

DESIGN AND IMPLEMENTATION OF THE ELECTIVE COURSE FOR STUDENTS OF SUBJECT-ORIENTED STUDY ON THE SUBJECT "WE ARE WHAT WE EAT"

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Antonina Anatol'yevna Mostyakova
Kazan Federal University

Yusupova Enzhe Minaskhadovna
*Kazan Federal University Student of the Master's
Degree of the Department of Botany and Plant
Physiology, Institute of Basic Medicine and Biolog*

Abstract. this paper suggests the content of an elective course on the subject "We are what we eat", aimed at the formation of knowledge and practical skills related to the rational and safe nutrition of the population. In addition to the development of an elective course, the paper highlights the implementation of the course for pre-profile or profile education in the general education school.

The content of the program details and discloses the content of the standard, corresponds to the general strategy of teaching, education and development of students using the means of the subject in accordance with the goals of in-depth study of biology, which are defined by the standard.

The program includes 14 sections for 17 hours (half a year). The program is aimed at the formation of active cognitive activity, independence and responsibility, communication and information skills, creative and logical thinking, and, of course, expansion of the knowledge base in biology. The development of all the competencies required for the graduate is carried out through the use of modern technologies for teaching biology.

This elective course plays both a professional role and is suitable for pre-professional training of students, since the program, in addition to forming a responsible attitude to one's own health, opens up to the students the sphere of professional activity in the study of biology.

The paper contains the results of approbation of the course on the basis of the secondary general education school

Keywords: school, subject-oriented study, elective course, rational nutrition, safe nutrition.

1. INTRODUCTION

Subject orientation of teaching is considered as the main way to implement the individual educational interests of students in the upper grades. One of the central places in the system of pre-profile and profile training is occupied by elective courses (Sidorova, 2010; Petrosian, 2014; Ermakov, 2004).

The need for the introduction of the course "We are what we eat" for the natural-science pre-profile or profile training of students is conditioned by the enormous educational value.

In modern society, the problems of providing the population with healthy and safe food are given great attention. The Government of the Russian Federation approved the "Fundamentals of the State Policy of the Russian Federation in the Field of Healthy Nutrition of the Population until 2020" (Order of the Government of the Russian Federation No. 1873-r of October 25, 2010). This order provides for a set of activities aimed at creating conditions that meet the needs of various groups of people in healthy and safe food. To formulate the basic rules for a healthy lifestyle of people is the task of doctors and teachers who have scientific information about health, and can intelligibly and interestingly convey the necessary knowledge to a person (Strakhova, 2015).

Objective of the study is to develop an elective course on the subject "We are what we eat", for students of the subject-oriented (profile) school.

2. METHODS AND ORGANIZATION OF RESEARCH

The research methods included the analysis of scientific and methodological literature, the design of the program and content of the elective course, the development of testing to identify available and acquired knowledge and testing of the developed course on the basis of a general education school.

Course curriculum

Total number of hours – 17

Section 1. Physiology of digestion

Subject 1. Digestive organs. Digestive process

Section 2. Water

Subject 1. Drinking water – the most important factor of human health; treatment of gastrointestinal diseases with mineral water.

Laboratory work. Mineral water composition study

Section 3. Nutritional value of food

Subject 1. Nutrients; increase of the nutritional value of food. Section 4. Food as a source of energy

Subject 1. Energy value of food.

Subject 2. Types of metabolism. *Practical work. "Calculation of the values of different types of metabolism."*

Section 5. Nutrition regimen and dietary nutrition.

Subject 1. Nutrition regimen: daily ration planning; excess weight. Dietary food. Diet, starvation, vegetarianism, separate nutrition, raw food diet, low-carb diet, blood type diet; components of food and the consequences of their insufficiency. *Practical work. "Analysis of known diets: can diet be considered a rational nutrition?"*

Section 6. Food microflora

Subject 1. General patterns of growth, reproduction and death of microorganisms on food products; food poisoning and prevention; sanitary standards.

Subject 2. Microbiology of basic food products: microbiology of meat / meat products, fish / fish products, sterilized canned food, vegetables / fruits, milk / dairy products, eggs / egg products. *Laboratory work. Microbiology of fermented milk products.*

Section 7. Food contaminants

Subject 1. Nitrates in food: determining the presence of nitrates in foods; rational use of fertilizers in the cultivation of agricultural products. Recommendations for reducing the content of nitrates during processing and use of raw fruits and vegetables. Pesticides in food.

Subject 2. Heavy metals in food: sources of pollution and toxic effects of heavy metals on the human body (mercury, lead, cadmium, zinc).

Carcinogens in food: ways of cooking, leading to the emergence of carcinogens and practical recommendations for reducing the consumption of

carcinogens with food. *Round table: "Alternative to chemical fertilizers and pesticides"*.

Section 8. Food additives

Subject 1. Classification of food additives by the effect on food raw materials: dyes, preservatives, antioxidants, stabilizers, emulsifiers, thickeners, taste and flavor enhancers. Influence on human health. List of "banned food additives" in Russia. *Practical work "Food inspection by the information on the package."*

Section 9. Food packaging and utensils.

Subject 1. Food package and dishes: plastic packaging, self-destructive packaging, packed and canned food, freezing, drying.

Section 10. Problems of genetically modified food products.

Subject 1. Goals and methods for obtaining genetically modified organisms.

Subject 2. Genetically modified food related risks: allergy, mutation; environmental risks. Methods for checking for GMOs.

Practical work "GMO: threat or salvation?".

Section 11. Consumer rights when buying food

Subject 1. Consumer rights when buying food: the emergence of the movement in protection of consumer rights, the law on consumer protection. RF, the right to information about the manufacturer and about the goods, the organization for the protection of consumer rights.

Section 12. Racial and social differences in nutrition

Subject 1. Physiological and racial differences and their relationship with nutrition. Social aspects of nutrition: information on the environment available to various communities, information on the nutritional value of food, on the methods of their preparation, storage and distribution, social and technical limitations related to the satisfaction of nutritional needs. *Round table. "Culinary traditions of different nations."*

Section 13. Evolution of the human diet

Subject 1. Evolution of the human diet - yesterday, today, tomorrow.

Section 14. Therapeutic and preventive role of nutrition

Project defense: Therapeutic and preventive role of nutrition.

Analysis of the literature that can help achieve the objectives allowed us to choose the necessary methods, forms, means of training.

The traditional lesson does not meet the modern requirements in education, therefore innovative pedagogical technologies, in particular active and interactive teaching methods, which stimulate students' cognitive activity towards the subject, were used.

To conduct an elective course, seven lessons were selected, which technologies and techniques of development and implementation are presented in Table 1.

No.	Topic of the lesson	Technology	Techniques
1.	Energy value of food	Integrative	Practical work
2.	Nutrition dietary regimen	Group training method (Rivin's method)	Discussion
3.	Food microflora	Critical thinking	Insert, laboratory work
4.	Food contaminants	Case	Brainstorm, FILA table
5.	Food additives	Group (puzzle)	Discussion, practical work
6.	GMO	Problem-based	Debates
7.	Therapeutic and preventive role of nutrition	Project-based	Public speech

Table 1. Methods and forms of training used in approbation of the elective coursea

3.RESULTS AND DISCUSSION

The elective course "We are what we eat" was tested during the pedagogical practice on the basis of the secondary general education school No.1 of the city of Mendeleevsk in the 11th grade.

During the first and the last lesson test-polls were conducted to determine the level of knowledge available to and acquired by the students in the course sections. Tests for input diagnostics consisted of 18 questions, suggesting the choice of one correct answer. 15 students participated in the testing. The results of the survey are shown in Figures 1 and 2.

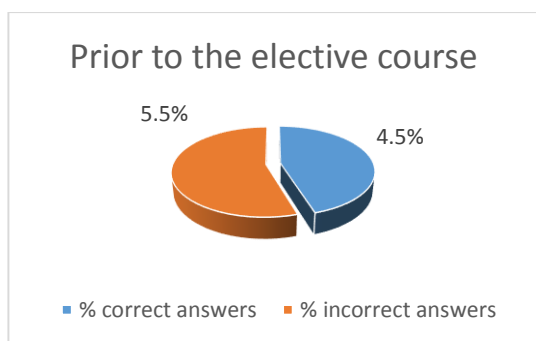


Fig. 1. General test results before the elective course

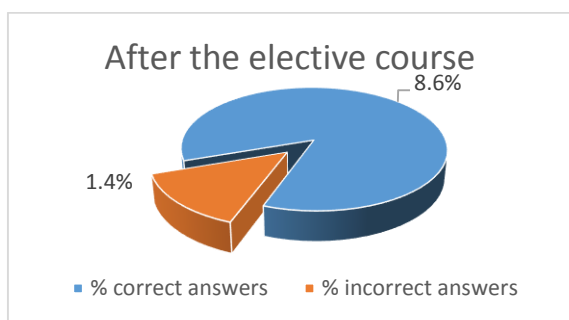


Fig. 2. General test results after the elective course

The figures show that the conducted elective course gave a good result: the number of incorrect answers decreased from 54% to 14%. This suggests that this elective course "works".

Figures 3 and 4 show the dynamics of changes in the test results before and after the elective course on certain topics.

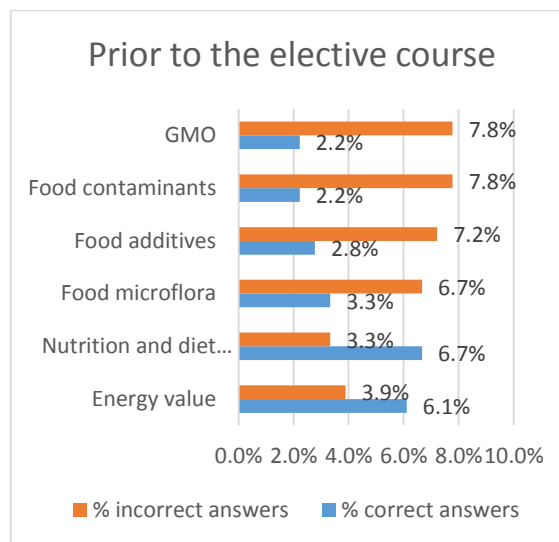


Fig. 3 Test-poll results before the elective course on individual sections

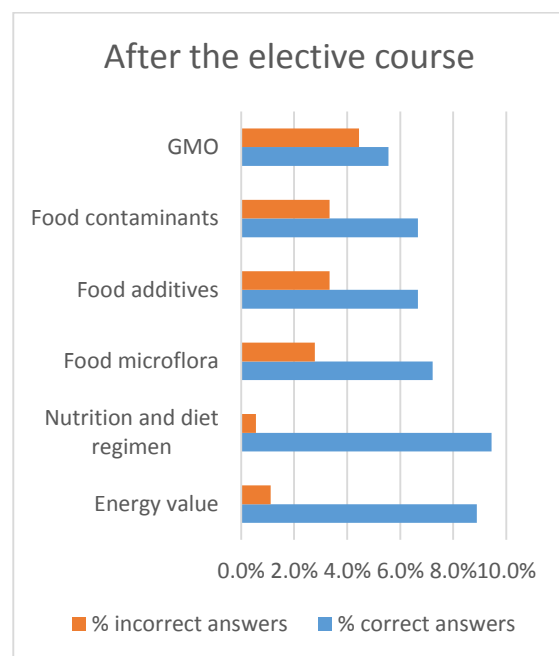


Fig. 4 Test-poll results after the elective course on individual sections

During the test-poll before the elective course the students had difficulties in answering the questions of such sections as "Food microflora", "Food contaminants", "Food additives", "GMOs". Questions related to food energy, diet and nutrition regimen were easy for the students (Figure 2). Such results are connected, most likely, with the fact that the students partially dealt with these subjects in the 8th grade earlier, or knew it from their own, albeit poor, experience.

The results after the elective course were positive, which indicates the correct selection of methods, forms and means of training. The students found difficulties in the topic "GMOs".

The final stage of the elective course was a research project on "Therapeutic and preventive role of food". Students showed their creative and research skills.

The elective course in general showed a good end result, high motivational, active cognitive activity of the students, which was directly the task of the teacher.

After practical training, students were invited to leave feedback. The results of the reviews are shown in Figures 5 and 6.

13 of 15 students left their feedback. The elective course aroused interest in 84.65 of students, which indicates a well-chosen theoretical material and exercises.

4.CONCLUSION

Based on the analyzed literature, a program and methodology for conducting some elective courses on the topic "We are what we eat" was developed. The results of the efficiency of the elective course produced good results and positive feedback from students.

5.SUMMARY

1. Analysis of scientific and methodological literature and requirements for the development of the elective course in subject-oriented biological education made it possible to identify the conditions for effective training of senior students. The main one is the use of active and interactive methods in teaching.
2. Analysis of educational and popular science literature on the topic of correct and safe nutrition made it possible to emphasize and focus attention in the development of an elective course on basic nutrition problems.
3. Based on the analyzed literature, a program and methodology for conducting some elective courses on the topic "We are what we eat" was developed.
4. The developed materials were tested on the basis of the secondary general education school No.1 of the city of Mendeleevsk in grade 11. The results

of the efficiency of the elective course produced good results and positive feedback from students.

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