Worksheet On Periodic Trends

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Part 1: Building a Foundation

What does the atomic number of an element represent?

Hint: Think about what defines an element's identity.

- ◯ A) The number of neutrons in an atom
- ◯ B) The number of protons in an atom
- ◯ C) The number of electrons in an atom
- ◯ D) The atomic mass of an atom

Which of the following statements about the periodic table are true? (Select all that apply)

Hint: Consider the arrangement and properties of elements.

- ☐ A) Elements in the same period have the same number of electron shells.
- ☐ B) Elements in the same group have similar chemical properties.
- ☐ C) Atomic radius increases across a period from left to right.
- ☐ D) Ionization energy decreases down a group.

Explain how electron configuration influences the chemical properties of an element.

Hint: Consider how the arrangement of electrons affects reactivity.

Part 2: Comprehension

Why does the atomic radius decrease across a period?

Hint: Consider the effects of nuclear charge and electron shielding.

- ◯ A) Increased number of electron shells
- ◯ B) Increased nuclear charge
- ◯ C) Decreased electron shielding
- ◯ D) Decreased nuclear charge

Describe how ionization energy changes as you move down a group and explain why this trend occurs.

Hint: Think about the relationship between atomic size and energy required to remove an electron.

Which factors contribute to the increase in electronegativity across a period? (Select all that apply)

Hint: Consider how atomic structure affects attraction for electrons.

- ☐ A) Increased atomic radius
- ☐ B) Increased nuclear charge
- ☐ C) Decreased electron shielding
- ☐ D) Increased electron affinity

Part 3: Application and Analysis

Based on periodic trends, which element is likely to have the highest ionization energy?

Hint: Think about the position of elements in the periodic table.

- ◯ A) Sodium (Na)
- ◯ B) Chlorine (Cl)

- ◯ C) Potassium (K)
- ◯ D) Argon (Ar)

Consider a situation where you need a metal that easily loses electrons for a chemical reaction. Which group of the periodic table would you choose from and why?

Hint: Think about the reactivity of metals in different groups.

Which of the following best explains why noble gases are unreacti ve?

Hint: Think about the electron configuration of noble gases.

- ◯ A) They have high electronegativity.
- ◯ B) They have a complete valence shell.
- ◯ C) They have a low atomic radius.
- ◯ D) They have high ionization energy.

Part 4: Evaluation and Creation

Evaluate the impact of electron shielding on the periodic trends of atomic radius and ionization energy. Provide a detailed explanation.

Hint: Consider how inner electrons affect outer electrons.

Propose a solution for selecting materials for a battery based on periodic trends. Consider factors such as reactivity, ionization energy, and electronegativity in your proposal.

Hint: Think about how these properties affect battery performance.