Key

Lewis Structures

General Guidelines

Determine how many electrons you have to work with.
This will be equal to the sum of the valence electrons of all of the atoms in the molecule.

Write down the atoms in the molecule in the general shape you are going to want them.
Usually the least electronegative atom will go in the center
Carbon usually goes in the center
Hydrogens or halogens go on the outside

Now use your electrons to bond the atoms together. Each bond will use up 2 electrons

Use the remaining electrons to give the outer atoms full outer shells
A full outer shell has eight electrons EXCEPT for H who is happy with 2.

Now check your atoms to see if all of them have full outer shells. If some of them don't you need to rearrange electron pairs to form double and triple bonds.

For example....

CO_2 carbon has 4 valence electrons, both oxygens have 6
Total valence electrons = 16

Now place the atoms

O C O

Put in the bonds to attach the C to the O's. This uses up 4 electrons.

O—C—O

Now use the remaining 12 electrons to fill the outer shells of the O's.

:Ö—C—Ö:

The O's have full outer shells now, but C still needs more electrons. C can share electrons with O by forming double bonds.

Ö=C=Ö

Draw Lewis Structures for the Following

NH_3

$5+(3\times1)=8$



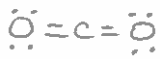
H_2O

$(2\times1)+6=8$



$4\times(2\times6)=16$

CO_2



$1+4+5=10$

HCN



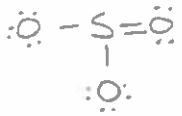
$2\times5=10$

N_2



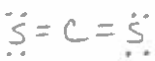
$6+(3\times6)=24$

SO_3



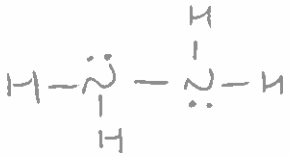
$4+2(6)=16$

CS_2



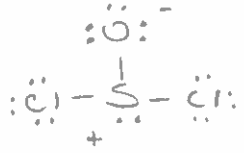
$2(5)+4(1)=14$

N_2H_4



$SOCl_2$

$6+6+2(7)=26$



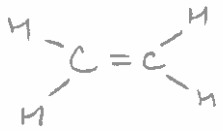
$3\times6=18$

O_3



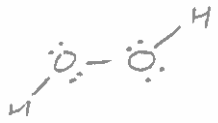
$2(4)+4(1)=12$

C_2H_4



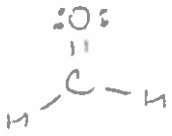
$2(1)+2(6)=14$

H_2O_2



$2(1)+4+6=12$

H_2CO



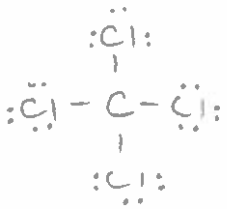
$2(5)+4(1)=14$

N_2H_4



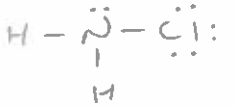
$4+4(7)=32$

CCl_4



$5+2(1)+7=14$

NH_2Cl



If you have an anion you will need to add electrons to the total available electrons. When you have a cation you will need to substract from the total number of electrons.

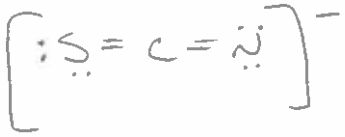
Example : OH^- has 6 (from O) + 1 (from H) + 1 (for the negative charge) = 8 electrons

NH_4^+ has 5 (from N) + 4 (from H's) -1 (for positive charge) = 8 electrons

$C_2O_4^{2-}$ has 8(from C's) + 24(from O's) + 2(for negative charges)=30 electrons

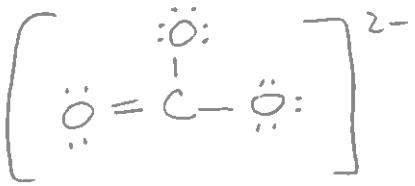
SCN^-

$6+4+5+1=16$



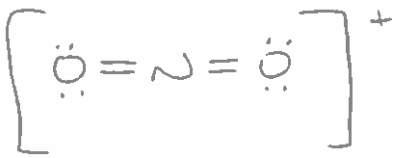
CO_3^{2-}

$4+3(6)+2=24$



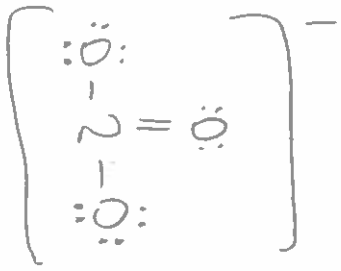
NO_2^+

$5+2(6)-1=16$



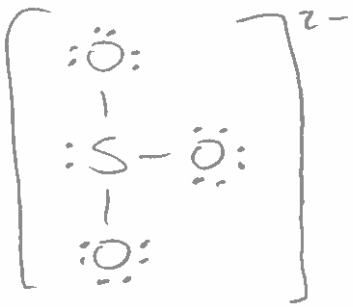
NO_3^-

$5+3(6)+1=24$



SO_3^{2-}

$6+3(6)+2=26$



BH_4^-

$3+4(1)+1=8$

