

Key

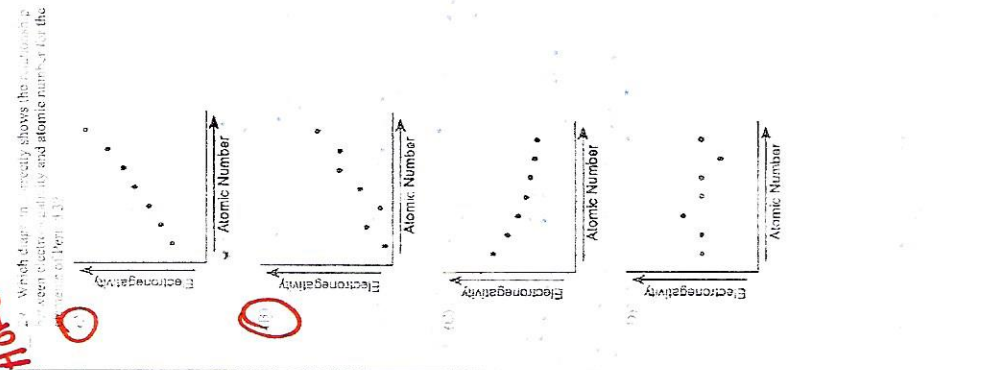
Worksheet: Periodic Trends

Name \_\_\_\_\_  
Period \_\_\_\_\_

1. Which of the next best describes Group 2 elements as they are considered in order from top to bottom of the Periodic Table?  
 (A) The number of principal energy levels increases, and the number of valence electrons increases.  
 (B) The number of principal energy levels increases, and the number of valence electrons remains the same.  
 (C) The number of principal energy levels remains the same, and the number of valence electrons increases.  
 (D) The number of principal energy levels remains the same, and the number of valence electrons decreases.  
 Answer: (B)
2. What is the total number of valence electrons in an atom of boron in the ground state?  
 (A) 1  
 (B) 2  
 (C) 3  
 (D) 5  
 Answer: (C)
3. What is the total number of valence electrons in an atom of xenon, Xe?  
 (A) 6  
 (B) 2  
 (C) 8  
 (D) 18  
 Answer: (D)
4. The elements calcium and strontium have similar chemical properties because they both have the same  
 (A) atomic number  
 (B) mass number  
 (C) number of valence electrons  
 (D) number of completely filled sublevels  
 Answer: (C)
5. On the Periodic Table of the Elements, all the elements within Group 16 have the same number of  
 (A) valence electrons  
 (B) energy levels  
 (C) protons  
 (D) neutrons  
 Answer: (A)
6. An element with a partially-filled *d* sublevel in the ground state is classified as  
 (A) a halogen  
 (B) a transition metal  
 (C) an alkali metal  
 (D) an alkaline earth metal  
 Answer: (B)
7. Which electron configuration represents a transition element?  
 (A)  $1s^2 2s^2 2p^5$   
 (B)  $1s^2 3s^2$   
 (C)  $[Ar] 3d^4 4s^2$   
 (D)  $[Ar] 3d^9 4s^2 4p^5$   
 Answer: (C)
8. Which element in Period 5 of the Periodic Table is a transition element?  
 (A) Sr  
 (B) Sb  
 (C) Ag  
 (D) Xe  
 Answer: (C)
9. Which of the following atoms has the largest atomic radius?  
 (A) Na  
 (B) K  
 (C) Mg  
 (D) Ca  
 Answer: (B)
10. Which noble gas has the highest first ionization energy?  
 (A) neon  
 (B) krypton  
 (C) argon  
 (D) helium  
 Answer: (D)

11. Which sequence of elements is arranged in order of decreasing atomic radii?  
 (A) Al, Si, P  
 (B) Li, Na, K  
 (C) Cl, Br, I  
 (D) N, C, B  
 Answer: (B)
12. Which of the elements from Group 2 on the Periodic Table is arranged in order of the existing atomic radii?  
 (A) Be, Mg, Ca  
 (B) Ca, Mg, Be  
 (C) Ba, Ra, Sr  
 (D) Sr, Ra, Ba  
 Answer: (D)
13. As each successive element in Group 15 of the Periodic Table is considered in order of increasing atomic number, the atomic radius  
 (A) decreases  
 (B) increases  
 (C) remains the same  
 (D) increases  
 Answer: (B)
14. The strength of an atom's attraction for the electrons in a chemical bond is the atom's  
 (A) electronegativity  
 (B) ionization energy  
 (C) heat of reaction  
 (D) heat of formation  
 Answer: (A)
15. Which properties are most common in nonmetals?  
 (A) low ionization energy and low electronegativity  
 (B) low ionization energy and high electronegativity  
 (C) high ionization energy and low electronegativity  
 (D) high ionization energy and high electronegativity  
 Answer: (D)
16. Which Group 17 element has the least attraction for electrons?  
 (A) F  
 (B) Cl  
 (C) Br  
 (D) I  
 Answer: (D)
17. Which element in Group 16 has the greatest tendency to gain electrons?  
 (A) Te  
 (B) Se  
 (C) S  
 (D) O  
 Answer: (D)
18. The Group 17 element with the highest electronegativity is  
 (A) fluorine  
 (B) chlorine  
 (C) bromine  
 (D) iodine  
 Answer: (A)
19. As the elements of Group 1 on the Periodic Table are considered in order of increasing atomic radius, the ionization energy of each successive element generally  
 (A) decreases  
 (B) increases  
 (C) remains the same  
 (D) increases  
 Answer: (A)
20. The amount of energy required to remove the outermost electron from a gaseous atom in the ground state is known as  
 (A) first ionization energy  
 (B) activation energy  
 (C) conductivity  
 (D) electronegativity  
 Answer: (A)
21. Which element is a member of the halogen family?  
 (A) K  
 (B) B  
 (C) I  
 (D) S  
 Answer: (C)

22. Which of the following Group 2 elements has the greatest first ionization energy?  
 (A) Be  
 (B) Mg  
 (C) Ca  
 (D) Ra  
 Answer: (A)
23. A element in Group 1 of the Periodic Table has the greatest ionization energy from top to bottom, the ionization energy will increase as element decreases. This decrease is due to  
 (A) increasing shielding and decreasing shielding effect  
 (B) increasing shielding and increasing shielding effect  
 (C) decreasing shielding and decreasing shielding effect  
 (D) decreasing shielding and increasing shielding effect  
 Answer: (C)
24. Which sequence correctly places the elements in order of increasing ionization energy?  
 (A) F > H > Ne > K  
 (B) O > S > Se > Te  
 (C) Br > Cl > P > K  
 (D) H > Be > Al > Cl  
 Answer: (D)
25. Compared to the atomic radius of a sodium atom, the atomic radius of a rubidium atom is smaller. The smaller atomic radius is primarily a result of the magnesium atom having  
 (A) larger nuclear charge  
 (B) smaller nuclear charge  
 (C) fewer principal energy levels  
 (D) fewer principal energy levels  
 Answer: (C)
26. Which of the elements has the least attraction for electrons in a chemical bond?  
 (A) oxygen  
 (B) iodine  
 (C) nitrogen  
 (D) chlorine  
 Answer: (B)
27. The ability of carbon to attract electrons is  
 (A) greater than that of nitrogen, but less than that of oxygen  
 (B) less than that of nitrogen, but greater than that of oxygen  
 (C) greater than that of nitrogen and oxygen  
 (D) less than that of nitrogen and oxygen  
 Answer: (D)
28. From element I to F in Period 2 of the Periodic Table, the relative ionization energy, how do the relative electronegativity and the covalent radius of each successive element compare?  
 (A) relative electronegativity decreases, and the atomic radius increases  
 (B) relative electronegativity decreases, and the atomic radius increases  
 (C) relative electronegativity increases, and the atomic radius decreases  
 (D) relative electronegativity increases, and the atomic radius increases  
 Answer: (C)



Answers: A, B, C, D