

## Innovative technologies for the formation of environmental competence of high school students in educational the system of the republic of Kazakhstan

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### Abstract

The article examines the state of environmental education in general and innovative technologies for the formation of environmental competence of high school students in the educational system of the Republic of Kazakhstan. The results of our own research on environmental education and the results obtained after the application of innovative technologies for the formation of environmental competence of high school students are presented: discussion of the results of the questionnaire before and after the elective course entitled "Ecology and sustainable development". The results of the survey showed that conducting an elective course using innovative technologies in environmental education is the most useful, convenient and necessary method of forming environmental competence of high school students of secondary schools. Based on the results of the survey, it was possible to determine which topic should be emphasized when drawing up the elective course program and on which topics innovative technologies such as the use of ICT, group design and research work, group work, promotions, as well as what knowledge, skills and abilities should be given when conducting a course on ecology. And the results of the questionnaire on the topic of "Rational nutrition" made it clear that the ignorance of students on the topic of proper nutrition that it is necessary to include this topic in the elective course program, and at the same time to focus on human health with frequent eating of quickly prepared food.

Keywords: environmental education, environmental development, innovative technologies, formation of environmental competence of high school students, environmental education in the Republic of Kazakhstan, tasks of modern environmental education in the Republic of Kazakhstan.

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**Topicality of theme of the research.** Nowadays, the problem of ecology is topical and it enables to strengthen the ecological education of the population, including the future generation. In the context of modernization of education in the Republic of Kazakhstan, the problem of ecological education has a completely new peculiarity [1-3].

The main tasks of modern ecological education are:

- To provide opportunities for all citizens to obtain theoretical knowledge and key ideas on the development of natural systems, their changes under the influence of the anthropogenic process, the need and ways to preserve life and civilization on the Earth;

- To develop constructive approaches and mechanisms for the implementation of environmental ideas of (systems action) at different levels;

- To form more perfect stereotypes of human behavior in the field of environmental management, restoration and preservation of a safe environment, stimulation of social activity.

Recently, more attention has been paid to the issue of ecological training of pupils at various stages of the educational process. Laws, by-laws, regulations are being passed, problem councils, centers, laboratories, etc. are being formed. There is an impression that ecological education in the country is a priority, as stated in a number of documents, which shows the topicality of ecological education at school programs.

In this regard, it is very important to form the ecological competence of high school pupils through elective courses [2].

**Research methods.** In this work, the following research methods were used:

1. Questionnaire; 2. Analysis; 3. Comparison;

As a result of the research, a questionnaire was conducted among pupils of 10<sup>th</sup> and 11<sup>th</sup> grades of Lyceum School No. 11 in Kyzylorda, before and after the elective course named "Ecology and Sustainable Development", an analysis of the results of the questionnaire was carried out, a comparative analysis of the results was made before and after the questionnaire.

The questionnaire on the topics as "Ecological questionnaire", "Nature, ecology and us" and "Rational nutrition" was conducted.

**Discussion of the obtained results.**

For the first time in September, 2015-2016 academic year, before the start of the elective course on the topic "Ecology and Sustainable Development" on the general topic named "Ecological Questionnaire".

The second time in September, 2016-2017 academic year, the questionnaire was conducted on the topic "Nature, ecology and us", then in November, 2017-2018 academic year, on the topic "Rational nutrition".

In the 2015-2016 academic year, only 150 respondents took part in the questionnaire, of which 10<sup>th</sup> grade in total - 83 respondents, of which 52 girls and 31 boys, 11<sup>th</sup> grade in total - 67 respondents, of which 35 girls and 32 boys; 2016-2017 academic year in total - 144 respondents, 10<sup>th</sup> grade - only 69 pupils, of which 39 girls and 30 boys, 11<sup>th</sup> grade - only 75 pupils, of which 49 girls and 26 boys.

In the 2017-2018 academic year, only 143 respondents took part in the questionnaire, of which 10<sup>th</sup> grade - 76 pupils (46 girls and 30 boys), 11<sup>th</sup> grade - 67 students (39 girls and 28 boys).

The results of the questionnaire on the topic "Ecological Questionnaire" are as follows:

Pupils answered the first question: 80 % - “Yes”, 20 % - “No”; and the answers to the second question were 90 % - in lessons and extracurricular activities, 10 % - in the media (TV, newspapers, magazines). The answers to the third question are obvious, because all pupils take part in cleaning school grounds, and among them there are those who helped to plant trees on school grounds, the answers are 100 and 100 %. Recently, there are no sparrows that winter in the city, so no one had to feed the birds.

The third question was asked so that pupils knew that the sparrows used to winter, and now we cannot even meet. The answers to the first three questions are given in Table No. 1.

Table No. 1. Results of the “Ecological questionnaire”

No.	Questions	Answers	%
1	Are you interested in ecological issues (nature conservation)?	Yes No	80 20
2	Where do you get information on ecological issues from?	in lessons and extracurricular activities in the media (TV, newspapers, magazines)	90 10
3	What have you done to improve the environment?	took part in cleaning school grounds took part in cleaning the banks of the river planted trees fed birds in winter	100 - 100 0

The fourth question was a little difficult, because pupils still make noise when they walk on the street, they often do not turn off the electricity at school (which is easy to understand and they do the same at home), among them there are still pupils (although high school) who mistreat books, does not save tap water, but they did not have a special concept of household waste. (see Figure 1)

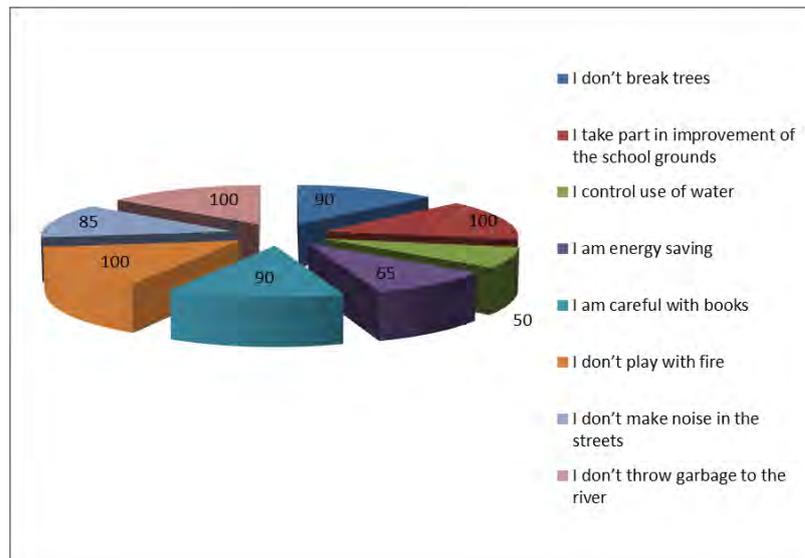


Figure 1. Question 4: “Highlight those actions that are characteristic of your behavior”.

\*Note. The pupils were allowed to indicate more than one answer.

And finally, on the fifth question, the following answers were received: participated in the competition of ecological drawings - 25 %, participated in scientific projects - 10 %, participated in

quizzes on an ecological topic - 70%, participated in an ecological evening on Biology - 95 %, issued wall newspaper for an ecological evening - 95 %, (see Picture No. 2).

According to the results of the questionnaire, it was found that the pupils basically had an idea about ecology. The result of the questionnaire enabled to determine what topics should be given to pupils in the elective course.

In the city of Kyzylorda, there is “Ibraikhan and K-LTD” LLP, which is engaged in the removal, disposal and processing of solid domestic waste. The enterprise often holds contests on ecological drawings, sometimes a competition of scientific projects among schoolchildren.

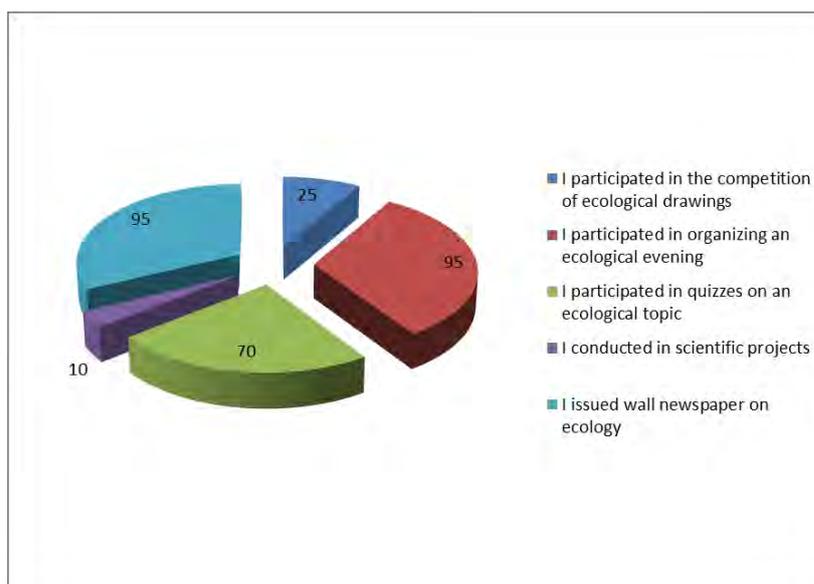


Figure 2. Question 5: Have you ever participated in promoting the ecological knowledge, if so, in what form? \*Note. The pupils were allowed to indicate more than one answer.

In the city akimat of Kyzylorda city there is a special department for youth affairs and domestic policy; and the Student Alliance in the Kyzylorda State University named after Korkyt Ata has been operating for several years, they often organize contests for scientific projects in ecology. Once a year, scientists, chemists and ecologists organize contests among schoolchildren of the region and the city. There were participants in such competitions among schoolchildren.

As a result of conducting a questionnaire on the topic “Nature, ecology and us”, the following results were obtained: to the first question which sounds “Do you love nature?” the answer was Yes - 90 %, No - 10 %, pupils were able to explain their answers very well, they gave an example of the beauty of nature. Questions No. 1, 2, 3 and 5, 6 and their answer are shown in Table 2.

The answer to the second question was b) - 78 %, c) 22 %, and no one answered the first question, which means that students have an idea of ecology, they know that there is such a science.

The third question is very important, because it sounds like this “Are there environmental problems in our country (Republic of Kazakhstan), in particular in the Kyzylorda region?”, if there is an answer “Yes”, they should the ecological problems they know.

Table No. 2. Results of the “Nature, ecology and us” questionnaire

No.	Questions	Answers	%
1	Do you love nature?	Yes	90
		No	10

2	What is ecology?	Science that studies the origin of the Earth	-
		Environmental science, home of a human, his interaction with this environment and ways to provide conditions for its life	78
		An understanding of the world, which includes both a conscious attitude towards everything that exists, and its active protection	22
3	Are there environmental problems in our country (Republic of Kazakhstan), in particular in the Kyzylorda region?	Yes	100
		No	-

Pupils wrote about the problem of the Aral Sea, Baikonur, the Semipalatinsk test site, the problem of Lake Balkhash, etc. Conclusion: pupils have an idea about the environmental problem of the region and the country.

To the question “What will happen to that area of nature where the forest will be completely cut down?” the answer was the following: a) - 5 %, b) - 52 %, c) - 30 %, d) - 13 %. Pupils basically chose the correct answer, which can be considered that they have an idea about this problem. (see Figure 3).

The following answers were given to the fifth question: a) - 45 %, b) - 45 % and c) - 10 %, logical answers were given, which shows that pupils have a correct idea.

On the sixth question 98 % of students answered “Yes”, only 2 % - “No”. Such an answer can be obtained thanks to our elective course. At this time, 11 grade pupils already passed the section of ecology on Biology, where there are the following topics on ecology: “A Man and the Biosphere”, “The doctrine of V.I. Vernadsky on the Biosphere”, “The role of a human in the Biosphere”, “Environmental problems of Kazakhstan” etc. The authors of the school Biology program are R. Satimbekov, R. Alimkulova and Zh. Shildebayev. The respondent pupils are trained in the natural science direction, therefore, their Biology course focuses on the topic of ecology.

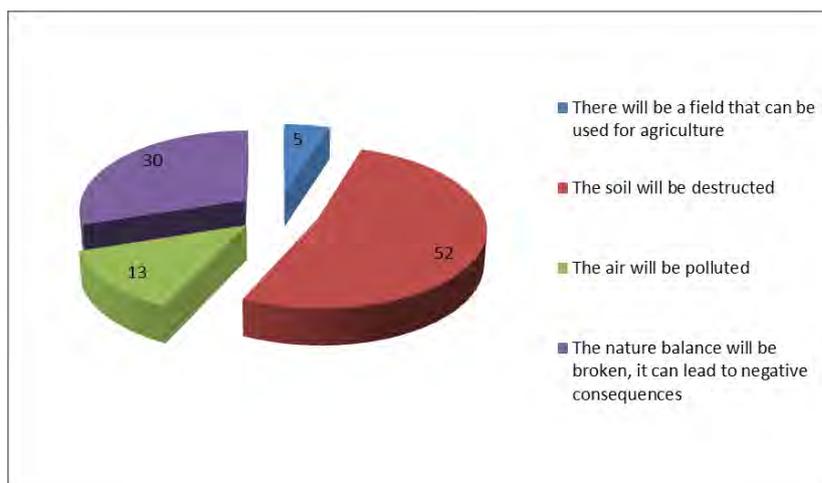


Figure 3. Question 4: «What will happen to that area of nature where the forest will be completely cut down?»

The seventh question was “Please point out the basic rules of behavior in nature”. The pupils were able to list the rules that people should adhere to when communicating with nature. Questions 5, 6 and 7 and their answers are shown in Table 3.

Table No. 3. Results of the “Nature, ecology and us” questionnaire

No.	Questions	Answers	%
5	Why is it impossible to wash a car in the river?	Fish is dying	45
		Gasoline film prevents oxygen entering	45
		Car is destroyed	30
6	Are you worried about the future of nature?	Yes	98
		No	2
7	Please point out the basic rules of behavior in nature.	Pupils gave different answers	

The answers to the last eighth question were as follows: a) - 25 %, b) – 35 %, c) - 30 %, d) - 10 % (see Figure 4).

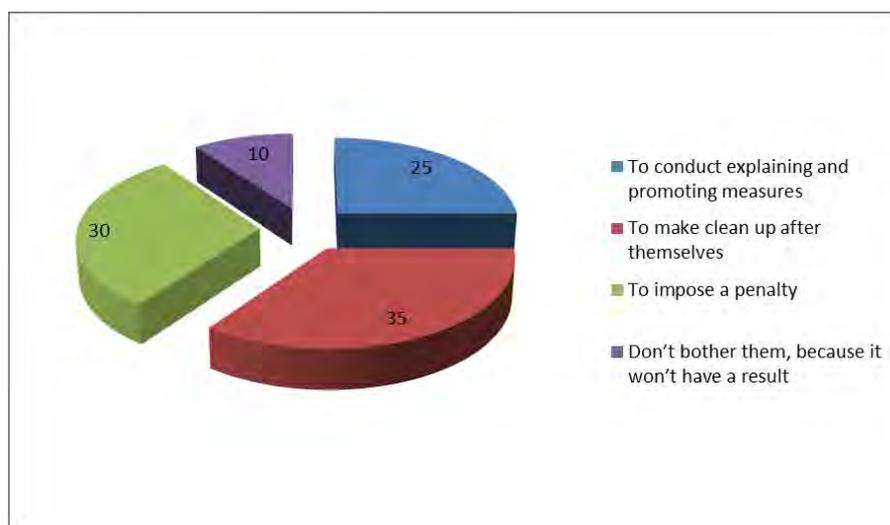


Figure 4. Question 8: “How would you deal with people who pollute the environment?”

Analyzing the answers of the children, we can draw the following conclusion: pupils are generally not indifferent to what is happening in the environment, they have their own opinion, and can express their point of view about the protection of the environment.

The answers obtained after analyzing the results of the questionnaire showed that pupils of 10 and 11 grades already had certain knowledge, skills and abilities on ecology, at least they were able to express their opinion on the protection of the environment, what activities can or even need to be carried out.

The questionnaire on the topic “Rational nutrition” showed the following results: the answers to the first question were a) - 70 %, b) - 30 %, it can be assumed that pupils go to bed late and get up late and do not have time to have breakfast at home.

To the question “How many times a week do you use milk or dairy products?” the answer was a) - 60 %, b) - 25 %, c) - 15 %, the results show that dairy products are relatively expensive and large families cannot buy milk and dairy products as often.

Answers to the third question a) - 85 %, b) - 15 % c) - no answer.

To the question “Do you use quickly prepared products (crackers, chips, hamburger, carbonated drink)?” the answers were as follows: a) - 98 %, b) - 2 %, which indicates that pupils usually use fast food without parental supervision, because they are already quite adults.

And to the question about diseases that can cause fast food, pupils answered a) - 30 %, b) - 17 %, c) - 5 % and d) - 48 %, such answers show that it is necessary to inform pupils about the dangers of frequent use of quickly prepared products.

Pupils answered the sixth question as: a) - 20 %, b) - 80 %. It can be concluded that although high school pupils often do not eat on time, they do not pay special attention to nutrition, especially since they are intensively preparing for the UNT.

To the seventh question “Do you eat vegetables and fruits every day?” the answers were as: a) - 40 %, b) - 60 %. Vegetables and fruits are mainly imported and of poor quality, the answers to the question can mainly be associated with this problem. Since vegetables and fruits are imported and expensive, it may be the reason for not often consuming them.

The results of answers to questions 1, 2, 6 and 7 are shown in Figure 5.

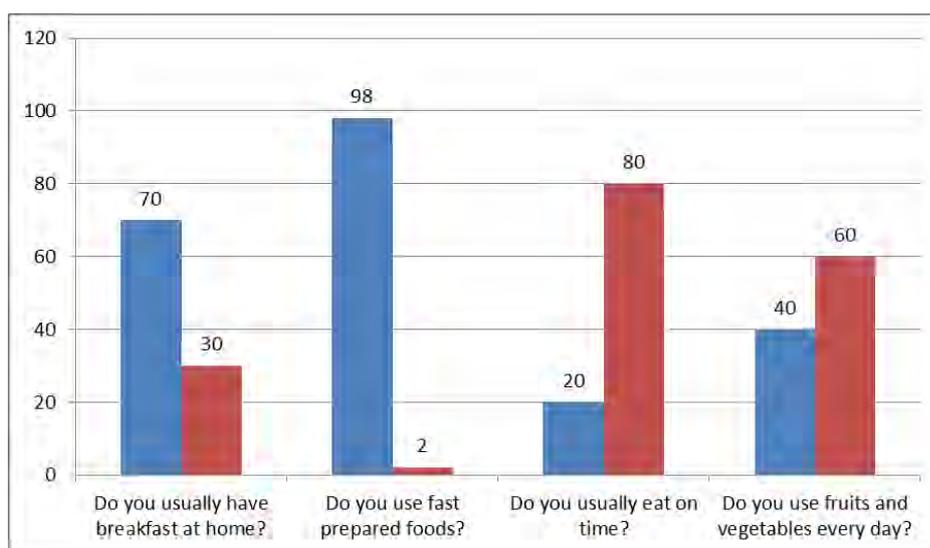


Figure 5. Questions 1, 2, 6 and 7: blue - Yes, red - No.

The eighth question was about proper nutrition, the answers: a) - 62 %, b) - 15 %, c) - 20 %, d) - 3 %. Basically, the pupils gave a spontaneous answer, many said that they did not even think about such a problem. This means that we need to give information on “Proper nutrition”.

“Do you visit the school canteen?”. To such a question the answers were: a) - 95 %, b) - 3 %, c) - 2 %. The answers to this question are complemented by the answer to the first question. Pupils do not have time to have breakfast at home, so they run to the school canteen as soon as it possible.

The answers to the last question were as follows: a) - 20 %, b) 70 % and c) - 10 %. These answers indicate that extracurricular activities on “Proper nutrition” need to be done, and that the answers complement the answers to the eighth question.

The respondents' answers to questions 2, 3, 9 and 10 are shown in Figure 6. And the results of the questionnaire on "Rational nutrition" on questions 5 and 8 can be seen in Table 4.

The obtained results of the questionnaire allow us to make the following conclusion: although they are high school pupils, they do not have a clue about "Proper nutrition", they eat various types of fast food without supervision of their elders, often do not have breakfast at home.

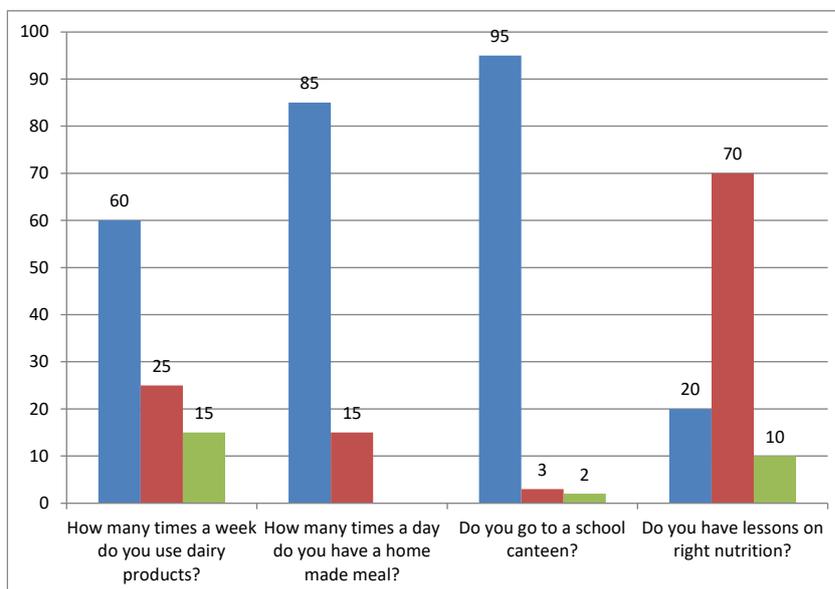


Figure 6. Questions and answers to questions 2, 3, 9 and 10.

Table 4. The results of the questionnaire on "Rational nutrition", answers to questions 5 and 8.

No.	Questions	Answers	%
5	What diseases can fast cooked foods cause?	Stomach disease	30
		Anemia	17
		Heart disease	5
		Do not know	48
8	How do you understand Rational nutrition?	Eating nutritious foods	62
		Keeping a diet	15
		Timely food	20
		Eating light foods	3

### Conclusion.

With the help of a questionnaire before the elective course, it was determined which issues should be considered thoroughly in the course and children's insufficient knowledge of ecology. And based on the results of the questionnaire on the topic "Ecological Questionnaire", it will be possible to draw up a plan for an elective course.

The results of the questionnaire on "Nature, ecology and us" enabled to determine that pupils need knowledge of an applied nature, i.e. on the topics physical and chemical methods for the analysis of environmental components on the example of air, water and soil.

The questionnaire on "Rational nutrition" enabled to determine that pupils have to know more about proper nutrition and the dangers of different types of fast prepared food.

In general, we can conclude that the ecological development of high school pupils must be ensured by conducting elective courses on an ecological topic, organizing master classes, for example, on proper nutrition and on environmental impact assessment and on the simplest methods of environmental monitoring.

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### **References**

1. Ob osobennostjeh organizacii obrazovatel'nogo processa v obshheobrazovatel'nyh shkolah Respubliki Kazahstan v 2017-2018 uchebnom godu: Instruktivno-metodicheskoe pis'mo. – Astana: Nacional'naja akademija obrazovaniya im. I. Altynsarina, 2017. – 370 s.
2. Sagyndikov G.M. Sostojanie jekologicheskogo obrazovaniya v Kazahstane // <http://naukarus.com/sostoyanie-ekologicheskogo-obrazovaniya-v-kazahstane>
3. Tanatarova K.T. Jekologicheskoe obrazovanie v Respublike Kazahstan // <http://library.ua/m/articles/view/>
4. Gorbenko N.V. Pedagogicheskie uslovija formirovaniya i razvitija himiko-jekologicheskoy kompetentnosti starsheklasnikov cherez jelektivnye kursy //Avtoreferat dissertacii na soiskanie uchenoj stepeni kandidata pedagogicheskikh nauk. - Moskva, 2009 g. – 20 s.
5. Askarova G.Sh., Nurgabylova N.Sh. "Ecology and sustainable development", the elective course program for grades 7-9, 2013 - 19 p.
6. Askarova G.Sh., Nurgabylova N.Sh. "Ecology and Green Technology", elective course program for 10-12 cells, 2014 - 20 seconds.
7. Gilmanov MK, Abshenova L.U., Solovyova A.R. Biology: Textbook for the 9th grade of the general education school. - Almaty: "Atamura", 2005.- 304 p.
8. A.N. Nazarbayeva, GS Syzdykov, K.O. Shayhyslyamova, S.E. Abdugalina. Ecology and sustainable development. - Almaty: The house is published. LLP "Exclusive", 2014. - 232 p.
9. Shalgymbaev S.T. Trends in the development of environmental education at the present stage. - Almaty, 2005. - 144 p.