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TEACHING CHEMISTRY WITH ELEMENTS OF ENVIRONMENT PROTECTION. TEACHING PRINCIPLES

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ABSTRACT:
In paper is presented some notions re4gardeing to teaching of the chemistry with protective environment elements, and then is detailed one most used didactic principles: the principle of acquiring knowledge in chemistry in view of solving the environments issues.
KEYWORDS:
environment, ecology, ecological education, teaching principles, environment protection

1. INTRODUCTION

Without doubt, the environment related issues represent worldwide one of the keenest, most serious and complex problems of the present time. The intricate problems regarding the environment have gradually become one of the most important scientific concerns, having an impressive amount of ideas, inquires, interdisciplinary controversies, arguments, which have shaped the need of a global approach (1). The issue of the environment protection is a universal issue, as it deals with an entity (the environment), which is undertaking a downgrading process. Thus, the phenomenon of environment pollution is a problem which concerns not only one country, but all the countries of the world.

The ecological education represents the process by which a conscious conception about the environment is formed, the people are convinced of the necessity of a conscientious attitude towards the nature, towards its richness (2), people are determined to preserve the purity and the beauty of nature, to preserve the cleanliness of the environment, and in the same time achieving an improvement of nature by expanding woods and green areas, by preserving the purity of water, air and soil (3). In the process of education, the formation of an ecological thinking on the world plays an important part. In order to achieve this goal, it is important to install in the mind and soul of every citizen, the concept that a person as a biological species, depends on nature and that she cannot live without it (4). The ecological education must shape a systemic thinking of the students, feed-back thinking, an ecosystem integrality thinking, that is why there should be an ecological educative programme which should help the students to become aware of the environment issue (2):

- To keep up to date and to be permanently informed on the environment condition;
- To grasp the consequences of the environment in the future;
- To asses the consequences and to take behavioural decisions, to act in an ecological manner;

- To acquire, by means of one's own convictions, a way of thinking and of acting in an ecological manner;
- -To spread the ecological information and to stimulate to action (2).

The ecological education in particular aims at processing knowledge in order to determine them to establish new relations-of the best relations-between man and nature, in order to stop the assault of imbalances, the consequence of pollution, of artificialization, of over population or of social and economic exploitations (5), imposing itself as an organic component of general education, of personality shaping (3).

2. THE PRINCIPLE OF ACQUIRING KNOWLEDGE IN CHEMISTRY IN VIEW OF SOLVING THE ENVIRONMENTS ISSUES

The principle of acquiring knowledge in a conscious and active manner expresses the need that the knowledge acquiring shall be done by means of science, there should be an understanding of abstract essential and general significations and connections of chemistry and, in this context, to make an operational thinking strain and, when applicable, an action strain to apply knowledge, that is to be conscious and active in the same time(3).According to this principle, the efficiency of the teaching process is determined by two aspects(6):a conscious participation(3)to the learning activity necessarily implies a clearer and deeper understanding of the material to learn. To really know means, above all, to understand (7). An active participation to learning activity implies the own implication of the students, their optimal thinking implication and the implication of all other intellectual processes. It is considered that only experience of elaboration, belong exclusively to the student, become a personal asset and can be applied in a creative way (6).

It is hard to make a clear delimitation between what is "conscious" and what is "active". Within certain boundaries and psycholinguistic shades, the says concepts complete and imply one another. That is why it can be said that the principle of conscious and active participation mean that, on the one hand, the students should understand what they are doing and learning during the educational activities, and, on the other hand, to put in their own effort to the learning activity(8). The chemical language implies knowing the changes of chemical elements, the correct writing of chemical formulas, the correct use of inorganic substances denominations (be they simple or composed) and of organic substances denominations according to IUPAC nomenclature, but also to distinguish the popular designations from systematic designations (nomenclature). An efficient strategy of acquiring the chemical language is applying in the instructive process the chemical dictation. This form of knowledge assessments has the premise of consolidation of the theoretical concept trained to the student during the lesson. The chemical dictation plays a dynamic role, a role of effort stimulation, of learning and making him attentive during the lesson.

Changing knowledge into convictions by learning can be started when the following subject is studied: "Periodicity and law" (VIII th grade) by using 20 charts to represent the most important information on elements, symbol, designation, atomic number, order number and table number. By arranging the charts in order of atomic number increase, Z, the student elaborate a primary scene of periodic table of chemical elements, obtaining horizontal rows (periods) and vertical rows 56 (groups).The closure of the teaching game is performed by starting the periodicity law: the physical and chemical features of chemical elements are periodic functions

as compared to the atomic number, Z. The students find this by comparing the physical features of elements in groups and periods. Processing the concrete information, perceived by the students occurs by observing the common notes, the essential connections, the encouraging the assisted discovery of the studied subject, which is often acquired by the students with difficulty.

Depending on the manner of various environment notions applications, it can be encouraged the formation of new informational structures, for instance, when teaching the subject "Ozone-the allotropic form of oxygen", the differentiated character of atmospheric ozone shall be emphasized: the tropospherical ozone and the stratospherical ozone (table 1).

Table 1. The role of atmospheric ozone

The forms of the atmospheric ozone	General features	Atmospheric ozone particularities
Tropospherical ozone	Formed at the surface of the earth crust by photochemical synthesis means of nitric oxides with hydrocarbons	Very noxious oxidizer, with a predominant content of polluting substances, specialized institutions used them as an index for the concentration of polluting substances and oxidizers in atmosphere
Stratospherical ozone	The layer of stratosphere located between 15 and 40 km above the earth crust	Protecting all form of life on earth, by totally retaining the UV radiation shorter than 290 nm, as well as dosing accordingly the UV in the range of 290-340 nm
		Adjusting the temperature in the stratosphere with special effects in conditioning the atmospheric traffic and the terrestrial globe climate

This form of application of the principle of acquiring chemical knowledge in order to solve the environment problems insures by the way of difference, comparison and reasoning, the availability of thorough and effective learning of environment concepts. The dual character of substances properties can be emphasized also in the subject: "Halogenated derivations", stating their practical application, due to physical and chemical characteristics, especially chloro-fluorocarbons, (CFC), as refrigerating agents and as means of gas stimulation in spray doses, to the swelling of plastic. The fluorocarbons have been introduced in cooling equipment, as means of stimulation, foaming agents, as well as solvents; by enumerated the applications we can observe their utility for the industry. These substances, to a certain extent, decrease the ozone concentration in the stratosphere (chloride atoms formed by radical reaction are the cause of ozone scission), which means the diminishing of the protective layer.

By analyzing the received information, the students are meant to continue and comment the situation-the created problem, the teacher asks the students questions: What protection measures for the ozone layer do you propose? CFC can be replaced with other substances? Propane/butane mixtures cam meet the technological requirements instead CFC? The sprays you use bear the distinctive sign indication the protection of the ozone layer?

The active and conscious participation of students in order to solve the environment issues can be achieved by means of concrete scientific research. Thus, the student can be stimulated to take part in the scientific research activity of some subjects having environment content, implying the solving and the identification-argumentation of some environment related problems and population health. For this purpose, subjects as: Finding food soda in tea, Rain water and its pH, Atmosphere-the sole source of life for all living things, etc could be studied.

Based on the learned theory, synthesis papers can be done, and the general algorithm of the scientific research activity can include various stages: information selection (analysis and synthesis), collecting analysis samples, preparing the experimental support (analysis methods, laboratory equipment), performing the experiments (in house and lab conditions), findings, drawing the report.

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