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Create Graded Tests Based on the Directions of the Pisa-International Assessment Program in the Teaching of Physics

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Abstract: Based on the fact that providing quality education and appropriate use of acquired knowledge in life activities is the main requirement of today's education, this article presents an example of the PISA task as a means of checking the level of students' mastery of knowledge in physics.

Keywords: PISA, science, creative thinking, charging, interaction, science literacy.

An agreement was signed between the State Inspectorate for Quality Control of Education and the Organization for Economic Cooperation and Development (OECD). For the first time, Uzbekistan began to participate in international studies conducted by this organization (PISA, PIRLS, TIMMS, TALIS). Among these international assessment programs, PISA (The Program for International Student Assessment) takes a special place. In PISA, the quality of students' knowledge is determined in 5 directions: reading literacy, mathematical literacy, natural-scientific literacy, financial literacy, computer literacy. The PISA study focuses on students' acquisition of knowledge, skills and competencies needed in life, and on assessing students' awareness of the interconnectedness of subjects.

In Uzbekistan, PISA studies also provide for the evaluation of students in the direction of natural-scientific literacy, and in this direction, the ability to think logically, acquired knowledge, skills and qualifications of students in natural sciences (physics, astronomy, chemistry, biology, geography) are evaluated. In this case, the organization of graded tests based on the directions of the PISA-international evaluation program is of great importance.

Level 1 tests are memory tests: involving memory of information such as proof, definition, term or simple operation, algorithm execution, formula application.

Thus, a single-step and algorithmic operation that is easily defined in mathematics should be included in this lowest level.

Key words of the level: "identify", "remember", "use", "measure", "describe."

Level 2 tests of skill, understanding involve some mental work in addition to the usual answer. While at Level 1 students are required to mechanically demonstrate an answer, follow a specific algorithm, or follow a well-defined set of steps (steps), Level 2 assessment requires students to make some decisions about how to approach a problem or activity. are required to accept.

Key words that distinguish Level 2 include "classify," "organize," "evaluate," "observe," "collect and present data," and "compare data." includes verbs such as These actions involve several stages.

Other Level 2 operations include non-conventional patterns that specify or describe. Explains the purpose and use of experimental procedures, their implementation, observation and data collection, classification, arrangement and comparison of data, arrangement and representation of data given in tables, graphs and diagrams.

Level 3 tests are a slightly higher level of strategic thinking-observation evidence and reasoning than the previous levels, requiring reflection and planning.

Often students are required to express their point of view. Actions that require students to make assumptions also fall into this category. At level 3, requirements are complex and abstract.

Complexity does not come from fact, there are many answers and possibilities for levels 1 and 2, the problem has more than one possible answer, other actions are to draw conclusions from observations; provide arguments in favor of concepts and develop logical hypotheses; to explain events; involves a decision that is used to solve a complex problem.

In level 4 tests, broad worldviews should be required for a long period of time, planning, planning, and developing visions. There is no time limit unless the work required is purely repetitive and does not require the application of significant conceptual understanding and high-level vision. For example, if a student were to measure the temperature of river water every day for a month and then make a graph, this would be classified as level 2. However, if the student were to create a river survey graph that required taking into account many variables, this would be a Level 4 task. At level 4, the cognitive and cognitive demands of the task are high, and the work must be very complex.

Students will have to make multiple connections—connect ideas within the same subject or across subjects—and choose among several alternative approaches to how to solve a problem in order to be at a higher level.

Level 4 activities include designing and conducting experiments and designs, developing and proving hypotheses by making connections between discovery and related concepts and phenomena, synthesizing ideas into new concepts, and critiquing experimental designs. The following PISA task can be used to determine and evaluate the knowledge and skills acquired by schoolchildren in physics.

Level 1 tests based on the guidelines of the PISA international assessment program.

Question 1: Remember the basic rules of the molecular-kinetic theory.

Answer:_____

Answer: Substances are composed of small particles-molecules and atoms, they are in irregular, non-stop movement, atoms and molecules interact with each other, the properties of substances are determined by the movement and interaction of these molecules.

Question 2: Determine the internal energy of 10 moles of a monoatomic gas at 27^0C?

A) 37,4 kj. B) 3740 kj C) 0,37 kj D)3700 kj E)3,7 kj

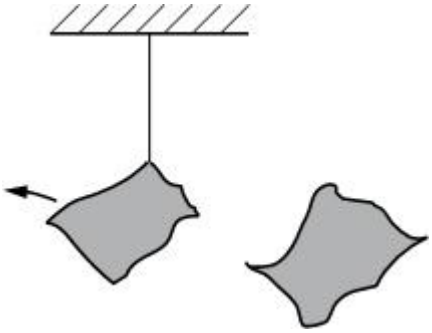
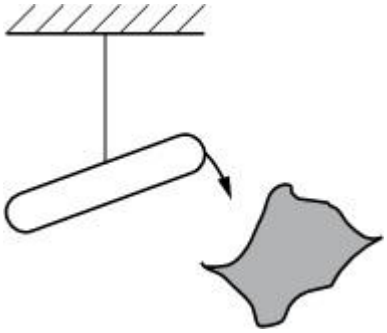
Question 3: Explain why ink bleeds when writing on poor quality paper.

Answer:_____

Answer: Poor quality paper has many capillaries, and the ink spreads to these capillaries.

Level 2 tests based on the directions of the PISA international assessment program.

Question 4: In the lesson, the teacher conducted experiments on constant charging using a stick and two identical cloths. The teacher's actions are described in the table.

	
Experiment 1. **After the pieces of cloth rub against the stick, the pieces are pushed against each other.**	**Experiment 2.** **After the stick is applied to the fabric, there is mutual attraction between the stick and the fabric.**

Choose two statements from the suggested list that match the results of experimental observations. Count their numbers.

1. During friction, only gas is charged.
2. Both the wand and the cloth are charged when rubbed.
3. When rubbed, the fabric gets a positive charge.
4. When rubbed, the rod and cloth acquire charges of different directions.
5. Charge is related to the transfer of protons from one body to another.

Answer to question 4

According to the results of the first experiment, we can conclude that the two pieces of cloth are charged and have the same charge, because repulsion is observed. As a result of friction, the rod is also charged, the rod and the cloth have different charges. Based on this, we can conclude that statements 2 and 4 are correct, and statement 1 is incorrect.

Statement 3 is incorrect. The sign of the rod's charge can be determined by its interaction with a positively charged object, because we do not know the charge of the tissue, so we cannot judge the sign of the rod's charge.

Statement 5 is incorrect. The conducted experiments do not allow to determine which particles left one body and went to another.

Answer: 2, 4

3-level tests based on the directions of the PISA-international assessment program.

Question 5: What happens when a glass is poured over a plate of water with a burning candle?

Answer:_____

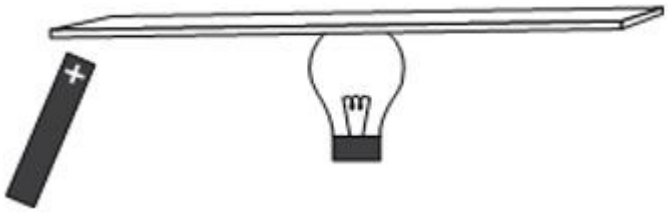
Answer: The candle flame goes out and the water from the saucer is drawn into the glass.

Question 6: If you take a cast-iron ball, fill it with water, seal it and freeze it, the cast-iron ball will crack. At what energy does a cast-iron ball explode?
Answer:_____
_____
_____

Answer: When water freezes, molecules in ice crystals are arranged in a fixed order with minimum energy. The excess energy of the ice molecules is used to crack the cast iron ball.

4-level tests based on the directions of the PISA-international assessment program.

Question 7: A student places a metal ruler over an unlit light bulb, brings a positively charged rod to its tip without touching it, and carefully moves the rod along an arc of a circle. At the same time, the student turned behind the stick. This happens because



1. there is a force of gravity between the stick and the ruler.
2. an excess positive charge is formed at the end of the meter closest to the rod and it is attracted to the rod.
3. excess negative charge is formed at the tip of the stick. the ruler is closest to the rod and it is attracted to the rod.
4. the entire meter gets an extra negative charge and is attracted to the rod.

Answer to question 7

Metal gauge - conductor. A characteristic feature of metals as conductors is the presence of free electrons in them, which can move throughout the entire volume of the metal. Under the influence of the electric field of the positively charged rod, electrons move to the end of the meter closest to the rod. Excess electrons are created there - a negative charge, so the meter is attracted to the rod. At the opposite end of the line, a lack of electrons is formed - a positive charge.

Answer: 3

These tasks serve to evaluate the creative and critical thinking skills of students, the ability to apply the acquired knowledge in life, and then to stimulate the development of these skills. In addition to forming the knowledge and skills of schoolchildren in subjects, it provides revolutionizing the ability to apply their knowledge in various life situations. In the future, these skills will help the school graduate to actively participate in the life of the society and improve his knowledge throughout his life.

A student who is literate in natural sciences will have the following competencies [1]:

Scientific understanding of phenomena;

Design and evaluation of scientific research;

Scientific interpretation of data and evidence.

Research not only helps students learn knowledge literacy, but also causes them to change and grow in their thinking. The main task is to form the skills that the student will need today and in the future to lead a successful life in society. Creative thinking is an important skill that today's youth should have. Therefore, today schoolchildren first of all need thorough knowledge and creative thinking. Formation of creative thinking skills in students allows solving local and global problems that may occur today and in the future. Students with especially high natural-scientific literacy think independently about the events and processes between man, nature and

[1] U.N. Tashkenbayev. "Newsletter for preparing students for international studies 1" Tashkent, 2020, 4, 64 p.

technology, and are more advanced in solving and preventing problems and finding the right solutions to life situations. Every activity aimed at improving the natural and scientific literacy of students, starting from school education, will bear fruit in the future. Literacy competences in natural sciences depend primarily on "knowledge of the content of science - knowledge of physical systems (physics and chemistry), living systems (biology), earth and space systems (geography, geology, astronomy). It is known that natural sciences include physics, astronomy, chemistry, biology, and geography. When these subjects are taught in school education, students are given sufficient fundamental knowledge about the processes and events occurring in the natural environment. The main requirement of today's education is to provide thorough knowledge and to form the skills of applying acquired knowledge to life activities. For example, the science of physics is the basis of all nature, natural phenomena, starting from the simplest mechanisms and the latest technologies. For this reason, it is necessary to make the students understand why they need to learn and where they can use each acquired physics knowledge, and it is necessary to form the skills of applying it in real life situations. The use of PISA tasks is a key programming tool for achieving these goals.

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