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### **METHODS OF TEACHING NATURAL SCIENCE SUBJECTS IN ENGLISH**

*The methodology of teaching physics in English is very relevant, since in specialized schools of the Republic of Kazakhstan in high school classes in physics, computer science and chemistry should be conducted in English. In this regard, the training of teachers in these areas implies the intensification of work on the in-depth introduction of the English language in pedagogical universities. The methodology of physics itself is associated with the study of the process and laws, the study of the basics of physics, methods of effective assimilation of these basics and the acquisition of practical skills provided by the program. Methods of teaching physics in English are relevant, as they explore the ways and means of education, its patterns for the development of students in physics in English. The article considers some problems of teaching physics in English, methods of conducting laboratory work in physics.*

**Keywords:** *modern education, natural science subjects, teaching in English, methods, laboratory, result.*

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### **ТАБИГЫЙ ИЛИМДЕР ПРЕДМЕТТЕРИН АНГЛИС ТИЛИНДЕ ОКУТУУНУН ЫКМАЛАРЫ**

*Физиканы англис тилинде окутуунун методологиясы өтө актуалдуу, анткени Казакстан Республикасынын адистештирилген мектептеринде жогорку класстардагы физика, информатика жана химия боюнча сабактар англис тилинде жүргүзүлүүгө тийиш. Буга байланыштуу, бул багытта педагогдорду даярдоо педагогикалык ЖОЖдордо англис тилин тереңдетип жайылтуу боюнча иштерди активдештирүү дегенди билдирет. Физика методикасынын өзү процессти жана мыйзамдарды изилдөө, физика негиздерин билүүгө, бул негиздерди натыйжалуу өздөштүрүү методдорун жана программада каралган практикалык көндүмдөрдү алууга байланыштуу. Физиканы англис тилинде окутуу методдору актуалдуу, анткени тарбия берүүнүн жолдорун жана каражаттарын, окуучулардын физика боюнча өнүгүшү мыйзам ченемдүүлүктөрүн англис тилинде берүү менен изилдейт. Макалада физиканы англис тилинде окутуунун айрым көйгөйлөрү, физика боюнча лабораториялык иштерди жүргүзүү ыкмалары каралган.*

**Өзөктүч сөздөр:** *заманбап билим берүү, табият таануу предметтери, англис тилинде окутуу, усулдар, лаборатория, жыйынтык*

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## **МЕТОДЫ ПРЕПОДАВАНИЯ ПРЕДМЕТОВ ЕСТЕСТВОЗНАНИЯ НА АНГЛИЙСКОМ ЯЗЫКЕ**

*Методология преподавания физики на английском языке очень актуальна, так как в специализированных школах Республики Казахстан в старших классах уроки по физике, информатике и химии должны проводиться на английском языке. В связи с этим подготовка педагогов в данных направлениях подразумевает активизацию работы по углубленному внедрению английского языка в педагогических вузах. Сама методика физики связана с изучением процесса и законов, изучением основ физики, методов эффективного усвоения этих основ и приобретения практических навыков, предусмотренных программой. Методы преподавания физики на английском языке актуальны, так как исследуют пути и средства воспитания, его закономерности для развития учащихся по физике на английском языке. Статья рассматривает некоторые проблемы преподавания физики на английском языке, методы проведения лабораторных работ по физике.*

**Ключевые слова:** современное образование, предметы естествознания, преподавание на английском языке, методы, лаборатория, результат

In Kazakhstan, we are taking measures to modernize the education system. Starting from September 1, 2019, physics, chemistry, biology and computer science will be taught in English. The program "Road map for the development of trilingual education for 2015-2020" is working, the main directions of which are the development of teaching AIDS for integrated training in the subjects "Informatics", "Chemistry", "Physics", "Biology".

Teachers of these subjects need to be fluent in English, not just to speak it, but also to teach their complex subjects.

As stated by Ushinsky K. D. «the Teacher lives as long as he learns». In order not to forget and continue learning English, it is recommended to start with the organization of optional classes of the subject in English in classes with a number of students not more than 15, and the written consent of parents is required. At the initial stage, you can start with 25-30% of the lesson time in English, and then gradually increase this time.

All types of speech activity should be present in physics lessons and laboratory work, although one of the key techniques of this technology is working with text. Texts must contain pre-text and post-text tasks.

On this topic, we find a similar text in English in Internet resources. Check the readability and accessibility for the perception of using online tools. Key words are highlighted in the text.

Apply reading strategies.

Viewing reading.

What are they used for?

Detailed reading.

True or False (правда или ложь)...

Laboratory work in English prepare students to apply knowledge and language skills in physics. On the example of our work, we allow students to enter the results of measurements in ready-made tables, making a calculation. We work on the work and on the problems and make a check and compare your solution with the right solution [1].



Instruments, materials: beads, ruler

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**Work progress: 1.** The ruler measures  $L_{\max} = 15 \text{ cm}$  ( $15 \cdot 10^{-6} \text{ m}^3$ )

$L_{\min} = 1 \text{ mm} = 1 \cdot 10^{-9} \text{ m}^3$

$L_{\text{v.d.}} = (15-14) : 10 = 0.1 \text{ mm}$ . Between the closest strokes is 0.1 mm.

$L_{\max} = 15 \text{ cm}$  ( $15 \cdot 10^{-6} \text{ m}^3$ )

The length of the ruler is 15 cm. If you put 10 beads in a row, then their length will be occupy: \_\_\_\_\_

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**Output:** \_\_\_\_\_

**Date** \_\_\_\_\_

**year** \_\_\_\_\_

**Class** \_\_\_\_\_

**First name** \_\_\_\_\_

**Last name** \_\_\_\_\_

**Laboratory work № 2. Measurement of specific heat of the body**

**Objective:** \_\_\_\_\_

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**Instruments and materials:** \_\_\_\_\_

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**Work progress: 1. We measure the volume of water:**  $V_1 = 100 \text{ cm}^3$

2. Measure the initial  $t$  °C of water:

$t =$  \_\_\_\_\_

3. We heat the cylinder in a vessel with hot water (this temperature will be the initial temperature of the cylinder). Then lower it in a calorimeter with water. We write the initial cylinder  $t$  °C:

$t =$  \_\_\_\_\_

4. Measure  $t$  °C of water in the calorimeter after lowering the cylinder:

$t$  to = \_\_\_\_\_

5. Using the scales, determine  $m$  of the aluminum cylinder, after drying it:

$m =$  \_\_\_\_\_

Note: index 1 - water parameters;

index 2 - cylinder parameters.

1. According to the equations: a:  $Q = c m (t_k - t)$ ; the amount of heat  $Q$  that the water received when heated; b:  $Q = c m (t - t_k)$ ; the amount of heat  $Q$  given by the metal cylinder.

Calculations:

Given: Вывод: \_\_\_\_\_

**№1 Measurement of body acceleration in uniformly accelerated movement**

**Objective:** \_\_\_\_\_

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Determine the acceleration of the body with uniformly accelerated motion according to the kinematics formula:

$$S = at^2/2$$

**Devices and meters [2]:**

- 1 Stopwatch with sensors
2. Gutter
3. The body
4. Tripod

Working process:

1. We measure time (t) in \_\_ (5) experiments at the same distance (S)
2. Enter the values in the table
3. Using the formula ( $S = at^2 / 2$ ), we calculate the arithmetic mean acceleration (a)
4. Find the arithmetic mean (add up all the results and divide by the number of experiments  
( $a_1 + a_2 \dots + a_x / 2$ ))
5. By the difference in the answers, determine the error

№ experience

- 1
- 2
- 3
- 4
- 5

Value (a)

6. Calculations:

Output: \_\_\_\_\_

If you have a computer class, you can upload your lab work to computers. Tasks should be arranged as their complexity increases. First, it makes sense to offer simple tasks of an introductory nature and experimental tasks, then computational tasks and, finally, tasks of a creative nature. It is possible to perform work in a virtual laboratory by selecting different initial parameters. This can significantly reduce the time of execution and verification of laboratory work [3]. The work is recorded in computers, thereby freeing students from unnecessary writing. The guys enter the results of measurements in the finished tables, making the count immediately in the computer. In the remaining time, you can work on the problems, the conditions of which are entered in the computer, and then make a check and compare your solution with the correct solution proposed by a special computer program [4].

When planning lessons, it is necessary to take into account the specifics of the technical conditions in which the lesson will be held, that is, how many computers in the class: one or is it a full-value computer class? It is from this that it will depend whether to limit the display of video and interactive experiment for the whole class through the video projector, or whether there is a possibility of full-fledged work with the testing complex, laboratory computer work, virtual modeling tools.

The educational disk «Virtual physical laboratory, grades 7-11» can be used in the educational process as follows: demonstration by means of a multimedia projector on the screen or by means of a computer class of laboratory works, display of video recordings, creation of interactive models; carrying out electronic certification of teachers on the attached control questions to each work; preparation of materials for carrying out control work or offset. Computer

models easily fit into a traditional lesson and allow you to organize new types of learning activities [5].

Lesson consolidation of knowledge. You can offer students for self-solving problems in the classroom or at home, the correctness of which they can check by conducting computer experiments. Independent verification of the results obtained by means of a computer experiment enhances the cognitive interest of students, makes their work creative, and in some cases brings it closer in nature to scientific research. As a result, at the stage of consolidation of knowledge, many students begin to come up with their problems, solve them, and then check the correctness of their reasoning, using a computer. Tasks compiled by students can be used in class work or offered to other students for independent study in the form of homework.

Everything that exists in nature is called matter. Any change in matter, any process occurring in nature, is called the movement of matter. The simplest form of motion of matter is mechanical motion. Mechanical motion is the change in the relative position of bodies or parts of the same body in space over time. The section of physics dealing with mechanical motion is called mechanics. The basic laws of mechanics to a considerable extent been elucidated by Galileo and formulated by Newton. Galileo Newton's mechanics is called classical. It studies the laws of motion of macroscopic bodies moving at speeds much lower than the speed of light [3].

The motion of bodies with velocities comparable to the speed of light is considered by relativistic mechanics. The study of the microcosm is engaged in quantum mechanics. Classical mechanics is divided into kinematics, dynamics and statics. Kinematics studies the laws of motion of bodies, without delving into the causes that cause this movement. Considering the dynamics of mechanical motion considering the reasons that cause it. Statics explores the equilibrium conditions of bodies. The content of General education should reflect different areas of human culture, so it includes different cycles of disciplines: humanitarian, mathematical, natural, aesthetic, labor and physical training. The main purpose of natural disciplines is the formation of a scientific worldview based on knowledge of nature and methods of its cognition.

The inclusion of physics as one of the natural disciplines is due to two factors:

- the role of physics-science in modern natural science;
- the role of physics as a subject in the development of students and the formation of their scientific worldview.

Science is the main source of the content of the school course of physics, its theoretical basis. In this regard, physics reflects the main features of physics-science: classical and modern physics, leading ideas and theories, scientific facts, basic concepts, laws, the physical picture of the world, as well as modern methods of cognition-experimental and theoretical.

Physics is the science of the most General properties and forms of motion of matter. (matter-matter and field (2 species). Physics helps to know the world around us. The task of physics is to investigate the laws of physical phenomena and find ways to apply these phenomena in human life. The subject of physics methodology is the educational process in physics. The object methods of teaching physics students and the teacher. The task of the teacher is not only to know physics, but also to master a scientifically-based Arsenal of techniques and ways to transfer knowledge to students.

*Requirements for teacher:*

1. Know the subject-scientist.
2. Be able to present-teacher.
3. Be an artist.

*The main functions of methods of teaching physics:*

1. General education (students gain knowledge of the basics of physics and acquire the skills to use this knowledge in practice).

2. Developing (develops cognitive abilities: independently study new literature, navigate the flow of scientific and technical information, learn to think logically and move from logical thinking to dialectical and creative).

3. Educative (teaching physics serves as the basis for the formation of a scientific worldview, which is implemented when criticizing aspects such as man and labor, man and machine).

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