

**MOLECULAR SHAPE**  
**Extra Credit (15 points)**

- This assignment is due by 12/9/19 before the Final Exam.
- Visit the website at the following link:  
<https://phet.colorado.edu/en/simulation/molecule-shapes>  
and follow the instructions below.
- Click on the play button to load up the simulation.
- Click on the “Model” link.
- Build the molecules listed below, using the simulation on this page. Be sure to check the buttons for Molecular Geometry, Electron Geometry and Bond Angle for each model.

A) Central atom with 3 single bonds:

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

B) Central atom with 2 single bonds and 1 double bond:

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

C) Central atom with 2 single bonds and 1 lone pair:

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

D) Central atom with 4 single bonds:

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

E) Central atom with 3 single bonds and 1 lone pair:

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

F) Central atom with 2 single bonds and 2 lone pairs

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

G) Central atom with 2 double bonds:

Molecular Geometry: \_\_\_\_\_ Electron Geometry: \_\_\_\_\_ Bond Angle: \_\_\_\_\_

**Questions:**

1. Based on VSEPR theory, what affects the shape of a molecule?

2. What is an electron pair group?

3. Complete the table below for each molecule shown below:

| <b>Formula</b>               | <b>Bonding pair<br/>electron groups</b> | <b>Lone pair<br/>electron groups</b> | <b>Molecular<br/>Geometry</b> | <b>Bond<br/>Angle</b> |
|------------------------------|---|--------------------------------------|-------------------------------|-----------------------|
| OCl <sub>2</sub>             |   |                                      |                               |                       |
| NBr <sub>3</sub>             |   |                                      |                               |                       |
| NO <sub>2</sub> <sup>-</sup> |   |                                      |                               |                       |