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**NECESSITY AND POSSIBILITY OF SCHOOLCHILDREN ACQUAINTANCE WITH BASIC IDEAS OF STATISTICAL PHYSICS**

The rapid progress of fundamental physics and technology, including nanodevices, deepens the gap between science achievements and the level of user awareness. This can give rise to problems in maintenance of equipment and further technology development. The necessity of modernization of the course of general school physics is obvious. The only way to overcome the problem of lack of time is to expand the part of the course based on deductive approach, inherent in theoretical physics, and not to be afraid of the mathematical apparatus. The authors suggest starting this work with the basics of statistical physics in the section of the general course "Molecular Physics", which prepares pupils the probabilistic description of matter at the microlevel.

Pupils should distinguish between the concept of "microstate" and "macrostate". The main task of statistical physics is the transition to macrostate investigation. It is based on the ergodic hypothesis, which allows using the probability methods in the theory of many-body systems. Postulating the equal probability of microstates of an isolated system actualizing a fixed macrostate we come to different Gibbs distributions and the corresponding formalisms. It is convenient to rely on the discreteness of system states that is performed for quantum systems. The proposed acquaintance of pupils with the fundamentals of statistical physics opens the possibility of a better understanding of the concept of temperature, the origin of Maxwell and Boltzmann distributions and the picture of conduction in solids, as well as of some explanation of the nature of collective quantum phenomena To begin with, we present some interesting results from the theory of ideal quantum gases.

A more profound and correct engagement of pupils to the principles of quantum theory is necessary. The current approach dwells on century old ideas. It will be appropriate to inform students that the state of a non-relativistic microparticle is determined by a wave function. The identity of quantum particles and the symmetry properties of many-particle functions allow the particles to be divided into bosons and fermions according to their statistical properties. We give an example of a quick explanation of the various behavior of ideal Bose and Fermi gases at low temperatures. Weakly non-ideal systems in these conditions may exhibit the properties of superstructure or superconductivity.

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