



Periodic Trends Worksheet

Here's a "Periodic Trends" worksheet that focuses on understanding and analyzing the periodic trends in the periodic table, along with the answers provided at the end. This will help you practice your knowledge of the trends in atomic properties across the periodic table.

Worksheet: Periodic Trends

****Problem 1: Atomic Radius****

Arrange the following elements in order of increasing atomic radius: Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I).

****Problem 2: Ionization Energy****

Which of the following elements has the highest ionization energy: Sodium (Na), Magnesium (Mg), Aluminum (Al), Silicon (Si)?

****Problem 3: Electron Affinity****

Which of the following elements is likely to have the highest electron affinity: Oxygen (O), Sulfur (S), Selenium (Se), Tellurium (Te)?

****Problem 4: Electronegativity****

Rank the following elements in order of decreasing electronegativity: Nitrogen (N), Oxygen (O), Fluorine (F), Chlorine (Cl).

****Problem 5: Periodic Trend Explanation****

Explain the periodic trend of atomic radius across a period (horizontal row) of the periodic table.

****Problem 6: Group Trend Explanation****

Explain the periodic trend of ionization energy down a group (vertical column) of the periodic table.

****Problem 7: Anomalous Trends****

Identify and explain any anomalous trends in the periodic table, if applicable.

****Problem 8: Metal vs. Nonmetal Properties****

List three properties that generally characterize metals and three properties that generally characterize nonmetals.



Answers:

1. Increasing atomic radius: $I < Br < Cl < F$
2. Silicon (Si)
3. Oxygen (O)
4. Decreasing electronegativity: $F > O > N > Cl$
5. Across a period, atomic radius generally decreases due to increasing effective nuclear charge and stronger attraction between the electrons and the nucleus.
6. Ionization energy generally decreases down a group due to increasing atomic size and shielding effect from inner electron shells.
7. Anomalous trends may include the irregular behavior of noble gases in ionization energy and the unusual behavior of transition metals in electron configuration.
8. **Metal Properties:** Good conductors of heat and electricity, malleable and ductile, tend to form cations in chemical reactions.
Nonmetal Properties: Poor conductors, often brittle, tend to form anions or share electrons in chemical reactions.

Remember, periodic trends provide insights into the changes in atomic properties as you move across a period or down a group in the periodic table.