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INCREASING THE EFFICIENCY OF STUDENTS' KNOWLEDGE THROUGH PROBLEM SOLVING IN CHEMISTRY LESSONS

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Abstract

In this article, the role of chemical problems in the formation of students' knowledge and inter-discipline relations in the teaching of chemistry at school is shown.

Key words

rational thinking, transition from abstraction to concreteness, methodological aspect.

INTRODUCTION

One of the main criteria of a modern teacher is to find information, check it and use it to solve specific practical problems. Basic skills in solving practical problems are obtained by solving educational problems in the educational process. The educational task is an example of a real problem situation, which develops thinking, forms universal educational behavior, interdisciplinary relations. But recently, especially in the process of teaching school subjects, there is a tendency to exclude calculation issues from the educational process. Solving chemical problems develops hard work, perseverance, and worldview in students, because interdisciplinary connections are easily made in the tasks.

LITERATURE REVIEW

Solving chemical problems forms rational thinking methods in students, eliminates the formality of knowledge, develops self-control and independence. The educational value of tasks is that, for example, calculation problems reveal to students the quantitative side of chemistry as an exact science. With theory by solving problems

the dependence of practice, in the process of solving them, the chemical understanding of substances and processes is strengthened and improved. It is easy to organize problem-based learning, especially on the basis of solving problems related to quality. The process of problem solving is to move from abstraction to concreteness. Methodologically, it consists in the transition from abstract thinking to practice, the connection of the particular with the general.

RESEARCH METHODOLOGY AND EMPIRICAL ANALYSIS

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It is important to remember that problem solving is not a learning tool by itself, but a learning tool that helps to continuously develop knowledge. Problems are classified by types, mainly divided into qualitative and computational. Quality issues in chemistry Some types of quality issues include:

1. Explanation of listed or observed events:

Why does the reaction of calcium carbonate with sulfuric acid start violently at first and then stop?

Why does the substance in the test tube disappear when dry ammonia carbonate is heated?

2 Characteristics of certain substances: With which substances can nitric acid react?

With which of the following substances does hydrochloric acid react?

3. Identification of substances: Which of the test tubes contains alkali, acid, salt?

Which test tube contains sulfuric, hydrochloric and nitric acids?

4. Proving the quality of the composition of substances: how to prove that ammonium and chlorine ions are present in the composition of ammonium chloride?

5. Separation of mixtures and pure substances: how to purify oxygen from a mixture of carbon monoxide (IV)?

Obtaining Substances: Obtain Ferric Chloride in a variety of ways. As well as the isolation of a substance, transformation chains involve the same problems if a number of other substances are given as starting substances. Problems can be about the use of instruments, for example: show which instruments can be used to collect ammonia, oxygen, hydrogen, chlorine, etc. Problems are solved orally, in writing or experimentally. Calculation problems in chemistry. When teaching students how to solve calculus problems in chemistry, it is important to remember that problem solving is not in itself, but a tool that helps to deepen the understanding and mastery of chemical concepts, primarily quantitative concepts. Usually, how to solve calculus problems in chemistry, students face certain difficulties related to the specific characteristics of chemistry. First of all, they are required to know how to use the "amount of substance" and its unit - a special physical quantity called the mole - in chemical calculations. To understand this quantity,

It is important to note that there are very few supported concepts. These abstract concepts have no analogues in science other than chemistry, because they don't. In addition, there are no suitable instruments to measure a specific substance directly. You can measure the mass and volume of a substance in a mole, not the

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amount. This is determined by calculation. Therefore, if it is possible to help VIII graders, whose abstract thinking is not yet well developed, to master this material, it is necessary to involve visualization, although it is very difficult, because it requires a developed imagination. It is easy to explain the concept of "amount of substance" in terms of the number of constituent particles N, and "mol" in terms of Avogadro's number. The second reason for the difficulties is that in chemistry, in calculations, it is necessary to work with two chemical and mathematical formulas in a row. All these difficulties should be overcome by showing students that, without exception, chemical calculations are based on the use of moles as a unit of amount of substance. Calculate

Students should fully understand that it is easier to explain in terms of grams or volume ratio. For students, ratios are familiar values from a long time ago. Teachers should teach students to think about chemical quantities. You need to choose the problems that require the use of this unit, and only then, when it is confirmed in the minds of students that the quantitative relations of substances are always expressed in moles, we can study formulas, see the relationship between the mass and amount of a substance, the volume and amount of a substance we can see. Sometimes the name of the quantities contradicts the students' old understanding. For example, students understand the value of "molar mass" as mass, but it is not measured in grams (as is the case for mass), "g/mol" is explained as the ratio of mass to the amount of substance. It is important to properly explain what molar mass M and molar volume V are, show their dimensions, and explain how they are used to convert from mass and volume to amount of substance and vice versa. Avogadro's constant should be explained - students should use all the formulas consciously. General formulas are always abstract, the generalized approach to the solution is clear in each problem. It is useful to inform students about the system of quantitative concepts, the relationships between them, and the formulas expressing the relationships between these three concepts. For self-control and better memorization, teachers sometimes hang diagrams and formulas on the wall at the first step. Many teachers believe that it is better for students to make these formulas themselves. When choosing calculation problems for students, the teacher should evaluate it in terms of the following goals:

1. In the process of solving the problem, what concepts, laws, theories, facts should be defined, what aspects of the studied substance and chemical reactions should be noted.

2. What methods should be formed to solve the problem.

3. What mental methods develop in the process of solving the problem.

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4. Which didactic tasks fulfill these issues.

CONCLUSION AND DISCUSSION

The methods of teaching chemistry are complex, through which a connection is established between the chemical composition and the process of its mastery. Methods and components form a dialectical unity, because any content is included in the learning process through the method. Teaching methods for students are methods of acquiring knowledge. By mastering the content, the student also understands how to learn it, which can be applied to other content.

LIST OF REFERENCES:

1. Erygin D.P., Shishkin E.A. Methods of solving problems in chemistry. M., 2019. 2. Kuznetsova N.E., Levkin A.N. Problem books on chemistry for 8th and 9th grade students of educational institutions. M.: Ventana-Graf, 2018.

3. Lidin R.A., Alikberova L.Yu. Chemistry: A guide for high school students and university applicants - M .: AST-PRESS SCHOOL, 2012.

4. Lidin R.A., Alikberova L.Yu. Assignments, questions and exercises in chemistry: 8-11 boxes: A guide for students of educational institutions. - M.: Marifat, 2012.