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FORMATION OF DIALECTICAL STYLE OF SCHOOLCHILDREN'S THINKING

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ANNOTATION

In this article, it is analyzed the content of formation of dialectic improvement in school children.

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INTRODUCTION

In addition to knowledge about nature, beliefs in their truth and dialectical attitude to reality, the worldview contains one more component. Knowledge becomes convictions when they are independently comprehended, and not taken on faith "ready-made", when they are the fruit of intense mental work. Therefore, for the formation of a worldview, it is important to teach schoolchildren the methods of mental activity, develop their thinking, and not only formally logical, but also dialectical, and gradually accustom schoolchildren to the scientific style of thinking. All this constitutes the fourth component of the scientific worldview. Much has been said about the development of the cognitive abilities of students; a lot is being done in this direction. Therefore, let us dwell only on what features of the scientific dialectical style of thinking can be formed on the basis of studying a course in physics.

Familiarization of students with the style and methods of scientific thinking is best carried out on the basis of revealing the creative searches of the largest physicists, the creative laboratory of scientists' thought and their views on the process of cognition. Here are the main features of the style of scientific thinking.

1. Respect for facts as the starting material for any scientific statement. This idea can be explained, in particular, by the following example from the history of science. In the first quarter of the nineteenth century, the concept of light as a longitudinal vibration was generally accepted, since only such vibrations could propagate in the ether, similar to an extremely rarefied gas or liquid. This concept was used by O. Fresnel to explain the phenomena of diffraction interference. And only one phenomenon, the phenomenon of polarization of light did

not fit into the framework of these generally accepted ideas about light. The phenomenon of polarization required the recognition of light as transverse waves. O. Fresnel said, "This hypothesis was in such a contradiction with generally recognized ideas that I did not decide for a long time, it was accepted" (I; 246). But the fact cannot be dismissed.

O. Fresnel, contrary to his sympathies, but in accordance with the requirements of actual data, introduces in physics the concept of light as transverse waves.

2. Discretion in coming up with new ideas. Reasonable can only be considered a conclusion that is based not on a single fact, but on their large aggregate. It would seem that D.D. Thomson back in 1897 could make a confident conclusion about the existence of an electron on the basis of measuring the specific charge for cathode particles. For years, he and his followers continue to stage more and more new experiments to measure the ratio for carriers of photocurrent and thermal current, for "B" rays, etc. And only after a good coincidence of the results of all experiments was the conclusion about the existence of an electron made. No less instructive is the delay (for 18 years!). In the publication by Isaac Newton about the law of gravitation, which he obtained back in 1665-1666, and appeared in a publication in 1686.

3. "Concreteness" of thinking, manifested in the understanding that any scientific position is true under certain conditions, and applied outside these conditions becomes false; understanding the variability, flexibility of concepts. This feature of dialectical thinking was clearly manifested in almost all the founders of modern physics, and above all in Nicholas Bohr and A. Einstein, who understood better than others that some ideas of classical physics may be unfair in the microcosm and the world of fast motions.

4. Healthy skepticism in relation to the generally accepted, but contrary to new experimental data and, on the other hand, a respectful attitude towards previously obtained by science. G. Galileo put forward a number of ideas that contradicted the generally accepted judgments of "common sense", the canons of "official science", the dogmas of religion. This is the idea of the possibility of movement without the action of force, the idea of the constancy of the acceleration of free fall, the idea of the unity of "heavenly" and "earthly". For their nomination it was necessary to have great courage, the ability to doubt the generally accepted, the freshness of the perception of the world.

5. Understanding that cognition should take into account the contradictory sides in natural phenomena and consider opposites in unity. Metaphysical thinking proceeds from the fact that any phenomenon should be discussed according to the principle "either this or that": light is either a particle or a wave; the behavior of the electron is either accidental or necessary; the flying arrow at the moment is either moving or at rest. Dialectical thinking requires consideration of a phenomenon taking into account its opposite sides and their unity: light - both particles and waves at the same time; the behavior of the electron is both random and necessary; the flying arrow at the moment is either moving or at rest. Awareness of the need for such a dialectical approach to phenomena was expressed in the assertion of Bohr's complementarity principle in physics.

6. Understanding that in order to achieve the truth, it is necessary to take into account all the connections of this phenomenon with other phenomena. All-round consideration is shown by any physicist, highlighting the investigated phenomenon "in its pure form". The more the

number of factors influencing the studied phenomenon is taken into account, the more reliable the result will be. A prime example of this approach. The experiments of P.N. Lebedev for measuring light pressure.

By drawing the attention of students to these some other features inherent in the style and method of scientific thinking, we form the culture of thinking and the personality of the student, and the best examples of scientific thinking given in physics lessons will help students to understand science a little deeper, but also to better orient themselves in life, more correctly evaluate the facts, events, social problems.

So, in the process of forming a scientific worldview, the following sides can be distinguished:

a) scientifically and methodologically rigorous presentation of the foundations of physics with an emphasis on the ideological side of each question of the physics course;

b) dialectical interpretation of the foundations of physics, as a result of which students are led to generalizations of a philosophical nature and to the basic ideas about the physical picture of the world;

c) formation of beliefs in the correctness of the scientific dialectical understanding of the world and the creation of a dialectical attitude to nature and the process of its cognition;

d) development of scientific dialectical thinking, based on versatile work on the formation of schoolchildren's cognitive abilities.

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