

Molecular Models Lab

Background: Organic molecules contain atoms of carbon and hydrogen bonded together. Carbohydrates, fats and proteins are the three major groups of organic compounds found in living things (biomolecules). They are composed mainly of carbon, hydrogen and oxygen. In proteins, nitrogen is also present. The skeletons of biomolecules are often chains of carbons to which hydrogen atoms are bonded. Compounds composed entirely of carbon and hydrogen are called *hydrocarbons*. Other organic molecules are formed from hydrocarbons when one or more different kinds of atoms are substituted for a carbon or a hydrogen. These groups of atoms are called *functional groups*. The chemical properties of a molecule are often determined by the functional groups present.

Organic molecules can be illustrated in many different ways. A *molecular formula* shows the types and numbers of atoms in a molecule. A *structural formula* shows the arrangement of the atoms in a molecule.

Objective: In this activity you will:

1. Study the structure of several organic molecules
2. Practice making chemical and structural formulas
3. Create 3-D models of some organic molecules

Procedures and Observations:

Part I. Number of covalent bonds

Remove one model atom from your model kit. Each "hole" in the "atom" represents a possible bonding site. Count the number of bonds for each element.

CARBON [C] Black	_____	Bonds
HYDROGEN [H] white	_____	Bonds
OXYGEN [O] Red	_____	Bonds
NITROGEN [N] Orange	_____	Bonds
SULPHUR [S] Yellow	_____	Bonds

Part II. Organic Molecules

Determine the chemical and structural formula for each molecule. Make a three-dimension model using the model kits for each molecule and have Mr. U. check them. Be sure to include three facts (other than what they're made of) about each molecule.

Molecule

Chemical formula

Structural formula

Initials

Water

Facts:

Carbon Dioxide

Facts:

Oxygen

Facts:

Methane

Facts:

Molecule

Chemical formula

Structural formula

Initials

**Ethyl alcohol
(ethanol)**

Facts:

Glycine

Facts:

Glycerol

Facts:

Glucose

Facts: