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WAYS OF FORMATION OF STUDENTS' HEALTH CULTURE
WHILE STUDYING PHYSICS

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Abstract

Formation of the younger generation's health culture has become one of the main tasks facing the modern system of education. The importance of it is connected with the increasing information flow when it is necessary to be more attentive to one's own health and to the health of the younger generation. Health of the nation is one of the priority tasks of the society. The knowledge of the health culture should be formed as early as possible, in childhood and at school age it should become more conscious. Such natural-science disciplines studied at school as Physics, Biology, etc. can help with it. The authors consider the formation of health culture of the students of comprehensive schools by the example of studying the school course of Physics. The article describes some concrete examples of the phenomena and processes according to the sections studied at the lessons of Physics promoting the formation of health culture (valeological culture). The use of such concrete examples is the most expedient while explaining the regularities of the physical nature of the phenomena and processes. Much attention in the given article is paid to the pedagogical techniques allowing teachers to develop the students' individual abilities and to create the atmosphere of success for each student both at the lessons and during the extraclass activities, the independent preparation for classes.

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Keywords: Health culture, health culture formation at the lessons, tasks on Physics, tasks with the valeological contents, laboratory-based work on Physics.



1. Introduction

The development of society and education at the present stage allows putting forward the character and mission of a person, his social health. The social health problems of the younger generation are especially relevant. One of the tasks of the development of the student's identity, facing all the educational institutions, is the formation of health culture.

Health culture or valeological culture is a part of general personal culture, which represents a conscious system of actions and attitudes to one's own health and the health of other people, i.e. an ability to live without harming the organism and benefiting it (Malyarchuk, 2008).

We will notice that health culture is not a simple «collecting» of recommendations and knowledge, useful in this or that situation, but their active use every day in life, in practice.

2. Problem Statement

It is necessary to teach children while training them to treat their life and health consciously; to add immeasurably to knowledge of the ways of preserving health, to acquire the necessary skills to preserve, support and save health; to solve the problems connected with a healthy way of living, safe behavior, providing medical, psychological, self and mutual assistance independently and effectively.

The majority of the studies of the problems of preserving and strengthening health are devoted to preschool or junior school ages: an individual and differentiated approach to work with preschool children (Zmanovsky, 1989; Pavlova, 2009), considering the development of the child's emotional sphere and social competence (Tatarnikova, 2007), or during the health-promoting activities (Ivanova, 2000) and so on.

At the same time, it is necessary to consider some special opportunities of the natural-science disciplines, in particular Physics in formation of the students' health culture. Physics, as well as other natural-science disciplines has ample opportunities for using the valeological data, for example, for digestion of the physical facts about a healthy way of living, for acquaintance with some specific physical and general scientific methods used in medicine, valeology, sport. Studying the elements of valeology helps the students to see the connections of various disciplines, to understand that natural sciences have the same object of study – people and the material world surrounding them (Jankowska & Tanaś, 2017). At the same time, pupils acquire the corresponding scientific terminology which is widely used while studying various disciplines (Ermakova, 2013).

The majority of physical laws studied at school can be illustrated with the following valeological examples (see tab. 1).

Table 01. Examples of the phenomena offered to study at Physics lessons

Physics/units	Subjects that can be used for formation of valeological culture
Mechanics	Biomechanics of a person. Kinematics, dynamics and person-motion energy. Physical activity. Zero gravity and g-forces. Bases of biostatics. Work and power of a person. Ergometry. Reaction time and factors influencing it. Physiological acoustics. Influence of sounds on a person. Heart and lungs-sound recording. Ultrasound and its use in medicine. Noise. Noise pollution
Molecular Physics	Thermal physic measurements: temperature of organs, parts of a body, calorimetric measurements of biological objects, products, etc. Temperature of a person. Temperature distribution in the body. Sanguimotion. Physical characteristics of various mediums used for treatment. Use of low temperatures in medicine. Valeology of feeding. Personal hygiene. Refusal of pernicious habits. Role of vitamins in the organism. Weather and general condition of a person.
Electrodynamics	Conductivity of bio-tissues. Electric shock. Electrostatic shower. Natural sources of electromagnetic radiation. Physical bases of electrocardiography.
Optics	Physics of human eye. Optical radiation of the body. Influence of different kinds of radiation on a person.
Quantum Physics	Study of X-rays in medicine. Thermal radiation. Use of radioisotopes in medicine. Protection against ionizing radiation. Ionisation of ultrarays. Ecological problems, their reasons, connection with health, ways of their decision.

3. Research Questions

The research question is to describe the ways of the formation of the students' health culture while studying Physics at school.

4. Purpose of the Study

The study is devoted to the description of the ways in practice while studying the school course of Physics

5. Research Methods

There are various ways of the pupils' acquaintance with valeological material within the school course of Physics (Danishkina & Ermakova, 2014):

1. *Giving some valeological data by the teacher while studying the new material.* In this case students will acquire the new material better as it is not an abstract set of phrases and formulas that do not have their practical application at first sight. Besides, valeological examples help to build the students' health culture.

2. *Giving some valeological data by the students when they make reports about the results of their independent work.* For this purpose, there are several forms reflecting the results of the gained knowledge, for example, making reports, papers, presentations by the students.

3. *Writing and solving tasks with valeological contents by the students.*

We will consider a task with valeological contents to be a task formulated in the field of valeology which solution demands the use of knowledge in Physics, Mathematics (or Biology).

For the purpose to reinforce, revise and systematize the gained knowledge, it is possible to suggest writing the tasks connecting the valeological material with physical processes and phenomena.

For example, how is it correct to do cupping? (The answer is the following: First smear skin with vaseline or cream. Heat the cups, the fire burns away some of the oxygen from the inside of the cup, then apply the cups to the skin. As the glass cools, the space inside transforms into a vacuum. This vacuum creates enough suction to hold the cup in place).

To examine the patients' throat or teeth, doctors sometimes use a mirror, slightly heated in advance (about 37°C). What for?

Radon baths used for treatment contain 1.8×10^6 of radon atoms in 1 dm³ of water. How many molecules of water does a radon atom refer to in a therapy tank?

Solving such tasks intensifies the students' thinking as they understand the physical phenomena and processes properly, determine the consistent patterns and find out that the gained knowledge can be applied to deciding some practical questions. Many tasks written by students are integrated with Biology, Chemistry (Ermakova, 2014). Writing and solving such tasks can promote also the students' cognitive interest.

For example, while studying electrostatics, we can offer the following task for solving: While treating by means of electrostatic shower, the potential difference 10 kv is applied to the electrodes of the electric machine. What charge do the electrodes maintain during the procedure, if we know that the electric field work is 3.6 kJ?

Solving the tasks can be accompanied by the additional information.

4. *Carrying out laboratory-based works with valeological contents.* For example, carrying out the laboratory-based work we can give students the following topics:

- Assessment of the microclimate at school, at home.
- Assessment of the peoples' daily energy costs.
- Determination of the person's body drag.
- Determination of the horizontal and vertical FOV.

While carrying out the laboratory-based works in the profile classes we also can use solving the tasks (Ermakova, 2013; Danishkina, 2014). For example, while carrying out the laboratory-based work «Determination of the person's body drag», the following task is offered: Serious warning: 0.1 A can kill. What voltage is extremely dangerous for a person?

5. *Creating presentations by the students.* The results of them can be creation of experience, figures, schemes, videos and electronic presentations.

6. *Organization of excursions with valeological contents,* for example to a medical center. Excursions help to consider an entity of physical theories and laws in practice, contribute to the development of the students' understanding of the role of a person in the world around. Visiting health centers functioning in medical institutions can be an example of such valeological excursion.

7. *Creating problem situations at the lessons by the teacher with the use of valeological material.*

8. *Revision at the lesson with the use of valeological material* allows the teacher to focus the students' attention on the use of theoretical knowledge in practice, to show the needs and possibilities of their extension. Such form of revision allows students to realize the studied material at a higher level.

6. Findings

So, we can conclude that the use of the valeological material helps teachers to solve some physical problems at a higher level, focusing the students' attention on the connection of valeology and some physical processes.

7. Conclusion

The analyses of the given research show that the valeological material is not given prominence at the lessons. The material is most often intended for the pupils' independent work and sometimes is not considered at all. According to the teachers' opinion, the main reasons of such use of the valeological data are the following: the insufficient quantity of the instructor's manuals with the use of the valeological data (Jackson, 2001), the lack of scientific and non-fiction literature with the valeological contents and also the shortage of the study time necessary to cover the school course of Physics.

As the way out that we see in the use of the valeological material during the facultative studies and courses, for example for senior students, we can offer the following courses: «Human Health», «Physics and Medicine». It will help teachers to consider the physical processes at a higher level, to draw the students' attention to the connection of all the physical processes in life and in practice.

Nowadays when mass media provides some valeological data, some data about the smoking hazards, the noise pollution, etc., the characteristics of the medical and sport objects, it is important to make such information clear and useful for students (Ermakova, 2014). There are many various ways of giving students the valeological information from giving the data by the teacher through the end of the students' independent work. Teachers should use them actively at the lessons and correlate them with the lesson aims.

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