



USING CASE-METHOD TO TEACH OXIDATION-REDUCTION (REDOX) REACTIONS AT A SECONDARY SCHOOL

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***Abstract.** Redox reactions are among the most common chemical reactions and are very important in theory and practice. The most important processes on the planet are associated with this type of chemical reactions and a conscious understanding of this topic is very important for specialists in most industries: future doctors, process chemists, biotechnology engineers, military specialists, agronomists, veterinarians, etc. Applying case-technology in the oxidation-reduction reaction learning process, contributes to the in-depth study of the topic and increase the cognitive interest in the chemistry.*

***Keywords:** case technology, case method, education, innovation, redox reactions, chemistry lesson.*

We live in an era of globalization, when the world is becoming more dynamic. High intelligence becomes a value, as well-being and successful development of our society, quality of life in it depends on the number of intellectual, creative individuals. The 21st century can be considered the century of education and chemistry is the most important channel of transmission of the components of modern culture produced by chemistry, without assimilating which it is impossible to adequately fit into modern society, nor to make the desired transformations in it.

Chemistry has become an integral part of modern civilization, a necessary condition for its reproduction and innovative development. Therefore, chemical education should be a mandatory element of the overall system of socialization of the individual. The knowledge obtained by chemists form the basis for the formation of a system of fundamental knowledge that is the basis for the development of natural science (biology, geography, medicine, ecology) and technical (construction, engineering, agriculture, electronics) disciplines related to chemistry.

One of the most important and complex topics in the course of chemistry is the "Redox Reactions". According to a Dutch survey, students as well as their teachers ranked electrochemistry as one of the most difficult topics in the secondary school chemistry curriculum [1]. On the topic of redox reactions, these studies together indicate that the main learning problems concern concepts as well as procedures.

Concepts evoking learning problems appeared to be the relative strength of oxidizing and reducing agents and the concept of oxidation number. Procedures evoking learning problems appeared to be classifying reactions as examples of redox reactions and the balancing of complex redox equations [2].

Redox processes are among the most common chemical reactions and are of great importance in theory and practice. The life of any living being is connected with redox reactions: metabolic processes, photosynthesis, decay and fermentation, what students know from the course of biology. The cycles of nitrogen, carbon and oxygen in nature are all belongs to the redox reactions. These reactions occur during the combustion of fuel, in the process of corrosion of metals, during electrolysis. The equations of these reactions are interesting for their complexity and peculiarity. Historically, one of the most difficult tasks of school chemistry has always been redox reactions.

In addition, a basic course of chemistry in a comprehensive school contains a large amount of theoretical material, the study of which is devoted to an insignificant amount of time. The methodology of teaching chemistry, which is currently used in secondary school, is still somewhat traditional. The activity of students with this method of teaching is mainly aimed at memorizing and reproducing educational material, performing tasks and exercises [3].

In this regard, in pedagogy there is a problem of improving the educational process and methods of teaching it by introducing modern pedagogical technologies. The most effective are technologies that allow to create learning conditions that ensure students develop their internal motivational sphere, learning activities, cognitive activity, and independence [4].

In the organization of this kind of activity, one of the most promising modern pedagogical learning technologies that are actively taking root in the practice of a chemistry teacher, is the so-called case-study. The case method in chemistry lessons successfully solves educational problems that cannot be solved in an analytical or other way.

Case-based technologies that activate the learning process include:

- method of situational analysis (method of analyzing specific situations, situational tasks and exercises; case study);
- incident method;
- method of situational role-playing games;
- business correspondence method;
- game design;
- discussion method.

Thus, case technology is an interactive technology for short-term learning based on real or fictional situations, aimed not so much at mastering knowledge, as at developing students' new qualities and skills. Its main purpose is to develop the ability to work through various problems and find their solutions, learn how to work

with information [5]. It can easily be combined with other teaching methods, including traditional ones, which impose compulsory normative knowledge on students.

There are various designations of this technology. In foreign publications you can find names: a method of studying the situation, a method of business stories and, finally, just a method of cases.

According to the observations of leading foreign and domestic educators, innovators and methodologists, it was concluded that the systematic and purposeful use of case technologies in chemistry classes allows students to create high motivation, sustained interest, a desire for learning and the ability to transform theoretical knowledge into ways of acting in real, life situations [6]. Of course, it is precisely these indicators that should be sought when teaching chemistry.

To cover such an extensive and complex topic as “Redox Reactions”, the use of case technologies in training is fully justified. Simple presentation of the theory, incomprehensible signs and symbols cause rejection even in an adult. Teenagers, due to their physiological characteristics, are not able to concentrate attention on one object for a long time, they get tired quickly and lose interest in the subject. Using the case method, it will be fun and easy to remember the applying situational tasks and exercises.

Undoubtedly, innovative teaching methods have advantages over traditional methods. The introduction of case-technology in chemistry classes shows high efficiency when working with students, increases their interest in the study of chemistry. Contribute to the improvement of academic performance on the subject, the development of analytical skills and, finally, the most important thing: awareness of the need to study such a science as chemistry in terms of an integral part of the knowledge of the world, the surrounding reality and practical application.

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