

## Mathematical Analysis Of Improving The Use And Creation Of Didactic And Exhibition Tools In Biology Teaching

*Rozmatova Sharofat Tashmatjonovna*  
*Chirchik State Pedagogical University*  
*Boltayeva Muhayyo Dilshod kizi*  
*Chirchik State Pedagogical University*  
[sharofatrozmatova@gmail.com](mailto:sharofatrozmatova@gmail.com)

**Annotation:** Improving the methodology of using didactic-visual tools in the process of teaching biology is one of the current issues. Despite the fact that didactic materials are actively used by teachers in practice, they often use didactic materials mainly to monitor students' knowledge.

**Keywords:** I saw, I heard, I did, didactic-demonstrative thinking, practical skills, style, creativity

Didactic-visual aid taking into account the characteristics of the classification and their tasks that we have considered, it is possible to form systems (complexes) of educational tools, the use of which is directed to learning. The content of the educational material is known to the students. As noted in the literature, five groups of principles have been identified in the formation of such a system of training manuals in the pedagogical design of various subjects: systematic, scientific-pedagogical, ergonomic, organizational-production and prognostic.

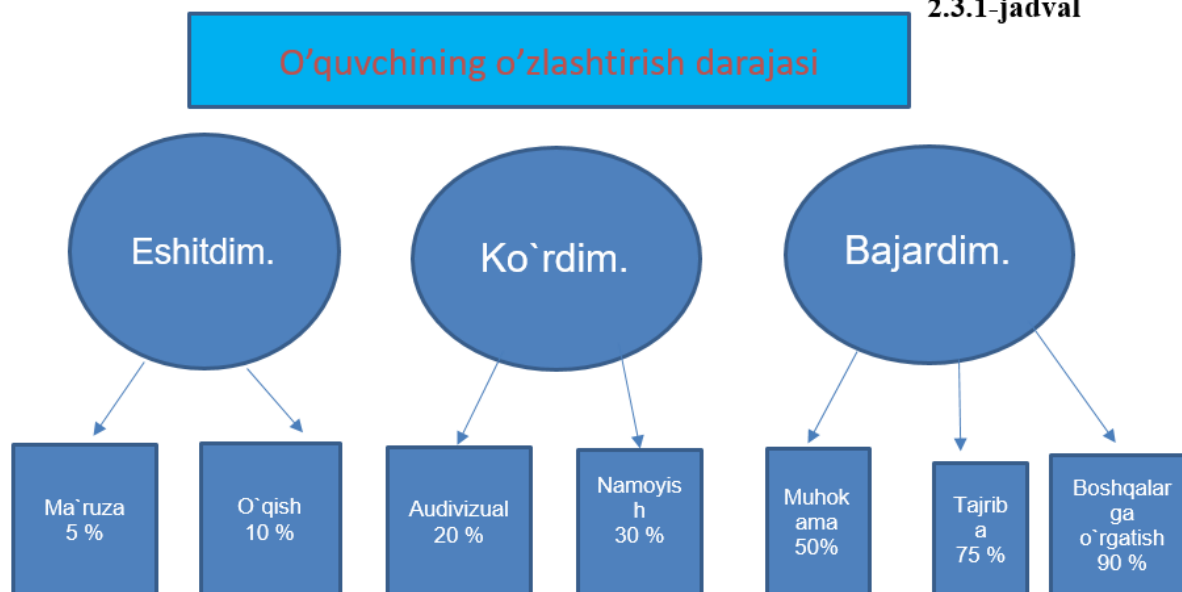
In our work, we also followed the principles belonging to these groups when determining the place of didactic material in the system of educational tools. However, in solving this problem, it is necessary to pay attention to these principles, which are of special importance.

In our opinion, it is possible to solve the problem of determining the location of didactic materials in the development of a system of educational materials in the conditions of the implementation of the following principles related to systematic groups:

As can be seen from the above points, modern educational methods are diverse and multifaceted, and teachers can use these methods to effectively and skillfully conduct lessons. It is clear from this that it is impossible to achieve the goal without a method in the course of the lesson and fill the education with the necessary content. The choice of method is very important for the educational process, the success of the student's and teacher's work depends on the methods. During the research, we used "Labyrinth", "Acquaintance", "Brainstorming", "Chain of terms", "Charkhpalak", "Quick questions", "Non-standard tests" in the course of the lesson. As the main principle of research in the teaching process, we used the method called "I heard, I saw, I did" as a basis. There are different teaching methods in education, but not all of them are equally effective. Therefore, it is important to choose the right method that will give its result. In the practice of teaching biology, the following methods are widely used: lecture, story, conversation, working with a book, observation, experiment, working with a microscope, viewing screen tools, practical work. Currently, teaching methods are enriched with modeling, building mental models and mathematical modeling. The effectiveness of the methods depends on the ability of the teacher to enrich them with methodical techniques. Skillful use of natural objects, pictures, schemes during the story, conversation, systematization and summarization of tables help to increase the cognitive activity of students and master the basic material. With the help of the style of methods, the methods are enriched and their efficiency increases. The style of the methods is considered in an integral connection with the description of the methods.

"I saw, heard and did" method is one of the new methods in teaching biology. After using this method at school, I am convinced that it is effective. When students listen to the information (lesson), they remember a maximum of 20%, and when they see it with their own eyes, the result is about 50% more, and of course, they remember it themselves. When done with 's, the result is

2.3.1-jadval

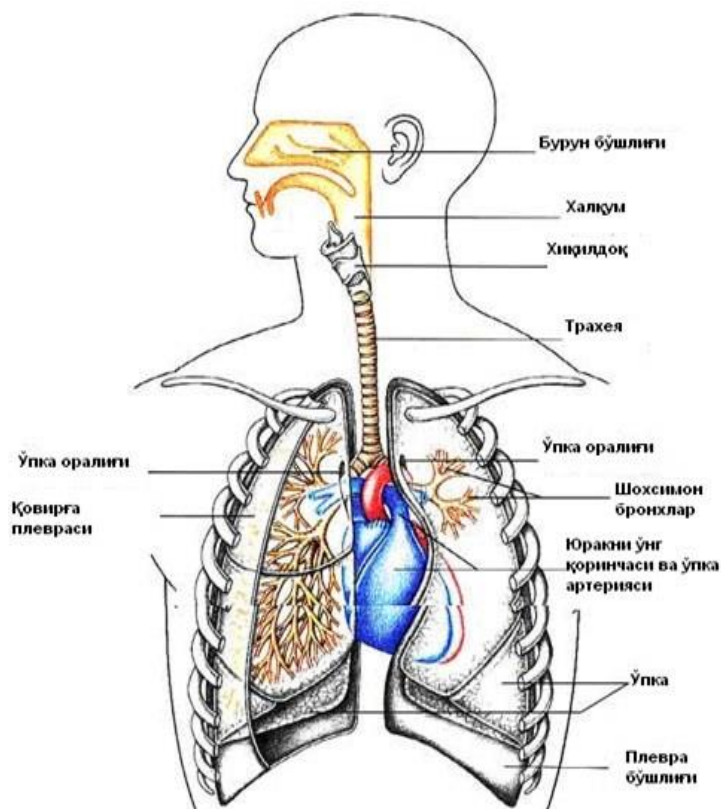


In the process of biology teaching, it is important to take into account the content of the educational material and the specific educational tasks to be solved, the equipment of the biology room with educational equipment, the availability of handouts, the age characteristics of the students and their level of preparation. When learning, it is important to use a combination of methods so that one method complements the other. At the same time, one should not engage in the use of too many methods, because frequent switching from one method to another can lead to distraction of students and overloading of the learning process in the classroom. Improving education requires the use of active methods. It is necessary to use the methods specific to biology: observation, experience, practical work in the field of study and in the biology classroom, in combination with conversation, working with textbooks, and storytelling. They are the most convenient in solving educational problems in the development of thinking, practical skills in teaching biology, eliminating formalism in students' knowledge. The methods of observation, experience, and practical work give learning the character of activity, so they are more effective in teaching biology.

**The first part of the lesson-** I heard. Here the student gets acquainted with the lecture orally.



**To the respiratory organs-** includes nasal cavity, larynx, larynx (trachea), bronchi, lungs and pleural membranes



***The second part of the lesson "I saw."***

The golden rule for students is this: "Students learn what they can perceive by means of the senses, that is, what they can see with their eyes, what they can hear with their ears, smell what they can smell, and taste what they can taste. they must learn by grasping things that can be grasped and felt."

John Amos Comenius (1592-1670)

The procedure for conducting the practical training for the demonstration method is explained. The necessary equipment will be introduced.

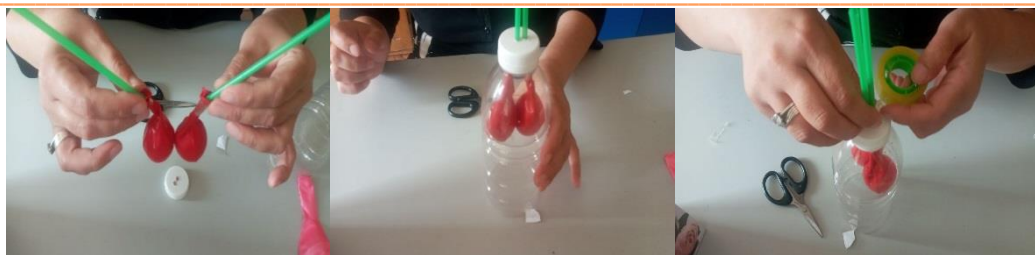


I explained to the students how it works and how to make a model of the respiratory organ. In this part, students have to remember the order of the exercises by sight. They focus the attention of the students on the activity, which helps to develop the ability of concentration in the students.

The method of execution of the saw part;



1st case 2nd case 3rd case



4th case 5th case 6th case



7th work 8th work 9th work

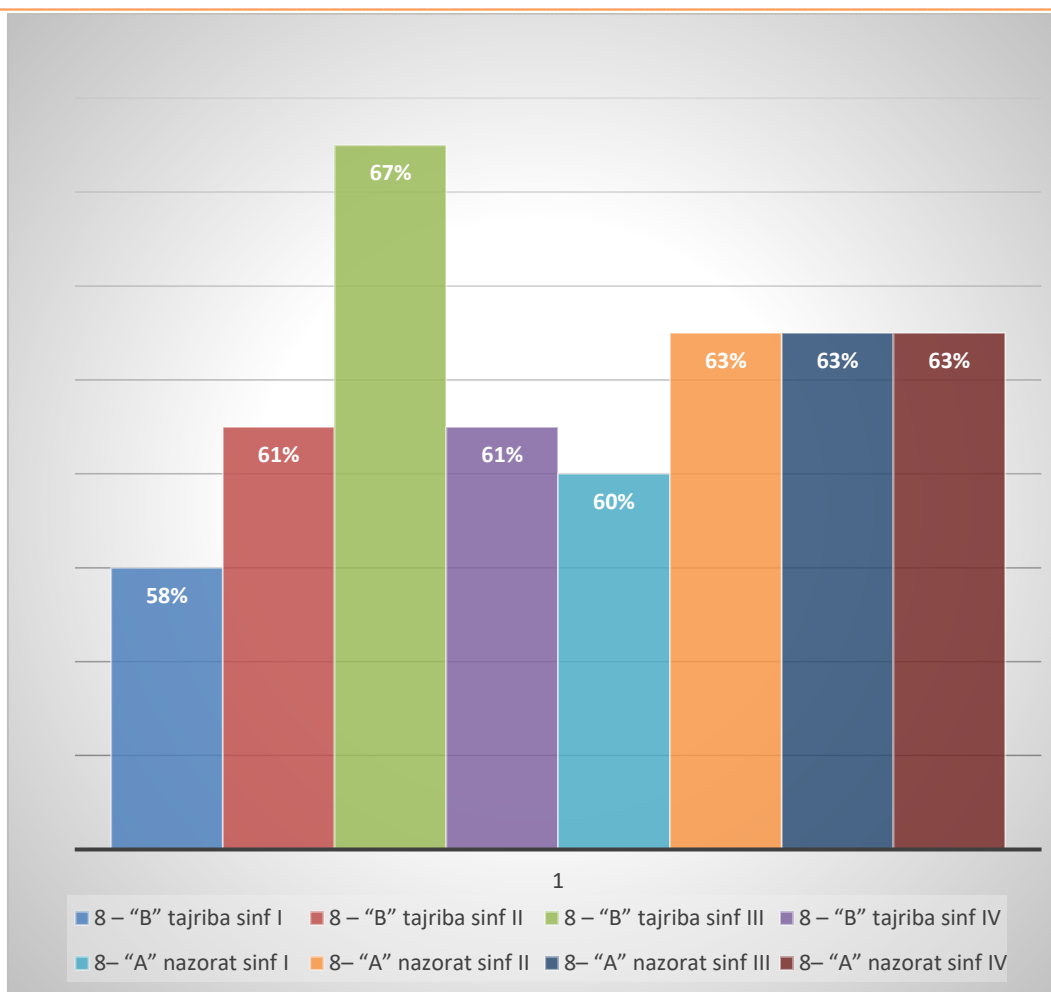


10th case 11th case

Practical training in biology classes is one of the forms of increasing cognitive activity. They enable students to make, analyze, compare, draw conclusions, or generalize essential research observations about various biological objects and processes. We made a mathematical analysis of the lessons conducted using the above methods and showed them through tables.

**Quality indicators of students in I-IV quarters of the 2021-2022 academic year Table 3.2.2**

Class es	Quarters	Number of students	Quality indicators	The number of "excellent" students	The number of students who learn "good".	students who go to the "middle" grade	the number of students studying with "unsatisfactory" grades
8 – "B" experimental class	I	33	58%	8	11	14	-
	II	33	61%	9	11	13	-
	III	33	67%	9	13	12	-
	IV	33	61%	8	12	13	-
8- "A" control class	I	30	60%	6	12	12	-
	II	30	63%	6	13	11	-
	III	30	63%	7	12	11	-
	IV	30	63%	7	12	11	-



**O'of students 2021-2022 o'quality control in I-IV quarters of the academic year'diagram of indicators Fig. 3.2.1.**

In the 2022-2023 academic year, 56 students participated in the research, and the results of the experimental work were based on the criteria for determining the levels of development and formation of students' creativity in biology at the beginning of the experiment and in the control class. in comparison with the values obtained at the end, it was studied using statistical methods that the efficiency indicator of the experimental classes is 8% higher than the indicator of the control classes. It was observed that the quality index of the experimental class at the end of the year increased by 8 percent compared to the results of the first quarter of the 8th class.

**Quality indicators of students in the I-IV quarters of the 2022-2023 academic year**

**Table 3.2.4**

Classes	Quarters	Number of students	Quality indicators	The number of "excellent" students	The number of students who learn "good".	students who go to the "middle" grade	the number of students studying with "unsatisfactory" grades
7 – "B" experimental class	I	27	59%	7	9	11	-
	II	27	63%	7	10	10	-
	III	27	70%	8	11	8	-
	IV	27	70%	9	10	8	-
7 - "V" control	I	29	65%	6	13	10	-
	II	29	65%	7	12	10	-

class	III	29	62%	7	11	11	-
	IV	29	62%	8	10	11	-

According to the results of statistical analysis, it was found that the mastery rates of the experimental class were 7% higher than the control class for two years.

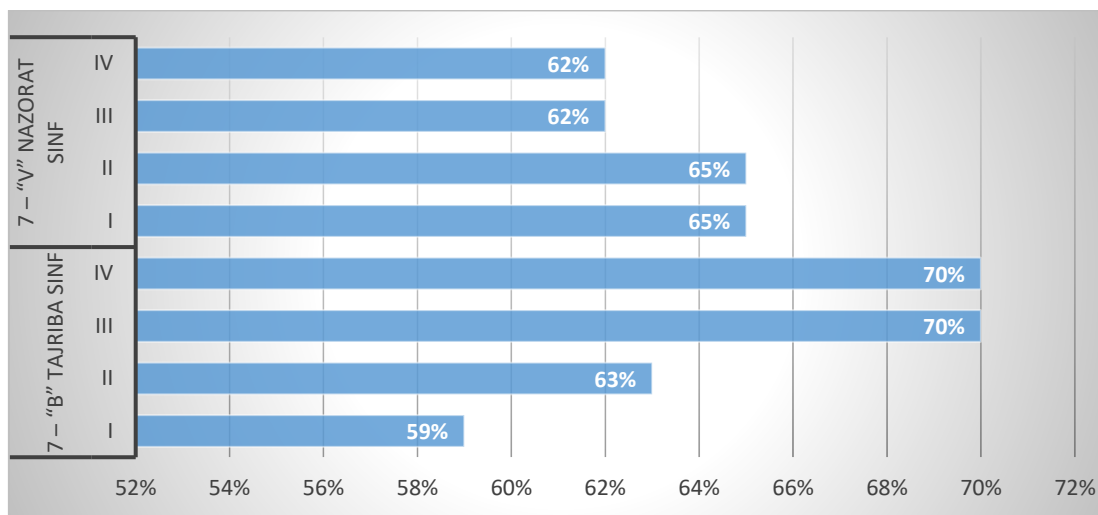


Figure 3.2.3.

The results were summarized and compared according to the indicators obtained from the experimental and control classes, processed on the basis of the mathematical statistic (Student) criterion method. The results and conclusions obtained during the experiment-test period were formalized in the form of a dissertation.

#### References:

1. Sharofatxon Toshmatjonovna Ro'zmatova (2021). UMUMIY O'RTA TA'LIMI MUASSALARIDA BIOLOGIYA XONASI JIHOZLANISHIGA OID ZAMONAVIY TALABLAR. Academic research in educational sciences, 2 (12), 593-599. maydonchasi-pedagogik-talimda-innovatsion-klaster-loyi-asini-zhoriy-etish (дата обращения: 14.06.2023).
2. M.D. Boltayeva, & Yo'ldasheva Dilnavoz Xatamjon qizi. (2023). ANANAVIY TALIM METODI ASOSIDA VA "ESHITDIM, KO'RDIM, BAJARDIM" TAMOIYILI ASOSIDA TAJRIBA SINOV ISHLARIDA TALABALARNI O'ZLASHTIRISH DARAJASINI MATEMATIK STATISTIK TAHLILI. O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI, 2(18), 148-162. <https://doi.org/10.5281/zenodo.7843738>
3. Boltayeva, M. D. (2023). MATHEMATICAL ANALYSIS OF THE INCREASED DEVELOPMENT OF STUDENTS IN HIGHER EDUCATION USING THE INNOVATION CLUSTER OF PEDAGOGICAL EDUCATION. *Galaxy International Interdisciplinary Research Journal*, 11(4), 332-340.
4. Avliyoqulov N.X., Musayeva N.N. Didaktikaning boshlanishi. Qo'llanma. Toshkent: Fan va texnologiya, 2014. -132b.
5. Beshimov A.S. Odam va uning salomatligini o'qitishda pedagogik texnologiyalardan foydalanish. Umumiy o'rta ta'lim maktablarining biologiya o'qituvchilari uchun metodik qo'llanma. – Toshkent: Istiqol. 2008. – 102b.
6. Tuynazarova, I. A. (2019). Toxic chemicals and their impact on the environment. *Евразийское Научное Объединение*, (10-4), 357-359.
7. Abdubokievna, T. I. (2020). Chemicals used in cotton agrocenosis and their harmful effects on the environment. *International Engineering Journal For Research & Development*, 5(6), 4-4.

- 
8. Sharofatxon Toshmatjonovna Ro'zmatova Biologiya o'qitish jarayonida didaktik-ko'rgazmali vositalardan foydalanish metodikasini takomillashtirish. Dis 2023 Chirchiq(54-60)