

**RULES FOR WRITING ELECTRON DOT STRUCTURES OF MOLECULES AND IONS**

- Sum up the total number of valence electrons (outer shell electrons) for all atoms in the molecule or ion.

For positive ions, subtract electrons to obtain the correct charge:

For +1 ion, subtract 1 e<sup>-</sup>; For +2 ion, subtract 2 e<sup>-</sup>; For +3 ion, subtract 3 e<sup>-</sup>

For negative ions, add electron to obtain the correct charge:

For -1 ion, add 1 e<sup>-</sup>; For 2 ion, add 2 e<sup>-</sup>; For -3 ion, add 3 e<sup>-</sup>

- Arrange atoms spacially in a symmetric fashion.

- Central atom is usually first one listed (except with acids, HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, etc., see 6 below)
- Most likely atom arrangement is symmetrical
- Oxygen atoms are rarely bonded to each other
- Hydrogen atoms are never bonded to each other; exception: H<sub>2</sub>
- Carbon forms 4 bonds always

- Put two e<sup>-</sup> ( : ) (or one pair of e<sup>-</sup>) between each pair of atoms in the molecule
  - Distribute remaining e<sup>-</sup> pairs such that the more electronegative atoms get e<sup>-</sup> pairs first, and that all atoms have a noble gas configuration. The order of electronegativities from the most to the least is as follows:



(c) Put any remaining e<sup>-</sup> pairs on the central atom.

- Make multiple bonds if necessary such that all atoms have noble gas configurations.
- Write exactly equivalent structures, called “resonance structures” by moving e<sup>-</sup> pairs, but not the atoms.
- For oxy acids (HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, etc.) place the H atom(s) on the O atom(s); exceptions, HF, HCl, HBr, HI.

**EXAMPLE #1: SO<sub>2</sub>**

**Step 1.**

**Total valence e<sup>-</sup>**

**S = Group VIA = 1 x 6 e<sup>-</sup> = 6 e<sup>-</sup>**

**O = Group VIA = 2 x 6 e<sup>-</sup> = 12 e<sup>-</sup>**

**Total e<sup>-</sup> = 18 e<sup>-</sup>**

**Step 2.** O S O

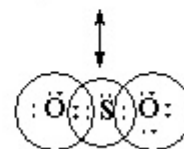
**Step 3a.** O : S : O

**Step 3b.** :Ö : S : Ö :

**Step 3c.** :Ö : Ṣ : Ö :

**Step 4.** :Ọ̈ : Ṣ : Ọ̈ :

**Step 5.** :Ọ̈ : Ṣ : Ọ̈ :



**all atom have noble gas configuration**