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Abstract. This article focuses on in-depth teaching of natural sciences in specialized and presidential schools, where the methods of developing research skills in students in practical training in physics are presented. In particular, the types of assessment questions in terms of content, content and complexity were analyzed on the basis of when and how to use such questions for students.

Keywords: presidential school, specialized school, practical training, problem solving, evaluation problem, student, evaluation criteria, quality, analytical, experimental, acceleration, speed, distance traveled, physical process, methodical instruction.

ЗАРУБЕЖНЫЙ ОПЫТ КОНТРОЛЯ ЗНАНИЙ СТУДЕНТОВ

Аннотация. Данная статья посвящена углубленному преподаванию естественных наук в специализированных и президентских школах, где представлены методики формирования исследовательских умений у учащихся на практических занятиях по физике. В частности, были проанализированы типы оценочных вопросов с точки зрения содержания, содержания и сложности на основе того, когда и как использовать такие вопросы для учащихся.

Ключевые слова: президентская школа, специализированная школа, практика, решение задач, задача оценивания, студент, критерии оценивания, качество, аналитический, экспериментальный, ускорение, скорость, пройденное расстояние, физический процесс, методические указания.

Introduction

In today's world of rapid development of science and technology, one of the main tasks of secondary schools is to educate young people in a comprehensive way, to direct them to higher education with fundamental primary education in order not to lag behind in global development.

To carry out this task, the leadership of the republic has adopted a number of orders and decrees [1,2]. As a result of the implementation of the adopted presidential decisions, Presidential schools were established in 2019, which meet both the conditions created and world standards for quality education. In addition, starting from the 2022-2023 academic year, about 200 more specialized and boarding schools are being established, which provide training in the curriculum of presidential schools. It is known that the Presidential schools are based on the curriculum of Cambridge Assessment International Education. Later, when this program is widely applied in the school system of the republic, it is expedient to analyze the differences and similarities of this program with the current system of education in schools of the republic.

Methods and Materials

Obviously, presidential schools specialize in teaching the exact and natural sciences, so physics is taught in depth in the science. In this article we will focus on the assessments (control work) in physics in local and presidential schools, the methodology of analysis of assessments and the conclusions drawn from it. It is known that the level of mastery of knowledge given to

students is assessed through various forms of control work in almost the entire education system. Due to the lack of hours for physics in secondary schools in the country, little attention is paid to written tests, but special attention is paid to physics in boarding schools and academic lyceums specializing in specific subjects. There are 3 or 4 problems in the written work variants, and their work consists mainly of performing mathematical calculations.

It is clear that during the practical lessons of physics in schools of the republic, "Collection of problems in physics" edited by A. P Rimkevich or a set of thematic tests in physics published in the former Soviet Union are mainly used [3,4]. Therefore, the questions proposed in the written work will also be mainly derived from these collections or similar to those in this collection.

The problems used in physics schools are mainly divided into three types: qualitative problems, quantitative problems, and experimental problems. Whether the control work is conducted in the form of multiple choice questions or a written work, the problems used are mainly quantitative problems, and in most cases only one physical quantity is required to be found, let us consider the following problem from mechanics as an example. Let's look at the problem [5,6].

Problem: Find the acceleration of a uniformly accelerated car when it travels a distance of 50 m to change its speed from 10 m/s to 15 m/s.

Physics textbook represents the relationship between S, v, v_0 and a as shown below:

$$S = \frac{v^2 - v_0^2}{2a}$$

Therefore, the student finds the acceleration value using this formula and receives a positive feedback. The rest of the issues in the written work option will be similar. There are a number of shortcomings in determining the level of mastery of the knowledge acquired by students in this method, i.e. not paying attention to the system of units requires finding only one physical quantity. Not all parameters of smooth accelerating motion are covered in the case study;

There are no quality issues within this issue.

Due to the shortcomings listed above, it is not possible to determine a student's level of mastery of a topic in a single issue, and monitoring the level of mastery of a self-written group is unrealistic.

Abroad, as well as examples of issues used in oversight work in presidential schools, it can be seen that they have a comprehensive approach to oversight [7].

Problem: The picture shows the vertical position of a uniform ABCD concrete tile in the shape of a parallelepiped. Its width is 0.3 m, height 0.6 m and mass 18 kg. 40 N force is exerted on the point B of the slab in the horizontal direction.

a) (i) Find the weight W of the concrete slab.

$$W = \text{_____} [1\text{-ball}]$$

(ii) If the thickness of the tile is 0.04 m, find the pressure on the ground

$$P = \text{_____} [2\text{-ball}]$$

b) (i) Describe the force of gravity acting on the tile in the figure to the center of mass. [1-ball]

(ii) Calculate:

- moment of 40 N force about the point D _____ [1-ball]
- moment of the gravity relative to the point D _____ [1-ball]
- c) At least how much force must be applied to point D to topple over the tile ?
[2-ball]

d) If the force 40 N acts to the point B at an angle $\alpha < 90^\circ$, how does the moment of force change relative to point D . _____ [2-ball]

The problem is related to the topic "Moment of a force", which requires first finding the value and direction of the physical quantities involved in the process, and then the main quantity of the topic, the moment of the force.

This approach to the question has the following advantages:

- One questions includes three types of issues, qualitative problem (d)
- limitation problem of assessment (c)
- graphical problems (b) and quantitative problems (1)

In solving the problem, the student is given the initial impulse in (a) (i), (ii) and (b) (i) and steps from easy to complex.

- The assessment fully monitors the knowledge of students to find the quantities required in the problem

If 2-3 of such tasks are used in an assessment, a complete monitoring of the level of mastering the previous and new topics will be obtained.

For example, if the student's score in section b), c) of the above example is less than 60% of the average score of the whole group, the assignments on this topic will be given to the student individually. In addition, 5-6 problems with a lower level of difficulty than the control work on this topic are given as homework and their mastering is monitored.

If the average score collected by students on all assignments in the control work is around 55-70%, the students will be tested in a simpler way by repeating the topics covered. Around 75-85% are limited to individual assignments, as noted above, and assignments are given only to low-achieving students.

Results and analysis

From the problems used in the assessment (paper 4, Structured questions), it is clear that in the first case it is required to describe the physical process, give the required quantities and find only one unknown quantity. In modern education, such an approach is not sufficient because the student cannot approach reality from an ideal physical model because the student is not formed to imagine whether a physical quantity other than the given physical quantities will participate or not. In addition, students do not develop logical thinking and creativity, because the control of the acquired knowledge in some cases consists in calculating the physical quantities in the memorized formula, and there is no analysis.

In the second case, the process is expressed and only some of the quantities that characterize it are given. The physical magnitude found is followed step by step by explaining some changes in the process and it is found. It also analyzes how the direction or value of the previously given physical quantities changes as a result of the physical process.

If the problems are presented only in the form of a description of the physical process, it also prepares students to assess their knowledge on the basis of PISA research. This is because the United Kingdom and many other countries around the world are using the Cambridge

Assessment International Education program in the education system to achieve high results in PISA research. Therefore, it can be used not only in schools specializing in the exact and natural sciences in the country, but also in secondary schools, as there are almost no complex tasks in the sample. These problems do not use complex mathematical substitutions for the quantities to be found, mainly because simple physical processes are considered.

It goes from simple to complex. This gives simple assignments on the previous topic, but most of the sizes found in this assignment can be used in the next step. This gives students a motivational task and reduces the chances of students getting unsatisfactory grades. Most importantly, it is possible to cover an entire chapter through a single question. It is also possible to gradually increase the level of difficulty of the problem by distributing the knowledge differentially and adding additional quantities sequentially. The most important thing is that the variants of assessment papers are tested many times, and the CAIE training center creates them in A, B, C types with different levels of difficulty, and takes into account the objections and submit them in each case each year.

Conclusion

The scope of theoretical topics and methods of explaining physics in secondary schools of the Republic and the Presidential schools are almost the same. The main difference is in the structure of the questions used in the workbook and summative assessments. At present, there are Presidential schools in all regions of the Republic. Taking this into account, we believe that a group of experienced professors of the Higher Education Institutions and international teachers of the Presidential Schools should create a set of questions and different types of assessments, differentiated into local and specialized schools. In addition, it is vital to gradually use tests based on foreign experience in the exams for admission to higher education.

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