

## Computer technology energy education in the study of natural sciences

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The Russian Federal Law "On energy saving and energy efficiency improvements and on Amendments to Certain Legislative Acts of the Russian Federation" adopted by the State Duma on November 11, 2009 and approved by the Federation Council 18 November 2009 actualizes the need for advocacy for energy conservation in higher educational institutions, secondary and general education in the study of natural sciences and [1].

Since the modern economy is based on the use of fossil energy reserves which are not renewed, energy plays a key role in the conservation of natural resources and the prevention of environmental disaster. In addition, the implementation of the project on energy efficiency in educational institutions will contribute to the formation of ecological culture among the younger generation.

Learning the basics of energy conservation in educational institutions is aimed at attracting students to conscious efforts to conserve biodiversity and conservation, environmental safety in the process of learning and in life. The goal requires the following tasks: analysis of modern energy-saving measures and identify the most effective ones; develop appropriate recommendations; carrying out energy efficiency measures in educational institutions and at home, an analysis of their effectiveness.

The solution of the problems seen by the inclusion in the curriculum of elective courses (elective courses for high school) the appropriate direction. Moreover, since, according to the literature [2], in science education computer animation and virtual models of human events, systems and objects become part of digital educational resources, learning the basics of energy savings possible in the process of studying the chemical disciplines on examples of computer models of the natural processes.

For example, in the course of physical chemistry in the study of the topic "Thermodynamics of chemical processes" based on the first law of thermodynamics, using computer multimedia presentations, you can demonstrate the importance of energy saving in terms of re-use of energy. Using animation to show how not to waste energy in vain, to use energy more efficiently (to use cost-effective energy-saving lamps, industrial waste heat for home heating). Conclude that, transforming energy into the desired shape, it is possible to solve the problem of shortage in the future. Then, based on the second law of thermodynamics, show that this process is quite complicated due to energy losses. Otherwise, in the process of energy transformations useful energy decreases due to dispersion in the environment (energy quality is lost). Conclude that the energy savings in accordance with the second law involves the use of bioenergy, chemical and thermal energy instead of electricity better. Next introduce computer models to compare the quality of energies: the use of electrical (lighting, heating and mechanical work) and thermal energy (for heating, and losses). In this case the computer models must meet certain requirements: to reflect the familiar and popular natural science processes in the life-saving measures, ways of assessing the impact of their implementation.

In conclusion, we note that the energy education involving computer technology will improve the quality of learning, motivation, enhance interdisciplinary communication and build modern eco-directed scientific outlook on the basis of scientific knowledge, and chemical as well.

### References

1. Gilmanshin I. R. *Informacionnye resursy Rossii*, 2013, no. 3, pp. 2-4.
2. Gilmanshina S. I., Yamaltdinov R. K. *Fundamental Research*, 2014, no. 11(5), pp. 1156-1160.