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CLUSTER METHOD OF IMPLEMENTING THE CONCEPT OF SUSTAINABLE EDUCATION IN TEACHING THE PERIODIC TABLE (Using Software Tools)

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Abstract
Introduce the concept of sustainable development education in the minds of students by showing the areas of use of various elements in the teaching of the topic of the periodic table.

Keywords: Period, small period, large period, group, main group, additional (lateral) group, changes in metallic and non-metallic properties in groups.

Introduction

DAVRIY JADVAL MAVZUSINI O‘QITISHDA BARQAROR TA’LIM TUSHUNCHASINI TADBIQ QILISHNING KLASTER USULI (yordamchi dasturli vositalardan foydalanish)

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Chirchiq davlat pedagogika universiteti

ANNOTATSIYA
Davriy jadval mavzusini o‘qitishda turli elementlarning ishlatilish sohalarini rasmlar orqali ko‘rsatib, o‘quvchilar ongiga barqaror taraqqiyot ta’limi tushunchalarini singdirish.

Kalit so‘zlar. Davr, kichik davr, katta davr, guruh, bosh guruhcha, qo‘shimcha (yonaki) guruhcha, guruhlarda metallik va metallmaslik xossalarining o‘zgarishi.

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Introduction

The periodic law and the periodic table on the subject of the periodic system are the result of many years of scientific research and are considered one of the great achievements of chemistry. The periodic table is a characteristic of atomic mass, and all the properties of the elements change depending on it. The properties of atoms develop periodically depending on their masses. The first proposal was to arrange the periodic system in accordance with the atomic mass, the disadvantage of which was that the replacement of argon and potassium, copper and zinc would lead to a violation of the periodicity properties. However, D.I. Mendeleev scientifically substantiated the fact that if we arrange the elements according to the change in the properties of simple and complex substances, they will have a periodicity property. In the current modern periodic system, the number of protons is equal to the ordinal number, the number of protons and electrons is equal, and the mass difference is equal to the number of protons and neutrons.

Mendeleev was the first to present the periodic system in the form of a table. Currently, there are more than 500 variants of the periodic table. There are short and extended versions of the periodic table, the short version is more convenient to use, but elements that are similar in properties to one group and not similar in properties to the adjacent group are placed in the adjacent group. The elements in the adjacent group seem to be a violation of periodicity in terms of their chemical properties.

The disadvantage of the extended version of the periodic table is that it is spread out and some cells remain empty, the actinoids are placed in the sixth period, and the lanthanoids in the seventh period, which makes it very long and inconvenient to use. Therefore, in the short version, the lanthanoids and actinoids are placed separately at the bottom of the periodic table.

The physicochemical properties of the elements in the periodic system, hydrogen and oxygen compounds are given in detail in the 8th grade chemistry textbook.

In the periodic table, non-metallic properties increase from left to right and from bottom to top, and metallic properties increase from right to left and from top to bottom, resulting in a diagonal division from the first group to the seventh group. As the relative atomic masses increase in the main groups, the metallic properties also increase. The non-metallic properties decrease.

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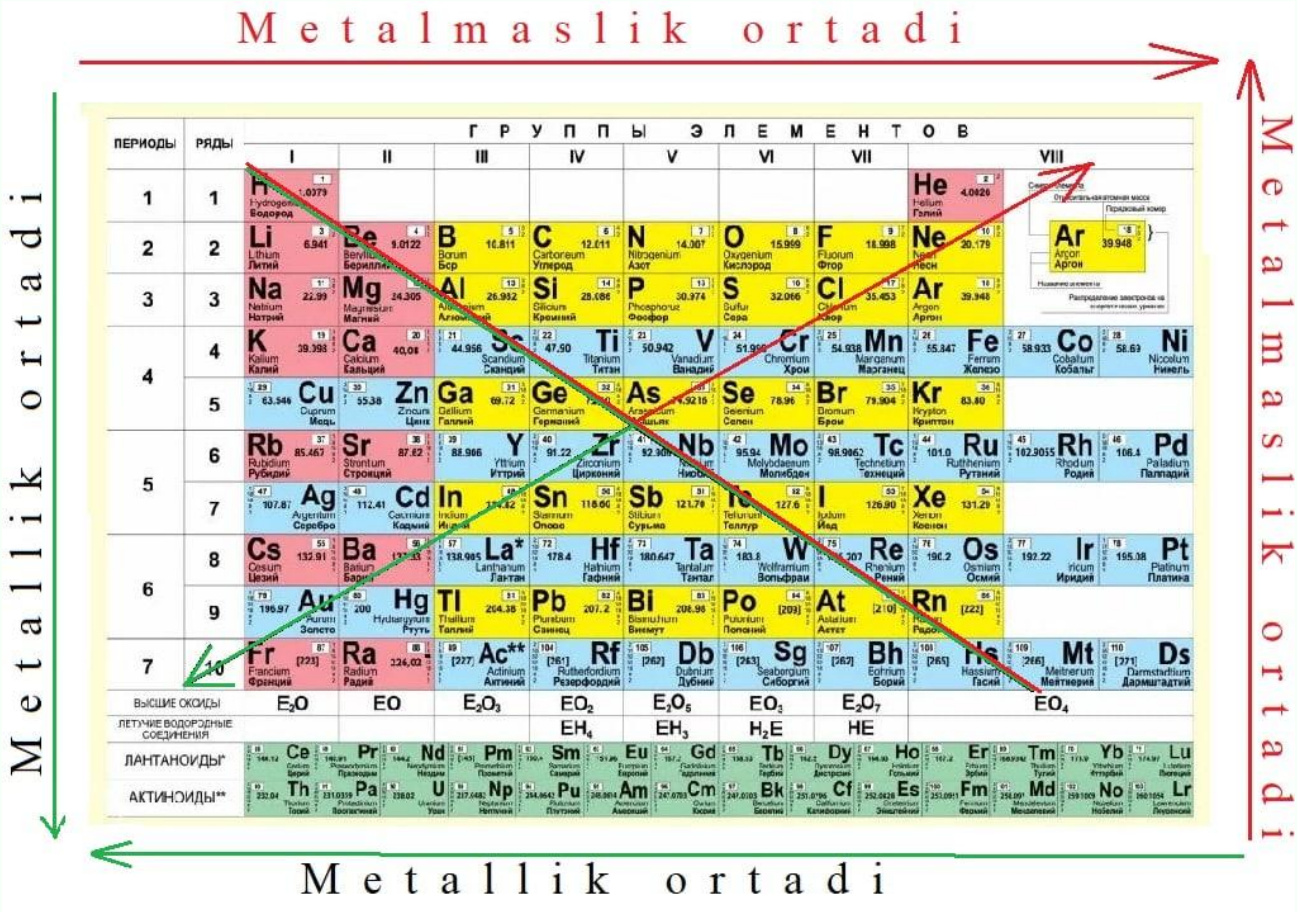

1-fig

For example, in the main group of group I, starting from lithium, the metallic properties increase as you go down, and francium exhibits the highest metallic properties. In the halogens, the non-metallic properties decrease from fluorine to iodine. The strongest non-metal is fluorine. The diagonal line in the middle passes through these amphoteric elements. Amphoteric elements have properties similar to those of both metals and non-metals. When they react with bases, they react like non-metals, and with acids, they react like metals. As you draw the diagonal line drawn over amphoterics downwards to the left, their metallic properties increase. . As you draw the diagonal line drawn over amphoterics upwards to the right, their non-metallic properties increase (Figure 1). The information learned by students is retained in their memory for a longer period of time, and sustainable development contributes to the development of education.

From right to left, from top to bottom, the atomic radius increases. Electron affinity increases from left to right, from bottom to top, but decreases sharply

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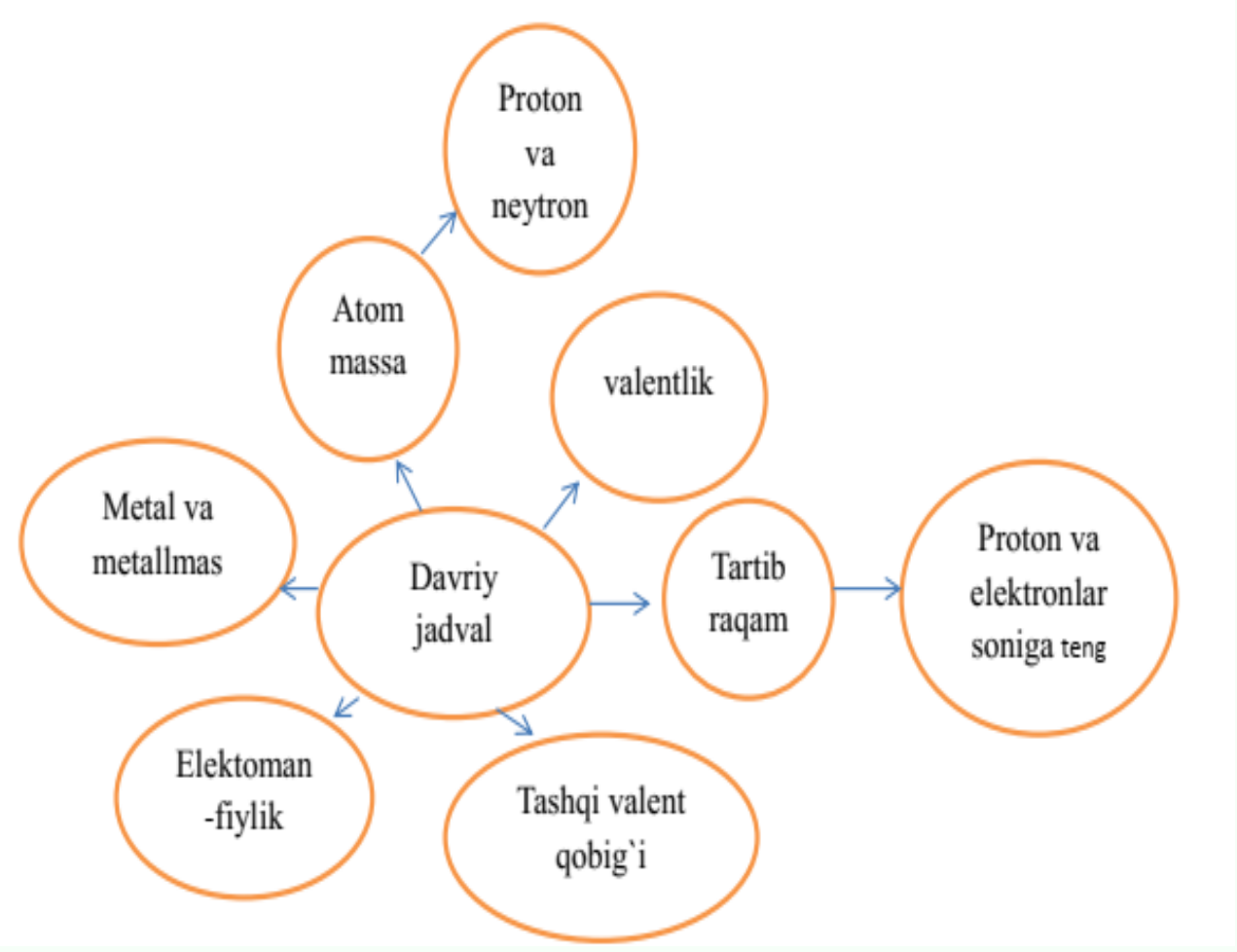
towards the noble gas family. Ionization potential and electronegativity, like electronegativity, reach their maximum points in the noble gases. As a result of scientific research, the periodic system is being supplemented.

The number of electrons in the outer shell of elements located in the main groups is numerically equal to the group number. The high valency in their oxides is also mainly numerically equal to the group number (except for fluorine and oxygen). The valency of elements in volatile compounds formed with hydrogen also decreases periodically from 4 to 1 (only non-metals). Detailed information about the concepts of quantum numbers of elements is available in the literature.



2-fig

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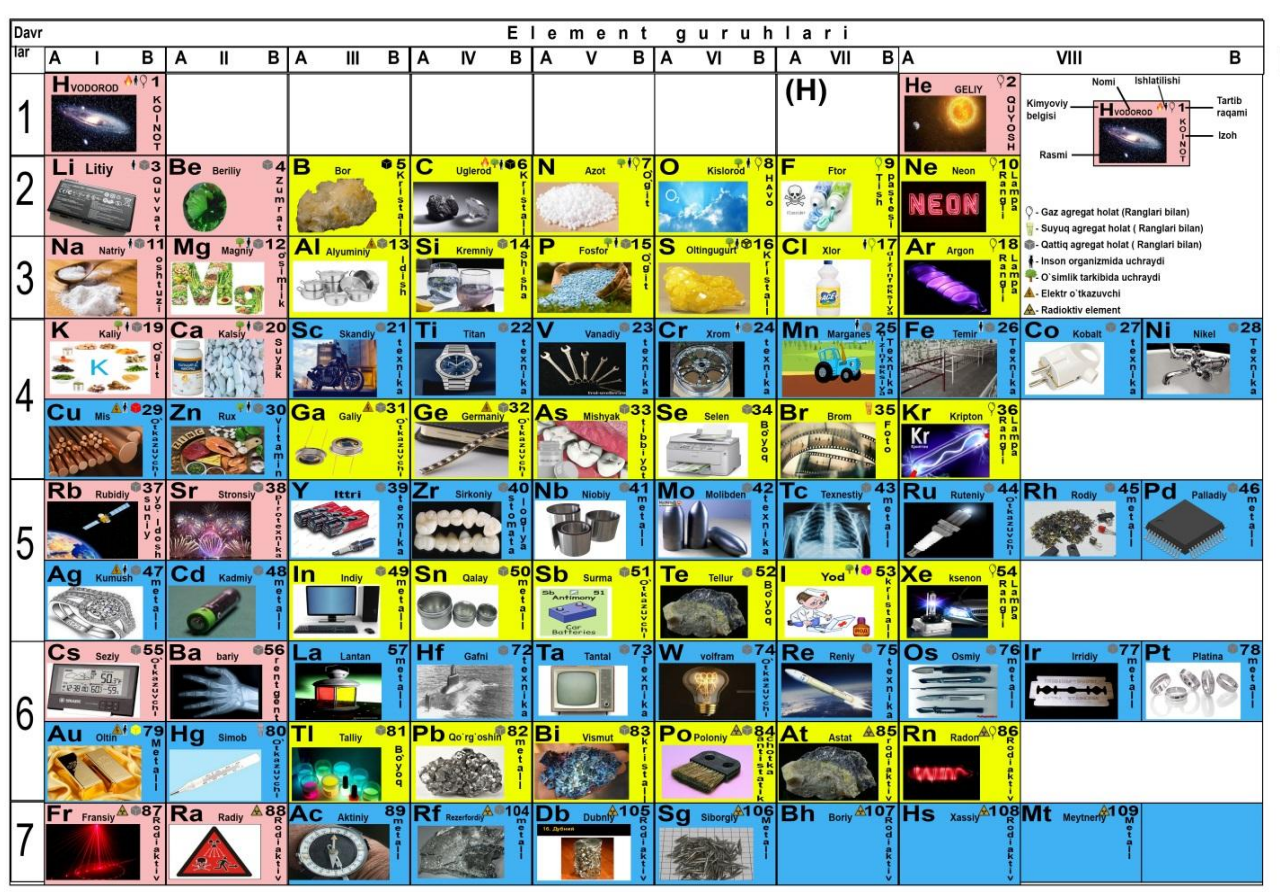

3-fig

In the 8th grade chemistry lesson, when teaching the topic of the periodic table, if we explain the elements in the periodic table better using various animations (pictures), their imagination will increase and take a deeper place in their memory (pictures 3-4). When they see what objects and substances an element is found in, the imagination process will improve, and we will achieve a higher level of sustainable learning. Because for students, remembering by seeing is an effective method rather than remembering by hearing.

For example: the element oxygen is the main component of air, which we breathe. When we see our clear sky, we see oxygen, and if we explain to students that the most oxygen is present here, the element oxygen will always remain in their mind.

Picture 4

Carbon is very common in nature as a simple substance in the form of coal, diamond, and graphite. When a student hears about diamonds or sees coal, he or she thinks of the element carbon, and with this, we will have achieved the goal of sustainable development and sustainable education. By instilling in students the

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existence of elements found in nature and developing sustainable development concepts such as using them wisely, not polluting the environment, and treating natural resources wisely, we will also achieve sustainable education.

For example: The element Na (Figure 4) (if you eat it, you will die) is present in table salt, it is found in the human body, it is a silvery metal, it is shown in the periodic table, Cl (Figure 5) (if you smell it, you will die) is found in the human body, it is a yellowish-green gas, you can see in Figure 4. Table salt NaCl (if you don't eat it, you will die) is a combination of these elements, which is often used in the economy.

Conclusion

1. In the periodic table, the group number is equal to its maximum valence, we can find out its highly valent oxides and hydrides.
2. The periodic system is perfectly structured, depending on the periodic system, we can see that the electronegativity, atomic radius, ionization potential, and electron affinity change at the same time (Figure 2).
3. The properties of the compounds of the elements are repeated periodically.
4. The masses of elements increase as the atomic number increases, with the exceptions of Ar and K, Co and Ni.
5. The periodic table of elements, their occurrence, natural compounds, and areas of use are shown with various animations, which develop the memorization and study of elements, and help students understand the need for rational and fair use of substances formed by elements.
6. The main reason for the major problems (5) that humanity faces, such as food supply, the spread of diseases, energy production, and climate change, is the lack of understanding of the essence of the concepts of sustainable development.

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