

PERIODIC TRENDS PRACTICE QUESTIONS: Name _____

1) **B Al Ga In**

- a) Most metallic?
 - b) Least metallic?
 - c) Lowest electronegativity?
 - d) Highest ionization energy?
 - e) Largest atomic radius?
 - f) Which are non-metals?
 - g) Which are conductors?
 - h) Highest shielding effect?
 - i) List them in order from small to large.
 - j) Would they gain or lose electrons to form ions?
 - k) What charge would the ion have?
 - l) Would these be considered cations or anions?
 - m) Would the ion be larger or smaller than the atom?
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2) **Sn Sb Te I**

- a) Highest metallic character?
 - b) Lowest I.E.?
 - c) Smallest atom?
 - d) Which are metalloids?
 - e) List in order of increasing size (from small to large)
 - f) When Iodine becomes an ion, is the ion larger or smaller than the atom?
 - g) When Tin (Sn) becomes an ion, is the ion larger or smaller than the atom?
 - h) Highest shielding effect?
 - i) Which one is a halogen?
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3) **Mg Ca Sr Ba**

- a) Most metallic?
 - b) Least metallic?
 - c) Lowest electronegativity?
 - d) Highest ionization energy?
 - e) Largest atomic radius?
 - f) Which are non-metals?
 - g) Which are conductors?
 - h) List them in order from small to large.
 - i) Would they gain or lose electrons to form ions? Charge would the ion have?
 - j) Would the ion be larger or smaller than the atom?
 - k) Lowest shielding effect?
 - l) Would the ions be cations or anions?
 - m) What is the special name given to the group in which these elements belong?
 - n) What are some characteristics of this group?
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4) **Al Si P S**

- a) Highest metallic character?
 - b) Lowest I.E.?
 - c) Smallest?
 - d) Which are metalloids?
 - e) List in order of increasing size (from small to large)
 - f) Which are non-metals?
 - g) Lowest electronegativity?
 - h) Which would rather gain electrons?
 - i) Which would rather lose electrons?
 - j) Which ones would form cations?
 - k) Would these be larger or smaller than the neutral atom?
 - l) Which ones would form anions?
 - o) Would these be larger or smaller than the neutral atom?
 - m) Lowest shielding effect?
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5) In each set, tell which is larger AND explain why.

- a) Ca v. K _____
- b) As v. Se _____
- c) S v. O _____
- d) Rb v. Li _____
- e) O v. O⁻² _____
- f) Ca v. Ca⁺² _____
- g) O⁻² v. F⁻¹ _____
- h) S⁻² v. Se⁻² _____

6) Arrange the following elements in order of decreasing atomic size:

- a) S, Cl, Al, Na
b) C, Ge, Pb, Si
c) Cs, Pb, B, Ba

7) Arrange the following elements in order of increasing ionization energy:

- a) Be, Mg, Sr
b) Bi, Cs, Ba
c) Na, Al, S

8) In each of the following pairs, which element is the most electronegative?

- a) chlorine, fluorine
b) carbon, nitrogen
c) magnesium, neon
d) arsenic, calcium

9) Give the name the element found at each of the following locations on the periodic table:

- a) Group 1, period 4.
b) Group 13, period 3.
c) Group 16, period 3
d) Group 2, period 6

10) Write the symbols for the members of the following groups:

- a) alkali metals
b) halogens
c) alkaline earth metals
d) noble gases

11) What is the general term applied to the elements:

- a) in Groups 3 - 12?
b) in the "d block"?
c) in Group 18?
a) d along the zig-zag line?
d) to the right of the zig-zag line?

13) In general do metals or non-metals have:

- a) higher ionization energies?
b) higher electronegativities?
c) higher malleability?
d) higher conductivity?
e) larger ion size compared to the size of the neutral atom?

14) Explain the following trends:

- a) atomic radius decreases as you go across a period
b) ionization energy increases as you go across a period
c) ionization energy decreases as you go down a group
d) negative ions are larger than their neutral atoms

PERIODIC TRENDS PRACTICE QUESTIONS: Name _____

1) B Al Ga In

- a) Most metallic? In
- b) Least metallic? B
- c) Lowest electronegativity? In
- d) Highest ionization energy? B
- e) Largest atomic radius? In
- f) Which are non-metals? B (metalloid)
- g) Which are conductors? Al Ga In
- h) Highest shielding effect? In

B Al Ga In

- i) List them in order from small to large.
- j) Would they gain or lose electrons to form ions? lose
- k) What charge would the ion have? +
- l) Would these be considered cations or anions? cations
- m) Would the ion be larger or smaller than the atom? smaller

2) Sn Sb Te I

- a) Highest metallic character? Sn
- b) Lowest I.E.? Sn
- c) Smallest atom? I
- d) Which are metalloids? Sb Te
- e) List in order of increasing size (from small to large) I Te Sb Sn

* Anion - larger than atom

- f) When Iodine becomes an ion, is the ion larger or smaller than the atom? bigger
- g) When Tin (Sn) becomes an ion, is the ion larger or smaller than the atom? smaller
- h) Highest shielding effect? Sn
- i) Which one is a halogen? I

3) Mg Ca Sr Ba

- a) Most metallic? Ba
- b) Least metallic? Mg
- c) Lowest electronegativity? Ba
- d) Highest ionization energy? Mg
- e) Largest atomic radius? Ba
- f) Which are non-metals? none
- g) Which are conductors? Mg Ca Sr Ba
- h) List them in order from small to large. Mg Ca Sr Ba
- i) Would they gain or lose electrons to form ions? lose Charge would the ion have? +

* cation - smaller than atom

- j) Would the ion be larger or smaller than the atom? smaller
- k) Lowest shielding effect? Mg
- l) Would the ions be cations or anions? cation
- m) What is the special name given to the group in which these elements belong? alkali earth
- n) What are some characteristics of this group? 2ve- conductors

4) Al Si P S

- a) Highest metallic character? Al
- b) Lowest I.E.? Al
- c) Smallest? S
- d) Which are metalloids? Si
- e) List in order of increasing size (from small to large) S P Si Al
- f) Which are non-metals? P S
- g) Lowest electronegativity? Al
- h) Which would rather gain electrons? S P

- i) Which would rather lose electrons? Al Si
- j) Which ones would form cations? Al Si
- k) Would these be larger or smaller than the neutral atom? smaller
- l) Which ones would form anions? P S
- o) Would these be larger or smaller than the neutral atom? larger
- m) Lowest shielding effect? S

5) In each set, tell which is larger AND explain why.

- a) Ca v. K K - Ca has 1 more proton - higher nuclear charge
- b) As v. Se As - Se has 1 more proton - higher nuclear charge
- c) S v. O S - S has 1 more energy level than O.
- d) Rb v. Li Rb - Rb has 5 energy levels; Li only has 2
- e) O v. O^{2-} O^{2-} O^{2-} has gained 2 valence e^- and is bigger - more e^-e^- repulsion
- f) Ca v. Ca^{+2} Ca Ca^{2+} lost 2 ve^- less e^-e^- repulsion more pt^- pull tighter
- g) O^{2-} v. F^{-1} O^{2-} gain 2 ve^- so pulling less on levels / e^- Rep
- h) S^{2-} v. Se^{2-} Se^{2-} Se has 1 more energy level than S

6) Arrange the following elements in order of decreasing atomic size:

- a) S, Cl, Al, Na Na Al S Cl
- b) C, Ge, Pb, Si Pb Ge Si C
- c) Cs, Pb, B, Ba Cs Ba Pb Bi

Bi

7) Arrange the following elements in order of increasing ionization energy:

- a) Be, Mg, Sr Be Mg Sr
- b) Bi, Cs, Ba Cs Ba Bi
- c) Na, Al, S Na Al S

8) In each of the following pairs, which element is the most electronegative?

- a) chlorine, fluorine
- b) carbon, nitrogen
- c) magnesium, neon
- d) arsenic, calcium

9) Give the name the element found at each of the following locations on the periodic table:

- a) Group 1, period 4. K - potassium
- b) Group 13, period 3. Al - aluminum
- c) Group 16, period 3 S - sulfur
- d) Group 2, period 6 Ba - barium

10) Write the symbols for the members of the following groups:

- a) alkali metals - Li Na K Rb Cs Fr
- b) halogens - F Cl Br I At
- c) alkaline earth metals - Be Mg Ca Sr Ba Ra
- d) noble gases He Ne Ar Kr Xe Rn

11) What is the general term applied to the elements:

- a) in Groups 3 - 12? Transition metal
- b) in the "d block"? Transition metal
- c) in Group 18? Nobel gases
- a) ~~X~~ along the zig-zag line? metalloids
- d) to the right of the zig-zag line? non metal

13) In general do metals or non-metals have:

- a) higher ionization energies? non-metals
- b) higher electronegativities? non metals
- c) higher malleability? metals
- d) higher conductivity? metals
- e) larger ion size compared to the size of the neutral atom? nonmetals

14) Explain the following trends:

- a) atomic radius decreases as you go across a period - higher nuclear charge
- b) ionization energy increases as you go across a period nonmetals want to gain
- c) ionization ^{e^-} energy decreases as you go down a group - Lower IE when more energy levels
- d) negative ions are larger than their neutral atoms - ions gain electrons