THE METHOD OF PERFORMING NON-STANDARD LABORATORY WORKS IN PHYSICS

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ABSTRAC T

In this article have motivated for training independently school teachers for subject of physics and to develop students' creative work in performing non-standard laboratory work. In example have illustrated with experiment.

Keywords: non-standard, laboratory work, strategy, continuous education, creative work, The Moon, the Earth.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

Movement strategies have assigned for developing the Republic of Uzbekistan and for putting predominant missions as "continuation of ways to further improve the system of continuous education, professional development of teachers and specialists, improving the quality and effectiveness of the education system". The implementation of these tasks focuses on the implementation of non-standard laboratory works in the development of student's creative work in school physics education:

1. Make changes to the content of the curriculum and programs in the development of a new generation.
2. Implementation to use contemporary informational technology for create new text-books.
3. Continuous development of school education in the preparation of highly qualified teachers.

In the process of teaching physical education in general school, the most important factor is to provide students with a scientific outlook, creative thinking and intellectual development.

Studying physics, students get acquainted with a number of natural phenomena and their scientific explanation, they form a belief in the materiality of the world and in the unlimited possibilities of human knowledge of the surrounding world. An elementary course of physics, despite its elementary nature, should provide systematic knowledge and provide for students' initial acquaintance with physical theories, i.e. It is presented taking into account modern ideas about the molecular-kinetic theory of the structure of matter, the structure of the atom and the electronic theory of matter.

At present, this is of particular importance in connection with the task of further raising the scientific level of teaching the fundamentals of science in school, enhancing the role of instruction in the development of pupils' thinking in shaping their scientific world view. A.V. Usova pays special attention to the following tasks of teaching physics in high school [1].

communication to students of initial knowledge in physics (on mechanical motion, molecular, thermal, electrical, and optics);

familiarization with the methods of using the simplest devices, performing non-standard laboratory measurements, setting experiments, analyzing the conclusions based on these experiments;

independent work with a textbook and solving basic problems;

application of knowledge to explain the phenomena observed in the nature of the surrounding life;

implementation of polytechnic education of students and free choice of profession.

As you know, when students do not develop motivation and creative work, their enthusiasm for science quickly fades away and they can become indifferent and prepare only for writing reports. Therefore it is important to organize students' interest in laboratory work properly, both pedagogically and psychologically [2].

To this aim, the rational organization of non-standard laboratory works in physics will have a positive effect and will require the following:

1. Achieve a serious approach to physics for every non-standard laboratory work (maintenance of the equipment of educational laboratory work, development of logical sequence of work, etc.);

2. Ensuring thet students understand the full meaning of non-standard laboratory work;

3. The content and methodology of the non-standard work are fully consistent with level of knowledge and preparation of students, meet the requirements of modern pedagogical technology and formulate specific knowledge.

Performing non-standard laboratory classes in physics can be divided into several stages – organizational, basic and final [3].

In particular, the organizational stage provides guidance on introducing students to the specific aspects and components of a non-standard laboratory work. In this case, the reference is a general description, done by a science teacher or a laboratory technician.

In some instances, at the organizational stage, specially designed material is used to stimulate students' thinking, or they can do so directly by asking a teacher questions and interviews. A brief overview of the organizational phase of the non-standard laboratory work demonstrates that the role of the laboratory device at this stage is not constant, but mainly as a visual tool and generational tool.

The main stage is in the process of developing the practical knowledge and skills provided by the program-learning task, so it is important to achieve the interaction of all parts of the dactactical process.

In the main phase of a non-standard laboratory classroom, the learning process is a specific form of learning and specific learning of process that aims to reveal and appreciate the meaning of ideas. The practical knowledge, skills and qualification that will be important during this phase are formed.

In non-standard laboratory equipment we can do more work if we do, namely if it tool can do several tasks, in turn, the practically of such devices is much higher. Also a education laboratory equipment can change some elements and some works in it.

In the last phase non-standard laboratory equipment can do laboratory work and mainly in this phase strives to marking students' knowledge which they have learned in this period. For this students' should answer to task-questions. Task questions depend to knowledge, skills and experiences in internship, and they marking by assessment system [4].

Assessment system depends to students' knowledge and skills which have learned in internship, there are: theory, practice, collect chart rightly, calculate, accounting official accounts etch. In this part of discipline, used didactic technique as an other parts. It differs from the main stage only by the fact that they occur in a time of several shortage.

In general, physics is a science of nature, and students' interest in science and their positive activity in teaching classes are linked to physical phenomena in nature and doing non-standard laboratory work [5].

Subject of doing physics laboratory work is "State knowledge standard" and "Performing of non-standard laboratory work" tasks should be done. "Non-standard" means that regime of performing laboratory work, also it depends to regime performing laboratory work in "State knowledge". In example we can do with laboratory work to measure of diameter of the moon from the Earth, it depends to physics rule of "universal gravity", also "Action fo finger can define the moon's speed".

I. **Measuring of the diameter the moon from the ground**, for which students are required to know the size of the moon and how far the moon stretches from the Earth. Need tools for doing work: ruler which has amount of 50 sm, clipper and dense paper.

It is known that The moon is satellite of the Earth, and the moon rotates the Earth in 27 days 7 hours 43 minutes. Distance of between the moon and the Earth have included **L=3.84 10^8 m** have been compared heaviness and radiuses between the moon and the Earth. Heaviness of the moon is **M=7.35 10^{22} kg** And radius **R=1.737 10^6 m** Heaviness of the Earth is **M=5.976 10^{24} kg**, and radius **R=6.378 10^6 m**.

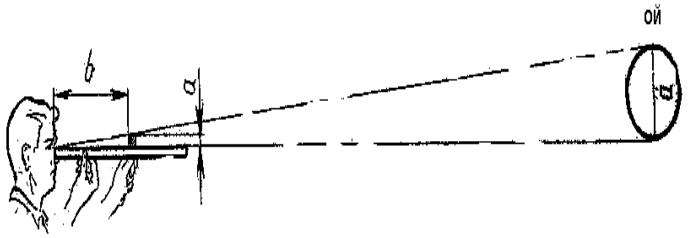
We can see that with comparing the Earth is 81 times larger than the moon, and the moon 3,5 times smaller radius than the Earth. In this case with teaching students this knowledge have developed their interest in it.

Regime of performing non-standard laboratory work:

1. Have been cut 4 mm from dense wide paper or from cardboard;
2. It needs to holded the right hand at the edge of the ruler and adjust it to the moon;
3. Must to pack piece of paper for it paper can hide whole the moon. Should measure with ruler **a**-width of paper and **b**- distance of it;
4. We can measure diameter of the moon with **D**-diameter fotmulain **L** distance between the moon and the Earth and **a**- width, **b**- distance

$$\mathbf{D} = \frac{a \cdot L}{b} \quad (1)$$

With this **1**- formula we can measure diameter of the moon from the ground.



Picture 1: Measuring diameter of the moon.

II. Measuring maximum speed of the finger. Determination of the maximum speed of the finger movement with a ruler and a tap. To determine maximum speed of finger movement, a small weight tap on the edge of table is should be required by click.

For this purpose you need to click on the tap which stays on table with your finger and mark point on the floor which tap felt. With some sizes we can know distance **S** of taps flying from the table and determine the distance of the line in the horizontal position.

Tap's speed can measure with $\mathbf{V} = \frac{S}{t}$

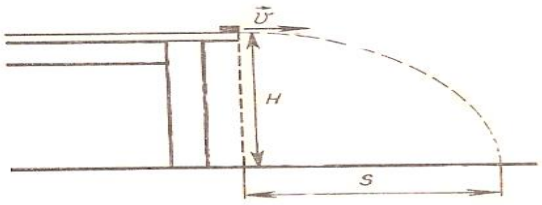
t- time of drop **H**- with measuring height can find it

$\mathbf{H} = \frac{g \cdot t^2}{2}$ here, have been finded it $t = \sqrt{\frac{2 \cdot H}{g}}$

Calculate speed is : $V = \frac{S}{\sqrt{\frac{2 \cdot H}{g}}}$ measured with it

The second variant of the calculation can calculate the maximum height **h** and starting speed of the tap. As a result of calculating these values, the maximum velocity of the finger is calculated using formula (2).

$V = \sqrt{2 \bullet g \cdot h}$ (2)



Picture 2: Measuring maximal speed of finger.

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