DESIGNING THE SUBJECT OF COMPARATIVE HEAT OF COMBUSTION OF FUEL USING GRAPHIC ORGANIZERS

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Abstract

This article *analyzes the problems of designing graphic organizers that serve to increase the efficiency of the lesson in the educational process* . In order to use graphic organizers in physics lessons, it is necessary to know the ways and means of data analysis, comparison, comparison, and then design. If the "Venn" diagram and "T-scheme" are used in the implementation of such planning, there will be opportunities to form the skills and competencies of the students and to achieve the effectiveness of the lesson.

Key words: *modern pedagogical technologies and interactive methods, graphic organizers, fuel, relative heat of combustion*

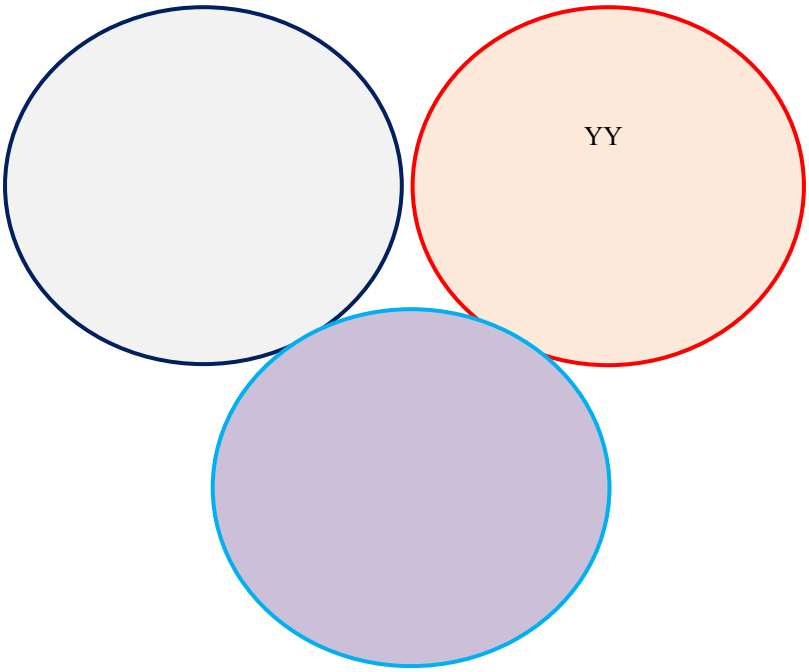
INTRODUCTION

In order to increase the effectiveness of education, to ensure that the individual is at the center of education and to ensure that young people learn independently, educational institutions need teachers who are well-prepared and who, in addition to solid knowledge in their field, know modern pedagogical technologies and interactive methods, and who know the rules of their use in organizing educational and educational activities. The contribution of teachers is also significant in transforming the fundamental reform of the educational system into the most important factor and solid basis of changing the mindset and worldview of our students and young people, increasing their confidence in the future. In the successful solution of these tasks, the presence of another factor, that is, the awareness of the nature of modern educational technologies by the employees of the continuous education system, pedagogues-teachers and their ability to use them effectively in the educational process, as well as the decision of a creative approach to the organization of the educational process, is of great importance. Based on this, it is necessary to use *graphic organizers that serve to increase the efficiency of the lesson in the educational process* [4]. In order to use graphic organizers in physics lessons, in turn, it is necessary to know the ways and means of data analysis, comparison, and comparison, and then to carry out design work [5]. If we use the "Venn" diagram and "T-schema" in the implementation of such planning, there will be opportunities to form the skills and competencies of the students and to achieve the effectiveness of the lesson. In this article, we refer to the role of designing graphic organizers in the teaching of Physics in general secondary schools, as well as lesson developments related to the content of information in the course of the lesson.

1. Problems of designing graphic organizers in physical education

1.1. "Venn Diagram"

This interactive method is used to analyze and summarize the specific and common aspects of two or more concepts. In this case , the specific aspects of the concepts are written on the right and left circles , and the aspects common to them are written on the intersection of the circles. For example , concepts of " theoretical training". The Venn diagram for is shown below shown .



A "Venn diagram" is used to compare, contrast, or contrast two aspects and what they have in common. In this, students develop the skills of systematic thinking, comparison, comparison, and analysis. This method with from working with the rule of making a "Venn diagram " first they get to know each other . They make a "Venn diagram " in separate small groups and intersecting places (xx) as desired data they kill with xy. This method, which seems simple at first glance, increases students' thinking ability and memory. Or it encourages independent work on the topic. Students are divided into three groups. Group 1 works for the right side of the diagram, Group 2 works for the left side of the diagram, Group 3 works for the space formed by the joining of two circles. In some cases, it can be given as homework or in the process of strengthening the lesson in order to test the level of mastery of the students.

1.2. T - scheme. This interactive method is a universal organizer of comparative concepts ("yes" / "no" or "agree" / "against"), and allows to visually and concisely describe opinions that are sharply different from each other or opposite, sometimes differing by different criteria. creates comfort. The T-schema on the topic "Attitude to teaching using interactive methods" can be described as follows.

- The teacher asks them to do the task individually and allocates 10 minutes;
- At the end of the time, he tells the students to read out their opinions without comments;
- All conclusions After listening , it is summarized and final conclusion is formed .

Student : - Carefully study the topic listens;

- He himself for necessary information records in his notebook;
- Based on the given scheme to understanding relatively his independent opinion;
- Final conclusion with those who have died introduces;
- To the regulations complies.

To be expected result: students topic on the surface necessary knowledge learns about the essence of the course.

2. Topic: Fuel composition and specifications

A combustible substance whose main component is carbon is called a fuel. As a result of the rapid progress of the physical reaction, the fuel emits heat. The main source of heat energy is fuel, and according to D.I. Mendeleev, fuel is "a combustible substance that is deliberately burned to obtain heat." In this case, the following requirements for fuel are burned:

- release a large amount of heat during combustion;
- low content of substances harmful to nature in the composition of combustion products ;
- fast and burning.

Aggregate on this fuel is solid , liquid and in the form of gas. It is divided into types . Either do it organic and nuclear , come exit on this natural and artificial to be can time heat energy to get main source It is an organic oil is used. On the globe work being released and consumption getting dressed of energy about 70% is organic oil like to h is taken and 30% - water, wind, sulfur and nuclear is taken. The composition of organic fuel includes combinations of combustible and non-combustible elements. Solid and liquid fuels include the following combustibles: carbon S, oxygen O, nitrogen N. Sulfur in fuel is usually divided into combustible and non-combustible. Non-combustible sulfur is part of the mineral part of the oil. Combustible sulfur (volatile) is divided into organic S_{op} and S_K species from kolche, sulfur composition from kolche is FeS_2 ; $S_{uch} = S_{or} + S_k$. Sulfur mineral part from Kolche to the composition when it comes in, it burns in the process participation is enough The mineral impurities included in the fuel form ash (A), and the ash does not participate in the combustion process and reduces the heating value of the fuel.

Organic vegetables

Organic oils are organic, flammable , dry and worker masses with is described. Consider the mass of each one organize to the doer suitable respectively with an index in the form of degree is determined

Organic mass:

$$C^{\circ} + H^{\circ} + S^{\circ} + O^{\circ} + N^{\circ} = 100\% \quad (1)$$

organic mass sulfur to the composition colchedanli sulfur

Combustible mass (dry ashless):

$$S^{or} N^{+} B^{or}_{three} + O^{or} + N = 100\% \quad (2)$$

Combustible mass composition or burning material.

Dry mass:

$$Sk + nk + S + Ok + NK = 100\% \quad (3)$$

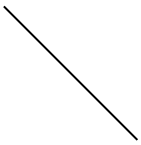
Dry mass includes all substances, including ash.

Working mass:

$$S^{i} + N^{i} + S^{i}_{three} + O^{i} + N + A^{i} + W^{M} = 100\% \quad (4)$$

Fuel common mass , that's it including ash and humidity, worker mass is called Burning with process analysis other accounts , according to through the working mass take will go. The composition of the fuel element from one mass to another is carried out using proportions or matching coefficients. The composition of gases is written in the form of the sum of the volumetric contents of the components:

$$CH_4 + Ho + CO + C_n H_m + Oo + N + HS = 100\% \quad (5)$$



FUEL

1 table. Table of main elements of fuel

The more carbon in the fuel, the less oxygen and vice versa. An increase in the amount of oxygen in the oil reduces its heat output. During the reaction (combustion) of the physical elements in the fuel, different amounts of heat are released. Few electrolysis of water with hydrogen gas in quantity method with is taken and scientific research used in laboratories . Natural and as water, gas, or oil of industry and village economy used in different fields.

Fuel content to know necessity burning material balance of the process information get for need. From this out, fuel composition or heat identifies, this while his of burning comparison heat Q, that is, 1 kg of liquid or solid fuel or 1 m^3 gas fuel normal in conditions combustion separable heat amount (respectively kJ /kg, kJ /m^3 measurement describes) in units . Burn

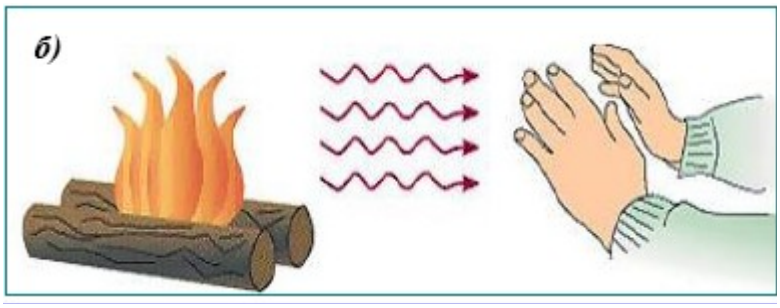
comparison the heat by calculating h to find or kilometer in the equipment experience method with clarify can burning comparison the heat in the analysis or the composition of the i element D. I. Mendeleev's suggestion on this came from the formula is used. It looks like fuel burning heat in his elements when it burns separable hot flashes to the index equal to
The formula for the high specific heat of combustion of liquid or solid fuel has the following form:

$$O_{yu} = 339C + 1256H - 109(0 - C), \text{ kJ/kg} \quad (6)$$

2512 kJ of heat is used to evaporate 1 kg of water, taking into account that W is given in percentages, the heat going to evaporate moisture is equal to 25W.
The relative heat of combustion of liquid or solid working oil is determined from this formula:

$$O_k^i = 339S + 1030N - 109(0- S) - 25 W , \text{ kJ /kg}, \quad (7)$$

where the coefficients represent the heat of combustion of individual elements and the number divided by 100 is given; Composition of various elements in % of C,H,O,S-oil. The heat of combustion of a gas boiler is taken for normal conditions relative to $1m^3$ of dry gas, and the constituent elements are found by the heat of combustion:



2 Pictures. Relative heat of combustion

$$Ok_k = 358SN_4 + 638S_2N_6 + 913S_3N_8 + 108N_2 ++ 12\ 6\ CO + 1590S_2N_4 + 234\ H_2S \text{ ; kJ/m}^3$$

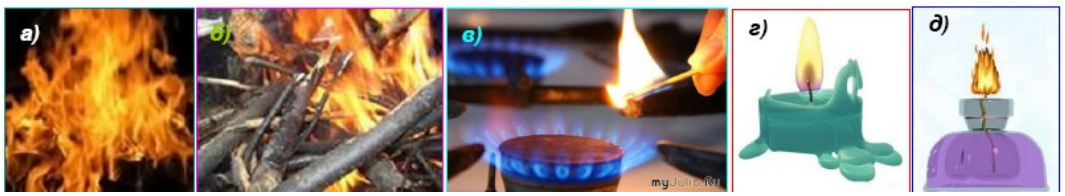
where CH_4 , C_2 H_6 and other components in the gas mixture by volume are in %. Planning, economic calculations and comparisons of indicators of thermal energy equipment should be carried out on a unified basis. For this purpose, the concept of conditional heat is introduced, its calorific value is assumed to be equal to 29.35 MJ/kg, which corresponds to the calorific value of low-ash coal.
In order to pass the subject of the physics textbook "Comparative heat of combustion of fuel" using the design of graphic organizers, it is appropriate to use the "Venn diagram" from the methods and tools of data analysis, comparison and comparison.

3 Pictures. Types of fuel

Then the teacher gives students an understanding of fuel and combustion phenomena: certain conditions are created for combustion phenomena to occur: the following requirements for fuel are burned:

- release a large amount of heat during combustion;
- low content of substances harmful to nature in the composition of combustion products;
- fast and burning.

Explain the combustion process given in the figure below



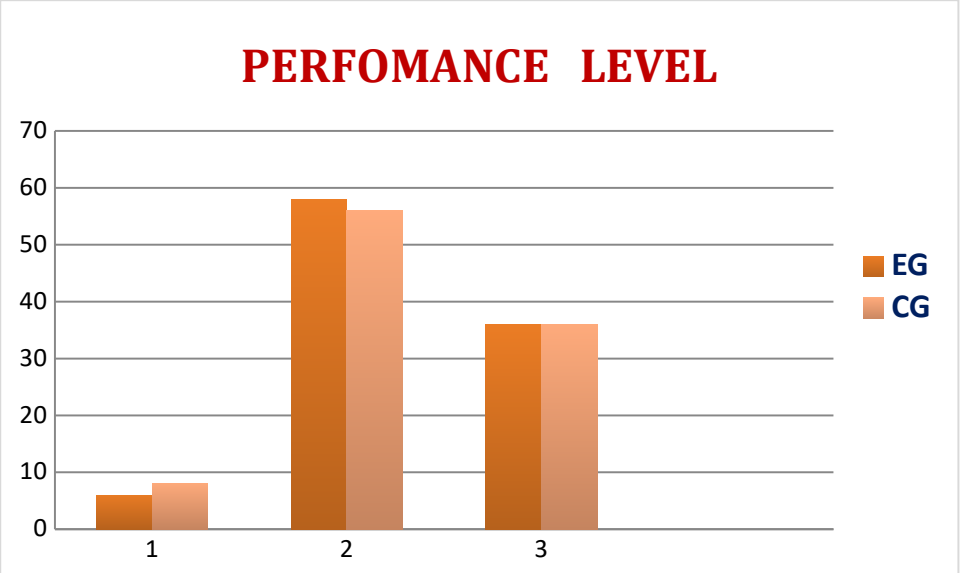
Gas evolution Heat evolution Precipitation Color change

4 Pictures. Specific heat of combustion of fuel

Then, after the teacher explains the topic, he has the students complete a Venn diagram to reinforce the new topic. It should be noted that there are no reliable standardized methods for determining the level of mastery of students using the design of graphic organizers on the topic "Specific heat of combustion of fuel". Taking this into account, standard and repeatedly tested methods were used, which indirectly correspond to the parameters of interest to us. made it possible to measure using indicators Control in Table 1 and acquisition of students in experimental groups the results are presented.

Table 1

Levels	E G	K G
It's okay	6	8
Average	58	56
Low	36	36



5 Pictures. Taken from an experimental study data control and the mastery levels of students in experimental groups .

Summary

Thus, the use of graphic organizers in physics lessons, organizing the lesson through informational analysis, comparison, and the means of comparison, prepares a solid foundation for students' mastery of a new topic and independent thinking.

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