NAME KEY PRACTICE

PERIODIC TRENDS QUIZ

1. Rank the following elements in order of increasing atomic radius:
Se, Ga, O, Cs, Rb

O, Se, Ga Rb, Cs

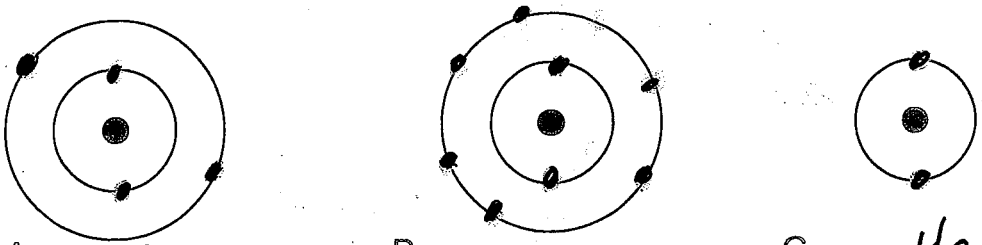
2. Rank the following elements in order of increasing electronegativity:
P, S, Al, Cl, Si

Al, Si, P, S, Cl

3. Why does P have a lower ionization energy than fluorine? You must make a reference to atomic radius in your answer.

P is larger than F; therefore F will have a greater pull on bonding e⁻.

Use the following diagrams to answer questions 4-9



A Be B O C He

4. Which of the atoms has the lowest Ionization energy? A

5. Which of the atoms has the largest radius? A

6. From which of the 3 atoms is it most difficult to remove an outer electron? C

7. Which of the atoms would form an ion with a +2 charge? A

8. Write the element symbols above the diagrams. (all atoms are neutral)
Be, O, He

9. Which of the three atoms has the highest electronegativity?
B - OXYGEN

10. CIRLCLE THE APPROPRIATE WORD TO FILL EACH BLANK.
The noble gases fit the trend for _____ (ionization energy, electronegativity), because it is difficult to _____ (remove, add) _____ (a proton, a neutron, an electron) _____ (to, from) these atoms. The noble gases do not have values for _____ (ionization energy, electronegativity), because these atoms do not readily _____ (share, produce) _____ (protons, neutrons, electrons) with other atoms.

11. Circle the element in each pair which has the greater atomic radius.
a. Be or Li b. Sr or Ga c. S or O d. Sn or Br

12. Circle the element in each pair which has the greater ionization energy.
a. Be or Li b. Sr or Ga c. S or O d. Sn or Br

13. Indicate which has the largest radius in each pair.
a. K or K^+ b. O or O^{2-} c. F or F^- d. Al or Al^{3+}

14. Which element is more electronegative?
a. Cl or F b. C or N c. Mg or Si d. As or Ca

15. The ions Se^{2-}, Br^-, Rb^+, and Sr^{2+} are isoelectronic. What does this mean?
THEY HAVE THE SAME NUMBER OF ELECTRONS (36 e⁻)

Rank these ions (from #15) from the smallest to the largest radius.
Sr^{+2}, Rb^{+1}, Br^{-1}, Se^{-2}

16. Put the following elements in order from MOST reactive to LEAST reactive:
Sodium, Lithium, Potassium K, Na, Li

17. Metals which are most reactive have LOW (low, high) ionization energy because these atoms LOSE (lose, hold on to) their electrons quite easily.

18. Alkaline earth metals are in group 2 (1,2,16,17,18), and are quite REACTIVE (reactive, non-reactive) because they DONATE (donate, take) electrons relatively easily. The noble gases are in group 18 (1,2,16,17,18), and are very NON-REACTIVE (reactive, non-reactive) because they DON'T (do, don't) form chemical bonds.

19. Metals CONDUCT (conduct, don't conduct) electricity. They are MALLEABLE (malleable, brittle), and LUSTROUS (lustrous, non-lustrous). Non-metals DON'T CONDUCT (conduct, don't conduct) electricity. They are BRITTLE (malleable, brittle), and NON-LUSTROUS (lustrous, non-lustrous). Metalloids have characterisitics of BOTH (metals, non-metals, both metals and non-metals).

20. Elements in the d (d, s, p, f) block are known as transition metals.

21. Quickly explain why anions have a larger radius than the atom from which they originate? (for example, why does the S^{2-} ion have a larger radius than the S atom?) MORE electrons, less protons to pull on them

22. Write the electron configurations ($1s^2$ $2s^2$ etc.) for Na and for F.
Na: $1s^2 2s^2 2p^6 3s^1$ F: $1s^2 2s^2 2p^5$

Which of these two atoms has a larger atomic radius? Na or F?

Now write the electron configurations for Na^{+1} and F^{-1}.
Na^{+1}: $1s^2 2s^2 2p^6$ F^{-1}: $1s^2 2s^2 2p^6$

Which of these two ions has a larger ionic radius? Na^{+1} or F^{-1}?

Explain why these two ions, which are isoelectronic, do not have the same ionic radius.
FLUORINE HAS FEWER PROTONS TO PULL ON THE OUTER e⁻

23. E electronegativity	A. a row on the periodic table
24. F ionization energy	B. one half the distance between nuclei in a diatomic element
25. A period	C. the radius of an atom *after* it has gained or lost electron(s)
26. G group	D. an atom's inner electrons _____ the outer electrons from the pull of the nucleus.
27. B atomic radius	E. tendency of an atom to attract electrons to itself in a chemical bond
28. C ionic radius	F. the energy you use to remove an electron from an atom
29. D shield	G. a column on the periodic table
30. H valence electrons	H. the name given to an atom's outermost electrons

31. Indicate how many valence electrons one atom of each of the following elements has.

A) Ba 2 B) Al 3 C) Ar 8 D) O 6

32. What is the most common charge taken by the following elements

A) Ba +2 B) Al +3 C) Ar 0 D) O -2

33. As you move across a period on the periodic table, mass increases. What happens to atomic radius? Explain why this is the case.

Atomic Radius Decreases Across A Period; More Protons & Electrons Increases The Pull On Outer Electron, making the atomic radius smaller

34. You have probably heard that bananas contain potassium and that many foods contain sodium. Our demo in class showed you that sodium and potassium react rather violently with water. Here is your job: explain how bananas and other foods can contain potassium and sodium without being dangerous.

The Potassium In Our Bananas Is The More Stable K^{+1} Ion And Not The More Reactive K0