

**Valence Electrons and Ions Worksheet****Valence electrons**

1. What is a valence electron and why are they important to a chemist?
2. What is the periodic trend for finding the number of valence electrons when looking at the periodic table?
3. How many valence electrons are there in an atom of oxygen? \_\_\_\_\_ Be? \_\_\_\_\_ K? \_\_\_\_\_
4. Valence electrons can be shown using Lewis dot structures. Draw the Lewis dot structure for...
  - a. calcium
  - b. silicon
  - c. chlorine
  - d. nitrogen

**Structure of an ion**

5. Elements that are classified as **metals** or **nonmetals** tend to form cations. (*circle one*)
6. Elements that are classified as **metals** or **nonmetals** tend to form anions. (*circle one*)

*(gains or loses)**(positive or negative)*

7. A cation \_\_\_\_\_ electrons causing the ion to have a \_\_\_\_\_ charge.
8. An anion \_\_\_\_\_ electrons causing the ion to have a \_\_\_\_\_ charge.
9. What does a roman numeral tell you when it is written after an element? \_\_\_\_\_
10. Write the symbols and charges for the atoms given below and then identify it as anion/cation and metal/nonmetal.

Element	Symbol & charge	Metal or nonmetal?	Anion or cation?
calcium	Ca <sup>+2</sup>	Metal	Cation
bromine	Br <sup>-1</sup>	Nonmetal	anion
nitrogen			
iron(III)			
tin(II)			
fluorine			
cesium			
iodine			
phosphorus			
copper(I)			
lithium			
aluminum			
sulfur			
manganese(IV)			
chlorine			
oxygen			

11. Fill in the information missing from the table below.

Name	Shorthand Symbol with charge	Proton #	Neutron #	Electron # <i>(Hint: no longer equal to # protons)</i>	Charge
iron(III)	${}_{26}^{57}\text{Fe}^{3+}$		31	23	3+
sulfide ion	${}_{16}^{33}\text{S}^{2-}$	16		18	2-
fluoride ion			10		1-
potassium ion					1+
		7	7		3-
copper(II) ion			34		
Silver ion			61		1+
			8	10	2-
iron(II)			31		