Periodic Trend Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the general trend for atomic radius across a period in the periodic table?

Hint: Consider how atomic size changes as you move from left to right.

- ◯ A) Increases from left to right
- ◯ **B) Decreases from left to right ✓**
- ◯ C) Remains constant
- ◯ D) Increases and then decreases

> The atomic radius generally decreases from left to right across a period.

Which of the following factors affect the atomic radius of an element? (Select all that apply)

Hint: Think about the properties of protons, electrons, and their arrangement.

- ☐ **A) Number of protons ✓**
- ☐ **B) Number of electron shells ✓**
- ☐ C) Electronegativity
- ☐ D) Ionization energy

> The atomic radius is affected by the number of protons and the number of electron shells.

Define ionization energy and explain why it generally increases across a period.

Hint: Consider the relationship between atomic structure and energy required to remove an electron.

Ionization energy is the energy required to remove an electron from an atom, and it generally increases across a period due to increased nuclear charge and decreased atomic radius.

List the periodic trends that typically increase from left to right across a period.

Hint: Think about properties that change as you move across the periodic table.

1. Electronegativity

Increases from left to right.

2. Ionization energy

Increases from left to right.

3. Electron affinity

Increases from left to right.

Trends that typically increase from left to right include electronegativity, ionization energy, and electron affinity.

Which element is likely to have the highest electronegativity?

Hint: Consider the elements in the top right corner of the periodic table.

◯ **A) Fluorine ✓**

- ◯ B) Oxygen
- ◯ C) Nitrogen
- ◯ D) Carbon

> Fluorine is likely to have the highest electronegativity due to its position in the periodic table.

Part 2: Application and Analysis

Predict which element would have a larger atomic radius: Sodium (Na) or Potassium (K)? Explain your reasoning.

Hint: Consider the position of these elements in the periodic table.

- ☐ A) Sodium
- ☐ **B) Potassium ✓**
- ☐ C) Both have the same atomic radius
- ☐ D) Cannot be determined

> Potassium (K) would have a larger atomic radius than Sodium (Na) because it has more electron shells.

Given the elements Oxygen (O), Sulfur (S), and Selenium (Se), arrange them in order of increasing electronegativity and justify your arrangement.

Hint: Think about the positions of these elements in the periodic table.

> **The order of increasing electronegativity is Se < S < O, as electronegativity increases across a period.**

Analyze the following statement: "The reactivity of nonmetals increases across a period." Which factors contribute to this trend? (Select all that apply)

Hint: Consider how atomic structure influences reactivity.

- ☐ A) Increase in atomic radius

- [x] **B) Increase in electronegativity ✓**
- [x] **C) Increase in ionization energy ✓**
- [ ] D) Decrease in electron affinity

> The reactivity of nonmetals increases due to an increase in electronegativity and ionization energy.

Compare and contrast the trends in electron affinity and ionization energy across a period. Provide examples to support your analysis.

Hint: Think about how these two properties relate to atomic structure.

> **Both electron affinity and ionization energy generally increase across a period, but they represent different processes: electron affinity is the energy change when an electron is added, while ionization energy is the energy required to remove an electron.**

Part 3: Evaluation and Creation

Evaluate the following elements: Fluorine (F), Chlorine (Cl), and Bromine (Br). Which element would you expect to have the highest reactivity and why? (Select all that apply)

Hint: Consider the halogens and their positions in the periodic table.

- [x] **A) Fluorine ✓**
- [ ] B) Chlorine
- [ ] C) Bromine
- [ ] D) Reactivity is the same for all

> Fluorine is expected to have the highest reactivity due to its high electronegativity and low atomic radius.

Design an experiment to demonstrate the trend in metallic character across a period. Describe the materials, procedure, and expected results.

Hint: Think about how you can illustrate the change in metallic character with a practical demonstration.

An experiment could involve comparing the reactivity of metals across a period, using materials like sodium, magnesium, and aluminum, and observing their reactions with water or acids.

Based on periodic trends, which element would you predict to be the most reactive metal?

Hint: Consider the alkali metals and their positions in the periodic table.

- ◯ A) Lithium (Li)
- ◯ B) Sodium (Na)
- ◯ C) Potassium (K)
- ◯ **D) Rubidium (Rb) ✓**

Rubidium (Rb) is predicted to be the most reactive metal due to its low ionization energy and large atomic radius.