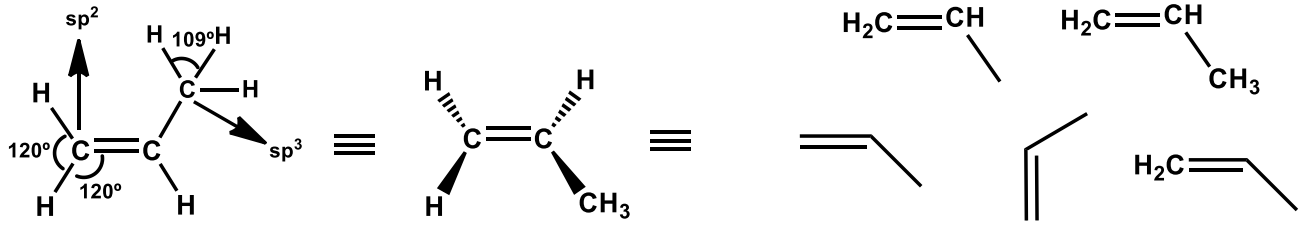
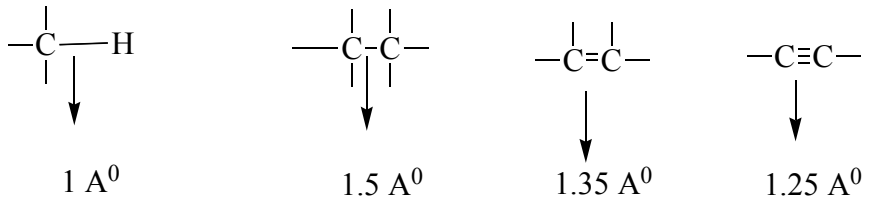
**Examples:**

**1.** $C_3H_3$ propene

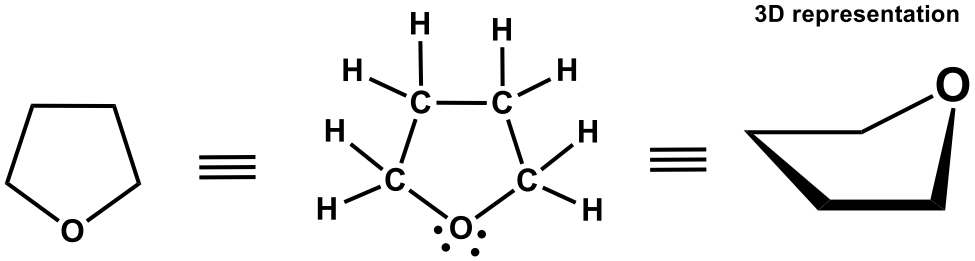



NOTE THE FOLLOWING (Estimated bond length between atoms)




1 $A^0$ 1.5 $A^0$ 1.35 $A^0$ 1.25 $A^0$

**2.** Tetrahydrofuran (THF)

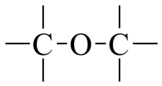



Chemical Formula: $C_4H_8O$
Molecular Weight: 72,11

NB: Oxygen in the stable uncharged state forms two bonds with 2 lone pairs of electrons

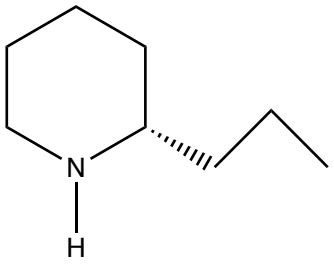
NB: Nitrogen in the stable uncharged state forms three bonds with 1 lone pair of electrons

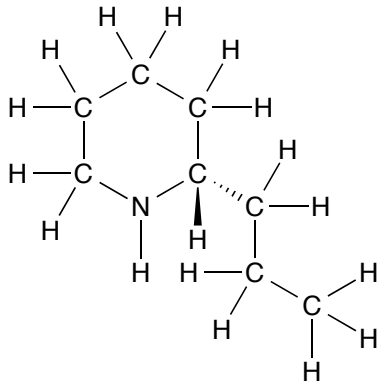
NB: Functional Group in Tetrahydrofuran is ETHER



ETHER

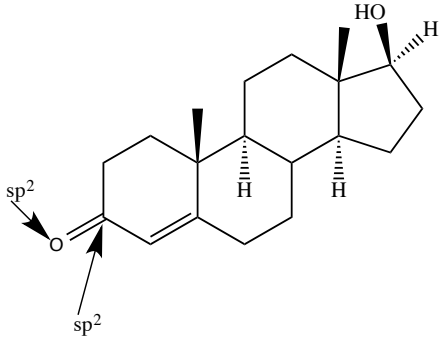
**3.** Corine (Poison Hemlock)

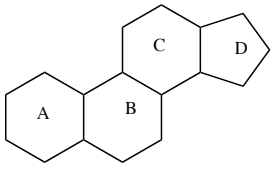




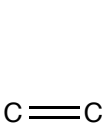
Chemical Formula: $C_8H_{17}N$
Molecular Weight: 127.23

**4.** Testosterone (a steroid)

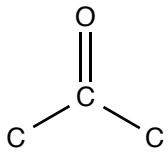


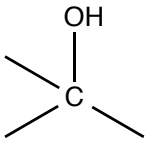

A Steroid, Ring Nomenclature A, B, C, D etc



Alkene



Ketone



Alcohol

Functional groups in testosterone (alkene and ketone and alcohol)

$CH_3$ Methyl
$CH_2$ Methylene
CH Methine

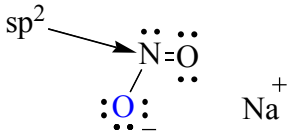
**Formal Charge**

- Convention to keep track of charges
- ∑ (sum of) of formal charges on all atoms in a molecule = overall charge on molecule

**Rules for calculating formal charge**

- Add number of protons in nucleus
- Subtract number of inner shell electrons
- Subtract number of unshared electrons
- Subtract ½ of the number of shared outer shell electrons

1. **Sodium Nitrite –$NaNO_2$**



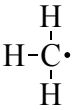

Formal Charge on Nitrogen

+7 (number of protons)
-2 (1s electrons)
-2 (unshared electrons)
½ x 6 = -3 (1/2 of shared electrons)
**0**

Single bonded oxygen (O):

+8 (number of protons)
-2 (1s electrons)
-6 (unshared electrons)
½ x 2 = -1 (1/2 of shared electrons)
**-1**

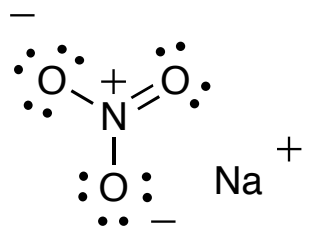
2. **Methyl Radical**



Formal Charge on Carbon

+6 (number of protons)
-2 (1s electrons)
-1 (unshared electrons)
½ x 6 = -3 (1/2 of shared electrons)
**0**

**3. Sodium Nitrate – $NaNO_3$**




Formal Charge on Nitrogen:
+7 (number of protons)
-2 (1s electrons)
0 (unshared electrons)
½ x 8 = -4 (1/2 of shared electrons)
**+1**

Double bonded oxygen:
+8 (number of protons)
-2 (1s electrons)
-4 (unshared electrons)
½ x 4 = -2 (1/2 of shared electrons)
**0**

Single bonded oxygen (both):
+8 (number of protons)
-2 (1s electrons)
-6 (unshared electrons)
½ x 2 = -1 (1/2 of shared electrons)
**-1**

Overall charge on the nitrate anion is = +1 + 0 – 1 – 1 = **-1**