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” and “Electron Geometry”

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

single-bonded atoms and electron clouds.

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Single Bond | Electron Cloud | Molecule Geometry | Electron Geometry | Bond Angle | Sketch |
| 3 | 0 |  |  |  |  |
| 3 | 1 |  |  |  |  |
| 3 | 2 |  |  |  |  |
| 3 | 3 |  |  |  |  |
| 4 | 0 |  |  |  |  |
| 4 | 1 |  |  |  |  |
| 4 | 2 |  |  |  |  |
| 5 | 0 |  |  |  |  |
| 5 | 1 |  |  |  |  |
| 6 | 0 |  |  |  |  |

Questions:

What is the difference between “Molecule Geometry” and “Electron Geometry”?

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

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

On a separate sheet of paper, create a simplified chart that you could use to identify the shape of a molecule based on the number and type of bonds surrounding the central atom.