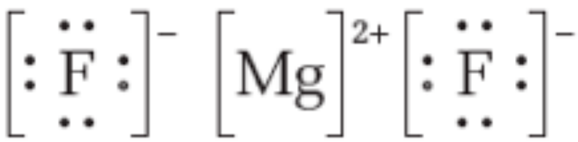
SCH3U	# Lewis Structures
Matter, Chemical Trends & Bonding	

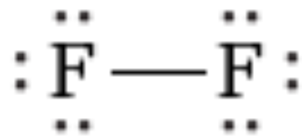
Lewis structures are diagrams which represent how atoms bond.

There are 2 types of bonding:

Ionic



Covalent



Ionic Lewis Structures: involves a complete transfer of electrons, so charges must be shown using square brackets on the top right side.

RULE	EXAMPLE	EXAMPLE
1. Draw the Lewis structure for each element.	ie) LiF	ie) $MgCl_2$
2. Transfer electrons from the metal to the non-metal to satisfy the octet rule.		
3. Draw square brackets and place charges around each atom.		

Covalent Lewis Structures: involves sharing of electrons. Bonds are represented by lines. Each bond or line represents 2 electrons.

RULE	EXAMPLE	EXAMPLE
1. Determine which atom goes in the centre (central atom). Often it is the element written first, or the least electronegative atom.	ie) CH_4	ie) CO_2
2. Count all the valence electrons for each atom in the compound.		
3. Connect all the atoms with single bonds. These are called bond pairs.		
4. Count the electrons left. Total electrons – 2 x # of bonds		
5. If you have electrons left over, place them in pairs around the outermost atoms, moving in towards the centre. These are called lone pairs.		
6. Check to see if all atoms have 8 electrons (satisfy the octet rule).		
7. Move lone pairs to make double or triple bonds in order to satisfy the octet rule.		

Polyatomic ions: For negatively charged polyatomics, you must add electrons. For positively charged polyatomics, you must subtract electrons.

RULE	EXAMPLE	EXAMPLE
1. Determine which atom goes in the centre (central atom). Often it is the element written first, or the least electronegative atom.	ie) CO_3^{2-}	ie) CO_3^{2-} and Na
2. Count all the valence electrons for each atom in the compound.		
3. Connect all the atoms with single bonds. These are called bond pairs.		
4. Count the electrons left. Total electrons – 2 x # of bonds		
5. If you have electrons left over, place them in pairs around the outermost atoms, moving in towards the centre. These are called lone pairs.		
6. Check to see if all atoms have 8 electrons (satisfy the octet rule).		
7. Move lone pairs to make double or triple bonds in order to satisfy the octet rule.		
8. Bond the polyatomic ion with the metal using an IONIC bond		