METHODOLOGICAL AND DIDACTIC REQUIREMENTS FOR DEMONSTRATION EXPERIMENTS IN SECONDARY SCHOOL

Yakubova Shohdakhon Kodirovna[1]
Fergana State University, associate professor[1]

Annotation: The system of educational experiments in physics is interconnected, consisting of a collection of important experimental facts, experimental methods of physics, types of experiments performed and observed in the physics classroom, and organizational forms of teaching, education and development of students and the leading essence of the methodology of teaching physics.

Key words: demonstrative experiments, educational process, quantitative laws, system, visibility, physical phenomenon, technical device.

It is important to learn the main stages of studying physical phenomena at school in order to determine the place and role of theory with demonstration experiments in the educational process in high school. The task of a physics teacher is that, as a result of working with students, making students understand the essence of physical phenomena and learn to apply the knowledge they have received in their future practical activities. Therefore, the educational process is primarily a learning process for students. Observing demonstrative experiments is the mainstay of the learning process and the source of primary perceptions about the phenomenon. The phenomenon should be observed during the experiment of a well-presented demonstration.

The system of demonstrative experiments. Experiments that allow to determine the quantitative laws characterizing the studied phenomenon are the most valuable experiments in teaching physics. Because it is not always possible to determine quantitative relationships during a demonstrative

Picture-1. Modern equipped physics office.

experiment, it is necessary to transfer some of the fundamental experiments to the laboratory practicum.

Studying fundamental physical experiments while demonstrating them in the laboratory and working independently, introducing some of such experiments through a motion picture creates a necessary demonstration base for learning physics. Based on these experiments, the course of modern physics can be stated clearly and without any contradictions. These experiments should be presented and explained slowly and with utmost precision. Students should be able to clearly imagine the place of these experiments in modern physics.

Experiments describing the teacher's explanatory work. For example, when learning circular motion, there is no need to demonstrate this motion in the classroom, because students often see and encounter this type of motion in everyday life. However, every teacher knows well that demonstrating this movement enlivens the course of the lesson and has a positive effect on the assimilation of the educational material.

Demonstration of such experiments is necessary to prepare students for practical activities and show the connection between physics and technology. When

performing such experiments, the most important thing is that students learn the principle of operation of certain technical objects, as well as their knowledge of previously passed (studied) physical phenomena is strengthened.

Selection of demonstrative experiments. When choosing demonstrative experiments, it is necessary to strive that all the studied phenomena and their important applications are shown while explaining the educational material. However, the number of demonstrations that can be conducted in each lesson should be moderate: experiments should not become too numerous and interfere with remembering the main theme. On the other hand, it is not appropriate to reduce the demonstrative experiments, to reduce the attention of students as a result of describing the material with "dry" sentences during the free time between experiments.

Preparing students to learn experiments. The idea of the experiment, its course and the obtained results should be understandable. Therefore, during the demonstration of the experiment, its idea should be thoroughly explained, usually by drawing a diagram of the device on the board.

Picture-2. Students observing how the experimental device is assembled.

It is recommended that students start assembling the experimental device after they understand the idea of the experiment. Observations show that the effectiveness of experimenting with ready-assembled devices is low.

Students should see how the experimental device is assembled, because during the assembly process, they will compare the circuit elements in a real device, which will help to gain a deeper understanding of the phenomenon being studied. After assembling the experimental device, students should focus on the element where the observed phenomenon occurs. Only after that it is necessary to proceed to experiment. After conducting the experiment, it is necessary to explain its results.

Demonstrative experiment visibility**.** The quality of the demonstrative experiment is also determined by how the demonstrated phenomenon is visible to the students. The visibility of the demonstration experiment is first of all achieved through the special construction of experimental devices.

It is known that the visibility is much better if the parts of the experimental devices are placed in a vertical plane. Therefore, most experimental devices are adapted to be installed in a vertical plane. When placing the equipment and parts of the experimental device, it is also necessary to think that during the lesson it is possible to assemble it and make the necessary changes without leaving the experiment table and without blocking the equipment.

Picture-3. A view of the demonstrative experiment from "Wave Optics".

Reliability of the demonstrative device. The teacher should pay special attention to the reliability of the demonstrative device. The demonstrative device should not stop working during the lesson. The lack of experience has a bad effect on

the professional reputation of a physics teacher. In the event that the device does not work during the lesson, it is necessary to carefully examine it, check it without haste and find its defect.

Safety measures when working with electricity**.** During the demonstration of the experiment, the teacher must strictly follow the rules of labor safety when assembling, changing and connecting the electric circuits. According to these rules, the use of electric tools is fundamentally different from the rules of using other tools in the room. There are usually signs of the risk of injury, which are perceived by human senses. It helps prevent the smell of toxic gas, changes in moving parts of the device, the sound of escaping steam and other hazards.

Equipping a physics lab for demonstrative experiments. Successful teaching of physics, solid and deep acquisition of the studied material by students depends in many respects on how many demonstratie experiments the teacher conducts and its quality.

Figure 4. Tools for equipping the physics cabinet.

The number of demonstratie experiments on each subject corresponds to the level of importance of the learned concept, practical skills, the time allocated to study the planned subject, and the possibilities of their implementation at school.

LITERATURE:

1. K.E.Onarkulov., Sh.Yakubova., O.Dehkonova. Urta umum-talim maktablarida fizikadan namoyish tajribalari [Demonstrative experiments in physics in secondary general schools]. Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan 100000-Humanitarian 110000 Pedagogy 5110200, Fergana 2020.

2. Sh.Yakubova, D.Yusupova, O.Dehqonova. Methodological features of the study of the topic electric current in a vacuum in secondary schools. Young scientist. International scientific journal. № 18 (360) / 2021.

3. Sh. Yakubova, O. Dehqonova, Methods of studying astronomical coordinate systems in secondary schools. Young scientist. 2072-0297. International scientific journal. № 42 (437) / 2022.

4. Ш, Якубова, Хошимов Хусанбой Анваржон огли. Механические свойства твердых тел кристаллов. Илмий тадқиқотлар Саммити. Республика кўп тармоқли илмий Самммит материаллари тўплами 1 –жилди. (22-февраль, 2022йил) Тошкент – 2022.

5. Ш, Якубова, О. Деҳқонова Mttdods of studying astronomikal coordinate systems in secondary schools. «Молодой учёный» Международный научный журнал. № 42 (437) / 2022.

6. Онаркулов К.Е., Якубова Ш.К., Юсупова Ф. К. Использование инновационных технологий при обучении учебного предмета машиноведение в высших учебных заведениях. FarDU. Ilmiy Xabarlar maxsus son 2022.

7. Ш, Якубова. Изучение видимое суточное вращение небесной сферы на различных географических широтах в школах. “Journal of Physics and Technology Education” 2023, № 2 (15) (Online).

ИНТЕРАКТИВНЫЙ МЕТОД ПРЕПОДАВАНИЯ ИНЕРЦИИ И МАССЫ НА УРОКАХ ФИЗИКИ

З.Хайдаров[1], А.А.Машраббоев[2]

Ферганский государственный университет[1,2]

Аннотация: В настоящей статье описывается результаты эксперимента применения интерактивного метода при преподавании инерции и массы на уроках физики. Как показывает эксперимент, проводимых один из школах города Ферганы, применение таксономии Блума как интерактивный метод обучения инерции и массы приводит к всесторонному анализу, полного понимания подобных физических понятий и величин.

Ключевые слова: Таксономия Блума, интерактивный метод, пассивный и активный метод, метод преподавания инерции и массы.