

IMPROVING THE METHODOLOGY OF DEVELOPING TECHNICAL THINKING IN TEACHING PHYSICS IN ACADEMIC LYCEUMS

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Abstract

In the article, it is important to plan practical exercises in physics, including problem solving, for academic lyceums, especially by solving technical problems, future military specialists can gain knowledge and skills in the technical direction, and it is a methodical way of forming their competence in their fields. are discussed.

Keywords: physics, creative thinking, technical issue, non-standard task.

Introduction

Talented, entrepreneurial, inquisitive, spiritually healthy and high scientific potential young people determine the future of the nation. Therefore, in our country, we pay attention to the encouragement and support of talented people in the education of young people [1].

Indeed, active and creative youth are the future of our development. Therefore, every teacher working in different educational systems should establish a mentor-student system, find talented students, and direct their activities to the development of science and technology. The teaching process in academic lyceums is divided into independent and interconnected theoretical and practical parts. In order to pass practical training at a high methodical level, the theoretical part of special subjects must be passed at the required level. Formation of students' theoretical knowledge, practical skills and qualifications related to production work is one of the important issues in the training of a junior specialist in a certain field.

Main part

Academic lyceums are educational institutions that provide special military and general professional education within the framework of the relevant state educational standards, which provide students with an inclination to the chosen profession, in-depth development of knowledge and skills, one or more of the chosen profession. how many specializations can he give. The educational process of academic lyceums consists of military education, general education classes, extracurricular educational activities, and their improvement as a whole pedagogical process is determined according to the results of practical experimental work. This process is carried out by teaching specialized subjects in relevant fields and passing production education at a high methodological level in academic lyceums. Through the mentioned organizational forms of training, it is ensured that students are trained as a high-quality junior specialist with specific professions and qualifications.

A modern military specialist should be aware of the latest developments in the field of his professional activity, be able to see the directions of development in the future, as well as the ways to solve the emerging problems. In order to educate a specialist at the level of such requirements, it is necessary to develop effective forms of teaching in academic lyceums, an active method and a complex of modern tools, as well as scientific and methodological justification.

Training of qualified military specialists in academic lyceums should meet the following requirements:

1. Formation of knowledge, skills and qualifications specified in the state educational standard for the specialty;
2. Conformity with educational goals and tasks envisaged in the educational content;
3. All components of the process of training qualified personnel (theoretical training, laboratory-practical training, production practice) should be organized in an interdependent manner;
4. The content of education meets the requirements of the level of development of science, technology and technology.

It is natural that the planning of practical exercises in physics, including problem solving, is of great importance for academic lyceums. The acquisition of knowledge and skills of future specialists in the technical direction, their competence in their fields, and the formation of practical training and skills, such as the principles of operation of technical devices, are determined by them.

In academic lyceums, the choice of career issues from physics undoubtedly requires a great skill, creative approach, experience and methodical knowledge from the teacher. The fact is that military-technical devices, their principles of operation are subject to the laws of various fields of physics, knowledge about them, qualifications and skills, and solving problems of various difficulties. Such problems are more related to mechanics, molecular physics, electricity or optics, depending on the direction of the technical field. Solving them requires students to actively observe and develop thinking. Achieving such a way of thinking requires that most students have a sufficiently high culture of solving problems in concrete and natural sciences such as physics, chemistry and mathematics, as well as high training in this field.

In this field, the problems of improving the vocational education system in Uzbekistan are discussed by the great methodists and pedagogues U.N. Nishonaliyev, A.R. Khodzhaboyev, F.Kh. Rashidov, N.SH. Shodiyev, N. Muslimov, E. Roziyev, O'.Q. Tolipov, It was researched by N.S. Sayidahmedov, O. Avazboyev, SH. Sharipov and a number of other scientists.

In the abstract of T.R. Rizayev's candidate's dissertation entitled "Formirovaniye interesa u uchashikhsya obsheobrazovatel'nix shkol k izucheniyyu fiziki", the reasons for the decline of students' interest in learning physics were studied and methods of increasing students' interest in learning physics were developed [4] . Part 1 of the book "Physics Teaching Methodology"

by B. Mirzakhmedov, M. Djourayev, N. Gafurov, G. Sagatova deals with the general issues of teaching physics, including the methodology of solving physics problems. In the second part of this book, the methodology of teaching a number of topics related to different sections of the physics course in different educational systems (general secondary education KHKs, academic lyceums and vocational colleges) is considered [3,4].

In the textbooks "Mechanics" and "Fundamentals of Molecular Physics and Thermodynamics" by B.F. Izbasarov, I.R. Kamolov, along with providing theoretical knowledge, examples of problem solving and tests related to the topics are covered [4].

In the textbook "Methodology of physics problem solving" by the well-known Russian scientists S.E.Kamenetsky, V.P.Orekhov [2], the general methods of solving physics problems at the I and II stages of physics education are described, a minimum number of physics problems are selected for students, physics The procedure for solving problems on all topics of the course is shown. The conditions of the problems are analyzed in detail and examples of problem solving are given.

K.Tursunmetov, A.Khudaiberganov and others "Collection of problems from physics" (for academic lyceums and vocational colleges) study guide [5] fully covers the program of academic lyceums, it contains 670 problem is given and more than 80 problem solving examples are shown. Another advantage of this book is that the problems recommended for independent solving are divided into five groups according to the level of difficulty. This brings a lot of comfort to both students and teachers.

From the analysis of the above-mentioned literature, it became clear that in almost all of these literature, very little attention was paid to the issues of technical content, therefore, it led to the conclusion that such a consideration can be a sufficient basis and evidence for the topic of our research, and to say that this problem is urgent. was the basis.

Our goal is to get acquainted with problems related to various departments of physics, which are suitable for the direction and program of academic lyceums, to classify problems by departments, levels of difficulty and other various characteristics, and to provide guides according to the types of problems. consists of development, analysis of results and development of recommendations for teachers.

Results and Discussions:

In the teaching methodology, a small problem that is solved with the help of experiments based on logical conclusions, mathematical operations and laws and methods of physics is usually called a physical problem. In fact, every puzzle that arises in connection with the study of educational material in physics lessons is reflected in the form of a problem in the minds of students. Active thinking for a specific purpose is "solving a problem." Exercises aimed at teaching students how to apply their knowledge are called problems. There are many other

purposes of solving problems, such as educating students, taking into account and controlling their knowledge, determining the formation of learning and skills, etc.

Students are introduced to the essence of physical phenomena in different ways: stories are told, experiments are demonstrated, laboratory work is performed, excursions are held, etc. In this case, the students' activity, i.e., the depth and reliability of their knowledge, depends on the "problematic situation". "reopens", but does not receive it ready. In this case, the problem becomes a means of studying a physical phenomenon. For this purpose, qualitative problems, computational problems, experimental problems, and other kinds of problems can be used.

Relying on the students' existing knowledge, it is possible to analyze the studied physical phenomena in the process of solving problems, to form concepts about physical phenomena and quantities.

In solving experimental problems, students can be given some understanding about physical experiment that the experiment is a method of applying natural phenomena, which is based on mathematical research of the functional connection between measurements and physical quantities.

They can be recommended to solve the following issues:

1. Level the spring and express its elongation depending on the magnitude of the applied force with a formula.

2. Using the hydraulic press model, determine the relationship between the size of the lift of the pistons and the size of their surfaces. The content of the issue should be closely related to the studied program material. The considered technical object or phenomenon should be widely used in the national economy. The problem should use real information about machines, processes, etc., and questions that are actually encountered in practice should be asked. Technical issues should be as close as possible to situations that occur in life, not only in terms of content, but also in terms of form, and issues that are not given any size should be solved by finding the necessary information from schemes, drawings, reference books or using experience. it's worth it. We give examples of technical issues

3. If the cutting speed of the lathe is 80 m/min, and the diameter of the workpiece is 40 mm, determine the number of revolutions of the lathe spindle. In this case, all the necessary information is given and only calculation is required.

4. Choose a wire that brings current to the electric motor.

To solve this problem, it is necessary to determine its power and efficiency, peak voltage, wire length and voltage drop according to the information in the engine's passport.

In addition to technical issues, issues related to physical phenomena that occur in life are also of great importance in order to connect teaching with life. Such problems help to see the physical phenomena "around us", increase the observation of students. Examples of such problems are:

5. Determine the cost of the washing machine in your home based on the cost of electricity consumed for 3 hours.

6. What should be the minimum height of the mirror so that you can see your full height in a vertically installed mirror? How to place it?

The educational importance of solving problems is also great. With the help of problems, it is possible to introduce students to the emergence of new progressive ideas and worldviews, to the discoveries of scientists, and to attract their attention to the great achievements of science and technology. In this regard, the issues with information about the flight of the ships of the world's first man into space, about huge power plants on our rivers, about new technical inventions will be very interesting.

Conclusion:

Examples of tools for developing students' creative abilities in physics problem-solving classes include problematic presentation of a physical problem, conducting research to solve this problem, students' research activity, solving creative problems, etc. According to the research of scientists, the most effective way to organize the educational and creative activities of students is to solve various types of special non-standard problems. Solving problems related to physics and technology serves as a great tool for education of hard work, courage, will and character in students, especially in military professions. Solving physical problems is not an easy task, you need to put all your energy into it. By solving problems, you can get the creative joy of achievements and love the subject. Solving problems is a clear "barometer" of their theoretical preparation, which allows the teacher to constantly monitor the achievements and moods of students, as well as the effectiveness of his educational work.

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