

GENERAL SCIENTIFIC RESEARCH METHODS
AS A THEORETICAL BASIS FOR IMPROVING THE QUALITY
OF THE EDUCATIONAL PROCESS

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The study evaluating the biological significance of harmful substances' threat entering the food and water from the environment to human health was held by bacteriological and chemical analysis of drinking water, raw materials and food together with students. This topic has been divided into theoretical methods and students from different groups (such as TPC, Commerce, Finance and credit) attending a biological circle, were combined into three groups for convenience. Each group worked out one of the proposed theoretical methods on the topic.

It is known, that one of the main theoretical methods is the analysis, the decomposition of the experimental whole into parts, the selection of individual traits and qualities of a phenomenon or a process.

The analysis of the problem implemented by the first group of students showed that rapid urbanization and industrial development have led to the fact that the circulation of substances in nature includes nowadays such substances that are not peculiar to it, that can be found in the sediments. People began to call the emergence of these unusual substances in the biosphere the pollution of water, air and soil. And the intensity of pollution began to grow rapidly. Permanent presence of large amounts of chemicals in the environment leads to the fact that these harmful substances get into the body with food.

Another daunting problem is the growing of population of the planet. In the 20th century, the population was doubling in every 33 years. In connection with

this the number and the rate of malnourished and starving people are rocketing. This number is verging towards half a billion. To compensate the lack of food the third of the world crop is grown using chemical fertilizers, 15% of the Earth's harvest is represented by GMOs. The volume of the use of synthetic pesticides in the world reaches 5 million tons per year, or nearly 1 kg per each person of the Earth.

Thus, the behavior and health of the people are greatly affected by the environment and unbalanced nourishment, which is also one of the main causes of cardiovascular diseases, digestive diseases and diseases relating to metabolic disorders. It is proved that the hydrocarbons affect the cardiovascular system, blood parameters, affect the liver, cause skin dermatitis, eczema, etc.

The next method of the research is synthesis, the combination of various elements of the item in the whole (system).

Here the important point is to put across the students the thought that synthesis is not a simple summation, but a meaningful connection. To evaluate the quality of drinking water its samples were measured for chemical and microbiological parameters, they were selected from underground sources of water supply and distribution networks of the city and its districts. The quality of raw materials and food products was also appraised. As a result, the second group of students formed a matrix with systematized data.

Comparison is a cognitive operation underlying the judgments about the similarities or differences of objects. For example, by comparing the concentrations of heavy metals, bacterial contamination of water, pesticides applied to soils in several areas, the third group of students identified the areas that are much contaminated with toxic substances and identified adverse areas for people's residence.

After the preliminary stage a round-table discussion was arranged; each group of students indoctrinated the others with their results for all of them to discuss the possibility of using other methods to achieve the objective stated. The

choice of the following research methods such as the specification, formalization, simulation, analogy became the result of the discussions.

The concretization: while reading the lectures and, in particular, during practical and laboratory work, the students, should make the examples displaying the whole on a small subject in their environment. The paper discusses specific areas of research (they are Buynaksk and 3 settlements of Buynaksk District - Nizhny and Verkhny Dzhengutay and Erpeli).

The formalization: to calculate the concentration of heavy metals and the number of coli titer in water the formulae were used.

Modeling: we used in our work different models and solutions with known concentrations of heavy metals, samples of colonies of Gram-negative and Gram-positive bacteria to calibrate immunoassays and inversion-voltammetric measurements.

Analogy: there was an analogy with the research of Federal service on customers' rights protection and human well-being surveillance in Buynaksk and Buynaksk district, that had been conducted earlier; the results did not coincide completely. Relevant literature, the results of the activities carried out in other regions, the experiments and other measurements were studied during this process.

Thus, this knowledge and this skilled use of the methods of scientific research can help any students in any field to set the available arsenal of required methods and to decide the task of any complexity. In this case we must highlight not only the theme itself and its development, but the knowledge of methods as tools for a particular purpose. The practice shows that such students become more trained, independent and creative-minded for the course and diploma works in their specialties.