



USING INTERACTIVE TECHNOLOGIES AND METHODS IN TEACHING BIOLOGY

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Abstract

Educational practice shows that the establishment of interdisciplinary connections in school education is a vivid expression of the integration processes taking place today in science and society. This connection plays an important role in the conscious assimilation of knowledge by students, the development of a holistic view of the world, and the improvement of their practical and scientific-methodical training. Such training allows graduates of general secondary education to freely apply the knowledge, skills, and competencies acquired in the classroom and in extracurricular activities, in production, and in general in any activity.

Keywords: Integration, science method, lesson, natural science, evrika, intellekt, kvest.

ANNOTATSIYA:

Interfaol metodlarning eng asosiy xususiyati o'quvchilarni faollashtirish va fikrlashini rivojlantirishga imkon berishidir. Ularni mutloqlashtirib qo'yish ham o'rinli emas, chunki interfaol metodlar yangi bilimlarni berishga xizmat qilmaydi. Ana shu sababli ular bir necha asrlardan buyon qo'llanib kelayotgan suhbat, hikoya, tushuntirish, ko'rsatish, namoyish etish, didaktik o'yin kabi metodlarni chetga surib qo'ya olmaydi. O'quvchilarni bilimlar bilan qurollantirmasdan turib, ularni fikrlashga va faollikka faollikka undab bo'lmaydi.



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Kalit so'zlar: integratsiya, fan usuli, dars, tabiatshunoslik, evrika, intellekt, kvest.

АННОТАЦИЯ:

Образовательная практика показывает, что формирование межпредметных связей в школьном образовании является ярким выражением интеграционных процессов, происходящих сегодня в науке и обществе. Эта связь играет важную роль в осознанном усвоении знаний учащимися, развитии целостного мировоззрения, повышении их практической и научно-методической подготовки. Такая подготовка позволяет выпускникам учреждений общего среднего образования свободно применять полученные знания, умения и навыки на уроках и во внеурочной деятельности, на производстве и вообще в любой деятельности.

Ключевые слова: интеграция, метод естественнонаучного образования, урок, естествознание, эврика, интеллект, квест.

Interactive methods, like other methods, help to organize the cooperation of the teacher and the student as a component of the training session. In other words, they serve for the full implementation of the technological process.

The implementation of each training session is based on a certain algorithmic sequence. The methodology requires a basis in the general and specific rules of this algorithmic sequence. The teacher can freely choose the technology of conducting the training session in connection with the training goal. More precisely, it becomes possible to design the training stages separately in accordance with the expected result in each training session, and to select the form, methods and tools used at each stage.

The “Mind Map” method is an effective way of thinking, remembering, solving creative tasks, and processing on paper. It is also called a mental map and mind map.



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In a mind map, students can use texts, linear forms, schemes, tables, and lists to write their thoughts. In the educational process, a mind map can be used in different ways: when writing basic concepts; when solving a problem situation; when finding a possible solution to a specific task; when solving a collective problem; to summarize the topic; it can be used in control work.

The “Heuristic Learning” method. In this method, students are given a problem and asked to find a solution to the problem through an electronic library, laboratory and workshop, various books, and sources. The teacher’s role is to manage the learning process, and students perform the entire process independently. Using creative thinking and imagination, they try to find appropriate solutions based on some logic. They share their experiences. In this method, the teacher does not give ready-made information, but encourages the student to think through questions, problems, and experiments. We can consider this method in the topic “The Process of Photosynthesis”.

Lesson Objectives: 1. Students will discover the essence of the photosynthesis process on their own. 2. They will form an understanding of the cycle of matter and energy in plants.

- **1. At the stage of creating a problem situation:** the teacher asks the following question: “If we keep a plant in a dark room for a long time, it loses its green color. Why?” At this point, the students express their assumptions: lack of light, lack of nutrients, lack of water, etc. The teacher directs: “So, what does light do for a plant?”
- **2. At the research stage:** The teacher offers a small experiment: 1. Leave one plant in the sun, the other in the dark. 2. After a few days, compare the color and condition of the leaves. In this case, students draw the following conclusion based on the results of their observations: “The plant remains green in the light, which means that an important process is taking place there.”
- **3. In the cognitive (thinking) stage,** the teacher guides the students through questions:



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Where does a plant get energy from?

- What substance is formed in leaves?
- If light is needed, what is this process called?

Students reflect on these questions and come to the idea of “producing food with the help of light.” The teacher summarizes by saying, “This process is called photosynthesis.”

4. At the final stage, students write the following conclusion based on the experiment: “Photosynthesis is the process of forming organic matter (glucose) from carbon dioxide and water in the leaves of plants in the presence of sunlight.”

5. Heuristic questions for consolidation

- What energy is transformed in the process of photosynthesis?
- Why is this process important for life?
- Could animals live without photosynthesis? Why?

Using the heuristic method, students:

- Acquire knowledge not in a ready-made form, but through their own research.
- Learn to experiment, analyze, and draw logical conclusions.
- Develops the skills of thinking, asking questions, and understanding cause and effect.

At one point, in 1995, University of San Diego professors Bernie Dodge and Tom March proposed using computer games to engage students in lessons. The game they proposed was called “quest”, later “Quest technology” (the word “quest” in English means “to search”, “adventure”). Advantages of quest technology:

- To interest students in lessons through various adventure games;
- To teach students to work as a team;
- To teach students to get out of unexpected situations through games;
- To teach them to apply the knowledge they have gained in lessons in practice;
- To teach them to think logically;

Students of the Faculty of Biology of the University of Cambridge expressed their desire to go to the mountains for an internship in biology during the summer holidays and applied to the leadership of the higher educational institution. The applicants’ request was granted. Only one condition was set before them. During



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the internship, the students had to go to the highest peak of the mountain and bring the most valuable medicinal plant from there. The trip was organized. The students climbed the highest They had to overcome several obstacles before reaching the top.

Task 1: The students have to walk 150 km and 5 days to reach an altitude of 3000 meters. (A person can walk an average of 3 km in one hour)

Task: Determine how many hours the students walked in one day.

1. 5 hours
2. 8 hours
3. 7 hours
4. 10 hours

1 – Answer to task:

Students need to walk 150 km and 5 days to reach an altitude of 3000 meters. (A person can walk an average of 3 km in one hour)

Task: Determine how many hours the students traveled in one day.

- 1) $150 : 5 = 30$ km
- 2) $30 \text{ km} : 3 \text{ km} = 10$ hours
1. 5 hours
2. 8 hours
3. 7 hours

4. 10 hours

Task 2: When walking on a flat road, a person weighing 70 kg spends 3000 kJ of energy per day. To climb to a height, the students spent 300 kJ more energy than on a flat road. (The average weight of the students is 60 kg)

Task: Find how much energy (kJ) the students spent per hour and how much energy (kcal) they accumulated per day.

1. 235.5 kJ, 3300 kcal
2. 2828.5 kJ, 282.85 kcal
3. 330 kJ, 1680 kcal
4. 282.85 kJ, 6788.4 kcal



Answer to task 2: When walking on a flat road, a person weighing 70 kg spends 3000 kJ of energy per day. To climb to a height, the students spent 300 kJ more energy than on a flat road. (The average weight of students is 60 kg)

Task: Find how much energy (kJ) the students expend per hour and how much energy (kcal) they accumulate per day.

70 3300

$60 \times X = 2828.5$ $2828.5 : 10 = 282.85$ kJ

1. 235.5 kJ, 3300 kcal $282.85 \times 24 = 6788.4$ kcal

2. 2828.5 kJ, 282.85 kcal

3. 330 kJ, 1680 kcal

4. 282.85 kJ, 6788.4 kcal

Task 3:

The students packed energy-giving foods in their backpacks because they were going on a long journey.

Task: Which of the following foods did the students choose?

Objective: To obtain low-calorie, light-weight, high-calorie foods. They should choose 15 foods from these foods.

Explanation: Using Task 2, students should choose foods that correspond to the kcal energy they accumulate in a day. Oziq mahsulotlari 100 gramdagi energiya miqdori (kcal) Taken at the rate of 200 grams

<u>Kolbasa</u> (640 kkal)	<u>Tuxum</u> (350 kkal)	<u>Karam</u> (54 kkal)	<u>Go'sht</u> (374 kkal)	<u>Piyoz</u> (42 kkal)
<u>Baliq konserva</u> (480 kkal)	<u>Non</u> (1200 kkal)	<u>Sabzi</u> (112 kkal)	<u>Shokolad</u> (1226 kkal)	<u>Ouyultirilgan sut</u> (648 kkal)
<u>Olma</u> (90 kkal)	<u>Ikra</u> (300 kkal)	<u>Pishloq</u> (458 kkal)	<u>Bodring</u> (60 kkal)	<u>Ayron</u> (100 kkal)
<u>Tarbuz</u> (76 kkal)	<u>Limon</u> (23 kkal)	<u>Kartoshka</u> (129 kkal)	<u>Saryog'</u> (734 kkal)	<u>Pomidor</u> (36 kkal)



Answer to Task 3: 6788 kcal

Energy content (kcal) per 100 grams of food products

According to 200 grams

Kolbasa (640kcal)	Tuxum (350 kkal)	Karam (54 kkal)	Go'shit (374 kkal)	Piyoz (42 kkal)
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Task 4:

On the 5th day of the trip, the students developed a disease that, based on their knowledge of biology, they knew that the cause of this disease was their diet. And they began to look for a plant in the mountain that could cure this disease.

Task: What disease did the students suffer from and which plant did they look for in the mountain? Find the name of the disease hidden in the following task and the name of the plant that could cure this disease.

Explanation: Using task 3, students must find the name of the disease and the name of the plant that could cure the disease that they forgot to take from the given products.



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4-TOPSHIRIQ

734	300	1200	374	100
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4-TOPSHIRIQ JAVOBI

S I N G A

P I Y O Z

5-TOPSHIRIQ

Talabalar bu o'simlikni topishlari uchun qanday asbobni o'zlari bilan olishlari kerak edi?

Topshiriq: Quydagi krossvordni yechib, bu yerda yashiringan asbob nomini toping.



ASSIGNMENT QUESTIONS

1. What substance did Karpochenko use to increase the number of chromosomes?
2. What cell lives for 120 days?
3. Who is the scientist who discovered the "master" cell?
4. What is the lowest level of life?
5. What is the individual development of organisms?
6. What is the blue-green algae that forms colonies?

5-TOPSHIRIQ JAVOBI

Talabalar bu o'simlikni topishlari uchun qanday asbobni o'zlari bilan olishlari kerak edi?
Topshiriq: Quyidagi krossvordni yechib, bu yerda yashiringan asbob nomini toping.

K	O	L	X	I	T	S	I	N
E	R	I	T	R	O	S	I	T
T	O	M	S	O	N			
M	O	L	E	K	U	L	A	
O	N	T	O	G	E	N	E	Z
N	O	S	T	O	K			

ASSIGNMENT 6

The students reached the top of the mountain and found the medicinal plant they were looking for.

Assignment: Find the family and name (also the second name) of the plant described below.

The life form is grass, shrub, and sometimes shrub. There are 1,600 species. The leaves are usually complex, pinnate. The flowers are in a raceme or spike-like inflorescence. The fruit is a pod. 592 species grow in Central Asia and 250 in Uzbekistan. The rootstock (singren) is considered a good fodder. The plant, which grows in Kopetdag and Turkmenistan, is used in medicine, the confectionery industry, and technology to obtain tragacanth glue, which is insoluble in water



and only soluble in water. The above-ground part of some species contains glycyrrhizin, flavonoids, and microelements. The tincture is used to treat hypertension.

6-TOPSHIRIQ

OLIASI

1

1- NOMI

2

2- NOMI

3

6-TOPSHIRIQ JAVOBI

OLIASI

1 B U R C H O Q D O S H L A R

1- NOMI

2 A S T R A G A L

2- NOMI

3 N O ' X A T A K



PLANT NAME:

A S T R A G A L



Quest technology conclusion

1. After completing the tasks, students reach the end of their journey and return without obstacles.
2. During the completion of these tasks, students apply their knowledge of biology in situations encountered on the journey and overcome obstacles.
3. This further develops their competencies

The use of interactive technologies and methods in teaching biology allows you to organize the learning process in an effective, interesting and student-oriented way. Interactive methods teach students to think independently, analyze the problem and justify their point of view. As a result, students:



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- deeply master biological knowledge,
 - expand their scientific outlook,
 - develop research, communication and teamwork skills.

Thus, interactive technologies and methods improve the quality of biology education, encourage students to be active, creative and have a scientific attitude to nature.

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