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METHODOLOGICAL APPROACHES TO DEVELOPING FUNCTIONAL LITERACY IN 10TH-GRADE STUDENTS THROUGH THE TOPIC "PETROLEUM AND ITS PROCESSING"

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Abstract

The article highlights methodological approaches to developing functional literacy in the process of teaching the topic “Petroleum and its processing” to 10th-grade students. The study analyzes the didactic possibilities of organizing chemistry education based on the integration of students daily life experiences. Methods for developing students’ chemical thinking, problem-solving competence, and functional literacy are also described based on practical situations related to the everyday use of petroleum products, environmental problems, the rational use of energy resources, and production processes.

Keywords

petroleum, functional literacy, innovative methods, tasks, didactic support, problem situations.

The development of functional literacy in teaching chemistry serves to integrate students' theoretical knowledge with practical activity, to analyze problem situations encountered in daily life on a scientific basis, and to develop competencies for their application in developing effective solutions. To effectively organize this process, it is important to develop and implement into the educational process special didactic support based on modern pedagogical approaches, including innovative teaching methods, practice-oriented tasks, and a system of educational and methodological materials. The essence of developing functional literacy: This approach involves developing students’ ability not only to assimilate information but also to analyze, evaluate, and effectively apply it in daily activities. Didactic support serves to increase educational effectiveness by ensuring the content consistency of educational tasks, their level of complexity, and their integration with real-life situations. Developing students’ functional literacy

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through the topic “Petroleum and its processing” in 10th-grade chemistry lessons involves applying theoretical knowledge to solving real-life problems. Through this topic, students will learn not only the composition of hydrocarbons but also how to analyze environmental protection, energy conservation, and industrial processes [1].

Competence-based approach: Teaching students not only to memorize formulas and rules but also to apply them in practice. It consists of linking chemical processes with life situations, ecology, health, and industry.

Modular education system: It consists of increasing students' ability to work independently by dividing educational material into small, logically complete modules [2].

In the current educational process, since traditional lesson forms cannot fully satisfy students’ interest in knowledge, it is becoming increasingly important to organize classes in interactive, rich-content, innovative forms aimed at increasing educational efficiency. The modern teacher acts as a subject who organizes, directs, and methodologically supports the cognitive activities of students in the educational process, and their main task is not only to convey theoretical knowledge but also to form competencies for its application in practical life situations. In the process of teaching the topic “Petroleum and its Processed Products” along with forming students' professional interest in professions such as engineering, ecology, and geology, it is of great pedagogical importance to develop scientifically grounded concepts regarding global environmental problems related to the oil industry and the impact of industrialization processes on the environment. Thanks to the use of modern ICT (electronic textbooks, virtual laboratories, flash animations, presentations, the Internet, etc.), it is possible to easily carry out the assigned lesson tasks, impart basic knowledge, and awaken great interest in the subject being studied [3].

Lesson Objective: Identification of oil deposits and their origin. Studying the composition of oil and methods of its processing. Familiarization with the composition of petroleum fractions and the application of petroleum products.

Developmental. Continue to develop skills in comparing and analyzing experimental data with theoretical knowledge. Continue developing skills in working with information sources.

Educational goal. Schoolchildren’s use of raw materials. Formation of socially oriented personality traits in students and a careful attitude toward the environment. Cultivating neatness and precision when working in a chemistry laboratory [4].

I. Organizational aspect.

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Teacher's greetings. Checking the class's preparation for the lesson.

II. Activation of knowledge.

Students are asked to recall previous lesson materials.

What are the sources of hydrocarbons? (Answer: natural and petroleum gas, a companion to oil and coal.)

Composition, processing, and application of natural gas (personal answer). Composition, processing, and application of associated petroleum gas. Students in the class are asked to review the answers, and part of the class works on the cards.

Problem statement:

1. Topic on the board and in the presentation. "Petroleum: Composition, Properties, Processing"

The development of functional literacy in teaching the topic "Petroleum and its processing" to 10th-grade students serves to form students' competencies in applying chemical knowledge in real-life situations. In teaching this topic, it is an important methodological factor to link the composition, physicochemical properties, processing stages, and the significance of petroleum products in the national economy with everyday life [5].

In the development of functional literacy, assigning tasks to students based on problem situations yields effective results. In particular, students develop critical and analytical thinking skills by analyzing issues such as the environmental impact of gasoline and diesel fuel, the rational use of petroleum products, atmospheric pollution, and the conservation of energy resources. At the same time, the use of technological diagrams, laboratory experiments, and production examples related to oil refining processes increases students' interest in the topic. In the process of teaching this topic, the use of interactive methods such as "Brainstorming", "Case Study", "Cluster", "BBB", and "Problem Learning" is of great didactic importance in developing students' independent and critical thinking skills, increasing their cognitive activity, and ensuring their active participation in the educational process. At the same time, the analysis of environmental problems and practical tasks aimed at their solution serve to form students' competencies in environmental culture, a responsible attitude toward nature, and social responsibility. Additionally, the topic "Petroleum and Its Processin" possesses significant didactic opportunities for fostering students' interest in professions such as engineer, technologist, ecologist, and geologist. This, along with strengthening the vocational-oriented function of education, contributes to the development of a conscious attitude toward students' future professional activities. As a result, teaching the topic "Petroleum and its processing" based on a functional approach serves to develop students' competencies in applying chemical knowledge in real-

life situations, scientifically and theoretically analyzing problem situations, and making informed decisions. This approach enhances the practical orientation of the educational process and ensures significant pedagogical effectiveness in forming students' functional literacy, independent thinking, and life competencies [8].

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