

# Forming Compounds



- The goal of every atom is to become stable.
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- What are the three ways atoms can accomplish this?
  - Gain electrons
  - Lose electrons
  - Share electrons

# Ionic Compounds

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- Metals form positive ions
- Non-metals form negative ions
- So metals and non-metals form together to create ionic bonds.
- Metals transfer their electrons to non-metals.
- Both will now have full and stable valence shells

# Ionic Compounds

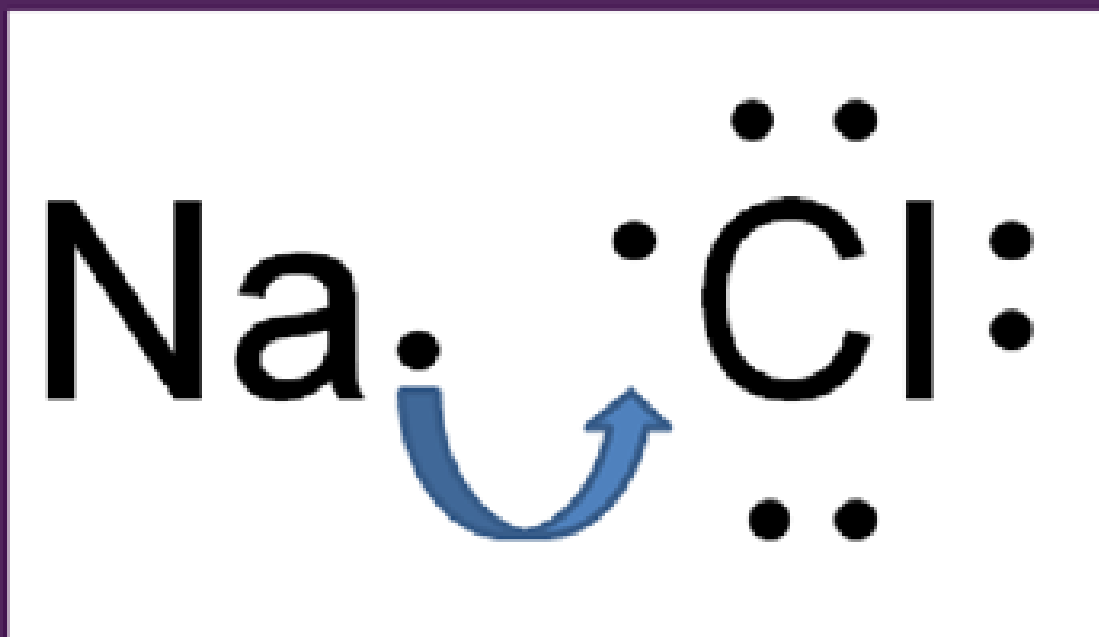
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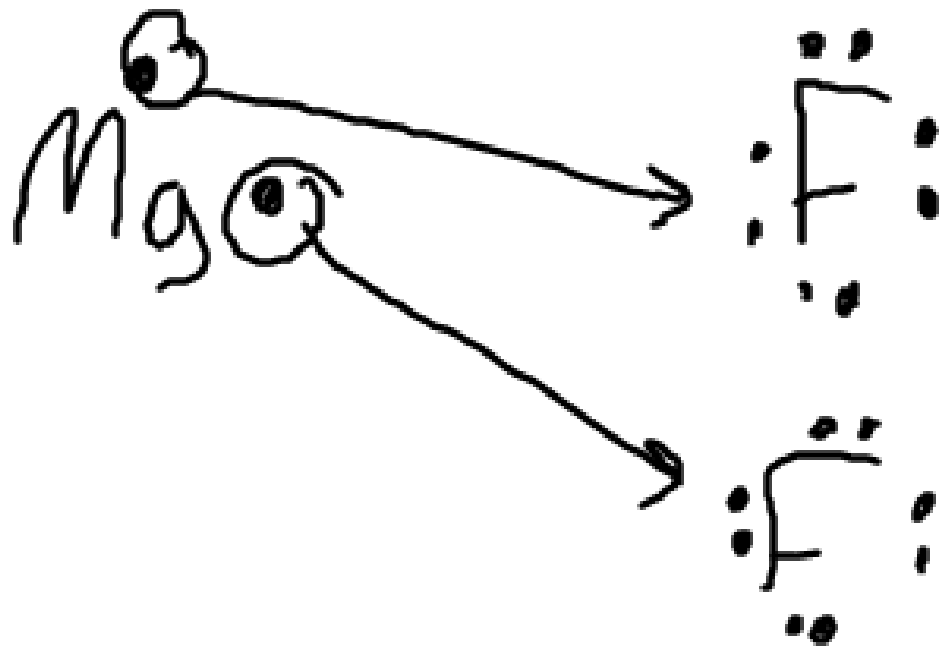
- In Summary:
  - Formed between a metal and non-metal
  - Transfer electrons to become stable

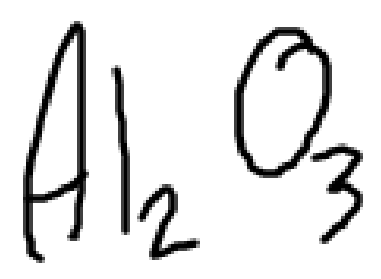
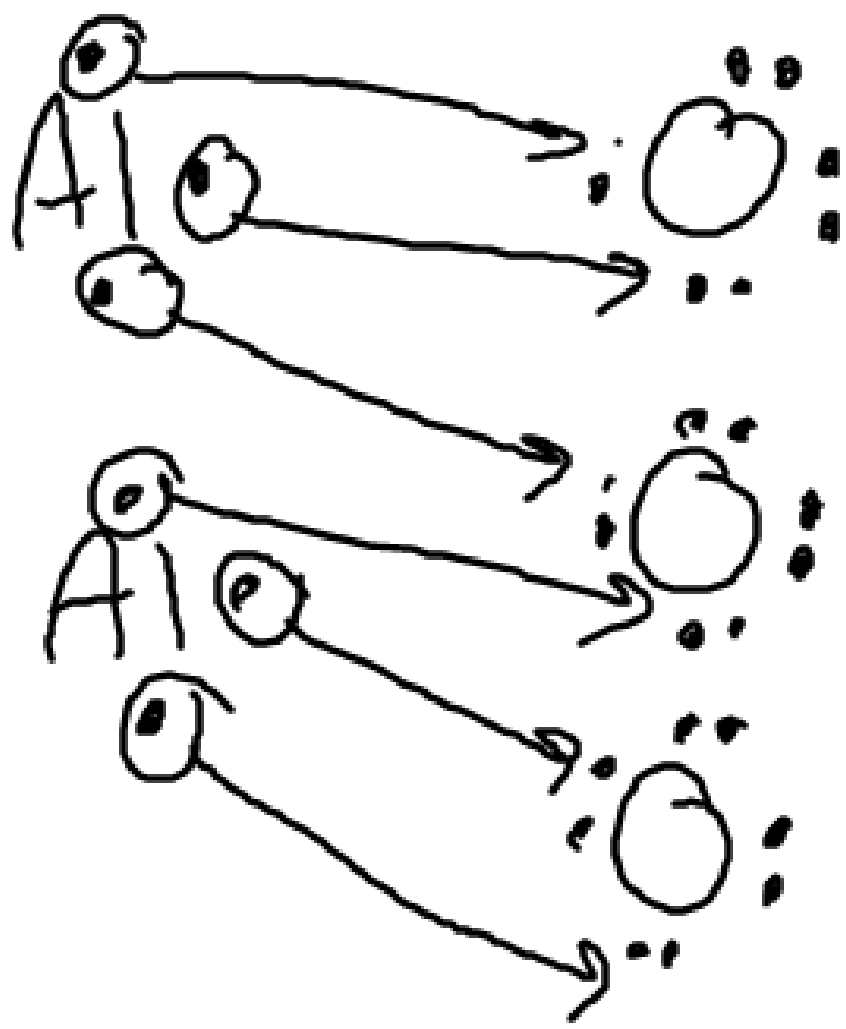
Name: sodium chloride

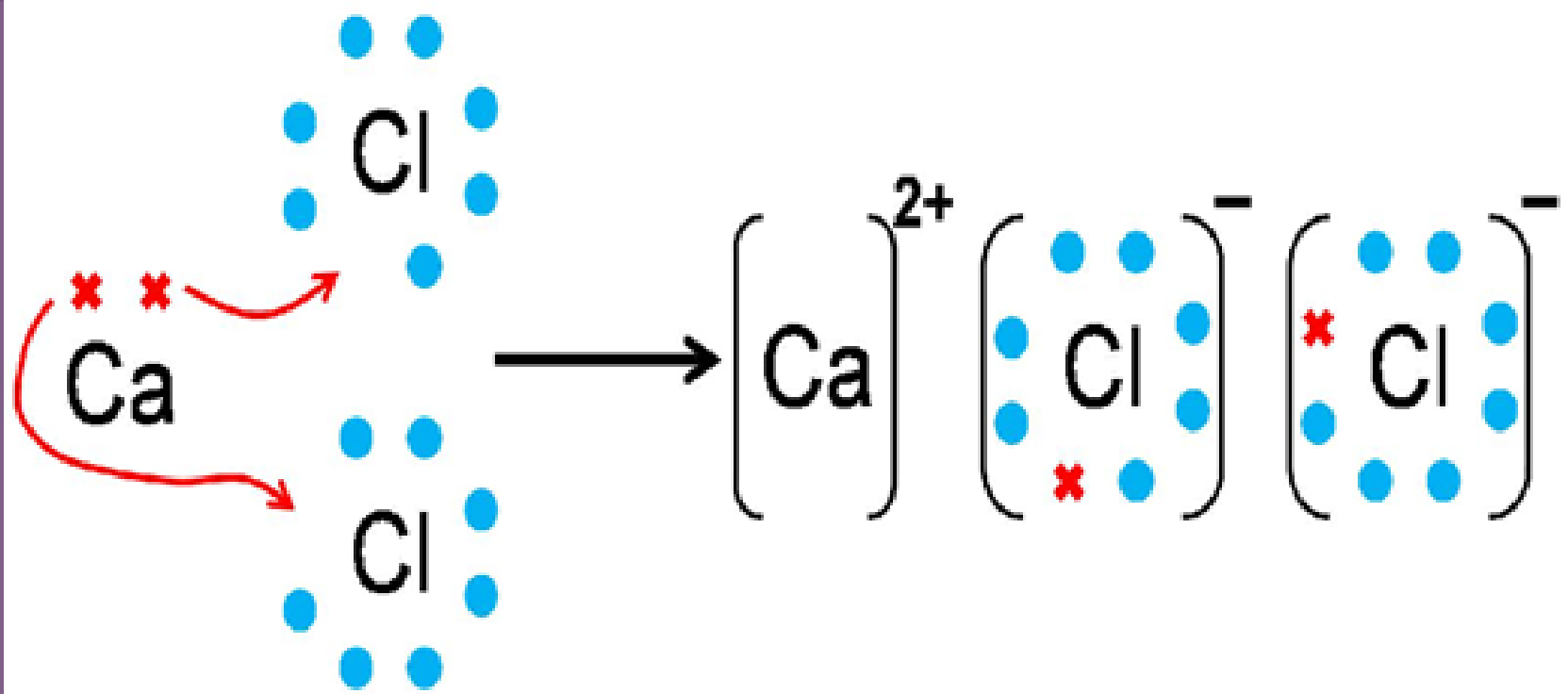
Formula: NaCl

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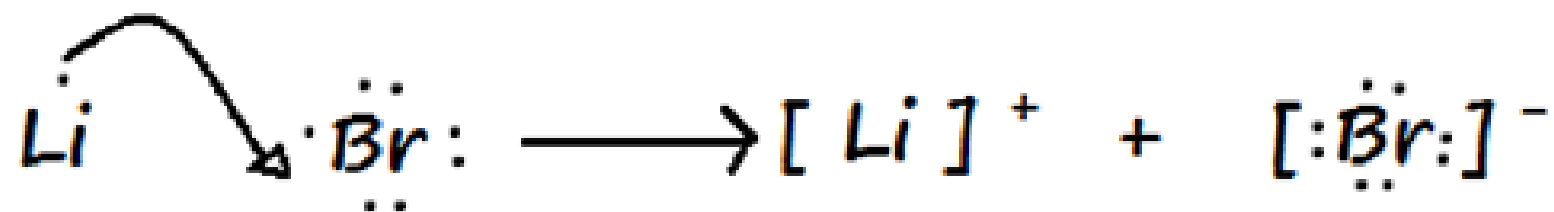






- Name – calcium chloride
- Formula –  $\text{CaCl}_2$





- Name – lithium bromide
- Formula – LiBr

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- [Video](#) – What are Ionic Bonds?
  - [Notes and practice problems](#)

# Molecular (Covalent) Compounds

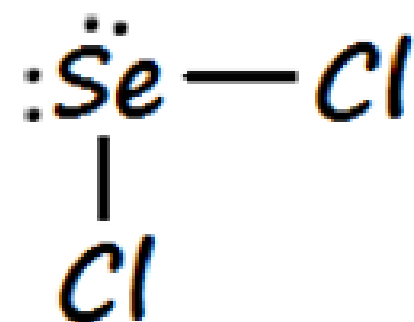
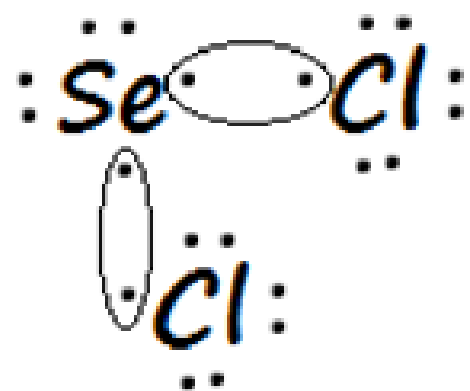
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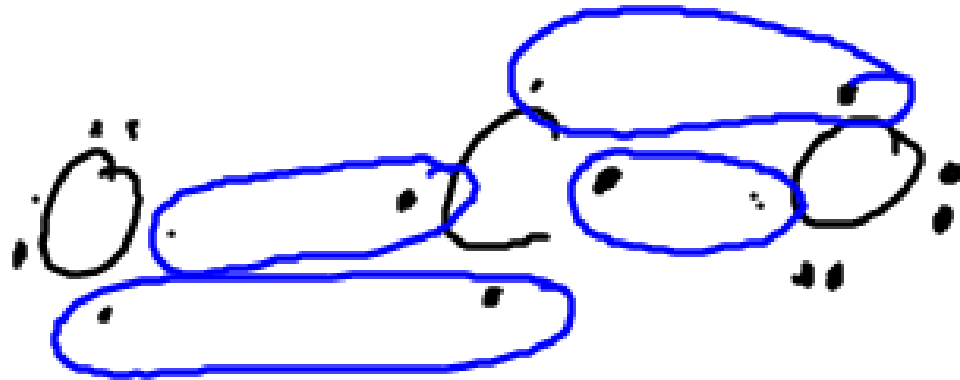
- Atoms that share a pair of electrons are joined by a **covalent bond**.
- The particles made from covalent bonds are called **molecules**.
- Formed by two non-metals sharing valence electrons to achieve a full (stable) valence shell

# Covalent or Molecular Compounds

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- In Summary:
  - 2 non-metals
  - Share electrons





$$O = C = O$$

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- Animation: Ionic and Covalent bonds
  - Notes and Practice Problems

# Diatomic Molecules

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- **Diatomic Molecule** – 2 atoms of the same element that share electrons.
- There are 7 elements in nature that cannot exist as a single atom; they always have to be paired with another element or with another of their same element.
- (There are 7:  $H_2$ ,  $O_2$ ,  $F_2$ ,  $Br_2$ ,  $I_2$ ,  $N_2$ ,  $Cl_2$ ) A molecule that contains two atoms
- HOBFINCl
  - Hydrogen, Oxygen, Bromine, Fluorine, Iodine, Nitrogen, Chlorine



HOFBRING!



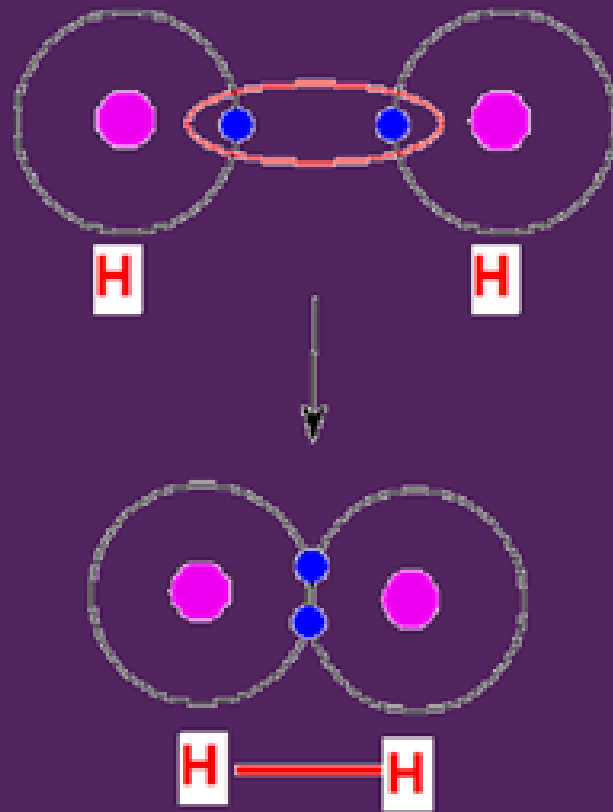
Period 1										Period 2								
1 H 1.008										2 He 4.003								
3 Li 6.941	4 Be 9.012											5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180	
11 Na 22.990	12 Mg 24.305											13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.065	17 Cl 35.453	18 Ar 39.948	
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.867	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.61	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80	
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc 98	44 Ru 101.07	45 Rh 101.07	46 Pd 106.32	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.905	54 Xe 131.29	
55 Cs 132.91	56 Ba 137.33	57-70 *	71 Lu 174.967	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po 209	85 At 210	86 Rn 222
87 Fr 223	88 Ra 226	89-102 **	103 Lr 260	104 Rf 261	105 Db 262	106 Sg 263	107 Bh 264	108 Hs 265	109 Mt 266	110 Uun 267	111 Uuu 268	112 Uub 269	114 Uuq 269					

\* Lanthanide series

57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 144.91	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.05
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\*\* Actinide series

89 Ac 227	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237	94 Pu 239	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 258	102 No 259
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- Notes and practice problems

# TEST YOURSELF: Ionic or Covalent?

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- NaCl ionic
- CaS ionic
- LiF ionic
- Mg<sub>3</sub>P<sub>2</sub> ionic
- CO<sub>2</sub> Covalent
- Li<sub>2</sub>O ionic
- SrBr<sub>2</sub> ionic
- CCl<sub>4</sub> covalent
- N<sub>2</sub> Element with covalent bond

TEST YOURSELF: Now draw the bonds between the following compounds (remember that there are different rules for drawing ionic and covalent bonds)

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- NaCl
- CaS
- LiF
- $\text{Mg}_3\text{P}_2$
- $\text{CO}_2$
- $\text{Li}_2\text{O}$
- $\text{SrBr}_2$
- $\text{CCl}_4$
- $\text{N}_2$

NaCl

CaS

LiF

Mg<sub>3</sub>P<sub>2</sub>



$\text{CO}_2$

$\text{Li}_2\text{O}$

$\text{SrBr}_2$

$\text{CCl}_4$

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Practice Sheet: Ionic and Covalent Bonds