

## Unit 4: Ch 9 – Drawing Lewis Structures

### COVALENT BONDS:

- Formed when atoms \_\_\_\_\_ valence electrons to become \_\_\_\_\_.
  - Chemical \_\_\_\_\_ of molecules.
- **Single Covalent Bonds** → \_\_\_\_\_ of valence electrons \_\_\_\_\_.
- **Double Covalent Bonds** → \_\_\_\_\_ of valence electrons \_\_\_\_\_.
- **Triple Covalent Bonds** → \_\_\_\_\_ of valence electrons \_\_\_\_\_.

### ELECTRON DOT DIAGRAMS:

- 2-D \_\_\_\_\_ representation of \_\_\_\_\_.
  - \_\_\_\_\_ number of valence electrons = \_\_\_\_\_ = \_\_\_\_\_

### RULES FOR DRAWING LEWIS STRUCTURES:

- 2-D pictorial \_\_\_\_\_ of \_\_\_\_\_ and \_\_\_\_\_ (non-bonding electrons) in \_\_\_\_\_.
- 1. Calculate the \_\_\_\_\_ of valence electrons \_\_\_\_\_ in the molecule (**neutral OR charged**).
  - 1a. Cations = \_\_\_\_\_                      1b. Anions = \_\_\_\_\_
    - Ex)  $\text{NO}_3^-$  → \_\_\_\_\_ → \_\_\_\_\_ valence electrons
- 2. Pick a \_\_\_\_\_ atom.
  - Atom with the \_\_\_\_\_ electronegativity **OR** Rule-of-Thumb: \_\_\_\_\_
    - Ex)  $\text{NO}_3^-$  → Central Atom:

- 3. Place \_\_\_\_\_ (outside) atoms \_\_\_\_\_ around \_\_\_\_\_ atom.
  - Then connect **each** with a \_\_\_\_\_ bond.
    - Ex)  $\text{NO}_3^-$  → Lewis Structure:
  
- 4. Fulfill the \_\_\_\_\_ of **ALL** \_\_\_\_\_ atoms with \_\_\_\_\_.
  - 4a. (H) → Full octet with a \_\_\_\_\_ bond.
  - 4b. \_\_\_\_\_ or \_\_\_\_\_ valence electrons possible.
    - Ex)  $\text{NO}_3^-$  → Lewis Structure:
  
- 5. Calculate \_\_\_\_\_ number of valence electrons: \_\_\_\_\_.
  - 5a. **ANY** left-over electrons are placed on the \_\_\_\_\_ atom as \_\_\_\_\_.
    - Ex)  $\text{NO}_3^-$  → Lewis Structure:
  
- 6. If \_\_\_\_\_ atom does \_\_\_\_\_ fill its octet, create \_\_\_\_\_ or \_\_\_\_\_ bond.
  - 6a. Only applies to \_\_\_\_\_
    - Ex)  $\text{NO}_3^-$  → Lewis Structure:
  
- 7. Put \_\_\_\_\_ around the Lewis structure \_\_\_\_\_ molecule is an \_\_\_\_\_.
  - 7a. Write charge as \_\_\_\_\_, \_\_\_\_\_ of the bracket.
    - Ex)  $\text{NO}_3^-$  → Lewis Structure:

➤ 8. Draw \_\_\_\_\_; Only \_\_\_\_\_ needed.

- 8a. \_\_\_\_\_ can \_\_\_\_\_ around the \_\_\_\_\_ atom, and thus resonance indicates \_\_\_\_\_ of \_\_\_\_\_ bond, \_\_\_\_\_ atom positions.

- Ex)  $\text{NO}_3^-$  → Lewis Structure:

**PRACTICE EXAMPLES:**

1.  $\text{PO}_3^{3-}$

2.  $\text{PCl}_5$