

Trends in Periodic Table Worksheet

Use the periodic table and your knowledge of periodic trends to answer the following questions.

- ① What is the periodic trend for the atomic size from top to bottom in a group and from left to right in a period?
- ② Explain the relationship between the relative size of an ion to its neutral atom and the nature of the charge on the ions.
- ③ What is the periodic trend for first ionization energy?
- ④ How does electronegativity change within a period? Explain why this trend occurs?
- ⑤ How does electronegativity change within a group? Explain why this trend occurs?
- ⑥ Why is potassium (K) bigger than calcium (Ca)?
- ⑦ Which element has the highest ionization energy: Be or B? Why?
- ⑧ Why do elements in the same group have similar properties?
- ⑨ Why does fluorine have higher ionization energy than iodine?
- ⑩ What is the difference between electronegativity and ionization energy?

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Answers

- ① What is the periodic trend for the atomic size from top to bottom in a group and from left to right in a period?

It increases from top to bottom down a group and decreases from left to right across a period.

- ② Explain the relationship between the relative size of an ion to its neutral atom and the nature of the charge on the ions.

Positive ions are smaller than their corresponding neutral atoms, and negative ions are larger than their corresponding neutral atoms.

- ③ What is the periodic trend for first ionization energy?

It increases from left to right across a period and decreases from top to bottom down a group.

- ④ How does electronegativity change within a period? Explain why this trend occurs?

It increases from left to right across a period. The reason is that the atoms get smaller and more protons are added to the nucleus. The valence electrons are held tightly.

- ⑤ How does electronegativity change within a group? Explain why this trend occurs?

It decreases from top to bottom down a group. The reason is that the atomic size increases down a group making it difficult for the inner electrons to shield the valence electrons. As a result, the nucleus no longer holds the valence electrons tightly.

- ⑥ Why is potassium (K) bigger than calcium (Ca)?

K has less proton than Ca on its outer shell. It does not pull the outer electrons as strongly as Ca.

- ⑦ Which element has the highest ionization energy: Be or B? Why?

Be. Because it has completely filled s-subshell. On the other hand, B has an incompletely filled p-subshell.

- ⑧ Why do elements in the same group have similar properties?

Because they have the same valence electron arrangement in their atoms.

- ⑨ Why does fluorine have higher ionization energy than iodine?

Fluorine is a small atom. The nucleus tightly holds its valence electrons. Hence, it is challenging to remove an electron from its atom.

- ⑩ What is the difference between electronegativity and ionization energy?

Electronegativity is the tendency of an atom to attract a pair of electrons in a chemical bond. On the other hand, ionization energy is the energy required to remove an electron from an atom.