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Some Problems of Formation of Scientific Competencies Based on Studying Problems in Physics

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ABSTRACT

The article discusses the role of physics in the formation of students' scientific outlook in general secondary schools, understanding the nature of physical phenomena and laws through in-depth observation, increasing student activity and interest in science, and solving problems in computation.

KEYWORDS: *physical problems, students' scientific worldview, physical phenomena and laws, observation, student activity, interest in science, calculation, problem solving, competence, technical creativity competencies, modeling skills*

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INTRODUCTION

Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No PF-4947 "On the Strategy for further development of the Republic of Uzbekistan", the task of in-depth study of other important and demanding subjects, such as computer science, mathematics, physics, chemistry, biology. This strategic approach is effective in the development of society through the introduction of advanced pedagogical technologies in the teaching of complex physics, rich in abstract concepts, the wider use of innovative and methodological approaches in education, the introduction of interactive teaching methods in the educational process, the creation of modernized didactic reveals opportunities for business development.

LITERATURE ANALYSIS AND METHODOLOGY

K.Tursunmetov, N.Turdiev, Z.Sangirova, K.Suyarov, J.Usarov on improving the state educational standards and curricula in physics in the general education system on the basis of a competent approach - pedagogical aspects have been studied by N.Rahmankulova, M.Yuldashev, A.Bahramov, I.Zimnyaya, E.Bondarenko I.Ipateva in the CIS countries, V.Adolf, I.Frumin M.Klarin and others in foreign countries. Problems of methods of teaching physics M.Djoraev, S.Kahkhorov, M.Kurbanov, Yu.Mahmudov, K.Nasriddinov, I.Bilolov, H.Mahmudova, B.Sattarova, Sh.Tashkhodjaev, O.Tigay, on the use of information technology in teaching physics G.Umarova, teaching physics on the basis of modular technology M.Daminov, methods of teaching astronomy M.Mamadazimov, distance learning of physics and astronomy in the CIS countries E.Vedeneeva, N.Gomulina, O.Mirzabekova, A.Nazarov, A.Chefranova, in foreign countries D Researched by Mamontov, T.Hinton, M.Shepherd and others[1].

DISCUSSION

Problem solving is important in teaching physics. Problem solving is an integral part of the process of teaching physics, it greatly contributes to the formation of physical concepts, develops physical thinking, improves the ability to apply knowledge in

practice. The role of issues in developing students 'creative abilities is enormous. Problem-solving develops students' diligence, meticulousness, independent thinking, interest in reading and behavior, determination to achieve goals. Problem solving in physics has a positive effect on shaping students 'worldviews. Problem solving is often an integral part of physics lessons. The teacher uses problem solving in explaining and reinforcing a new topic, repeating what has been said, in students 'independent work, and in testing their knowledge. Problems are also solved in extracurricular activities with students interested in physics[2].

Nowadays, the activation of more students in the educational process, in the organization of practice-based lessons, is based on the fact that the main driving force of the educational process, that is, its subject should be the student, not the teacher. This means that now the modern physics teacher has to organize the teaching process first on the basis of practice and then on the basis of theory, so that the student does not have to be ready to present knowledge to the student, but tries to find the necessary knowledge for himself. Such lessons ensure that students have the skills and abilities to apply knowledge of physics in everyday life. As a result, on the basis of DTS, students in physics are taught:

- competence to observe, understand and explain physical processes and events;
- competence to conduct experiments, measure physical quantities and draw conclusions;
- the ability to gain physical knowledge and tools in practice and the effectiveness of students' mastery of physics will be high.

In preparation for the lesson on the topic indicated in the program, the teacher selects the problems and determines the sequence of their solution. The system of issues selected must meet a number of requirements. The main didactic requirement is the gradual complication of the relationship between the size and concepts that characterize the process or event described in the problem. It is preferable to start the physics course by solving problems on some topics with exercise problems. This is followed by more complex computational, experimental, and other issues that are selected sequentially, with an increasing number of connections between the magnitudes and concepts that characterize the event[3].

Combined more complex, incompletely detailed questions in the technical context may be the outcome of a system of questions selected on a particular topic. In addition to the didactic requirement for problem selection, it is important that the teacher achieves the intended goal in selecting each problem. Each chosen topic should contribute to the development of students' knowledge, deepen their understanding of the relationship between sizes, clarify concepts and reveal some new features that are not sufficiently defined and deepened in other forms of learning, teach them to apply the acquired knowledge in practice. Problem-solving methods depend on the simplicity or complexity of the problem, the goal set by the teacher, the level of knowledge of the students, and many other reasons. Here are some basic requirements for teaching students physics to problem-solving techniques. There are general aspects of problem solving that apply to all sections of the physics course, but there are also specific aspects of problem solving methodology that are relevant to each major topic.

We will discuss the general aspects of problem solving below.

1. It is known that in the content of each physical problem lies a special view of all physical phenomena, laws. This means that in order to solve a simple problem or a complex problem in any branch of physics, it is necessary to study in depth the theory that belongs to it. It is impossible to solve any example without knowing the laws, the formulas that represent the actions.
2. The solution to the problem begins with reading it carefully several times and understanding its content. As soon as you read the terms of the issue, you should not immediately focus on the size you are looking for and try to find it quickly. On the contrary, in order to better understand the physical phenomena reflected in the problems, it is necessary to remember the physical laws and formulas that lie in this phenomenon. If it is necessary to find a physical quantity and to calculate a chain, or if it is necessary to make an image, it is necessary to determine what quantities and conditions are given in the problem. The details of the matter should be recorded in the order given in its terms. If the quantities in the problem are given in different systems, it is definitely necessary to bring them to the SI system.
3. If a drawing or chain is given in the matter, they should be studied carefully, copied correctly. If a diagram or chain is not provided, it is necessary to draw a diagram or chain that fully reflects the content of the problem, imagining the physical process according to the condition of the problem.

Another common aspect of all sections is that after completing the next steps specific to each section, the result obtained should be analyzed and verified. Once you are sure of the accuracy of the result obtained, the calculations should be performed.

It is possible to show a certain sequence of actions in solving problems.

Phase I. Solving the problem should begin with a study of the condition of the problem, a brief description of what is given using the accepted symbols. Studying the condition of an issue means taking a good look at the event or process described in the context of the issue.

Phase II. A comprehensive examination of the physical phenomena and processes in question is the most important thing to pay attention to. It is important to draw students' attention to the fact that in this analysis it is often necessary to determine the initial and final state of the process and the quantities that characterize them. This allows you to define the condition of the problem, to set the indices corresponding to the letter symbols. I

Phase II. Problems are the stage that determines the success of the solution, and consists in finding the law (law, formula, procedure) that describes this event or process (determinant), that is, to restore it in memory.

Stage IV - check the accuracy of the system of generated equations or the number of equations corresponds to the number of unknowns, use the data given in the problem to create additional equations when necessary, solve the system of equations in general, ie generate a calculation formula.

V-final stage - calculation and numerical value of the searched quantities, discussion of the answer to the problem.

VI- The solution of any qualitative or computational problem (in whatever form they are given: graphic, experimental, etc. ...) should begin with an analysis of the physical content. The only difference between them is in the way they are solved.

Computational problems, which can be solved with a thorough analysis of physical properties, are no less important than qualitative problems to develop students' thinking and teach them to apply knowledge. Each of these issues has its own advantages[4]. The same issues do not require computational work, they are solved faster, so they can be used, for example, in a group conversation with classmates, when the teacher is describing new material. But computational problems teach to calculate by formulas, to set the values of quantities measured in the same system of units. Defines students 'perceptions of the true values of physical quantities, and so on.

CONCLUSION

In teaching practice, there are certain rational ways of formalizing problem solving. The condition of the matter is abbreviated in the form of a column by means of accepted letter symbols. When discussing the content of the issue, all the missing information, which is identified as necessary, can be found in the experiment or taken from the references and recorded in this column. Once all the data has been recorded, the size to be determined is recorded.

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