

Molecular Models Lab

EQ: What patterns exist when molecules are modeled in 3-D?

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 when completing the table to include ALL necessary information. Yes, that means drawing in all of the lone pairs of electrons. You may want to reference p. 200 in your textbook.

Common Name	Formula	Systematic Name	Lewis Structure	Molecular Geometry	Bond Types	Polar?
hydrogen	H ₂					
water	H ₂ O					
methane	CH ₄					
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					

Analysis and Conclusion Questions: Answer the following questions on a separate sheet of paper.

1. What is a polar bond?
2. Which molecules did not contain any polar bonds? Why is this?
3. Could you use the model kits to represent formula units of NaCl or Fe₂O₃? Why or why not?
4. Using the molecules you made, which seems to be the strongest type of bond, a single bond, double bond, or triple bond? Explain.

STUDENT KEY:

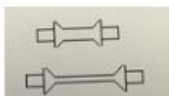
Bonding Links- Stored in plastic bag

(38) **Short grey** links are used for single covalent bonds

(36) **Long grey** links are flexible and used for double or triple bonds

(12) **Purple Medium** links are used for contrast for dative or coionic bonds, hydrogen bonds, and ionic bonds.

(18) **Pear shaped lobes**- Represent lone pairs of electrons, or p-lobes responsible for pi bonding.



List of Elements

CONTENTS : 108 atoms

Qty.	Element	Colour	Holes
14	Carbon	black	4
6	Carbon	Dk blue	5
12	Hydrogen	White	1
2	Hydrogen	White	2
6	Nitrogen	Blue	4
4	Nitrogen	Blue	3
16	Oxygen	Red	2
6	Oxygen	Red	4
8	Sulphur	Yellow	2
4	Sulphur	Yellow	4
1	Sulphur	yellow	6
4	Phosphorus	purple	4
1	Phosphorus	purple	5
2	Phosphorus	purple	3
8	Halogen	green	1
4	Metal	grey	1
3	Metal	grey	2
2	Metal	grey	3
4	Metal	grey	4
1	Metal	grey	6