

## Common names on the periodic table:

A column is called a \_\_\_\_\_ or \_\_\_\_\_.

A row is called a \_\_\_\_\_.

1																	8
hydrogen 1 H 1.0079	beryllium 4 Be 9.0122											boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180
lithium 3 Li 6.941	sodium 11 Na 22.990											aluminum 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453	argon 18 Ar 39.948
		← variable valence →															
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.61	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 102.91	palladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29
cesium 55 Cs 132.91	barium 56 Ba 137.33	lanthanum 57-70 * Lu 174.967	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84	rhenium 75 Re 186.21	osmium 76 Os 190.23	iridium 77 Ir 192.22	platinum 78 Pt 195.08	gold 79 Au 196.97	mercury 80 Hg 200.59	thallium 81 Tl 204.38	lead 82 Pb 207.2	bismuth 83 Bi 208.98	polonium 84 Po [209]	astatine 85 At [210]	radon 86 Rn [222]
francium 87 Fr [223]	radium 88 Ra [226]	actinium 89-102 ** Lr [260]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]	bohrium 107 Bh [264]	hassium 108 Hs [277]	meitnerium 109 Mt [268]	darmstadtium 110 Uun [271]	roentgenium 111 Uuu [272]	unbinilium 112 Uub [277]						
		* Lanthanide series															
		lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	dysprosium 66 Dy 162.50	holmium 67 Ho 164.93	erbium 68 Er 167.26	thulium 69 Tm 168.93	ytterbium 70 Yb 173.04		
		* Actinide series															
		actinium 89 Ac [227]	thorium 90 Th 232.04	protactinium 91 Pa 231.04	uranium 92 U 238.03	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [288]	nobelium 102 No [289]		

Write the names of the family / groups below.

Group 1 :

Group 2:

Group 7:

Group 8:

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

## Chemical bonding:

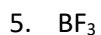
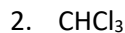
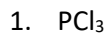
- Every atom on the periodic table wants a total of \_\_\_\_\_ valence electrons.
- The only group on the periodic table with 8 valence electrons are the \_\_\_\_\_.
- In order to be stable \_\_\_\_\_ will lose electrons and form cations.
- In order to be stable \_\_\_\_\_ will gain electrons and form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

### Drawing Lewis Structures:




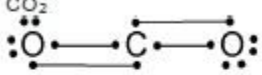
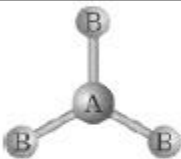
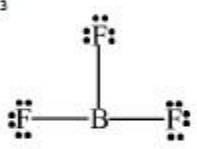

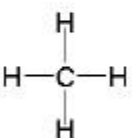
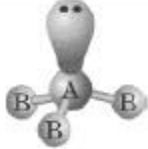
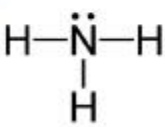
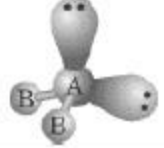
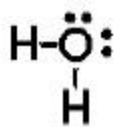
1. Find the total number of valence electrons.
  - a. Multiply by subscripts in the formula.
2. Divide the total number by 2.
3. Put the atom that is farthest away from F in the middle (lowest electronegativity)
  - a. Hydrogen NEVER goes in the middle
4. Place the other atoms around the outside.
5. 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 OCTET 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 😊

**Draw Structure. Tell Molecular Geometry and Polarity of your molecule.**

Examples:



Notes for Molecular Geometry:

Bonds	Lone Pairs	Name	Geometry	Lewis Structure
2 atoms		linear		$\text{Cl}_2$ 
2	0	linear		$\text{CO}_2$ 
3	0	trigonal planar		$\text{BF}_3$ 
4	0	tetrahedral		$\text{CH}_4$ 
3	1	trigonal pyramidal		$\text{NH}_3$ 
2	2	bent		$\text{H}_2\text{O}$ 

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.