

# VSEPR Worksheet

- 1) What is the main idea behind VSEPR theory?
  
  
  
  
  
  
  
  
  
  
- 2) For each of the following compounds, determine the bond angles, molecular shapes, and hybridizations for all atoms:
  - a) carbon tetrachloride
  
  
  
  
  
  
  
  - b)  $\text{BH}_3$
  
  
  
  
  
  
  
  - c) silicon disulfide
  
  
  
  
  
  
  
  - d)  $\text{C}_2\text{H}_2$
  
  
  
  
  
  
  
  - e)  $\text{PF}_3$

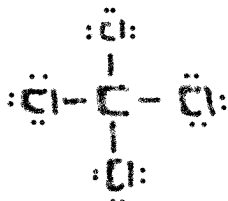
## VSEPR Worksheet - Solutions

- 1) What is the main idea behind VSEPR theory?

**The main idea is that electrons don't like to hang around near each other because they repel each other. As a result, the atoms in a molecule tend to separate as far as they can because their bonds repel each other.**

- 2) For each of the following compounds, determine the bond angles, molecular shapes, and hybridizations for all atoms:

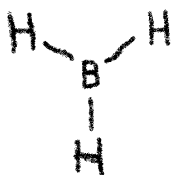
- a) carbon tetrachloride



Carbon is tetrahedral,  $109.5^\circ$  bond angle, and  $sp^3$  hybridized.

Chlorine is linear, has no bond angle, and is  $sp^3$  hybridized

- b)  $BH_3$



Boron is trigonal planar,  $120^\circ$  bond angle, and  $sp^2$  hybridized.

Hydrogen is linear, has no bond angle, and no hybridization

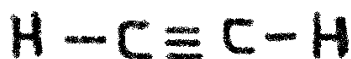
- c) silicon disulfide



Silicon is linear, has a  $180^\circ$  bond angle, and is  $sp$  hybridized.

Sulfur is linear, has no bond angle, and is  $sp^2$  hybridized.

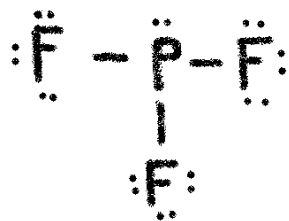
- d)  $C_2H_2$



Carbon is linear, has a  $180^\circ$  bond angle, and is  $sp$  hybridized.

Hydrogen is linear, has no bond angle, and no hybridization.

e) PF<sub>3</sub>



Phosphorus is trigonal pyramidal, has a bond angle of 107.5°, and is sp<sup>3</sup> hybridized.

Fluorine is linear, has no bond angle, and is sp<sup>3</sup> hybridized.