

## USE OF PISA TESTS IN TEACHING BIOLOGICAL SCIENCES

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**Abstract.** *In the article, on the basis of the PISA international assessment program, scientific understanding of the text on natural sciences (biology), scientific interpretation of data and evidence, determination of students' ability to apply the knowledge and skills acquired in science in life situations, and biology information about PISA tasks in the subject.*

**Keywords:** *PISA, skills, literacy, assessment, research, natural sciences, concept.*

The content and essence of education is determined by the level of development of the society. In the decision of the President of the Republic of Uzbekistan dated August 12, 2020 "On measures to increase the quality of continuous education and the effectiveness of science in the fields of chemistry and biology" No. PQ-4805 on the sciences of chemistry and biology priority tasks have been defined for the fundamental improvement of the quality of education, the introduction of a completely new system of teaching these subjects in general education schools. It is possible to improve the quality of education by developing the ability of students to conduct independent research, creative thinking and apply the acquired knowledge.

### LITERATURE ANALYSIS AND METHODOLOGY

Organization for Economic Cooperation and Development (OECD) in order to develop general secondary education, which is the main link of world education PISA (The Program for International Student Assessment) was developed and put into practice. The research was conducted for the first time in 2000 and is carried out once every three years. The main reason for conducting it in the framework of 20-year-old learners is the final period of compulsory education at this age in most of the countries that are members of the Organization for Economic Cooperation and Development (OECD). The science framework forms the basis of science literacy assessment tools. The concept of literacy in these subjects has been developed in the framework of natural sciences.

Literacy competitions in natural sciences include: a) scientific explanation of phenomena; b) design and evaluation of scientific researches; c) scientific interpretation of information and evidence. They allow students to get acquainted with the content and format of PISA tasks. Below are examples of tasks to determine literacy in natural sciences.

### RESULTS AND DISCUSSION

**Task 1.** In recent years, as a result of the in-depth study of ecological problems in medicine, it became known that magnetic storms that occur from time to time on the surface of the earth have a negative effect on the human body. The effect of a magnetic storm is especially noticeable in people with nervous, cardiovascular, and locomotor diseases. Such people make up 17-25% of the population. The days when a magnetic storm will occur will be announced to the population in advance in the press, radio and blue screen.

**Question 1.1.** Read the above article and answer the following questions by circling yes or no.

What rules should people with the above diseases follow these days?	Yes\No
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Not walking a lot, not doing physical exercises	Yes\No
Avoid getting nervous, don't bathe in a hot bath	Yes\No
To treat the existing disease, it is necessary to take sedatives prescribed by the doctor.	Yes\No
Drink more fluids	Yes\No
Eating more fatty foods	Yes\No

This question is aimed at assessing the competence of students to scientifically explain phenomena.

**Question 1.2.** To what extent do you agree with the following statements? Mark only one box from each row.

		Totally agree	Approve	Do not approve	Do not approve at all
a	The external environment has a continuous effect on the health and work activity of the human organism throughout its life, starting from the period of embryonic development.				
b	It is everyone's sacred duty to keep the environment clean and consider its impact.				

This question is aimed at assessing the competence of students to scientifically explain phenomena.

**Task 2.** A lack of vitamin D or insufficient use of sunlight causes a disturbance in the metabolism of calcium and phosphorus salts in the body, and the ossification process slows down. As a result, rickets occurs. Bones of children with this disease become soft and flexible. In particular, the legs, spine, chest, and pelvic bones can become crooked. This has a negative effect on the normal shape of my height.

**Question 2.1.** How to organize a healthy lifestyle in order to prevent rickets in children.

This question is aimed at assessing the competence of students to scientifically explain phenomena

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**Question 2.2.** How interested are you in the following information?

Select only one from each row.

		Very interesting	Interesting	Not so interesting	Not interesting
a]	Studying the causes of rickets				

b]	Development of disease prevention measures				
c]	Studying the history of the disease				

This question is aimed at determining students' attitude to science, that is, their interest in science.

**Task 3.** A person's body shape is called height. The normal development of the spine is especially important in the formation of stature. Normally, the spine is slightly forward in the neck and back, and slightly backward in the chest and buttocks. These natural bends do not occur in children under one year of age. As a result of the child's standing, walking, holding the head upright, these bends are formed gradually. Distortion of height not only affects the appearance of a person, but also affects the development and function of internal organs (such as lungs, heart, liver, kidneys, stomach and intestines).

**Question 3.1.** read the above article and answer the following question.

What conditions are observed when such people do physical work, engage in physical education and sports:

A) shortness of breath B) heart rate increases C) gets tired quickly D) all are observed

This question is aimed at assessing the competence of students to scientifically explain phenomena

**Question 3.2.** answer the following questions by circling yes or no

	Do you follow the following steps to maintain your normal height?	Yes\No
a	When sitting, the body should be straight, the shoulders should be level, and the waist should lean against the back of the chair (desk).	Yes\No
b	Bend your legs at the knee joint to form a right angle	Yes\No
c	Let the entire surface of the foot touch the floor.	Yes\No
d	Between the chest and the edge of the desk Let the distance be close to cm.	Yes\No

**Task 4.** Constancy of blood osmotic pressure is related to mineral salts and ions dissolved in its plasma. Salts and ions ensure a constant osmotic pressure in the volume of liquid in the blood and cells. Excessive bleeding leads to the destruction of the body. The replacement of the lost blood isotonic (0.9% table salt solution) is used for filling, the osmotic pressure of which is equal to the constant of blood plasma. In medicine, blood substitute solutions containing a complex of salts, proteins, and glucose necessary for the body are used. is also used.

When erythrocytes are placed in a low-concentration (hypotonic) solution of salts, water is transferred into them. Hemoglobin enters the blood plasma and colors it. A dehydrated erythrocyte does not swell.

**Question 4.1.** Read the above text and answer the question below.

Blood cells burst in fresh water and do not swell in salt water. Why does this not happen when a person drinks a lot of water or eats a lot of salty food?

This question is aimed at assessing the competence of students to scientifically explain phenomena.

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**Task 5.** Blood clots in a healthy person in 3-4 minutes. Some people do not have enough antihemophilic factor in their blood plasma, which is important for blood clotting. This disease is called hemophilia, and it is passed from generation to generation, that is, from parent to child. In such people, blood coagulation is disturbed, as a result of which they can accidentally bleed from the nose, and they can lose a lot of blood due to a slight injury. In addition, when the number of platelets decreases, when the amount of Ca ions and vitamin K in food is insufficient, blood clotting properties decrease.

**Question 5.1.** Read the text and answer the following questions by circling yes or no.

The patient who came to the doctor complained that he was bleeding from the nose and that the bleeding did not stop from a small wound on his hand.

	How should the patient behave?	Yes\No
a	Should eat more products made from jag-jag	Yes\No
b	Avoid injury	Yes\No
c	The number of leukocytes should be checked	Yes\No
d	Diseases in the ancestors should be identified	Yes\No

**Question 5.2.** Blood coagulation also depends on the formation of fibrin from fibrinogen in the plasma. Why does blood not clot despite the fact that fibrinogen is always present in the blood?

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**Question 5.3.** How interested are you in the following information?

		Very interesting	Interesting	Not so interesting	Not interesting
a	Counting the number of shaped elements of blood in laboratory conditions				
b	Learning to save donor blood				
c	Determination of saliva content of leeches				

In conclusion, it can be said that the given tasks are aimed at evaluating the competences of students in data analysis, scientific substantiation of existing evidence, and in order to answer them, they should have mastered the topics covered.

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