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Research Article

METHODS OF TEACHING THE TEACHINGS OF DEMOCRITUS, AR-RAZI, BERUNI AND IBN SINA ON THE STRUCTURE OF SUBSTANCE IN A SCHOOL PHYSICS COURSE

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ABSTRACT

Continuity of education is ensured based on the introduction of basic physical concepts and phenomena in the sixth grade about the structure of matter. Only then will the sequence from simple to complex be maintained in education, and students' understanding and comprehension activities will develop. Such information is used when passing topics related to thermal phenomena. In particular, it is explained that the movement of molecules depends on the temperature of the body, and this connection is expressed based on the comparison of the diffusion rates in bodies with different temperatures. It is intended to teach students to think logically about the surrounding physical phenomena, including the phenomenon of the structure of matter and its essence, and equip them with the knowledge, skills and abilities related to physics necessary for their social life.

KEYWORDS

substance, heat, temperature, molecule, solid, liquid, gas, competence, method, computer technology, projector, interactive, variable induction current, pedagogical technology, scale, atom, beaker, proton, neutron, particle , quarks.

INTRODUCTION

Continuity of education is ensured based on the introduction of basic physical concepts and phenomena about the structure of matter in the VI grade. Only then will the sequence from simple

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The purpose of the subject: to provide students with knowledge about the structure and principle of operation of matter, as well as to observe, understand and explain physical processes and phenomena, to conduct experiments and draw conclusions, to form the competence of using physical knowledge in practice.

Tasks: To provide students with knowledge about the structure and principle of operation of matter and to explain the importance of their role in the formation of alternating induction current. Interest in science by explaining the possibility of changing the voltage of alternating current and its use in industry and technology.

The content of the educational process: Explain to the students the structure and principle of operation of the substance by showing a slide. Interest in science by explaining its use in industry and technology.

Implementation technology of the educational process: Method: Active lecture, working with groups

Tool: Distributed questions, connecting wires, computer equipment, overhead projector, blackboard, chalk.

Supervision: Oral supervision, evaluation of students.

Evaluation. Based on a 5-point system.

Expected results: Teacher: By giving students knowledge about the structure and principle of operation of matter, and using interactive methods to explain its importance in industry and technology, students' independent thinking, activity, and interest in the lesson and science will increase.

Pupil: Pupils can independently express their opinion in a clear and comprehensible way orally and in writing. Based on the topic, he can ask questions logically. They learn to work with groups and work on themselves, the skills and abilities of remembering, telling, and showing are formed.

Future plans: Teacher:

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Ways to interest students in physics and to work on themselves to apply pedagogical technologies in the lesson, to enrich their experience with the application of the subject in science and technology.

Student: Use of materials in practice, learning to work independently with additional literature. Ability to express one's opinion fluently.

Block diagram of the lesson...

	Lesson stages	time
1.	Organizational part	2 minutes
2.	Ask about the topic	6 minutes
3.	New topic statement	16 minutes
5.	Problem solving and testing for new topic reinforcement	15 minutes
6.	Encourage students	4 minutes
7.	Homework	2 minutes

Educational goal of the lesson: Preliminary information about the structure of the article to acquaint students with the works of our compatriots who have collected and interpreted.

The educational purpose of the lesson: to awaken the spirit of patriotism in the minds of students and to inculcate the national idea in them, to form national and general cultural competences in them.

Developmental goal of the lesson: To provide students with knowledge on measuring and determining physical quantities, conducting experiments and drawing conclusions.

Basic competences: Competence of working with information, the ability to independently find and use the necessary information from various information sources, knowledge and compliance with information security rules.

Self-development competence: independently developing physical knowledge based on acquired knowledge, being able to perform didactic tasks, and being able to evaluate one's own behavior.

Type of lesson: Oral.

Teaching methods: Binary, mutual teaching, work in groups, presentation, "Ball game"

Teaching equipment: Physics textbook, multimedia textbook, computer, portraits of scientists and scholars, booklets.

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The progress of the lesson

Organizational part:

Ask students for information about great scientists. Control of classroom cleanliness

Request a past subject:

1. What is the measurement limit of the beaker shown in the picture in the textbook?
2. How many grams is 1kg of substance?
3. What time units do you know?
4. How is body mass measured using a scale?
5. What size is measured using a beaker?

Reinforcement of the topic:

New topic statement:

In your daily life, if you pour water into a pot for making tea and start heating it, you will see steam coming out of it. After a while, the water will boil, and if you don't turn off the heater, the water will completely evaporate. On cold winter days, water left outside freezes. Why did the water evaporate? What are the differences in the structure of water and ice? Such questions have interested humanity since ancient times. The first concepts of the structure of matter belonged to the Greek scientist Democritus (460-370 BC). According to him, all things are made up of very small particles - "atoms". The smallest particle of matter - an atom - is considered indivisible. The word atom also means "indivisible particle" in Greek. Democritus' work about this has not reached us. His ideas are presented in the writings of others. This teaching of Democritus was later developed by many scientists. For example, there are works in this field in the works of Ar-Razi, Beruni and Ibn Sina, among the great thinkers who are our compatriots. Abu Bakr Ar-Razi (865-925) wrote a total of 184 works and created in all fields.

He develops the views of Greek scientists about the atom and says that the atom can also be divided. There is space and particles inside the atom, and all these particles are in motion. In addition, it is assumed that there will be interaction forces between the particles. Ar Razi's theoretical views were developed by Abu Rayhan Beruni and Ibn Sina. This is mentioned in their letters to each other. In one of Beruni's questions to Ibn Sina, it is said: - "Some philosophers say that the atom is indivisible and that there are no smaller particles, this is ignorance. The latter noted that the atom does not divide, and that there is no limit to its division. This is extreme ignorance. Because if the division of the atom is infinite, materiality can disappear. This cannot be - because materiality is eternal. What is your opinion on this matter?' - he asks. In his reply to Beruni, Ibn Sinong says that Aristotle and Ar-Razi's division of atoms should not be understood as going on indefinitely, and that division has a limit. Nowadays, the complex structure of the atom is fully confirmed. An atom consists of a nucleus and an electron shell. The nucleus is made up of even smaller particles - protons and neutrons. It was found that protons and neutrons are made up of smaller particles, that is, quarks.

Consolidation of a new topic: opening a multimedia textbook, getting to know physicists and further enriching the information received and evaluating students.

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Homework assignment: read the topic and write down the answers to the questions at the end based on the acquired knowledge.

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