What Are Periodic Table Trends?

Worksheet

Periodic trends are predictable changes in element properties based on position. Atomic radius decreases left-to-right and increases down; ionization energy and electronegativity increase left-to-right but decrease down; electron affinity shows no single trend but favors halogens.

Questions

1. Atomic radius increases

A) Left-to-right across a period
B) Down a group
C) From nonmetals to metals
D) As atomic number increases

2. Ionization energy is highest for

A) Metals (left side)
B) Noble gases (right side)
C) Halogens
D) Alkali metals

3. Which element has the smallest atomic radius?

A) Helium (He)
B) Fluorine (F)
C) Hydrogen (H)
D) Nitrogen (N)

4. Electronegativity increases

A) Down a group
B) Left-to-right across a period
C) Away from halogens
D) As you go to the center of the table

5. Compare atomic radius: Na vs Cl (both period 3). Which is larger?

6. Compare atomic radius: Li vs Na (both group 1). Which is larger?

7. Predict ionization energy trend in period 2 (Li to Ne).

8. Define: What is a periodic trend?

9. Define: How does atomic radius change across a period?

10. Define: How does atomic radius change down a group?

Answer Key

1. B) Down a group - Down a group, each element has more electron shells, making it larger.

2. B) Noble gases (right side) - Noble gases have the highest ionization energy - very stable, hard to remove electrons.

3. B) Fluorine (F) - Fluorine is the smallest non-noble gas; highest nuclear charge and lowest shells among reactives.

4. B) Left-to-right across a period - Left-to-right: stronger nucleus attracts electrons. Down a group: farther electrons less attracted.

5. Na is at the left of period 3, Cl is at the right. Atomic radius DECREASES left-to-right. Na (186 pm) > Cl (99 pm) - Na is much larger.

6. Li is in period 2, Na is in period 3. Atomic radius INCREASES down a group. Na (186 pm) > Li (152 pm) - Na is larger.

7. Ionization energy INCREASES left-to-right. Li (520 kJ/mol) < Be (900) < C (1086) < N (1402) < O (1314) < F (1681) < Ne (2081). Note: small dip at O due to electron pairing repulsion.

8. A predictable pattern in element properties based on position in the periodic table.

9. Decreases left to right (more protons pull electrons closer).

10. Increases (new electron shells are farther from nucleus).