

RATIONAL USE OF VISUAL LEARNING TOOLS IN BIOLOGICAL EDUCATION

Olimov. X. A. is a biology teacher at the academic lyceum of the Tashkent Pharmaceutical Institute

Annotation. This article presents opinions and judgments on the analysis of the results of research conducted to improve the effectiveness of biological education using visual means. The research conducted within the framework of biological education is aimed at identifying the effectiveness and features of methodological approaches in the system of modern education.

Keywords: visual means, didactics, empirical basis, modeling, graphic object, causal relationship, conditional signal.

Since it is necessary to work with different districts and a large amount of information in the teaching of biology, it is necessary to use visual materials. Using only oral methods in learning science does not give enough positive results. Therefore, biology teachers are required to use visual learning tools wisely in the learning process.

Visualization in education helps schoolchildren to form ideas that correctly reflect objective reality due to the perception of objects and processes of the surrounding world, and at the same time to analyze and generalize perceived phenomena in connection with educational tasks. will give. One of the most important rules of didactics is the use of visual tools not only to create figurative ideas in schoolchildren, but also to form concepts, understand abstract connections and connections.

Sensing and understanding are different stages of a single cognitive process. In modern didactics, the concept of demonstration refers to different types of perception (hearing, seeing, feeling, etc.). None of the visual aids has an absolute advantage over the other. It is known that human emotions received from the outside world are the first stage of his knowledge. At the next stage, knowledge in the form of concepts, rules, and laws is obtained. In order for the students' knowledge to be conscious and reflect the objective existing reality, the educational process should ensure their reliance on emotions. When students have the necessary visual representations, they can be used to build concepts and develop thinking.

Visualization helps to restore the form, essence, structure, connections, interaction of the phenomenon, to activate all the analyzers and their related intuition, perception, impression, and analytical mental processes in order to confirm the theoretical rules.

As a result, a rich empirical basis for generalizing-analytical mental activity of children and teachers appears.

It helps to form visual and auditory culture in students, to communicate with the teacher by giving them information, to enter into a discussion with students on assigned assignments, to master the material, to evaluate the opinion of other students, their efforts to understand the essence of events. . The most important visualization tools are those created directly in the lesson.

The principle of visualization in teaching means the use of various visual tools (models) in the process of acquiring knowledge by students and forming various skills and competencies in them. The essence of the visualization principle is to enrich students with the sensory knowledge experience necessary to fully master abstract concepts.

Visual tools (models) are widely used by the teacher during the presentation of educational material, during the independent activity of students on acquiring knowledge and forming skills, controlling the mastering of the material, and in other activities of the teacher and students. is used. However, the unreasonable and excessive use of different models in the lesson can also have a negative effect.

Accordingly, it is recommended to follow a number of conditions that must be followed when using different models:

- 1) the images used in the model should correspond to the age and psychophysical characteristics of the students.
- 2) moderate use of the model tool and use it only at the appropriate time of the lesson.
- 3) to clearly express and distinguish the main, important points in the use of the model.
- 4) detailed review of instructions for students' perception of models (additional explanations, highlighting the main thing, commenting, etc.).
- 5) the developed models should fully correspond to the content of the material.
- 6) involving students in finding and analyzing the necessary information in models and forming skills in them.
- 7) rationally combine various forms and methods of communication with educational materials and students' educational work, taking into account the content and specific features of the models.

At the first stage, it is necessary to receive information through the senses in order to form an understanding and concept of the subject. The more interesting, meaningful, multifaceted and complex impact this influencing factor has, the more it leaves its mark, that is, it is more strongly embedded in memory. In this regard, when using icons, special attention should be paid to their selection and the fact that they consist of simple, meaningful, and familiar images.

In the second stage, experience and previous knowledge on the subject are interconnected, summarized, and logically continued. The process of independent analysis and synthesis of new knowledge is carried out on the basis of previous observations, acquired knowledge.

In general, no matter what the models look like, they are the starting link, the impetus that causes chain processes such as sensing, accepting, imagining (perception), and understanding.

Visual tools can be conventionally called models. A model is a certain new object that reflects the important features of the studied object, phenomenon or process. Modeling is a way of knowing that consists in creating and exploring models. In different disciplines, objects and processes are studied from different perspectives and different types of models are created. In physics, the processes of interaction and movement of objects, in chemistry - their internal structure, in biology - the behavior of living organisms, internal and external structure, habitat, reproduction, importance in nature. All models can be divided into two large classes: material (object) models and symbolic (informational) models. Material models reproduce the geometric, physical and other properties of objects in a material form, in the form of a body. The following material models are widely used in the educational process: globes (geography), dolls (biology), crystal lattice models (chemistry), etc. The information model of an object is its description.

A cell, an organism, a group of living organisms, the processes and events occurring in them can be taken as an object of biological science. Material models are mainly used in biology education. These include artificial exhibitions in the form of fruit, herbarium of plants, flower model, animal brain, human organs. Important features of the material model are visualization, abstraction, element of scientific imagination and imagination, use of analogy as a logical method, hypothetical element. An important feature of such a model is the presence of creative imagination in it. By conducting such lessons, it is very easy to determine how well the students understand the subject. But in the modern world, the creation of information models is of particular importance. Students often cannot connect the theoretical knowledge about the research object and its structure and properties, simply put, they cannot create a "portrait" of the object according to the description and vice versa. By developing information modeling skills, students develop the ability to think logically, draw conclusions, compare data, analyze, and draw conclusions. Today, this concept has a much broader meaning and includes various information models or graphic objects such as pictures, maps, drawings, graphics, diagrams, icons.

The problem of forming a scientific view of the world is complicated by the fact that it develops in the individual mind of each student and cannot be directly observed by the teacher. During the learning process, the teacher sees not the student's thoughts, but his actions, which are the result of the initial mental modeling of the situation that arose in the process of solving any educational problem.

Table 1.

Representation of data in tabular form using icons

Living	stem	Move	What	Regene	Feed	Breathi	Circulat	Subtracti	Nervou	Genit	Increa
--------	------	------	------	--------	------	---------	----------	-----------	--------	-------	--------

g enviro nment	sim metriu s	ment	part of the day is active?	ration	niche	ng H ₂ O O ₂	ory system	on system	s system	al syste m	se

One of these emerging technologies is the method of creating basic outlines. This exhibition tool serves as a short synopsis of the material. When doing homework, this tool serves as a basis for repeating the material learned. Explanatory pictures, warning signs, basic outlines, ideograms, graphic outlines can be used as such tools. It is also possible to use auxiliary tools that connect data in the form of graphic images, statistical data, conditional symbols, which are provided under the main schemes.

Basic abstracts show the main concepts of the content of the subject and their main features, cause-and-effect relationships, general features of characteristic objects, directions of development, the most vivid facts of any processes. A conditional signal is a graphic symbol that replaces the meaning of some information, one or more phrases in the text of the textbook. Conditional signals serve as "memory nodes". Basic synopsis - one lesson consists of a system of logically connected conditional signals of educational material. The main requirements for the basic synopsis are the compactness of the educational material, the structure, the compactness of the location, the simplicity of the image and the ease of understanding, distinguishing the main material by color, the size of the characters, using abbreviations, graphics, diagrams, arrows, symbols to describe the educational material. is a form of demonstration.

The teacher should conduct a special lesson for the students on the implementation of the basic outline technology. A synopsis is a secondary text because it summarizes the main information of the original text. In this case, abbreviations, various signs, symbols, graphics can be used. Often, a basic outline is a picture or diagram, sometimes presented as a table.

The purpose of the basic synopsis is to create a clear, visual image of students as a knowledge system about educational materials in general, to help them understand its structure, to distinguish the main thing that is important in the presented material, to learn individual components of the content of the lecture.

showing the relationships between them is to help students remember the background material.

References

1. Bekmirzayev M.X. Zoologiya darslarida ta'lim shakl va texnologiyalaridan kompleks foydalanishning innovatsion modeli: Avtoref. dis. ... ped. fan. falsafa doktori (PhD). –Jizzax: 2023. -48 b.
2. Kuychiyeva M.A. Bo'lajak biologiya fani o'qituvchilarining kasbiy-metodik kompetentligini rivojlantirish: Avtoref. dis. ... ped. fan. falsafa doktori (PhD). –Nukus: 2023. -48 b.
3. Raupova M.H. Bo'lajak biologiya o'qituvchilarining kvaziprofessional tayyorgarligini takomillashtirish metodikasi (Biokimyo va molekulyar biologiya fani misolida): Avtoref. dis. ... ped. fan. falsafa doktori (PhD). – Chirchiq: 2023. -50 b.
4. Raxmatullayeva A.Q. Biologiyani o'qitishda o'qituvchilar iqtidorini aniqlash mexanizmlarini takomillashtirish (8-9 sinflari misolida): Avtoref. dis. ... ped. fan. falsafa doktori (PhD). –Chirchiq: 2022. -45 b.
5. Umarova R.U. Ta'limni axborotlashtirish sharoitida o'quvchilarning intellektual salohiyatini rivojlantirish: Avtoref. dis. ... ped. fan. falsafa doktori (PhD). –Chirchiq: 2023. -50 b.
6. Yaxshiboyeva D.T. Bo'lajak biologiya o'qituvchilarining mustaqil o'quv faoliyatini tashkil etish metodikasini takomillashtirish (biotexnologiya fani misolida): Avtoref. dis. ... ped. fan. falsafa doktori (PhD). –Chirchiq: 2022. -48 b.
7. Бережная О.В. Формирование исследовательской компетентности обучающихся на основе познавательных учебных действий при обучении биологии (6 класс): Автореф. дис... кандидат педагогических наук. – Москва: 2020. -28 с.
8. Asamovich, K. M., & Karimovna, H. T. (2022). POSSIBILITIES OF WIDE USE OF PRACTICAL METHODS OF TEACHING CHEMISTRY FOR ORGANIZING QUALITY EDUCATION. *Confrencea*, 140-143.
9. Asamovich, K. M. (2023). POSSIBILITIES OF WIDE USE OF PRACTICAL METHODS IN CHEMISTRY EDUCATION. In *Proceedings of International Conference on Educational Discoveries and Humanities* (Vol. 2, No. 1, pp. 44-47).
10. Asamovich, K. M. (2023). The Role of Logical Approaches in the Integrated Development of Scientific Literacy and Practical Skills in Chemistry. *EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION*, 3(10), 6-9.
11. Bobonazarovna, F. S., & Abduhamidovich, N. A. (2021). Development of Mathematical Literacy in Chemistry Lessons. *European Scholar Journal*, 2(3), 97-99.

12. Axmatovich J. R. In vitro rearing of trichogramma (Hymenoptera: Trichogrammatidae) //European science review. – 2016. – №. 9-10. – С. 11-13.
13. Jumaev R. A. et al. The technology of rearing Braconidae in vitro in biolaboratory //European Science Review. – 2017. – №. 3-4. – С. 3-5.
14. Жумаев Р. А. Массовое размножение трихограммы на яйцах хлопковой совки в условиях биологической лаборатории и ее применение в агробиоценозах //Халқаро илмий-амалий конференция “Ўзбекистон мева-сабзавот маҳсулотларининг устуңлиги” мақолалар тўплами. Тошкент. – 2016. – С. 193-196.
15. Жумаев Р. А. Значение представителей семейства BRACONIDAE в регулировании численности совок в агробиоценозах //ЎЗМУ Хабарлари. – 2017. – Т. 3. – №. 1.
16. Жумаев Р. А. РАЗМНОЖЕНИЯ ИН ВИТРО BACON NABETOR SAY И BRACON GREENI ASHMEAD //Актуальные проблемы современной науки. – 2017. – №. 3. – С. 215-218.
17. Axmatovich J. R. In Vitro Rearing of Parasitoids (Hymenoptera: Trichogrammatidae and Braconidae) //Texas Journal of Agriculture and Biological Sciences. – 2022. – Т. 4. – С. 33-37.
18. Suleymanov B. A., Jumaev R. A., Abduvosiqova L. A. Lepidoptera Found In Cabbage Agrobiocenosis The Dominant Types Of Representatives Of The Category Are Bioecology //The American Journal of Agriculture and Biomedical Engineering. – 2021. – Т. 3. – №. 06. – С. 125-134.