

Molecular Models Lab

Objectives:

- To gain an understanding of the three dimensional shapes of molecules.
- To relate the structural formulas to the electron and molecular geometries.
- Beware: there are some ionic compounds in the mix.

Procedure:

Build models of the molecules and provide the following information for each:

Something to note:

Many molecules have many different types of bonds and/or multiple centers. This can add a layer of complication to what we do when assigning bond types and geometries. Make sure you consider and deal with this added wrinkle when completing the table to include ALL necessary information.

Common Name	Formula	Systematic Name	Lewis Structure	Electron Geometry	Molecular Geometry	Bond Types	Polar?
hydrogen	H ₂						
water	H ₂ O						
methane	CH ₄	carbon tetrahydride	$ \begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array} $	Td	Td	C-H	yes
salt	NaCl						
ammonia	NH ₃						
ethyne	C ₂ H ₂						
dichloromethane	CH ₂ Cl ₂						
nitrogen	N ₂						
carbon dioxide	CO ₂						
rust	Fe ₂ O ₃						
methanol	CH ₃ OH						
hydrogen peroxide	H ₂ O ₂						

oxygen	O ₂						
ethene	C ₂ H ₄						
ethane	C ₂ H ₆						

Analysis and Conclusion Questions:

1. What is a polar bond?
2. Which molecules did not contain any polar bonds? Why is this?
3. What is a covalent bond?
4. Could you use the model kits to represent formula units of NaCl or LiF? Why or why not?
5. Please explain why water and carbon dioxide take on a different shape.
6. Using the molecules you made, which seems to be the strongest type of bond, a single bond, double bond, or triple bond? Explain.