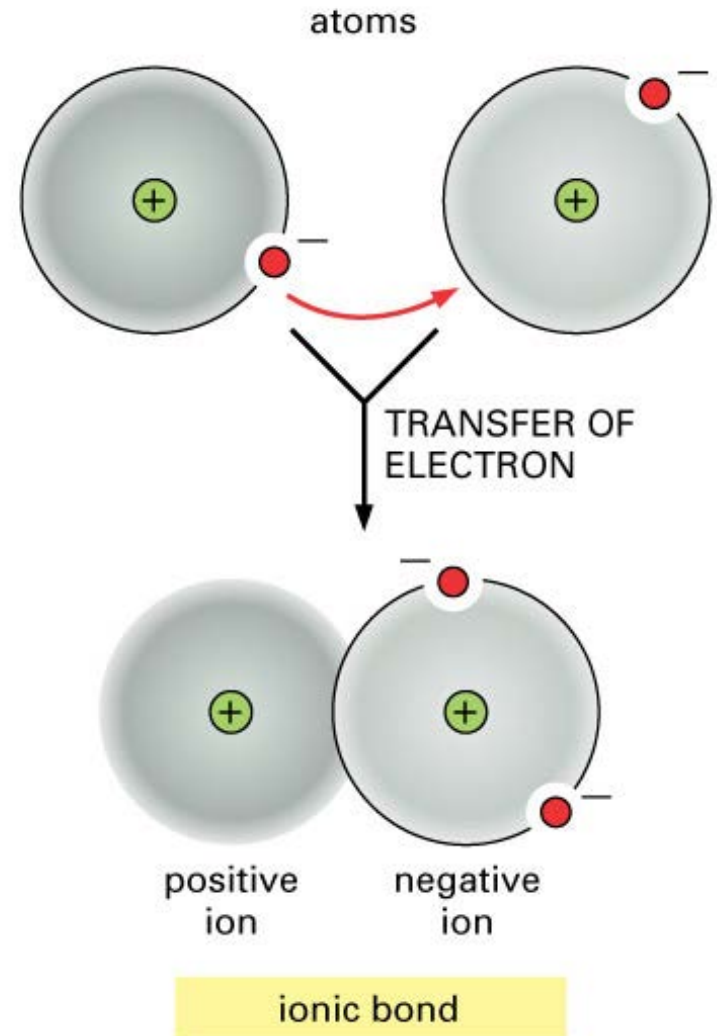
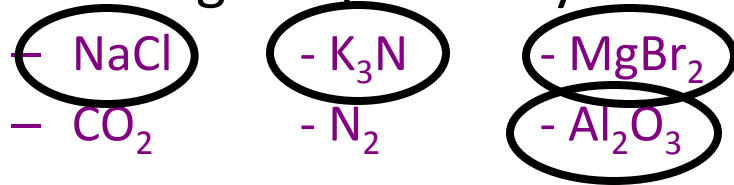


Covalent Molecules

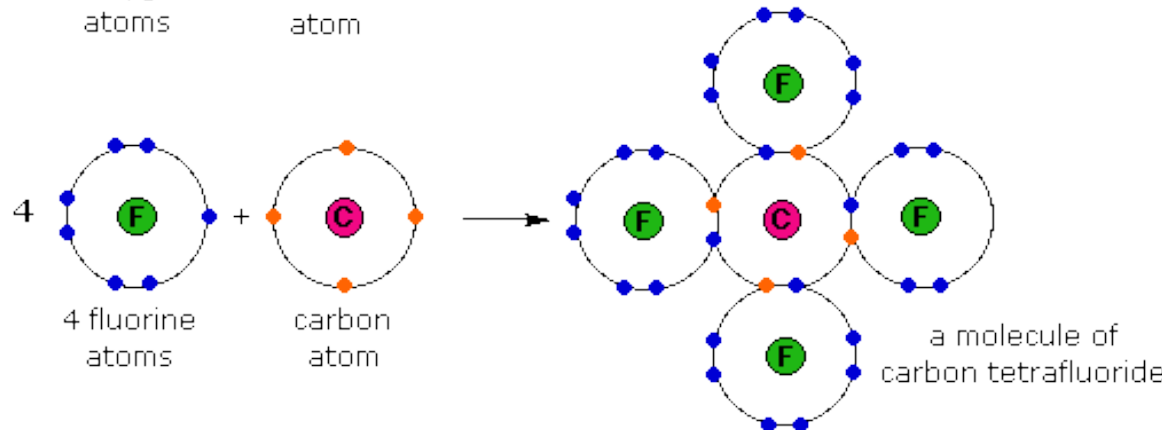
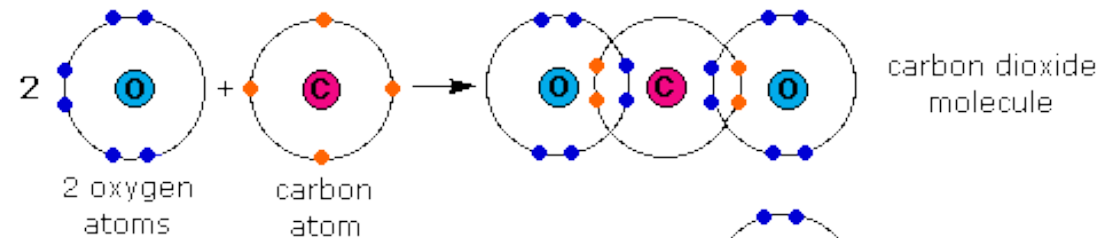
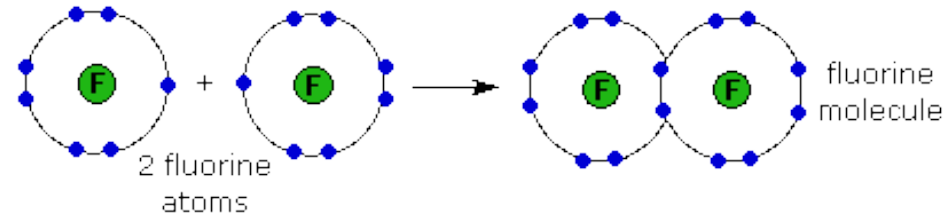
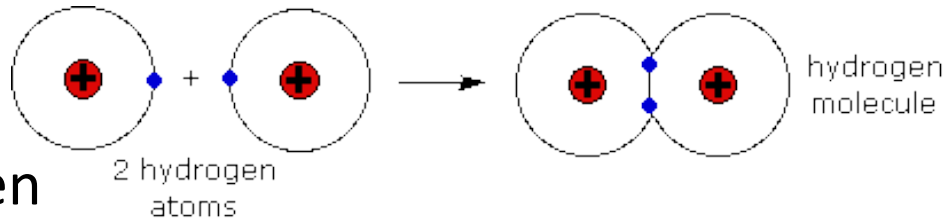
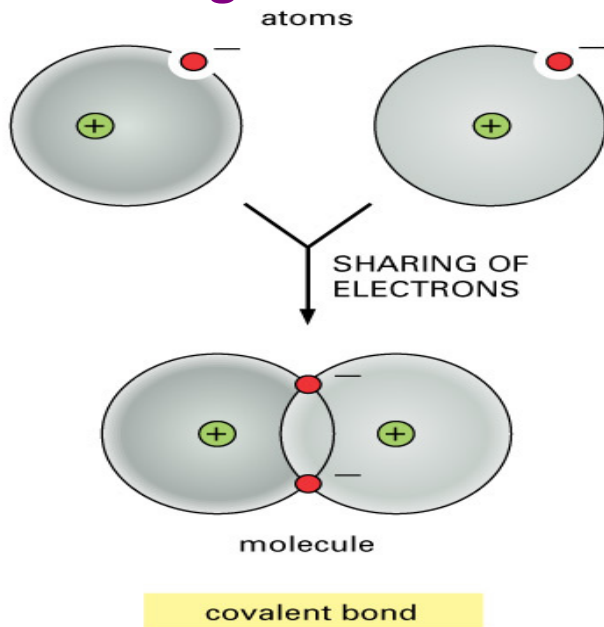
Review of Ionic Bonding

- Ionic bonds occur between a **metal** and a **nonmetal**, or between a **positively** charged particle and a **negatively** charged particle.
- Ionic bonds involve a **transfer** of electrons.
- Can you identify which of the following are joined by ionic bonds?



Covalent Bonding

- Covalent bonds occur between two **nonmetals**.
- A **molecule** is formed when two or more atoms bond **covalently**.
- Covalent bonds involve **sharing** of electrons.



Diatomic Molecules

- Certain elements occur in nature as **diatomic molecules** and not as single atoms (more stable as the molecule)

- Examples:



- Diatomic Molecules** are bonded together by **covalent bonds**.

hydrogen 1 H 1.0079																	helium 2 He 4.0026				
lithium 3 Li 6.941	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
sodium 11 Na 22.990	magnesium 12 Mg 24.305															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
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 79.90	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 118.71	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29				
caesium 55 Cs 132.91	barium 56 Ba 137.33	* 57-70	lutetium 71 Lu 174.97	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]	* * 89-102	lawrencium 103 Lr [262]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]	bohrium 107 Bh [264]	hassium 108 Hs [269]	meitnerium 109 Mt [268]	ununnium 110 Uun [271]	ununium 111 Uuu [272]	unubium 112 Uub [277]	ununquadium 114 Uuq [289]								

* 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
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]	mendeleevium 101 Md [258]	nobelium 102 No [259]

* * Actinide series

Important Definitions

- **Chemical Formula:** a representation, using symbols, showing the different types and number of atoms that make up a given compound or molecule
- **Subscript:** small number, written behind an element, showing how many atoms of that element are found in a compound or molecule

Naming Molecular Compounds

- The **first element** written in the formula is always written first, **using the element name**.
- The **second element** is named using the root of the element and the suffix “**-ide**”.
- **Prefixes** are used to indicate the **number of atoms** of each type that are present in the compound.
 - **Exception:** Do not use the prefix mono- for the first element
- Drop the final letter of the prefix when the element name begins with a vowel

Table 1: Common Prefixes Used in Covalent Compounds

Number of atoms	Prefix	Number of atoms	Prefix
1	Mono-	6	Hexa-
2	Di-	7	Hepta-
3	Tri-	8	Octa-
4	Tetra-	9	Nona-
5	Penta-	10	Deca-

What Does Naming Look Like?

1. CCl_4 : Carbon tetrachloride
2. CO : Carbon monoxide
3. NF_3 : Nitrogen trifluoride
4. NO : Nitrogen monoxide

Now, you practice

1. CO_2 : Carbon monoxide
2. SO_2 : Sulfur dioxide
3. S_2O_3 : Disulfur trioxide
4. N_2O : Dinitrogen monoxide
5. PCl_5 : Phosphorous tetrachloride
6. OF_2 : Oxygen difluoride
7. N_2O_4 : Dinitrogen tetroxide
8. S_4N_4 : Tetrasulfur tetranitride
9. SiCl_4 : Silicon tetrachloride
10. BF_3 : Boron trifluoride

What's the formula?

1. Selenium hexafluoride: SeF₆
2. Disilicon hexabromide: Si₂Br₆
3. Diboron silicide: B₂Si
4. Iodine pentafluoride: IF₅
5. Hexaboron silicide: B₆Si
6. Diboron tetrabromide: B₂Br₄
7. Diphosphorous pentoxide: P₂O₅
8. Carbon tetrafluoride: CF₄
9. Tetraphosphorous pentasulfide: P₄S₅
10. Hexasulfur oxide: S₆O