



LearnSight Systems Companion Worksheet

Periodic Trends: Energy & Reactivity - Companion Worksheet

Name _____ Period _____

Ionization Energy

Definition: Ionization energy is

Trend across a period: _____

Trend down a group: _____

Practice - Circle the highest ionization energy

Circle the highest ionization energy

Circle the atom/ion with the highest ionization energy in each comparison (for three-way sets, compare as listed).

O N or O

O Ne or F / Cl

O N / As or F

Three-way sets (circle one): Ne / F / Cl and N / As / F

Electronegativity

Definition: Electronegativity is

Noble gases in EN rankings (this lesson):

Trend across a period: _____

Trend down a group: _____

Element with the highest electronegativity and (among common cases) high electron affinity: _____

Arrange by increasing electronegativity

For each set, write the elements from lowest to highest electronegativity. Include every element listed (noble gases included - rank them lowest).

Set - B / Na / F / O / Ne

Use each element once. Include Ne and place it as the lowest EN.

Bank: B · Na · F · O · Ne

Lowest ?

1. _____
2. _____
3. _____
4. _____
5. _____

? Highest

Set - S / Na / Mg / Cl / Ar

Use each element once. Include Ar and place it as the lowest EN.

Bank: S · Na · Mg · Cl · Ar

Lowest ?

1. _____
2. _____
3. _____
4. _____
5. _____

? Highest

Set - N / P / Sb / Bi / As

Use each symbol once (same group, down the column).

Bank: N · P · Sb · Bi · As

Lowest ?

1. _____
2. _____
3. _____
4. _____
5. _____

? Highest

Reactivity

Definition: Reactivity is _____

Metals - trend: _____

Nonmetals - trend: _____

Practice - Circle the more reactive element

For each pair, circle the element that is more reactive.

O Rb or Sc

O Au or Nb

O O or S

ANSWER KEY

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

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Sample answers - Ionization Energy

Definition - Energy required to remove an electron from a gaseous atom.

Across a period - Ionization energy generally increases (left → right).

Down a group - Ionization energy generally decreases (top → bottom).

Circle practice - O (vs N); Ne (vs F, Cl); F (vs N, As). Order for N / As / F: $F > N > As$.

Sample answers - Electronegativity

Definition - Attraction an atom has for electrons in a chemical bond.

Noble gases in EN rankings - Include them and rank them as the lowest EN in the set (for this lesson).

Across a period - Electronegativity generally increases (left → right).

Down a group - Electronegativity generally decreases (top → bottom).

Highest EN (and high EA) - Fluorine (F).

Arrange B/Na/F/O/Ne - $Ne < Na < B < O < F$.

Arrange S/Na/Mg/Cl/Ar - $Ar < Na < Mg < S < Cl$.

Arrange N/P/Sb/Bi/As - $Bi < Sb < As < P < N$.

Sample answers - Reactivity

Definition - How readily an element reacts (gains, loses, or shares electrons).

Metals - More reactive down a group and toward the left (lose electrons easily). Francium/cesium often cited as most reactive metals.

Nonmetals - More reactive up a group and toward fluorine (gain electrons easily). Fluorine is the most reactive nonmetal.

Practice - more reactive element

Rb (more reactive than Sc - alkali metal far left / more metallic reactivity)

Nb (more reactive than Au - Au is farther right / less metallic reactivity under the generic metal trend)

O (more reactive than S - nonmetal reactivity decreases down the group)