ECOLOGIAN EDUCATION

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Enviromental education of students using the school chemistry course on the basa of the principle of local history

The purpose of the article is to reveal the method of using elements of environmental knowledge based on the principle of local history in teaching some topics of the school chemistry course.

The article establishes that environmentalization of educational subjects can be carried out by: introduction of elements of ecological knowledge when teaching some topics of various educational subjects; use of tasks, questions, problems of ecological content; carrying out interdisciplinary environmental activities; introduction of electives and optional courses in specialized classes; teaching ecology as a separate academic discipline.

Chemistry, as an educational discipline, makes it possible to use the means of its subject to carry out environmental education of students directly in the learning process, provided that environmental knowledge becomes a function of chemical education. Since the school chemistry course has its own research subject, content, goal, tasks and learning methods, it is subject to both general didactic and specific learning principles. The principle of regionality, or local lore, belongs to the specific principles of teaching chemistry. The principle of local history involves introducing into the educational material information about the locality in which schoolchildren live, about the natural conditions, economy, ecological state of the native region with cognitive, scientific, educational, educational and practical purposes. The use of local history material in chemistry lessons helps to reveal general laws and phenomena that are studied, improves the depth of understanding of the educational material, increases interest in it, enriches students with knowledge about their native region, promotes the development of creative thinking and leads to an understanding of the main problems of their area.

The use of ecological material in the school chemistry course based on the principle of local history makes it possible to carry out environmental education of schoolchildren, which contributes to the awareness of students of the need for a careful attitude and rational use of natural resources.

Key words: *environmental education, school chemistry course, principle of local history, institutions of general secondary education.*

Introduction. Environmental education of schoolchildren is one of the most important tasks of society in the field of environmental protection. In the concept of environmental education of Ukraine, it is indicated that the institution of general secondary education is assigned a leading role in its implementation, which consists in the formation of a system of knowledge, views and beliefs of students, which will ensure public responsibility for the state of the environment and readiness to improve it by making the necessary ecologically competent decisions. This leading idea should be developed at all levels of general education and consists in the greening of school academic disciplines by including ecological aspects related to the basic material to the educational subject [4].

The analysis of literary sources showed that environmentalization of educational subjects can be carried out by:

1) introduction of elements of ecological knowledge when teaching some topics of various educational subjects;

2) use of tasks, questions, problems of ecological content;

3) carrying out interdisciplinary environmental activities;

4) introduction of electives and optional courses in specialized classes;

5) teaching ecology as a separate academic discipline.

Chemistry, as an educational discipline, makes it possible to use the means of its subject to carry out environmental education of students directly in the learning process, provided that environmental knowledge becomes a function of chemical education.

The problem of environmentalization of the school chemistry course is considered in the works of many Ukrainian Methodist scientists and practicing teachers. A well-known scientist in the field of chemistry teaching methods N.M. Burynska considers the main tasks to be solved by environmental education in the process of teaching chemistry: "relying on students' chemical knowledge, to reveal their ecological essence, which will enable students to consciously participate in environmental protection in the future; promote understanding of the role of chemical facts that affect nature, including humans; to make it possible to develop a certain position, which conditions the environmentally competent behavior of the student" [1, p. 26]. According to the author, environmental information included in the content of the school chemistry course should: "be organically related to the content of the chemistry curriculum in order to avoid overloading the course with additional material; to contribute to mastering the basics of chemistry, strengthening the polytechnic education of students; to help the teacher reveal the essence of anthropogenic influence on the biosphere, to educate students in a careful attitude towards nature, a sense of civic responsibility for its preservation" [1, p.26].

A.M. Yasynska scientifically substantiated the social necessity and pedagogical expediency of creating specialized classes of a chemical-ecological profile and created a special course for students of grades 8-11 "Fundamentals of chemical ecology (environmental chemistry)" [8]. In connection with the increased attention to environmental education and education of students and the deterioration of the ecological state of the environment, the author suggests the introduction of the special course "Chemistry and Nature" in the classes of the chemical-technological profile [9].

According to T.I. Voronenko , optional classes are an effective means of environmental education. The author developed optional courses "Chemistry and environment" for students of grades 8-9 and " Ecological-hydrochemical characteristics of the state of natural waters" for students of grades 10-11, which have a practical and ecological orientation [2].

As the analysis of pedagogical literature and school practice shows, solving chemical problems with ecological content is an effective means of forming students' knowledge about environmental problems [3,7].

As for the problem of using the local lore principle in environmental education when studying the school chemistry course, it has practically not been investigated.

The purpose of the article is to reveal the method of using elements of environmental knowledge based on the principle of local history in teaching some topics of the school chemistry course.

The main part. Since the school chemistry course has its own research subject, content, goal, tasks and learning methods, it is subject to both general didactic and specific learning principles. The principle of regionality, or local lore, belongs to the specific principles of teaching chemistry.

The principle of local history involves introducing into the educational material information about the locality in which schoolchildren live, about the natural conditions, economy, ecological state of the native region with cognitive, scientific, educational, educational and practical purposes. The use of local history material in chemistry lessons helps to reveal general laws and phenomena that are studied, improves the depth of understanding of the educational material, increases interest in it, enriches students with knowledge about their native region, promotes the development of creative thinking and leads to an understanding of the main problems of their area.

H.P. Pustovit believes that local history is the most important didactic principle of environmental education, and the use of local history material in education makes it possible to study environmental problems using concrete examples [5].

In order to find out the practical state of the investigated problem, we conducted a survey among chemistry teachers. They were asked the question: "Do you carry out environmental education of schoolchildren by means of the school chemistry course, using material about the ecological state of your area?". From the results of the questionnaire, we learned that 19.3% of the interviewed teachers use materials about the ecological state of their locality in teaching chemistry to schoolchildren, but not systematically, 57.2% carry out environmental education of schoolchildren in chemistry lessons, but do not use the principle of local history and 23.5% - do not carry out environmental education of students in

chemistry lessons, explaining this by lack of time and insufficient amount of didactic materials. The results of the answers are clearly illustrated in figure 1.

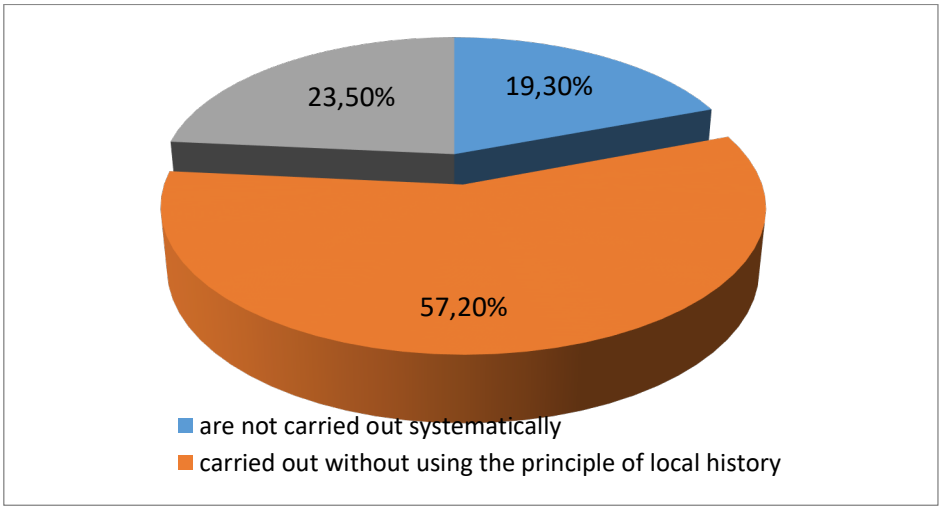

Fig. 1. The results survey on the question " Is carry out you ecological education schoolchildren means school chemistry course, using material about the ecological state of yours area?".

Based on the above survey results, it can be concluded that teachers do not sufficiently use the possibilities of the school chemistry course and local history material for the purpose of environmental education of schoolchildren.

In order to carry out environmental education of students through the school chemistry course based on the principle of local history, we chose to use information about the main chemical and ecological indicators of the water of the Southern Bug River, because it is the main source of drinking water supply of the city of Vinnytsia.

Based on the analysis of the chemistry curriculum for general educational institutions [6] and current textbooks, we have chosen topics, during the study of which it is appropriate to use knowledge about the chemical and ecological assessment of water (table 1).

Table 1. The use of knowledge about the chemical and ecological parameters of the water of the South Bug River in a school chemistry course

Class	Topic name	*The content of the environmental component*
7	Basic chemical concepts.	Filtering as one of the methods of cleaning sewage and natural waters during water treatment .
	Water.	Problems drinking water. Water resources of Ukraine. Ecological condition of the South Bug River. Influence activity of man on the ecological state of water objects in .
	Solutions.	The role of water as a solvent in living nature and practical human activity. Maximum permissible concentrations of substances in drinking water and indicators of its quality. Anthropogenic sources of water pollution of the Southern Bug River.
0	Aromatic hydrocarbons. Pesticides.	Pollution of the aquatic environment with pesticides and its consequences.
	Oil	Pollution of water bodies with oil and oil products and its impact on the vital activity of hydrobionts.
	Phenol	Phenol as a pollutant of the water environment.
	Synthetic detergents	Pollution of the water environment of the SMZ.
	Chemistry and ecology	Ecological condition of rivers and reservoirs of Ukraine and the native region. Assessment of the water condition of the Southern Bug River according to chemical and ecological indicators. Rational use of water. Water pollution. Problems of wastewater treatment.

Continuation **table 1**

1	Mineral fertilizers: nitrate and phosphate.	The content of nitrates and phosphates as an indicator of contamination of water bodies with mineral fertilizers.
	Carbonic acid and carbonates	Water hardness (carbonate and non-carbonate). Ways to eliminate water hardness.
	Physical properties of metals.	Concept of heavy metals, their content in water and negative impact on hydrobionts and human health.

The introduction of the material on the chemical and ecological assessment of the water of the Southern Bug River in the school chemistry course took place in accordance with the patterns of its assimilation and the age characteristics of the students. The educational material was studied from simple to complex as students developed relevant chemical knowledge and skills. First, methods of water purification, physical and chemical properties of water, characteristics of water objects, types of pollution of the water environment, etc., were studied.

Let's consider a specific example of the use of material on the chemical and ecological assessment of the water of the Southern Bug River in the process of studying the school chemistry course. Today, the issue of oil pollution of water bodies has become acute, so when studying the topic " Oil and its processing products " (10 cl) it is important to show the impact of oil products on the state of water bodies. In this lesson, we note that the degree of toxicity of different types of oil products is not the same, but they have one property in common - they attract other toxic chemicals, as a result of which whole depths of "time bombs" float in rivers, seas and oceans. This property of oil should be taken into account by people who pour oil tanker washing water directly into the ocean, or build gas stations near water bodies without thinking about the future. The South Bug River is also polluted with oil products, their average annual concentration is 0.3 mg/l, while the maximum permissible concentration of oil products for drinking water bodies is 0.1 mg/l. After that, we jointly discuss measures aimed at reducing the negative impact on the environment. This approach contributes to the development of students' cognitive interest in the problems of environmental protection and chemistry as a science.

Conclusions. So, the use of ecological material in the school chemistry course based on the principle of local history makes it possible to carry out environmental education of schoolchildren, which contributes to the awareness of students of the need for a careful attitude and rational use of natural resources.

We see the prospects for further research in identifying the impact of group work of students in chemistry using local history material of an ecological orientation on the environmental education of schoolchildren.

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