**Molecular Shapes Lab Name:**

Purpose: You will use a 3D computer simulator to determine patterns in molecular geometry and electron geometry. By the end of this lab, you should be able to determine the shape of a basic molecule based on the bonds and electron pairs surrounding the central atom.

Step 1: Go to http://phet.colorado.edu/en/simulation/molecule-shapes

(or Google “phet molecular shapes”)

Step 2: Run the simulator

Step 3: Check “Molecule Geometry”

Step 4: Check Show Lone Pairs & Show Bond Angles

Step 4: Create the molecules listed below by adding and removing

single-bonded atoms and electron clouds.

**Under the Model Tab…**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Single Bond | Lone Pairs | Molecule Geometry | Bond Angle | Sketch |
| 1 | 0 |  |  |  |
| 2 | 0 |  |  |  |
| 2 | 2 |  |  |  |
| 3 | 0 |  |  |  |
| 3 | 1 |  |  |  |
| 4 | 0 |  |  |  |
| 5 | 0 |  |  |  |
| 6 | 0 |  |  |  |

**Under the Real Molecules Tab**

1. Check to make sure ONLY molecular geometry tab is checked
2. Check to make sure Show Lone Pairs & Show Bond Angles is Checked
3. Check to make sure Model is checked, not real
4. Fill in the chart below by selecting different molecules (except don’t fill in last column yet)
5. Go back and select real button. Go back through and recheck your bond angles and fill out last column

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Molecule | Total Bonds | Lone Pairs | Molecule Geometry | Bond Angle | Sketch |
| H2O |  |  |  |  |  |
| CO2 |  |  |  |  |  |
| SO2 |  |  |  |  |  |
| BF3 |  |  |  |  |  |
| NH3 |  |  |  |  |  |
| CH4 |  |  |  |  |  |
| PCl5 |  |  |  |  |  |
| SF6 |  |  |  |  |  |

**Questions:**

What general patterns exist for identifying the Molecule Geometry of a molecule?

How did the bond angles differ from the model to real atoms? Give an explanation for why you think this occurs?