

CHAPTER 1	Investigation 1.A: Modelling Molecules	BLM 1.1.6
HANDOUT		

Models are very important tools for chemists. You cannot see detailed features of molecules, even with a microscope. However, you can build models that fit some of the properties that chemists have determined through experimentation. In this investigation, you will use a molecular model kit to assemble models of a few molecules.

Question

What can you predict about the structure of molecules by building models?

Materials

- molecular model kit
- pen
- paper

Procedure

1. Obtain a model kit from your teacher.
2. In the table on the following page, draw Lewis structures of each molecule in the list below:
 - (a) hydrogen bonded to hydrogen: $\text{H}_2(\text{g})$
 - (b) chlorine bonded to chlorine: $\text{Cl}_2(\text{g})$
 - (c) oxygen bonded to two hydrogens: $\text{H}_2\text{O}(\ell)$
 - (d) carbon bonded to two oxygens: $\text{CO}_2(\text{g})$
 - (e) nitrogen bonded to three hydrogens: $\text{NH}_3(\text{g})$
 - (f) carbon bonded to four chlorines: $\text{CCl}_4(\ell)$
 - (g) nitrogen bonded to three fluorines: $\text{NF}_3(\text{g})$
3. Look through the chapter and choose three other molecules that are not in the list above. Draw the Lewis structures of your selected molecules in your table.
4. Based on your Lewis structures, build models of all the molecules. Make a sketch of your model.

Analysis

1. Compare your models and sketches with those of your classmates. Discuss any differences.
2. What can you learn from models that you cannot learn from Lewis structures?

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Lewis Structures and Molecular Shapes of Some Simple Molecules Built Using a Model Kit

Name	Formula	Lewis Structure of Compound	Three Dimensional Sketch of Model

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Conclusion

3. Summarize the strengths and limitations of creating molecular models using kits. What can you deduce from the models? What features of molecules cannot be deduced from models?