

## Periodic Trends Quiz

1. From which of the following is it easiest to remove an electron?

- a. Mg      b. Na      c. Al      d. S

Answer: Na --It's the biggest

2. Which of the following influenced your answer to number one the most?

- a. nuclear charge (number of protons)      b. valence electrons  
c. inner shell electrons      d. shielding effect

Answer: A. All of these elements are in the same period, so size is the biggest influence.

3. What is the most probable oxidation state of the alkaline earth metals?

- a. -3      b. +2      c. +3      d. -1

Answer: B They have two valence electrons, so they tend to lose them.

4. Which of the following elements is least metallic?

- a. oxygen    b. fluorine    c. sulfur    d. chlorine

Answer: B fluorine is the smallest and the most non metallic.

5. Which of the following has a smaller radius?

- a. chlorine    b. chlorine ion    c. they are the same

Answer: A. Chlorine is smaller. The chlorine ion forms by gaining an electron, so the atom was smaller before the electron was gained.

6. Which of the following is most likely to gain electrons in a chemical reaction?

- a. magnesium    b. chlorine    c. fluorine    d. oxygen

Answer: C      Fluorine is the smallest atom

7. Low ionization energy is characteristic of:

- a. metals    b. non-metals    c. metalloids    d. liquids

Answer: A      Metals are bigger than non metals and lose their electrons easier.

8. Which of the following is the smallest?

- a. Ne      b. F<sup>-</sup>      c. Na<sup>+</sup>      d. Mg<sup>++</sup>

Answer: D All of these ions have the same number of electrons. Mg has the largest number of protons, so it is the smallest.

9. Rank the following elements by **increasing** atomic radius: sulfur, oxygen, neon, aluminum

Ne, O, S, Al

10. Rank the following elements from high to low electronegativity: carbon, aluminum, oxygen, potassium.

O, C, Al, K

11. Why does Chlorine have a higher ionization energy than Sulfur?

Chlorine has more protons than Sulfur and they have the same outer shell, so more protons hold the electrons tighter.

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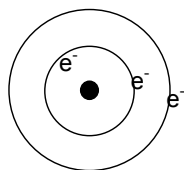
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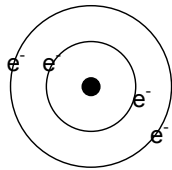
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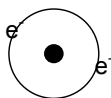
Use the following diagrams to answer questions 12- 17 (use your old test for these diagrams)



A



B



C

12. Which of the atoms has the highest Ionization energy?

C. it is the smallest atom.

13. Which of the atoms has the smallest radius?

C. The outer shell is the first energy level

14. Which of the atoms has the easiest electron to be removed?

A. There is only one electron in the outer shell and it is being held by only 3 protons.

15. Which of the atoms is the largest?

A. There is only one electron in the outer shell and it is being held by only 3 protons.

16. Assuming the atoms are neutral, write the element names above the diagram.

Li, Be, He

17. Rank the diagrams from lowest to highest electronegativity.

He, Li, Be

18. Why do the noble gases lack electronegativity values?

They have full outer shells.

19. Indicate which element in each pair has the **smaller** atomic radius.

- a. Na or Li      b. Sr or Mg      c. C or Ge      d. Se or O

Li(less shielding)    Mg(less shielding)    C(less shielding)    O(less shielding)

20. Indicate which element in each pair has the **lowest** ionization energy.

- a. Li or B      b. Mg or Sr      c. Cs or Al

Li (fewer protons, same shielding)    Sr (more shielding)    Cs( more shielding)

21. Indicate which is the **largest** in each pair.

- a. Na or Na<sup>+</sup>      b. S or S<sup>2-</sup>      c. I or I<sup>-</sup>      d. Al or Al<sup>3+</sup>

Na (the ion lost an electron)    S<sup>-2</sup> (the ion gained 2 electrons)    I<sup>-</sup> (the ion gained an electron)    Al (the ion lost 3 electrons)

22. The ions O<sup>2-</sup>, F<sup>-</sup>, Na<sup>+</sup>, Mg<sup>2+</sup>, and Al<sup>3+</sup> have the same total number of electrons as Neon. Which has the smallest radius and which has the largest radius? Explain your answer to receive credit.

These all have the same number of electrons. (they are ISOELECTRONIC) The smallest radius is the one with the most protons.