

Key

Worksheet 7- Cis and Trans Compounds/hybridization

1. What is the purpose of having specific bond angles?

To minimize electron-electron repulsion.

Want electrons the maximum ~~#~~ apart that they can be for the shape/hybridization they are in.

2. How many electron domains will you find in the following molecular geometries, of the central element?

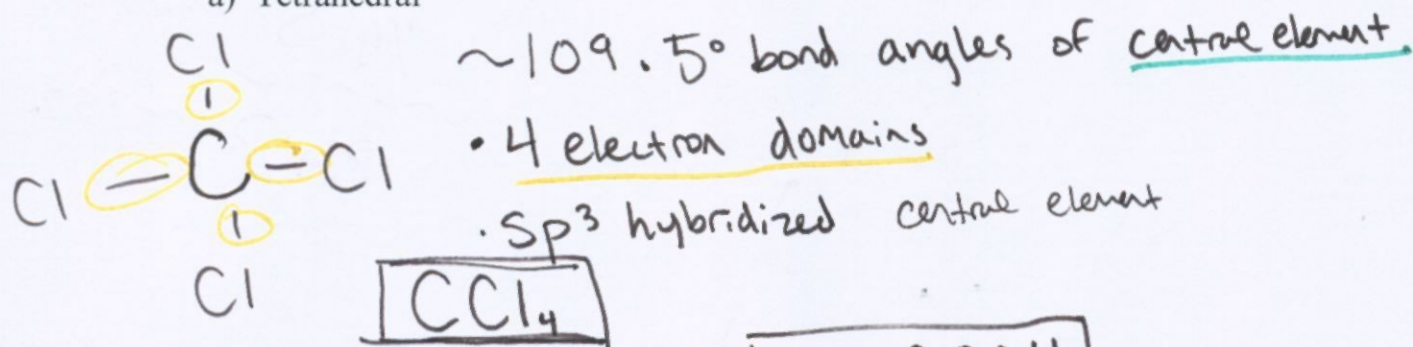
What should be the bond angles in each molecular geometry around the central element?

What is the hybridization of each geometry?

Draw an example of each one.

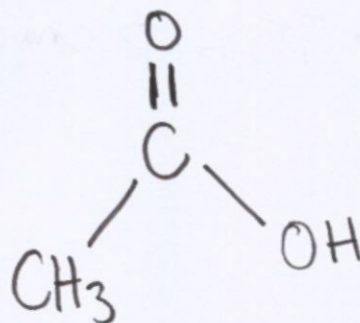
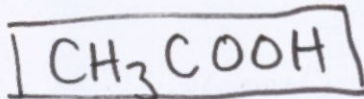
★ All have many drawing examples ★

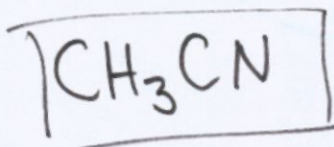
a) Tetrahedral



b) Trigonal Planar

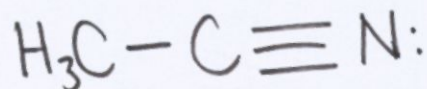
• sp^2 hybridized central atom
 $\sim 120^\circ$ bond angles on central element
• 3 electron domains



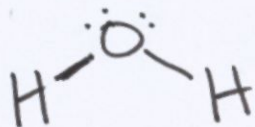
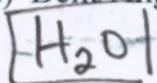


c) Linear

- Sp hybridized central atom
- $\sim 180^\circ$ bond
- 2 electron domains on central atom



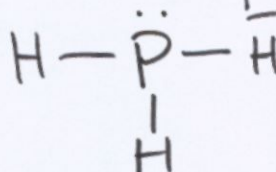
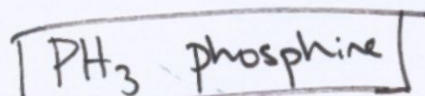
d) Bent/Angular



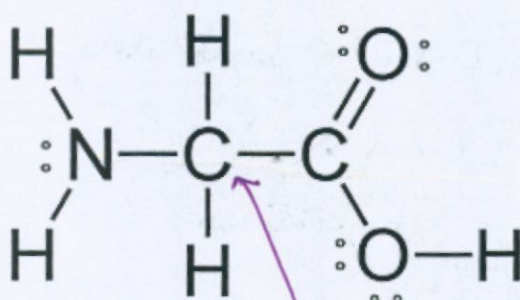
- Sp^3 hybridized central atom
 - $\sim 104.5^\circ$ bonds
 - 4 electron domains on central atom
- ★ don't forget lone pairs, each pair is an electron domain

e) Trigonal pyramidal

- Sp^3 hybridized central atom
- $\sim 107^\circ$ bonds
- 4 electron domains on central atom



3. How much s and p character are present in the central element of this compound (the carbon)?



$$\frac{1}{4} \text{ S} \sim 25\%$$

$$\frac{3}{4} \text{ P} \sim 75\%$$

- 25% S character
- 75% P character

central atom/element

- Sp^3 hybridized
- Tetrahedral

4. Determine if the following compounds are cis or trans:

