

Name \_\_\_\_\_

Period \_\_\_\_\_

### Molecule Building Simulation

- 1) Access the following website and download the simulation titled, **“Molecule Shapes”**.
  - a. <https://phet.colorado.edu/en/simulation/molecule-shapes>
- 2) Once downloaded, click on the **“Model”** simulation.
- 3) Draw the Lewis structure of the following molecules **BEFORE** building on the computer simulation.
- 4) Build the molecules on the simulation - be sure to show lone pairs of electrons on the central atom.
- 5) Check the boxes for **“Molecule Geometry”** and **“Show bond angles”** and fill in the following chart.  
Provide a 3-D sketch of what the model looks like in the final box.

Molecule	Lewis Structure	Bond °	Shape (MG) Name	VSEPR Term	3-D Drawing
<b>H<sub>2</sub></b>					
<b>CH<sub>4</sub></b>					
<b>NH<sub>3</sub></b>					
<b>H<sub>2</sub>O</b>					
<b>CO<sub>2</sub></b>					
<b>HCN</b>					
<b>CH<sub>2</sub>O</b>					

- 1) At the bottom of the simulation, click on “**Real Molecules**”.
- 2) Look at the following molecules on the simulation. These compounds break the octet rule by either expanding or reducing their octet. Sketch (3-D) the compound and explain how the compound has broken the octet rule.

Compound	Sketch (3-D)	Explain how the Octet Rule is broken
<b>PCl<sub>5</sub></b>		
<b>BF<sub>3</sub></b>		
<b>SF<sub>6</sub></b>		

- 1) Next, access and download the simulation titled “**Molecule Polarity**”.
  - a. <https://phet.colorado.edu/en/simulation/molecule-polarity>
- 2) Click on the tab “**Real Molecules**”.
- 3) Click the boxes under “**Bond Dipoles**” to see if the compounds you built had polar bonds (a **GRAY** arrow will show up if yes).
- 4) Click on the box under “**Molecular Dipole**” to see if the compound you built is a polar molecule (a **RED/ORANGE** arrow will show up if yes).
- 5) In the table below, write **YES** if polar bonds exist or write **NO** if the molecule is non-polar.

Molecule	Bond Polarity ( <i>Polar?</i> )	Molecular Polarity ( <i>Polar?</i> )
<b>H<sub>2</sub></b>		
<b>CH<sub>4</sub></b>		
<b>NH<sub>3</sub></b>		
<b>H<sub>2</sub>O</b>		
<b>CO<sub>2</sub></b>		
<b>HCN</b>		
<b>CH<sub>2</sub>O</b>		