INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

LABORATORY TRAINING IN PHYSICS IN SECONDARY SCHOOLS A TOOL TO INCREASE STUDENT EDUCATIONAL ACTIVITY

Kanatbayev Sagidat Saduovich
Associate Professor Department of Methods of Teaching Physics and Astronomy
Navoi state pedagogical institute
kanatbayev_sgd@mail.ru

Annotation
This article describes the current state of laboratory classes in physics in secondary schools by grades and years, the shortcomings and problems observed in this process, and analytical comments on their solutions.

Keywords: skill, physics, competence, laboratory, school, quality of education, experiment, event, scientific approach.

Introduction

Today, the education system and its development in our country are of great importance, and the focus on education is an important issue that has risen to the level of public policy. In the works of the head of our state Sh. Mirziyoyev, in the Strategy of actions on five priority directions of development of the Republic of Uzbekistan for 2017-2021, in the Addresses to Oliy Majlis, without development of system of education in science, production and various spheres it is repeatedly emphasized that it is impossible to implement innovations and innovations. As a result of summarizing the achievements and shortcomings in the field of education from the years of independence to the present day, a number of laws and regulations, decisions and orders have been issued, focusing on the legal aspects of the development of the education system as in all areas. The focus is on strengthening the material and technical base of the industry and attracting modern innovative technologies and strengthening the knowledge and skills of teachers, as well as the importance of the role of teachers in society. In particular, in the Address of the President to the Oliy Majlis: “We will carry out large-scale reforms on the basis of the idea that” New Uzbekistan – begins on the threshold of schools, the education system and without a deep understanding of the laws of physics, it is impossible to achieve results in today’s demanding fields, such as mechanical engineering, electrical engineering, IT, water and energy-saving technologies. The strategic idea was put on the agenda.

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

The modern school education system is characterized by a number of qualities that set new requirements. The so-called post-industrial society today is characterized by a very high rate of development of new technologies, which is also reflected in the advantages of educational strategies. In a number of disciplines, including physics, not only the teaching of specific knowledge, but also generalized, active, communicative universal learning activities will be of greater value, which will be necessary for the future life of the school student. In order to achieve these goals, it is necessary to develop effective teaching methods and, on the basis of these methods, to train personnel who will be able to focus on a specific field in the future and master the profession.

Nowadays, in teaching physics, an experiment that allows students to learn to ask questions about nature, which is a measure of the accuracy of the theoretical model, is of particular importance. Therefore, physics as a methodological core of the school course should go into the dialectical unit of physical theory and educational physical experiment. However, many schools do not pay enough attention to the experiment, which indicates that the modern equipment of the school physics classroom is updated at a slow pace of methodological support.

Currently, the modernization process is fully integrated into the school education system and is regulated by a number of normative documents. The range of requirements for the preparation of high school graduates in physics has expanded significantly due to new goals and objectives of education. Acquiring a system of physical knowledge from a graduate is not only a matter of acquiring general learning skills (including the information that is currently in high demand), but also of experimental skills. Not only sound education but his alertness and dedication too are most required.

As you know, physics, like all natural sciences, studies natural phenomena. Natural phenomena are widely used to increase the efficiency of production, the application of scientific and technological advances in various sectors of agriculture.

Laboratory work plays an important role in the study of physics. During laboratory work, students improve their knowledge, strengthen their theoretical knowledge, gain a deeper understanding and comprehension of the basic concepts and laws of physics, develop skills and abilities to solve experimental problems, devices, as well as learning to work with measuring instruments, to observe, and to develop experimental results.

Since the laws of physics are the most widely used in practice, it is time to pay special attention to the practical work of teaching it. This article was written for this purpose

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

and is considered as a tool in teaching physics, conducting physical experiments, increasing the effectiveness of teaching physics.

Develop teaching interests. Reasons to learn can vary. These include, first of all, broad social motives (motif is a French word meaning to move, to motivate, to motivate): to study any profession in the future, to bring more benefits to the homeland, a sense of duty, to the community liability, etc. However, research shows that of all the reasons to study, interest in the science is the most effective. Students know earlier than others that they are interested in science, that they are often guided in their activities, that it is important to them (with personal values) and therefore an effective, real reason to learn. Of course, this does not mean that students should be taught only what they are interested in. Knowledge is a labor-intensive process. Therefore, it is necessary to teach students the will, the ability to overcome difficulties, to explain to them that they have a responsible attitude to their tasks. However, at the same time, efforts should be made to facilitate the learning process. KDUshinsky also wrote: “Education, which is deprived of any interest and is carried out only by coercion ... destroys the student's desire to learn, and in this case he does not go far”. Cognitive interest refers to the selective orientation of a person's mental processes to the objects and phenomena of the surrounding world, in which a person's desire to participate in this field is observed. Curiosity is a powerful simulator of a person's activity, under the influence of which all mental processes are intense and the activity is interesting and productive. The essence of cognitive interest is the student's deep and thorough penetration into the field of knowledge, the desire to constantly engage in their field of interest.

Motive, interest, purpose, means, and outcome are also part of the learning process. Just as hunger motivates eating and curiosity to watch television, so the question, the task, the problem in the learning environment is a motivating factor for learning, learning, learning.

There are several stages in the formation of students' interest in knowledge. Initially, it manifests itself in the form of curiosity and is characterized by a person's natural reaction or reaction to unexpected, interesting things.

The curiosity that comes from the unexpected results of an experiment, the curiosity that arises from an interesting fact, draws the student’s attention to the material in this lesson, but cannot be transferred to other lessons. It’s an unstable, interest in the situation.

A high level of interest is when a student wants to explore in depth and understand what is being studied. In this case, the student is usually active in the classroom, asking

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

questions to the teacher, participating in the discussion of the results of the demonstrations, expressing his opinion, reading additional literature, designing instruments, conducting experiments independently, and so on.

However, the student's curiosity does not usually extend to the study of the whole subject. On the other hand, the materials of the section can be boring for him and he loses interest in it.

The task, therefore, is to maintain curiosity and to instill in students a constant interest in science, in which the student understands and independently performs the methods used to search for and prove new knowledge, the logic of the lesson, and the process of learning new knowledge. It should also be noted that non-standard problem-solving tasks bring joy to students.

Like all mental faculties, interest arises and develops in the process of activity. Since cognitive interest is expressed in the desire to explore the subject in depth, to reveal the essence of what can be learned, the development and formation of interest is observed in the context of the development of learning. The experience of independent work helps to ensure that curiosity and initial interest become a stable personal trait – cognitive interest.

Research shows that the forms of organization of educational activities have a great influence on the formation of the interests of schoolchildren. Clearly defining the learning objectives of the lesson, proving the materials, the clear structure of the lesson, using a variety of independent work, creative tasks, etc. in the learning process are all powerful tools for developing an interest in knowledge. Through such an organization of the learning process, students experience a number of positive emotions (joy in mastering more sophisticated ways of doing things, getting to know the world more deeply, self-esteem, etc.). Helps maintain and develop existing interest.

One way to stimulate and retain cognitive interest is to create problem situations during this activity and to develop students' active search activities based on them. In creating problem situations, the teacher compares new facts and observations with the existing knowledge system and does so in a sharp, contrasting way. Introspective (open) conflicts serve as a powerful incentive for learning. They evoke a desire to understand the essence, to open up the contradiction. In this case, students' active search activities are supported by direct, in-depth, intrinsic interest.

An important condition for the development of interest in the topic is the relationship between students and the teacher, which develops in the learning process. The

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

development of cognitive interest in the subject among schoolchildren depends largely on the personality of the teacher.

What qualities should a teacher have in order to interact with students, to contribute to their interest and visibility in the subject? G.I.Shukina's research shows that they are primarily [4, 27]:

1) the knowledge of the teacher, the ability to meet the requirements of students and the gradual complication of educational tasks; such teachers provide an intellectual mood in the classroom, stimulate the formation of students' desire to learn;

2) passion for the subject and love of work, the ability to motivate students to seek different solutions to cognitive problems;

3) create an atmosphere of sincerity, trust and compassion for students; it all has to think calmly, find the cause of the mistake, rejoice in your success and the success of your friend, and so on;

4) pedagogical optimism - the belief in the student, his cognitive powers, the ability to see and support the weak, almost imperceptible branches of cognitive interest in a timely manner, and thus to stimulate interest in learning, learning 'strengthen.

The teacher may not have all these advantages (although he should strive for them). But experience shows that if a teacher has at least one quality, he or she will often achieve great success in teaching and developing students.

Decreased demands on students' cognitive activity, the teacher's formal approach to their work, and the teacher's anger, students lose interest in any topic, conflict with the teacher, and the teacher and students o leads to a breakdown of the relationship between. The right approach to students (businesslike, passionate, friendly) is the key to the success of teaching.

In order to arouse and develop interest in physics, a teacher must love his subject, consider teaching and teaching physics to students as a high civic duty, and combine the tasks of teaching and educating students with the socio-economic tasks of society. He must be interconnected and express himself as a person in all his actions and deeds, as well as in harmony with an active lifestyle.

Thus, shaping school students ’interest in science is a complex learning process that involves the use of a variety of methods in the system of teaching aids and the correct style of teacher-student interaction.

The main part. Physics is the basis of technology and many manufacturing technologies, and increasing the effectiveness of physics education has a direct impact on the quality

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

and efficiency of the training process of leading professionals in various fields. One of the key steps in improving the effectiveness of physics teaching is practical and laboratory training, which serves to strengthen and deepen the theoretical knowledge. Laboratory classes strengthen students' theoretical knowledge as well as their practical knowledge and skills. From this point of view, the correct choice of methods of laboratory work in physics, the task of improving the number and content of laboratory work, as well as the training of highly competent - future teachers of physics who perform this task. is a topical issue facing educational institutions. The following diagram summarizes the tasks that need to be performed to accomplish this task.

The Education Law and the State Education Standards have been revised to improve the quality and efficiency of education and to raise it to the level of developed countries in this area. The tasks to be performed for this purpose and the interrelationships between them are shown in the diagram in Figure 1.

Creation of a new generation of textbooks and manuals in secondary schools, secondary special education and higher education systems, the creation of a new generation of subjects taught in the education system from secondary schools to higher education the themes should not be repeated with each other, but rather should be embodied in the themes that stand out. These are just some of the goal setting shareware that you can use in your science class.

In particular, in secondary schools, physics is taught in grades 6-11, and in the 6th grade, subjects are selected for the introduction of physics. In grades 7, 8 and 9, general physics is taught in mechanics, electrostatics and molecular physics. topics in atomic and nuclear physics are taught.

In teaching physics in these secondary schools, it is important to choose the right laboratory work and the right laboratory work. It should be noted that according to the curriculum of secondary schools, classes for grades 6-11 are held 2 hours a week. It has been around for years and has not changed over the years.

Students will be able to strengthen their theoretical and practical knowledge and improve their experimental skills by completing laboratory classes in physics. If we pay attention to the lexical meaning of the experiment, experimentation and testing help a person to make a material impact on the object, to master the reality, to enrich and develop knowledge. In the natural and technical sciences, experiment is used as a means of knowing and proving the truth. This means that it is necessary for students to develop and improve their experimental skills during school. This, in turn, depends in large part

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

on the amount of training allocated for laboratory classes in the school and the quality and level of these classes.

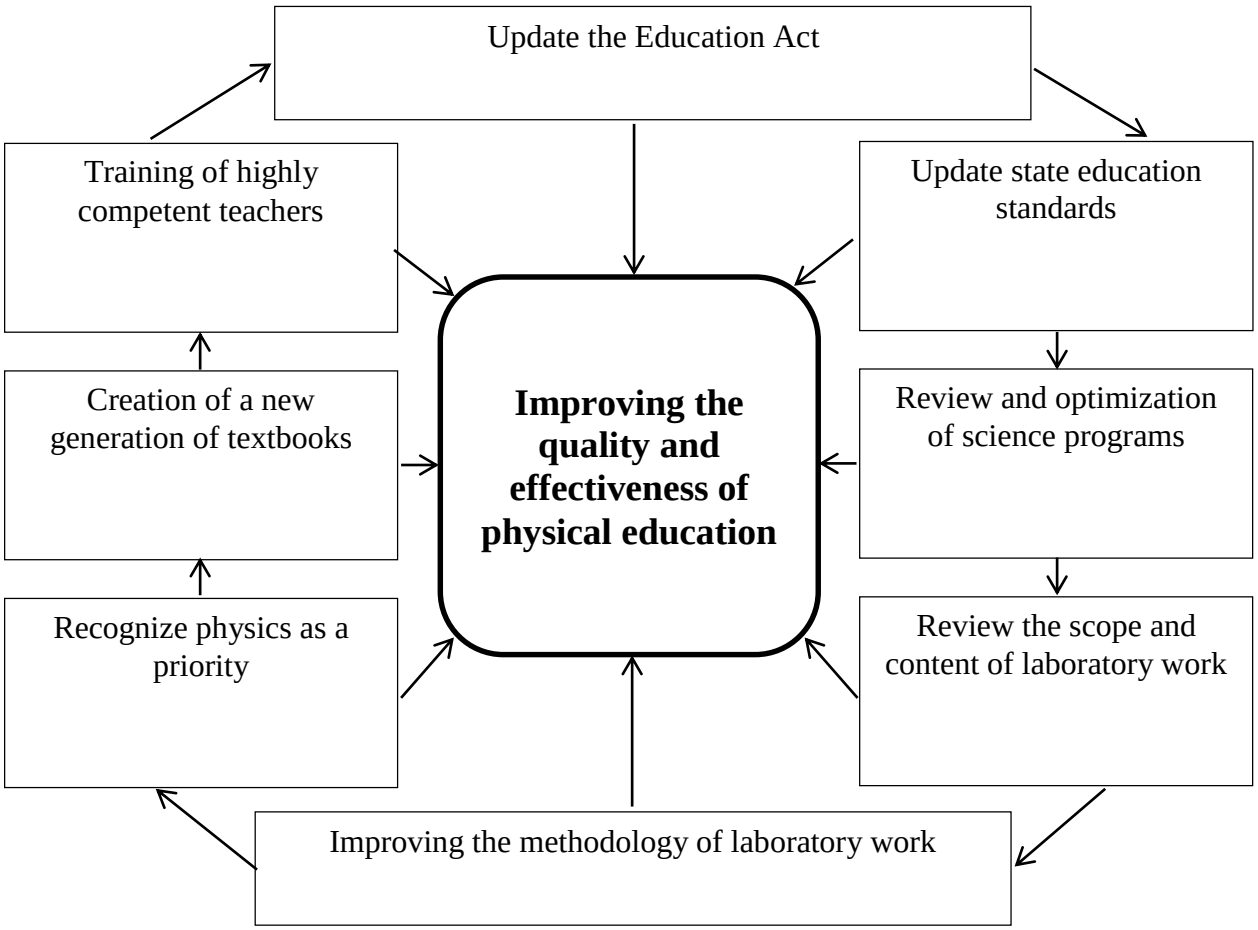


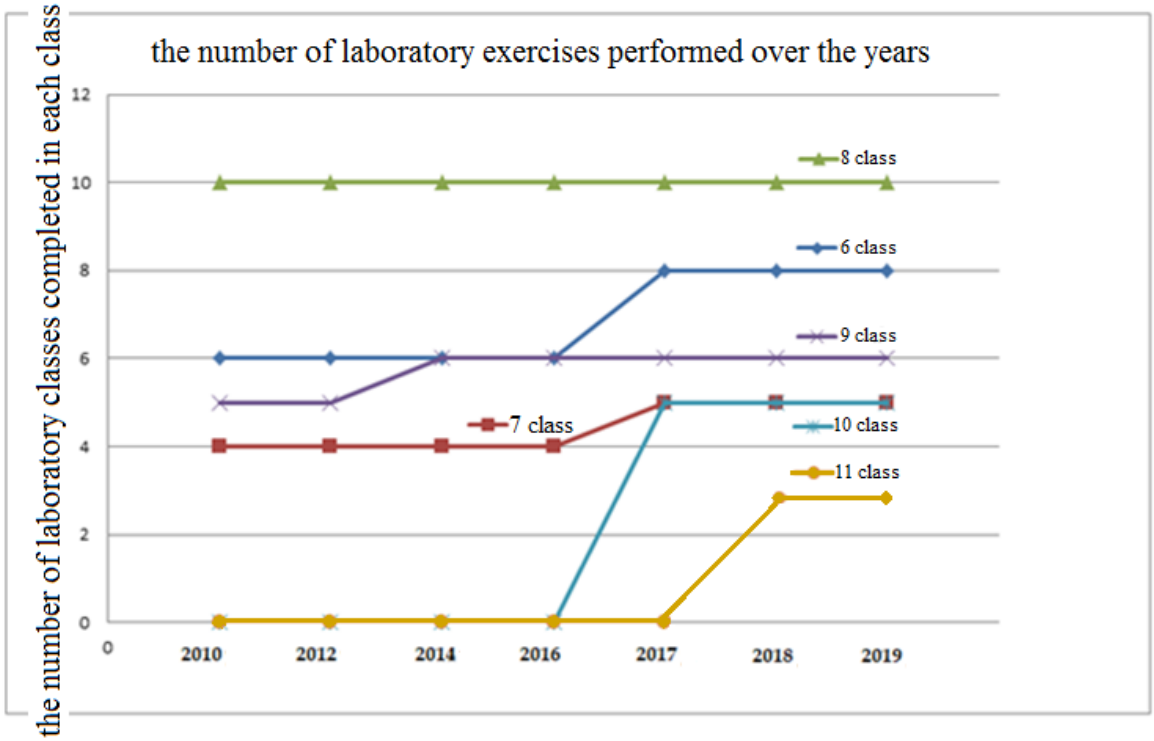
Figure 1. The role of laboratory classes in the mechanism of improving the quality and effectiveness of physical education

Over the last decade, the amount of hours devoted to analytical physics in physics programs in secondary schools has remained virtually unchanged over the years. Figure 1 below shows the state of the physics class in grades 6-11 over the years. Based on the comparison of the data in the chart and many years of experience in conducting laboratory classes in physics in secondary schools, the following analytical conclusions can be drawn:

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

1. The small number of hours allocated for laboratory classes in physics in secondary schools is not enough for a thorough study of this subject;
2. The scope and content of laboratory classes in physics have not changed over the years;
3. The order of laboratory classes in physics textbooks and the conclusions drawn from them have not changed and are analyzed one-sidedly;
4. There is no connection between production and laboratory work in physics;
5. No attention was paid to environmental education in physics laboratory classes;
6. The integration of "education-production-science" in the laboratory of physics, taking into account the science, is not taken into account.

Changes in the hours of laboratory classes in physics in secondary schools in 2010-2019



1-graph

The above shortcomings, in turn, can have a significant impact on improving the experimental skills of high school students in physics.

Discussions and Results. It is well known that the laws that govern the study of physics form the basis of technology and many technological processes. Therefore, the issue of increasing production efficiency and thus the economic potential of the country is

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

directly related to the training of mature and qualified personnel for all sectors. The issue of training qualified personnel for various fields depends on the effectiveness of the general education system and, in turn, the competence of teachers working in this system. From this point of view, in order to increase the effectiveness of physics education, it is necessary, first of all, to harmonize the content of laboratory classes in physics teaching in pedagogical higher education institutions with the content of school physics laboratory classes.

The following tasks can be cited as key factors in improving the quality and effectiveness of laboratory training:

1. Liaise with production in the laboratory;
2. Effective use of interdisciplinary communication in laboratory work;
3. Forming a scientific worldview by creating problem situations in the laboratory;
4. Formation of ecological concepts and ideas in the minds of students in the laboratory.

Of course, the effectiveness of these tasks will ultimately depend on the level, skills and abilities of the teaching staff. A highly qualified educator can make a voluntary production process or a connection with any subject in any subject of any lesson. Indeed, laboratory classes in physics can in a sense be seen as part of the production process. For example, in the 7th grade physics program "Determination of the acceleration of a body in smooth accelerating motion" [6,47], in the 10th grade physics program "Determination of the FIC of an inclined plane" [7,51] can be compared with extraction processes using.

It is also important to keep in mind that every laboratory work in physics is a scientific experimental study of the laws of a particular physical process. Indeed, the simple laboratory work being studied is initially perceived as a new discovery, and the Pupil or student should plan to further develop it and apply it to new situations by mastering this discovery. Through this approach, students develop a scientific approach to the study of each physical phenomenon. At this point in the history of physics, it should not be forgotten that many great scientific discoveries were made in very simple ways.

As mentioned above, any theoretical topic or laboratory activity can also be focused on scaling up environmental concepts. For example, laboratory studies on the phenomenon of electrolysis can show that it is possible to obtain environmentally friendly products through the electrochemical refining of various food products, including vegetable oils. It is also important to provide students with information on environmentally friendly methods of obtaining electricity in the formation of environmental awareness.

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

Conclusion. Unfortunately, in most schools, for a number of objective and sometimes subjective reasons, they almost stop demonstration experiments, laboratory work, physical experiments, and go to the lesson of "chalk" (often busy with problem solving). 'tdilar. Lessons without demonstrations and practical work will be boring. This reduces interest in science and consequently reduces the quality of the knowledge gained. A lesser-known fact is that the opportunity to engage students in an active cognitive process is not exploited. Thus, the words of LN Tolstoy are confirmed: “The harder it is for the teacher, the easier it is for the student, and the easier it is for the teacher, the harder it is for the student”.

Observations show that in recent years, the school education system has significantly reduced or stopped performing laboratory work. As a result, the newly formed experimental skills and imagination have not developed. The reason for this, of course, is to graduate from high school and enter higher education. The school focused on solving specific problems in theory and practice, using all its energy to get students into school. This leads to a decrease in the experimental skills of the student during school hours.

Perception of the external world begins with a vital way of thinking about the emotional impact on a person. Such effects can occur as we observe events in the world around us. The phenomenon can also be seen in specially designed conditions, such as in a physics room. In this case, they are engaged in physical experimentation. The physical things around us undergo various changes, that is, physical processes or events.

The task of physics is to explain the phenomenon that is happening, but it is necessary to determine the phenomenon, the scientific truth, between the various manifestations of nature. So the first step in studying a phenomenon in science is observation. But it is not limited to simple observation. This phenomenon needs to be studied in depth and effectively. It is necessary to create certain conditions for the emergence of phenomena and change them in accordance with the research plan, that is, to conduct physical experiments.

In the new working environment of the school, in the context of increasing knowledge and high density of teaching materials, along with oral and other teaching methods, physical experience should also play a worthy role.

In short, taking into account modern requirements, increasing the volume of laboratory classes in the school physics course and optimizing them through class analysis, the introduction of the necessary new types of laboratory classes in the science program to

ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

improve the quality and efficiency of physics teaching and physics. serves to achieve the goals and objectives of teaching science as a priority.

References

1. Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis. Toshkent. 29.12.2020.
2. K.D.Ushinsky. The writing. In 10 volumes. T. 10. M. 1951.
3. Usova A.V., Bobrov A.A. Formation of educational skills and abilities of students in physics lessons. M. Prosveshenie. 1988. pp 122.
4. G.I.Shukina. Enhancing the cognitive activity of students in the educational process. Textbook. allowance. M. Prosveshenie. 1979. pp 160.
5. И.Р.Камалов, Д.И.Камалова, С.С.Канатбаев. Влияние термообработки и толщины оксидного слоя на характеристики полупроводниковых материалов. «Universum: технические науки». Россия. Декабрь, 2016. №12(33). 38-40 стр.
6. И.Р.Камалов, Д.И.Камалова, С.С.Канатбаев. Перспективы применения полупроводникового материала на основе фосфида индия в отраслях приборостроения. «Universum: технические науки». Россия. Январь, 2017. №1(34). 43-46 стр.
7. I.R.Kamolov, D.I.Kamalova, S.S.Kanatbayev. Technology of receiving and production of field transistors with Shottky's lock on the basis of phosphide composition india. X International correspondence scientific specialized conference «International scientific review of the problems of natural sciences and medicine». USA, Boston. April 2-3, 2019. pp 25-29.
8. N.M.Shakhmaev, V.F.Shilov. Physics Experiment in High School: Mechanics. Molecular physics. Electrodynamics. M. Prosveshenie. 1989. pp 255.
9. P.Q.Khabibullayev, A.Boydedayev, A.D.Bahromov. Physics: textbook for 7th grade of general secondary schools. Revised third edition. T. "National Encyclopedia of Uzbekistan" State Scientific Publishing House. 2017. pp 176.
10. P.Q.Khabibullayev, A.Boydedayev, A.D.Bahromov, J.Usarov, K.Suyarov, M.Yuldasheva. Physics: textbook for 8th grade of general secondary schools Revised third edition. T. "Teacher" Publishing House. 2019. p 176.
11. P.Q.Khabibullayev, A.Boydedayev, A.D.Bahromov, J.Usarov, K.Suyarov, M.Yuldasheva. Physics: textbook for the 9th grade of general secondary schools.

ISSN: 2776-0987 Volume 2, Issue 5, May, 2021

Revised third edition. T. Publishing and Printing House named after Gafur Gulom. 2019. pp 176.
12. N.Sh.Turdiyev, K.A.Tursunmetov, A.G.Ganiyev, K.T.Suyarov, J.E.Usarov, A.K.Avliyoqulov. Physics. Textbook for students of 10th grade secondary special, vocational education institutions. T. "Niso Poligraf" publishing house. 2017. p 176.
13. N.Sh.Turdiyev, K.A.Tursunmetov, A.G.Ganiyev, K.T.Suyarov, J.E.Usarov, A.K.Avliyoqulov. Physics. Textbook for students of 11th grade of secondary special, vocational education institutions. T. "Niso Poligraf" publishing house. 2018. pp 192.