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APPLICATION OF CASE TECHNOLOGY IN CHEMISTRY EDUCATION

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Annotation
This article provides a methodology for using keys technologies in teaching chemistry. It expresses the keys and its solutions to the topic of "carbon".

Keywords: case study, innovation technology, education, initiative.

The process of developing students' initiative in vocational education depends on the teacher's ability to correctly apply various forms of organizing their cognitive activities, including joint activities in the form of group work. Numerous philosophical and psychological studies have been devoted to the problem of developing initiative. This is due to the fact that initiative is one of the key personality qualities, the formation of which is the purpose of training.

For the development of students' initiative, it is important to organize the learning process in such a way that the teacher has the opportunity to support their ever-increasing cognitive interest, cognitive needs, and cognitive activity. The case method just encourages students to become more active when analyzing a specific situation.

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 forming new qualities and skills in students. Its main purpose is to develop the ability to work through various problems and find solutions to them, to learn how to work with information.

The case technology provides for the use of group work in the learning process, i.e. such a form of teaching in which the class is divided into groups of 3-5 people working on educational material together, in mutual dependence, according to an agreed plan or order, as well as individual work.

When solving a common problem in the classroom, cooperation is useful, which allows students to fully comprehend and assimilate educational material and

additional information, and most importantly, to learn how to work together and independently.

Let us give examples of the implementation of keys technologies in chemistry:

Case №1

Case situation: in 1862, the famous German chemist Friedrich Wöhler tries to obtain calcium metal in the presence of activated charcoal from unfiltered lime. Unfiltered lime is calcium oxide. Violer believed that if coal was heated hard by adding coal to the unfiltered lime, the coal would absorb oxygen from the lime and combine with it, resulting in carbon dioxide gas, and the calcium metal would be released cleanly. In an attempt to confirm his opinion, violer repeatedly undergoes this reaction over several days to form a clay powder each time, rather than a calcium metal. After being unable to get expected from the experiment, he goes to quaor to stop the experiment and orders his laboratory assistant to take out the ash substance that has accumulated in the jars. At this time, heavy rain forms a puddle of water where the “ash” in the laboratory yard is thrown away. The laboratory assistant will go out into the yard and witness an amazing incident. The” ash " observes the boiling of water and the formation of gas bubbles with an unpleasant odor, and quickly reports this to violer. When a scientist looks out into the yard, he really observes such a situation.

"Oddly enough, it turned out what kind of ash and what gas it was,” says the scientist. He tries to light the gas by ringing a match. The decoupling gas then suddenly ignites, giving it an eye-catching light flame, forming a dud. Rejoicing at this, violer exclaims “Hans congratulating you! A great discovery seems to open up. The ultimate task is to unravel the secret of this discovery, determine what substance was formed as a result of the reaction and what gas was formed when this substance was exposed to water,” he told his laboratory assistant.

Case assignment

1. What do you think that together with the Vyoler laboratory assistant determined what substance?
2. What gas is released when the substance it forms is exposed to water?

Case solution

1. The solid heating of the German chemist scientist F.Wyoler by adding coal to the unsaturated lime goes according to the following reaction**:**

$$CaO+3C \rightarrow CaC_2+CO$$

Hence, the ash substance obtained was calcium carbide.

2. Acetylene is formed by the interaction of the resulting substance calcium carbide with water:

$$CaC_2+H_2O\rightarrow Ca(OH)_2+C_2H_2\uparrow$$

The separated gas burns by giving a bright flame for being acetylene:

$$2C_2H_2\uparrow+5O_2\rightarrow 4CO_2\uparrow+2H_2O$$

Case № 2

Case situation: You know that salts that are insoluble in water, such as $CaCO_3$, do not react with other salts. However, as a result of our experiments, a precipitate gas was released based on the reaction of $FeCl_3$ with $CaCO_3$, and a brown precipitate was formed. To detect the separating gas, we touched the tin with the end of the reactionary test tube, and as a result it went out. It was found that the resulting precipitate does not dissolve in water and alkali, dissolves in acid.

Case assignment:

1. What results from $CaCO_3$ interaction with $FeCl_3$?
2. What gas is separated?
3. What kind of sediment was formed?

Case solution

1. $CaCO_3$ does not interact with water, but upon heating with $FeCl_3$ in an aqueous medium, the reaction goes as follows:

$$2FeCl_3 + 3CaCO_3 + 3H_2O \rightarrow 3CaCl_2+2Fe(OH)_3\downarrow + 3CO_2\uparrow$$

2. The decoupling gas is extinguished when a tin is fired because it is carbon dioxide.
3. The resulting precipitate $Fe(OH)_3$ is insoluble in water, does not interact with alkali, but is soluble in acid:

$$2Fe(OH)_3\downarrow + HCl \rightarrow 2FeCl_3+ 3H_2O$$

Case №3

Case situation: Half of the test tube is filled with clear lime water, into which the folded glass flute is lowered into the liquid and slowly blown from the second end of the tube. In this case, bubbles in the liquid begin to boil up. When the Puffing continues for a few seconds, the liquid begins to blur and turns white, similar to milk. If the Puffing continues after a few seconds, the White muddy liquid will turn back into a clear liquid.

Case assignment:

1. What gas comes out when the glass is blown through the flute?
2. Why did the liquid first become turbid and then clear again?

Case solution.

1. Air was sent to the test tube via a glass flute. The air exhaled contains 4% carbon dioxide, 16.3% oxygen, and 79.7% nitrogen. Of these gases, only carbon (IV) oxide interacts with lime water. The carbon (IV) oxide in the air interacts with the calcareous water to form a white calcium carbonate precipitate (the Milky turbidity in the test tube is exorbitant). The reaction is sober as follows:

$$Ca(OH)_2 + CO_2\uparrow \rightarrow CaCO_3\downarrow$$

2. When carbon (IV) oxide is again injected into the turbid solution of the calcium carbonate formed, the calcium carbonate precipitate in the solution reacts with carbon (IV) oxide to become a soluble bicarbonate salt. This reaction goes as follows:

$$CaCO_3 + H_2O + CO_2 \rightarrow Ca(HCO_3)_2$$

In conclusion, the use of keys technologies in the teaching of chemistry leads to the fact that students not only increase their interest in science, but also develop the ability to think independently.

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