



LearnSight Systems Companion Worksheet

Periodic Trends: Shielding & Radii - Companion Worksheet

Name _____ Period _____

Shielding Effect

Definition: The shielding effect is

Trend across a period: _____

Trend down a group: _____

Nuclear Charge

Definition: Nuclear charge is

Trend across a period: _____

Trend down a group: _____

Atomic Radii

Definition: Atomic radius is _____

Trend across a period: _____

Trend down a group: _____

Practice - Circle the larger atom

Circle the larger atom

For each pair, circle the atom with the larger atomic radius.

O Li or F

O Sn or Sr

O Na or Rb

Arrange by increasing atomic radius

For each set, write the elements from smallest to largest.

Set - Period 5 (Y, Tc, Cd)

Use each symbol from the bank once.

Bank: Tc · Y · Cd

Smallest ?

1. _____

2. _____

3. _____

? Largest

Set - Group 2

Use each symbol from the bank once.

Bank: Mg · Ca · Be

Smallest ?

1. _____

2. _____

3. _____

? Largest

Set - Period 5 (Te-Xe)

Use each symbol from the bank once.

Bank: I · Te · Xe

Smallest ?

1. _____

2. _____

3. _____

? Largest

Ionic Radii

Definition: Ionic radius is _____

Trend (same charge / vs parent atom): _____

Circle the larger ionic radius

For each pair, circle the ion with the larger ionic radius.

O Mg⁺² or Mg⁺¹

O C⁻² or C⁺²

O F⁺¹ or F⁻¹

ANSWER KEY

For teacher use - do not distribute with the student worksheet.

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Sample answers - Shielding Effect

Definition - Core electrons reduce the nuclear attraction felt by valence electrons.

Across a period - Shielding stays roughly constant (same outer shell).

Down a group - Shielding increases (new inner shells are added).

Sample answers - Nuclear Charge

Definition - Nuclear charge is the positive charge of the nucleus, equal to the number of protons (atomic number).

Across a period - Nuclear charge increases left to right as protons are added.

Down a group - Nuclear charge increases as atomic number rises; effective attraction is often discussed together with shielding.

Sample answers - Atomic Radii

Definition - The typical distance from the nucleus to the outer electrons (size of the atom).

Across a period - Atomic radius decreases (nuclear charge rises; shielding stays similar).

Down a group - Atomic radius increases (more electron shells).

Circle the larger atom

Li or F ? larger: Li

Sn or Sr ? larger: Sr

Na or Rb ? larger: Rb

Increasing atomic radius

Period 5 (Y, Tc, Cd): $\text{Cd} < \text{Tc} < \text{Y}$

Group 2: $\text{Be} < \text{Mg} < \text{Ca}$

Period 5 (Te-Xe): $\text{Xe} < \text{I} < \text{Te}$

Sample answers - Ionic Radii

Definition - The distance from the nucleus to the outer edge of an ion's electron cloud.

Trend - Cations are smaller than their parent atoms; anions are larger. For ions with the same charge, trends resemble atomic radius. More positive charge ? smaller ion; more negative ? larger ion.

Larger ionic radius

Mg^{+2} or Mg^{+1} ? larger: Mg^{+1}

C^{-2} or C^{+2} ? larger: C^{-2}

F^{+1} or F^{-1} ? larger: F^{-1}