general conclusion, which is made on the basis of these observations. In induction, logic is not of primary importance, experience plays a primary role. From facts to rule, from many individual examples to a single general conclusion. From particular cases, opinions, a general conclusion is drawn.
The word induction comes from Latin, which means to correct, to regulate. In logic, a method of reasoning consisting in the derivation of general conclusions from individual provisions and applied to logical research.
Deduction (from Latin deductio - deduction) is the transition from the general to the particular, in a narrower sense, the term “deduction” refers to the process of inference, i.e. According to one or another rule of logic, the above sentences are transitions from premises to their consequences (conclusions).
Examples of deduction and induction can be observed in any class. Often in chemistry, physics or mathematics, the teacher gives a formula, and then during the lesson students solve problems corresponding to this case.
The object of studying the science of logic is thinking. Thinking is an Arabic word used as a synonym for the Uzbek word thinking, mental cognition. Thinking is the highest stage of cognition. For a better understanding of its essence, it is necessary to determine its role in the process of cognition, its connection with other forms of cognition.
Thinking exists in three different forms: in the form of understanding, judgment, and inference. The elements of thinking are understood as information about the signs of an object expressed in thought.
In judgments, ideas about an object and its properties, relations between subjects, about the fact of the existence or non-existence of an object are expressed in the form of confirmation or refutation. For example, in the sentence “iron – metal” there is a connection between the subject - iron and its property - metal. Or, when we say “sulfur-yellow substance”, we mean that the subject - a property of sulfur-has a yellow color.
Oxygen is a nonmetal. Hence oxygen exhibits properties inherent in metals.
Sodium is an alkaline metal. A sodium solution in water forms an alkali.
When determining the electrical conductivity of salt solutions, the reactions of their dissociation to ions are considered: the more ions dissociate in salt solutions, the higher the electrical conductivity in this solution. To test this by experiment, solutions of various salts are prepared. g.salt solutions are prepared, such as, NaCl, $CaCO_3$, $BaSO_4$, Na_2SO_4, K_2CO_3, CH_3COONa. The electrical conductivity of salt solutions is checked with a special device.

After conducting the experiment, a general conclusion is made. In salt solutions, an electric current is carried out, the more ions they dissociate.

The effectiveness of the educational process to a certain extent will depend on the clarity of the concepts used, terminology, the logic of setting and solving problems, the ability to correctly analyze the structure of existing hypotheses, correctly use the rules of argumentation.

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