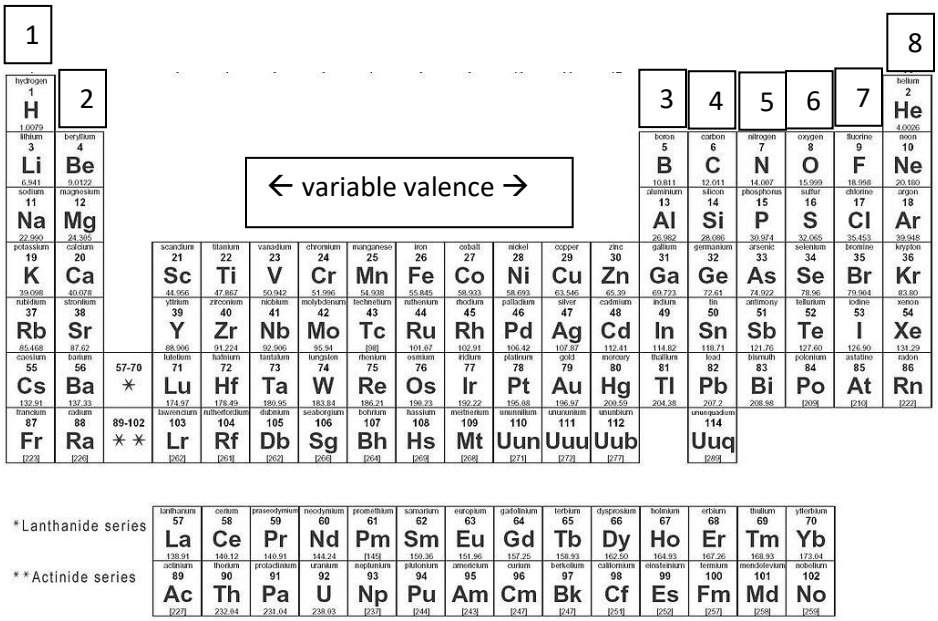
Common names on the periodic table:

A column is called a group or family.

A row is called a period.



Write the names of the family / groups below.

Group 1 : Alkali Metals

Group 2: Alkaline Earth Metals

Group 7: halogens

Group 8: noble gases

The large middle section of metals on the periodic table are called transition metals

Chemical bonding:

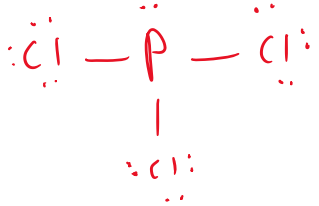
1. Every atom on the periodic table wants a total of 8 valence electrons.
2. The only group on the periodic table with 8 valence electrons are the noble gases.
3. In order to be stable metals will lose electrons and form cations.
4. In order to be stable nonmetals will gain electrons and form anions.
5. An ionic bond is between metals and nonmetals. An ionic bond will transfer electrons between atoms.
6. A covalent bond is between 2 or more nonmetals. A covalent bond will share electrons between atoms.
7. Ionic bonds conduct electricity when dissolved.
8. Predict the type of bond between each of these pairs of atoms:
   a. Na and Cl ionic
   b. F and O covalent
   c. Fe and S ionic
   d. Se and As covalent
   e. Ca and (PO_4^{-3}) ionic
9. Lewis structures are only drawn for molecules with covalent bonds.
10. 1 bond shares 2 electrons.

Drawing Lewis Structures:

1. Find the total number of valence electrons.
    a. Multiply by subscripts in the formula.
2. Divide the total number by 2.
3. Put the atom that is farthest away from F in the middle (lowest electronegativity)
    a. Hydrogen NEVER goes in the middle
4. Place the other atoms around the outside.
5. Draw 1 single bond from each outside atom to the central atom
6. Subtract the number of bonds you drew
7. Draw in "lone pairs" around each outside atom to satisfy the octet rule
    a. Hydrogen NEVER has lone pairs
    b. Left over pairs go on the center
8. CHECK YOUR CENTER ATOM FOR AN OCTECT BEFORE YOU ARE FINISHED
    a. If center atom does not have octet:
        i. Is it part of CNOPS? If yes erase a lone pair from your outside atoms and share with the central atom.
        ii. If not part of CNOPS leave it alone ☺

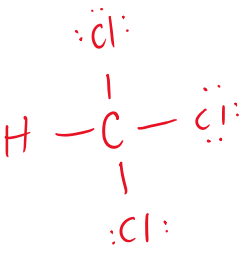
Examples:

1. PCl_3 $5+7(3)=26/2=13-3=10$ pairs of dots



• trigonal pyramidal
• polar

2. $CHCl_3$ $4+1+7(3)=26/2=13-4=9$ pairs of dots

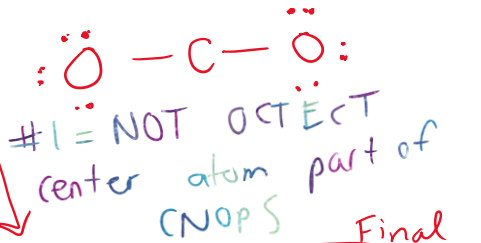


• tetrahedral • polar

3. H_2O $1(2)+6=8/2=4-2=2$ pairs of dots

• bent • polar

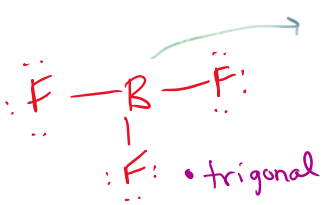
4. CO_2 $4+6(2)=16/2=8-2=6$



Final answer

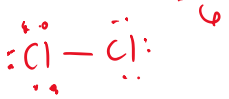
• linear
• nonpolar

5. BF_3 $3+7(3)=24/2=12-3=9$



• trigonal planar • nonpolar

6. Cl_2 $2(7)=14/2=7-1=6$

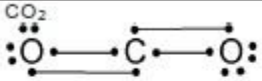
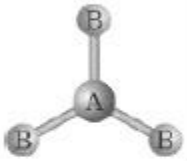
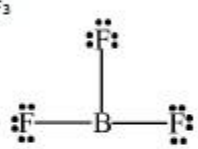
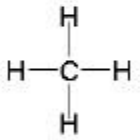
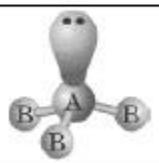
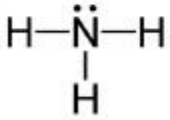
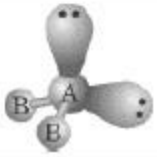
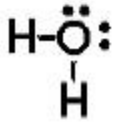


• linear
• nonpolar

7. HF $1+7=8/2=4-1=3$

• linear
• polar

Notes for Molecular Geometry:

Bonds	Lone Pairs	Name	Geometry	Lewis Structure
2 atoms		linear		Cl_2 
2	0	linear		CO_2 
3	0	trigonal planar		BF_3 
4	0	tetrahedral		CH_4 
3	1	trigonal pyramidal		NH_3 
2	2	bent		H_2O 

Notes for polarity:

- A polar molecule means there is a separation of charge – or one side is obviously positive and one side is obviously negative.
- You can tell if your Lewis structure is polar if:
    - 1. There are different types of atoms around the center atom
    - 2. There are lone pairs on the center atom
- If your molecule only has 2 atoms:
    - It is POLAR if there are 2 different atoms.
    - It is NONPOLAR if the 2 atoms are identical.