# Molecular Geometry Activity

**This activity supports the following unit and course objectives:**

(CLO6) Demonstrate knowledge of basic laboratory skills and operations in the areas of safety, measurement, chemical and physical properties of matter, atomic and molecular structure, chemical reactions, reactivity, structure, periodicity, and bonding.

(CLO7) Analyze and solve fundamental quantitative chemistry problems.

* Model Electron Configuration by using Lewis Structures (CLO6)(CLO7)
* Apply the Octet Rule for Lewis Structures (CLO6)(CLO7)

**Background:**

When learning how to draw structural formulas it is difficult to visualize the actual geometry or shape of the molecule when it is drawn on paper. When you draw a molecule on paper, you are only seeing a 2-dimensional representation of it. Molecular model kits and virtual simulations allow you the opportunity to gain a more accurate perception of a molecule’s actual geometry in three dimensions.

**Part 1: Lewis Diagrams**

1. Watch the following tutorial on drawing Lewis dot diagrams for covalent molecules.

[Lewis Diagrams Tutorial: How to Draw Lewis Dot Structures](https://edpuzzle.com/media/5c2f70811be7af406e5160d5)

2. Draw the Lewis structures for the following molecules. Pay attention to possible double and triple bonds!

|  | Lewis diagram |
| --- | --- |
| O2 |  |
| H2 |  |
| Cl2 |  |
| N2 |  |
| H2O |  |
| CO2 |  |
| CO |  |
| NH3 |  |
| PH3 |  |
| CH4 |  |

**Part 2: Molecular Shapes**

1. Visit the following [PHET simulation Build a Molecule](https://phet.colorado.edu/sims/html/build-a-molecule/latest/build-a-molecule_en.html) and go to the “Playground.”

2. Sketch the 3-D model of the molecule. Make sure you view the “ball and stick” views under the 3D tab. Click the to reset between models.

|  |  |  |
| --- | --- | --- |
|  | **“Ball and Stick”**  **Sketch of the Molecule** | **Shape of Molecule** |
| O2 |  |  |
| H2 |  |  |
| Cl2 |  |  |
| N2 |  |  |
| H2O |  |  |
| SO2 |  |  |
| CO2 |  |  |
| CO |  |  |
| NH3 |  |  |
| PH3 |  |  |
| CH4 |  |  |

**Questions:**

1. Which of the molecules that you built were polar? Explain your reasoning.

2. Which of the molecules that you built were nonpolar? Explain your reasoning.