INTERACTIVE EDUCATIONAL METHODS IN TEACHING THE SUBJECT OF PHYSICOCHEMICAL PROPERTIES OF MINERALS

Mamadaliyev Adkhamjon Tukhtamirzaevich
Namangan Engineering Construction Institute,
160103, Republic of Uzbekistan, Namangan, I. Karimov st.,12

Abstract:*This article covers the teaching of the subject of physical and chemical properties of minerals based on interactive educational methods. With the help of pseudochromatic, idiochromatic, allochromatic key words related to science, the content and essence of the topic is revealed using the interactive methods of working in small groups, "Sinquain», "Cubic strategy».*

Key words:*Interactive educational methods, pseudochromatic, idiochromatic, allochromatic, educational system, pedagogical technology, technological approach, creative thinking, sinkwein, cube strategy*

Currently, by improving the education system in our republic, great attention is being paid to the training of mature, well-rounded, independent thinking, willing, selfless and initiative personnel. Taking this into account, interactive methods are widely used in the education system.

Interactive methods mean methods that activate learners and encourage them to think independently, with the learner at the center of the educational process. When these methods are used, the teacher encourages active participation of the learner. The learner is involved throughout the process.

The concept of interactive is expressed in English as «interact» («interactive» in Russian), and from the dictionary point of view, it means «inter» - mutual, «act» - to act.

And interactive education is education based on the organization of interaction of students in order to acquire knowledge, skills, competences and certain moral qualities.

Today's «Case study» (or «Educational cases»), «Creative work», «Problematic education», «Brainstorming", «Boomerang», «Zig-zag», «Staircase», «Fish skeleton», «BBB», «Venn diagram», «T-table», «Insert» and «Cluster» are widely used interactive learning methods.Interactive teaching methods can be applied to almost all subjects. In this article, educational models on the topic «Physico-chemical properties of minerals» are created, the specified goals are developed based on «Bloom's taxonomy», and using the «Cubic strategy» and «Sinkwein» interactive methods on the example of the phrase «Idiochromatic», «Pseudochromatic», «Allochromatic» on the topic, the topic is used in the teaching process. the content and essence have been revealed. In addition, the use of the method of working in small groups was shown in the teaching of this topic.

1. «Syncway» - the interactive method helps to develop students' thinking ability based on a different approach to the problem in the process of disseminating and summarizing information.

1. ___ noun (who, what);
2. ___ ___ quality (how, what);
3. ___ ___ ___ verb (task, function);
4. ___ ___ ___ association (imagination, what came to mind)
5. Synonym (similarity) of ___ ___ noun.

For example, we create a syncway for the words «Idiochromatic**»**, «Pseudochromatic», «Allochromatic».

1. Idiochromatic…
2. The color of the mineral
3. Related to chemical composition
4. Red ruby, yellow sulfur mineral
5. Emerald $Be_3Al_2[Si_6O_{18}]$

Now the student will create a syncline for the words «Pseudochromatic», «Allochromatic».

1. Pseudochromatic	1. Allochromatic
2.....	2.....
3.....	3.....
4.....	4.....
5.....	5.....

2. Use the cube strategy.

A) **«Define».** The Greek word «Idios**»**means one's own. The color of many naturally occurring minerals is determined by the chemical elements they are composed of and how their atoms, ions, and molecules are bonded to each other. For example: $FeO•Fe_2O_3$ – black for magnetite, FeS_2 – straw yellow for pyrite, HgS – red for cinnabar. This specific color of minerals is called idiochromatic color and it is caused by various reasons.

B) **«Compare».** Allochromatic color. Translated from Greek, «allos**»** means «outer, different**»**. The same mineral can be found in different colors and shades in natural conditions. For example: quartz (SiO_2) can be found in different colors, its transparent colorless variety is rock crystal, and its purple variety is amethyst , the golden yellow color is called citrine, the dark transparent color is called morion. A similar table salt - halite (NaCl) - can be white, gray, brown, pink and sometimes blue.

V) **«Association».** The color variation of some transparent minerals is called «pseudochromatism**»**. The Greek word «pseudo**»** means fake. The reflection of the light falling on the surface of the mineral from the inner surfaces of the cracks of its connection plane, sometimes from the surface of some impurities, causes pseudochromatic colors. We can observe this phenomenon in the veil of kerosene, oil or oil floating on the water, which shines in various «rainbow colors». This is due to the separation of light reflected from the

lower (separated from water) and upper (confined by air) surfaces of the transparent oil film into other colors.

«Analysis» The color of minerals formed as a result of natural processes differs from each other according to their origin.

3. In the process of teaching students, the method of working in small groups is important. That is, discussion and evaluation is an important factor. At the final stage, the groups will provide information on the results of the work. For this, each group appoints its own captain. If necessary, the opinions expressed on the results of the activity will be recorded by the pedagogue. It is important to clarify the rationale of the problem solution in the group. If there is enough time, groups can also ask each other questions while arguing this or that point. The results of working in small groups are evaluated by the pedagogue. In this case, correct and accurate performance of activities, time consumption is the main criterion. We will consider the advantages and disadvantages of the method of working in small groups.

Advantages of working in small groups:

• leads to better mastering of the teaching content;
• improves communication skills;
• there is an opportunity to save time;
• all students are involved;
• Self- and peer-assessment will be available.

Disadvantages of the method of working in small groups:

• since there are weak students, strong students are also likely to get low grades;
• the ability to control all students will be low;
• negative inter-group competition may appear;
• a conflict may arise within the group.

Below is the application of the "Working in small groups" method in teaching the subject "Physico-chemical properties of minerals":

1. The direction of activity is determined. Interrelated issues are determined by the topic:

- What are the types of mineral luster?

- Vitreous, diamond-like, oily, pearly, silky, waxy. Arrange the following minerals calcite, diamond, galena, quartz molochnyy, mica, gypsum, talc, serpentine according to mirror luster.

2. Small groups are defined. Pupils can be divided into groups of 3-6 people: each group gives itself a name (for example, "Geologist", "Minerologist", etc.)

3. Small groups begin to complete the task.

They write their thoughts on the given issue on a sheet of paper (for example, minerals are divided into metallic, semi-metallic, mirrors according to their luster)

4. The teacher gives clear instructions and directs (what to pay attention to when finding a solution to the problem).

5. Small groups make a presentation (each group explains the information written on the sheets on solving the problem on the board).

6. Completed tasks are discussed and analyzed (all students can participate in the discussion and analysis).

7. Activity of small groups is assessed (students of the group and the activity of the small group as a whole are evaluated. Actively participating students are encouraged)

In conclusion, it can be said that the use of interactive educational methods based on ensuring students' activity in the learning process has a good effect. The interactive learning methods used above lead to the student's better mastering of the teaching content and improvement of communication skills. Most importantly, there will be an opportunity to save time.

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