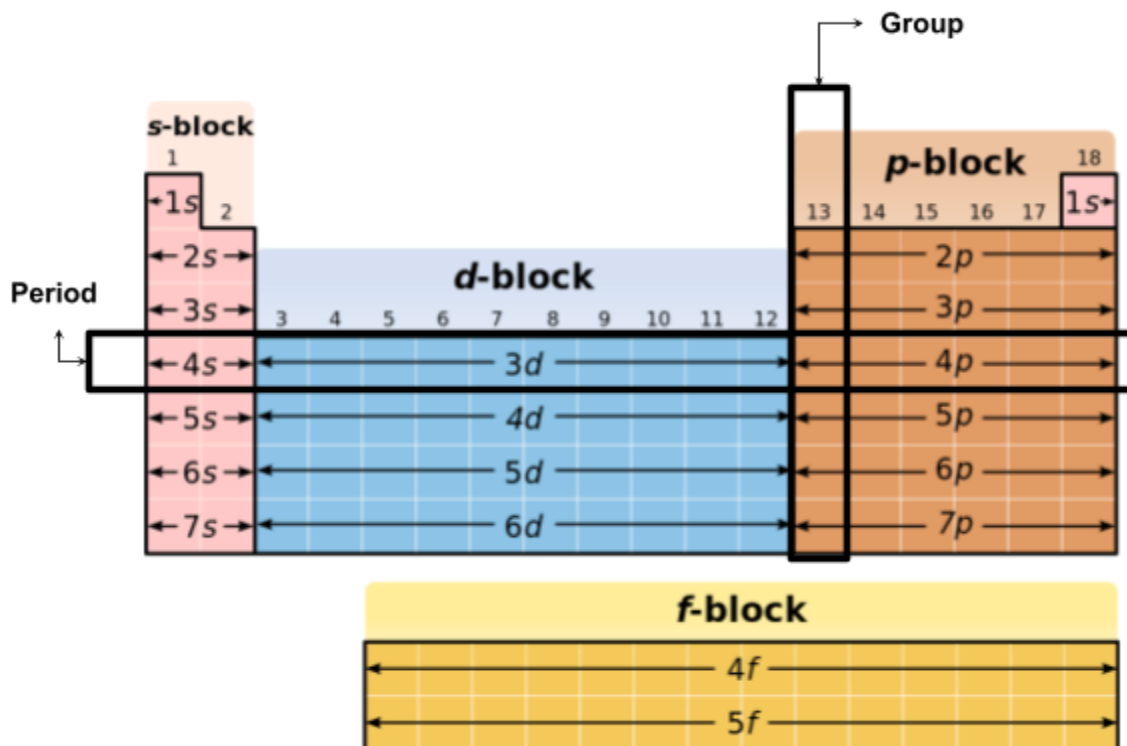


Unit 7: Periodicity

Organization of the periodic table

This worksheet will cover how the periodic table is organized, the trends of the periodic table, and valence electrons. The arrangement of the periodic table of elements is based on the electron orbitals of the elements as well as to group elements with similar characteristics,



1. Which periodic family has 6 valence electrons?

2. Which family does potassium belong to?

a. List the properties of this group

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b. Which group also has very similar properties to this group?

3. Which element has similar chemical properties to phosphorus? Oxygen or arsenic?

a. What group does phosphorus belong to?

b. Describe the properties of this group.

4. Explain how you got your answer to question 3 in terms of valence electrons.

5. Which period is boron part of?

6. What happens as you go across a period?

7. What block does aluminum belong in?

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8. What element is in period 6 group 3?

9. Name the first element in the lanthanides group and the last element in the actinides group.

a. What block do these elements belong to?

b. List the characteristics of the inner transition metals.

10. Which group contains the noble gases?

a. Describe the properties of noble gasses.

11. Which block contains alkali metals?

12. What happens as you go down a group?

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13. Which block contains the transition metals?

a. List the characteristics of transition metals.

14. Fill out this chart.

<u>Family</u>	<u>Group #</u>
Nitrogen Family	
Alkali Metals	
Boron Family	
Transition Metals	
Noble Gasses	
Halogens	
Chalogens	
Carbon Family	
Alkaline Earth Metals	

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ANSWER KEY

1. Which periodic family has 6 valence electrons?

Group 16 elements have 6 valence electrons. Chalcogens are part of group 16.

2. Which family does Potassium belong to?

Alkali metals. Potassium is part of group 1 or the alkali metals.

a. List the properties of this group

Alkali metals only have 1 valence electron. They are extremely reactive and can conduct electricity. They are soft metals that have low melting points. They are characterized by their silvery white color. These metals also easily react with halogens (group 17 elements). They have low electronegativity and ionization energies.

b. Which group also has very similar properties to this group

Group 2 or the Alkaline earth metals group. They have 2 valence electrons and share many properties with Alkali metals. However Alkaline earth metals are less reactive compared to alkali metals.

3. Which element has similar chemical properties to Phosphorus? Oxygen, or Arsenic?

Phosphorus has similar properties to arsenic. Their properties are more similar because they are in the same group of the periodic table.

a. What group does phosphorus belong to?

Phosphorus belongs to group 15 or the nitrogen family. We can identify this through the amount of valence electrons phosphorus has. Since it has 5, we can determine it belongs to the group that has only 5 valence electrons.

b. Describe the properties of this group.

The nitrogen family consists of nonmetals and semimetals. Nitrogen is the only gas and the rest are solids at standard pressure and temperature. They have 5 valence electrons.

4. Explain how you got your answer to question 3 in terms of valence electrons.

Arsenic is in the same group as phosphorus. Being in the same group means they will have

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the same number of valence electrons. Valence electrons are a major factor in determining how an element will react. Valence electrons determine how the atom will bond with a certain element. Take carbon for an example. Carbon has 4 valence electrons and will form four bonds to complete its shell. It will form a double bond with each oxygen to form CO_2 . Silicone having the same number of valence electrons will behave similarly. For example, it forms a double bond with each oxygen to form SiO_2 .

5. Which period is boron part of?

Period 2. Boron (B) can be identified on the periodic table on the second row. Boron also has 2 valence shells meaning it's in the 2nd period.

6. What happens to electronegativity as you go across a period?

The electronegativity of the atoms increases as you go from left to right on the periodic table of elements. Electronegativity is an atom's ability to attract a bonding pair of electrons. Going across a period means an increase of protons, and more protons means a greater force to attract electrons. In addition, the atomic radius decreases across a period, meaning the valence shells get closer to the nucleus. So the distance between the electrons and protons becomes smaller resulting in a greater attractive force. As a result, electronegativity also increases as the attractive force increases.

7. What block does aluminum belong in?

P-block. The p-block is group 13-18. Aluminum (Al) is in group 13, which is part of the p-block.

8. What element is in period 6 group 3?

Element 57, lanthanum

9. Name the first element in the lanthanides group and the last element in the actinides group.

The first element in the lanthanides group is cerium and the last element in the actinides group is lawrencium.

a. What block do these elements belong to?

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These elements are organized into the f-block due to their f orbitals being filled by electrons.

b. List the characteristics of the inner transition metals.

Inner transition metals are another name for the lanthanides and actinides. They have high densities, are malleable, and conduct electricity. They also have high melting points and high atomic numbers. Actinides are radioactive by nature.

10. Which group contains the noble gasses?

Group 18. The noble gasses are the last column of the periodic table and have a full octet of electrons.

b. Describe the properties of noble gasses.

Noble gasses are colorless, odorless, and tasteless. They are gasses and nonflammable under standard conditions. They are also relatively non-reactive due to having a full octet of electrons.

11. Which block contains alkali metals?

s-block. Alkali metals are group one metals. The s-block is group 1 and group 2.

12. What happens to the atomic radius as you go down a group?

The atomic radius of the atoms increases as you go downwards on the periodic table. Going down a periodic table results in the increase of the number of electron shells an atom has. More electron shells means a bigger atom.

13. Which block contains the transition metals?

The d-block contains the transition metals. The d-block goes from group 3-12.

a. List the characteristics of transition metals.

They have multiple oxidation states. They are malleable, conduct electricity, and are lustrous. They are all solid at room temperature (except mercury). They have high melting points

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(except mercury).

14. Without looking at the previous page fill out this chart.

<u>Family</u>	<u>Group #</u>
Nitrogen Family	15
Alkali Metals	1
Boron Family	13
Transition Metals	3-12
Noble Gasses	18
Halogens	17
Chalcogens	16
Carbon Family	14
Alkaline Earth Metals	2