

## Hydrocarbons: A Structural Study

### Introduction:

The physical and chemical properties of molecules are determined, to a large extent, by their three-dimensional shapes. Consequently, an understanding of molecular shape is very important to an understanding of chemistry. Most people, however, find it difficult to think in three dimensions. To make this task easier, scientists have developed kits for constructing 3-D models of molecules. By working with the model kits, the student can learn to visualize and understand molecular shape.

In this experiment, you will work with a ball-and-stick model kit. In this kit, atoms are represented by colored wooden balls, drilled with holes. Sticks and springs may be fit into the holes to indicate chemical bonds. Short sticks are used to represent all other single covalent bonds. Springs are used to indicate double or triple covalent bonds.

In this experiment, you will use ball-and-stick models to study the structures of hydrocarbons.

### Color Code of Models:

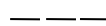
Black	Carbon
Yellow	Hydrogen
Red	Oxygen
Blue	Nitrogen
Green	Chlorine
Purple	Iodine
Orange	Bromine

### Note:

For Double and Triple Bonds draw:



For Below the Plane draw:



For Above the Plane draw:



For the Same Plane draw:



### Objectives:

1. To build ball-and-stick models of hydrocarbon molecules.
2. To study the relationship between the 3-D models and the structural formulas of chemical compounds.
3. To create models of structural and geometric isomers.

### Data:

Draw the structural formula and sketch the 3-D model of the following compounds and answer questions about each.

Setup a table in your lab notebook like the one below:

Methane Structural Formula:	Molecular Formula _____  Sketch:	Ethane Structural Formula:	Molecular Formula _____  Sketch:
H-C-H angle?		Rotation around C-C bond?	



