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METHODOLOGY FOR USING CASE ASSIGNMENTS IN TEACHING THE TOPIC" IRON AND ITS COMPOUNDS

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Abstract:

This article talks about the Case study method and its use in teaching the topic "Iron and its compounds".

Keywords: Case stage, method, educational technology, iron, "Heavenly iron", myoglobin, cytochrome, catalase.

Keys stadi is an English sase - specific situation, formed from a combination of stadi – educational words, an educational method based on the study, analysis and achievement of socially significant results of specific situations. This method is based on making specific decisions based on the study of real situations, in contrast to the method of problem education. If it is used as a way to achieve a certain goal in the educational process, it acquires a method character, reflects the technological aspect if it is carried out on the basis of a certain algorithm, step by step in the research of some process. By incorporating complex R & D, methodological and Constructivist activities performed outside the audience, it will be associated with the following consistency of the teacher's actions:

- creates case (unless the finished keys are used);
- design and plan education technology;

prepares students, develops educational and methodological support for their independent work with keys.

Consistency of teacher actions:

- On the basis of the working program, the degree program determines the form, type and time of training (practical training/independent work/ training practice).
- Clarifies the purpose of the training session, determines the results and pedagogical tasks expected from the training session.

Selects the optimal model of Education (a set of optimal educational methods, forms and tools that guarantee the implementation of the goal set at the specified time and under the determined conditions and the achievement of the projected academic results).

The created keys must pass an expert examination and assessment. The following may be verification methods:

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1. A review of the case project by an employee of the enterprise and the fact that the information described in it is in accordance with the real situation, as well as an interpretation of the facts presented and an examination of the like.
2. The expert assessment and the opinions of colleagues, the opinion of the teacher-keysologist on the value of keys in education, is the second way to verify it.

Case 1

Case's situation: "Heavenly iron”

Iron can be considered an important metal of our time. This element is very well studied, no one knows when and by whom the iron was opened. Iron is among the elements known from very ancient times. "Iron Age", the beginning of which dates back to the millennia before our century. Iron replaced the Bronze Age.

Problem questions:

1.What and by what method was pure iron obtained in ancient times?
2. What is "Heavenly iron"?
3. How was Iron valued in ancient times?

Guide for listeners

1. Get enough insight into the essence of Keys.
2. Identify the factors and sources that serve to find a solution to the problem.
3. Among the identified factors, distinguish a factor that is more relevant to the problem than all.
4. On the basis of these factors, proceed to the justification of the solution.
5. State your opinion.

Requirements for students on the process of solving keys:

1. Listeners are introduced to keys mokhati and are mukhakama in a small guru.
2. Listeners, in collaboration with members of small groups, identify the factors and sources that prepare the ground for halting the problem.
3. In solving the problem, the possibilities of using information technology in chemistry lessons are initially determined.
4. The opinions given by the members of the guru are considered and a general conclusion is drawn.

Teacher's solution

Femir can be considered an important metal of our time. This element is very well studied, no one knows when and by whom the iron was opened. Iron is among the elements known from very ancient times. "Iron Age", the beginning of which dates back to the millennia before our century. Iron replaced the Bronze Age.

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The first Iron used by man was meteorites that fell on Earth.The bulk of the meteorites that have fallen to Earth consists of nickel iron. The only important technological convenience of" Heavenly " iron: it is easily hammered when heated, it can be hammered even cold.
Iron is also found on the moon, on the moon it is found unoxidized, free. Iron is found on Earth in some cases in a Free State.

In ancient times, iron was highly valued. According to the ancient Greek scientist Strabo in his book "Geography", at the beginning of our century in the peoples of Africa stood 10 times more expensive than iron gold. The price of iron is determined not by its thinness and chemical stability, but by its importance in technology, in the development of civilization.

Case 2

Case's statement: the distribution of iron in nature.

In terms of distribution in the Earth's crust, iron is the fourth element (after oxygen, silicon and aluminum), the most common among heavy metals.

There is such a hepotesis: that is, there is speculation that the core of the Earth is made of iron and nickel. The density of the Earth's core is very close to that of iron and nickel. Iron is found bound in nature: it belongs to the composition of rocks and living organisms. Only meteorites are made up of Innate iron (pure). In Mineral waters, iron is dissolved in the case of FeSO4 and Fe(HSO3)2s, in which the amount of iron reaches 100 mg/ liter**.**

Problem questions:

1. Why has iron long been known to mankind in its pure form?
2. Why is iron considered important for living organism?

Teacher's solution:

At the end of the two millennia BC, man began to use iron. The meteorite was used by people from time immemorial, about 20 thousand tons of meteorites fell on Earth every day.
Iron is a necessary element for life, it is part of hemoglobin in the blood, hemoglobin is a substance that carries oxygen from the lungs to the tissues. The tissues also contain iron, a substance that acts as an oxidative-reversible enzyme. The cytochrome and breath enzyme reversible form has Fe2+, and their oxidized form has Fe3+. A person's blood contains ~2.5 g of iron, the human organism receives iron from food, and if iron is deficient in the body, anemia will occur. Plants also include iron in the green-giving chlorophyll, which, if the plant's Leaf lacks iron, does not grow and develop well when the leaf turns yellow.

Case 3

Case's statement: the effect of acids on Iron

Displaces hydrogen from ferrous acids:

$Fe + 2HCl = FeCl_2 + H_2$

$Fe + H_2SO_4 = FeSO_4 + H_2$

Iron with dilute nitric acid NO, NO_2, N_2 N_2O or with very crowded NH_4NO_3 yields.

$Fe + 4HNO_3 = Fe(NO_3)_3 + NO + 2H_2O$

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When boiled with concentrated sulfuric acid SO_2 is observed to form:

$2Fe + 6H_2SO_4 = Fe_2(SO_4)_3 + 3SO_2 + 6H_2O$

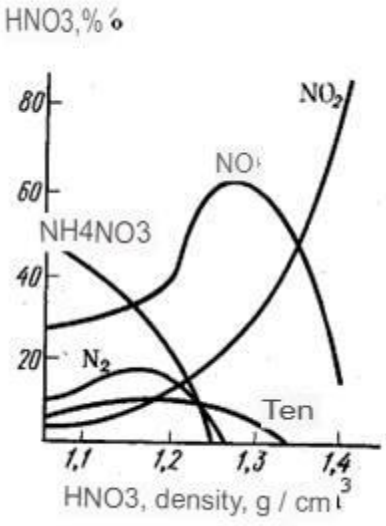
100% concentrated sulfuric acid passivates iron. High concentrations of nitric acid also passivate iron.

Problem questions:

1. Why does hydrogen not separate when nitric acid interacts with nitric acid?
2. Why do different nitrogen compounds dissociate when Iron interacts with nitric acid of different concentrations?
3. Why is 100% concentrated sulfuric acid passivating iron?

Teacher's solution:

Iron forms no, No2, N2 N2O with dilute nitric acid, or NH4NO3 with highly concentrated. A high concentration of nitric acid, on the other hand, passivates iron. This is due to the fact that nitric acid is a strong oxidizer, when exposed to iron, nitric acid decomposes and nitrogen oxides are formed.



The effect of the concentration of nitric acid on return products with iron.

Concentrated sulfuric acid passivates iron.

Case 4

Case's statement: the importance of iron in biological processes.

Proteins that capture iron in their composition are of great importance in biological processes. These include hemoglobin, myoglobin, cytochromes, catalase, and peroxidase. Hemoglobin is the bulk of erythrocytes. It is a carrier of oxygen by supplying oxygen to tissues in the lungs, again providing external respiration as well. Myoglobin, cytochrome and catalase, on the other hand, provide cellular respiration. Each of the above proteins is made up of a protein part and associated active centers.

The active centers are hemisoblazed by the macrocyclic complex compound (gem Greek" gema " means blood). These complexes involve the tetradentant compound porphyrin as a macrocyclic ligand. At the center of the complex is iron, at the ends of the Quadrangle is the donor atom nitrogen. The complex in general is considered to have an octahedral configuration. The fifth orbital, on the other hand, is connected to the aminkilota (histidine) by a nitrogen atom. The sixth orbital is empty and can bind low-molecular ligands(e.g., O_2, H_2O_2, CO, CN^- and etc.,).

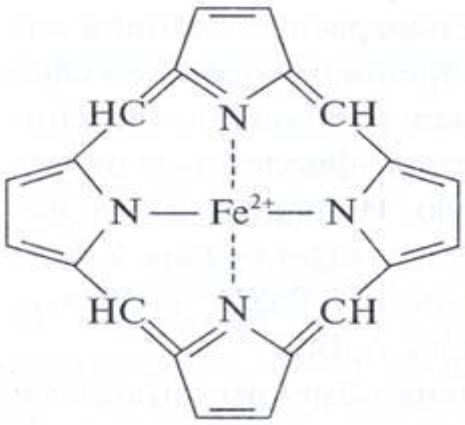
Problem questions:

1. What degree of oxidation does Iron have in the human body?
2. How to prove that fruits contain iron?

Teacher's solution:

The properties of hemoglobin and similar metallocomplexes can change dramatically under the action of certain toxic substances, such as CO (is gas) and cyanides. Therefore, due to the fact that CO mixed with the air content forms carbonylgemoglobin with hemoglobin, oxygen access to the organs is sharply reduced. On top of that, the complex yield capacity of CO is many times higher than that of oxygen.

Because of this, even if there is very little oxygen in the air I leads to hypoxia, that is, a lack of oxygen. To prevent CO poisoning, the patient must be quickly taken out into the fresh air. Then the balance is pushed towards the side of the formation of oxyhemoglobin.



Structure of hemoglobin.

The normal level of hemoglabin in the blood depends on how iron ions are absorbed by the human body. Iron is absorbed from the composition of foods in the form of ions.Iron content is mainly found in meat products, legumes, fruits and vegetables.

Hemoglabin has an iron + 2 oxidation state. Iron from the composition of foods Fe^{2+} is assimilated in the state.

To determine the iron contained in apples, we drip a piece of freshly cut apples from a solution of ammonium rhodanite, if Fe^{3+} in the case of an ion, a reddish compound must be formed. But this situation is not observed. When the cut Apple is left a little outdoors, it turns brown, that is, the Iron (II) ion is oxidized and converted into Iron (III)- compounds.

Conclusion:

Instead of a conclusion, it can be said that the introduction of many innovative technologies in the teaching of subjects in the educational system, the rapid introduction of new information entering the subject into the educational process, provides high efficiency. In addition, the organization of the educational process with the help of interactive educational technologies provides a wide range of opportunities for the learner, ensures the integrity, speed of the knowledge gained. Also, opportunities for obtaining additional information within the framework of the studied topic with speed, independent work are created. Taking into account these possibilities, today the desire to carry out new research of science is expressed in many industries. This encourages the student youth to learn more and seek. Summing up the knowledge gained, being able to apply it to the necessary areas and laying the foundation of our future from now on is one of the main tasks that each of us has set for us.

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