

MOLECULAR MODEL KIT

Student Worksheet
CAT. NO. MOD-1

You will construct models to understand the three dimensional arrangements of atoms in molecules using the materials in this kit.

Each packet of plastic models contains:

- 2 Black tetrahedral carbon centers
- 2 Blue tetrahedral nitrogen centers
- 6 Green univalent chlorine centers
- 4 Red diunivalent oxygen centers
- 1 Yellow diunivalent sulfur center
- 8 White univalent hydrogen centers
- 20 Plastic bond connectors
- 4 Flexible connectors

PROCEDURE:

As directed by your teacher, you are to use the electron-dot system or the short line (-) to diagram the molecular structures following. Remember that the dot or line represents a sharing of electrons between atoms (covalent bond).

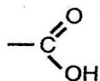
ie: Hydrogen atom H[•] or H-
Oxygen atom O: or O-

1. Write the structural formula for a molecule of Methane gas (CH₄) using either the dot or line method. Construct the model.
2. Do the same for the following models: You may have to take apart one model before making the next.
 - A. Methyl chloride (CH₃Cl)
 - B. Water (H₂O)
 - C. Hydrogen sulfate (H₂S)
 - D. Carbon dioxide (CO₂)
 - E. Hydrogen chloride (HCl)
 - F. Trichloromethane (CHCl₃)
 - G. Ammonia (NH₃)
3. Acids can donate a proton, H⁺, and a base can accept a proton. Use the hydrogen atom center to represent a proton. Show the reaction below by using the molecular model pieces:



Construct a model of ethanoic (acetic) acid which represents a simple organic acid. (CH₃CO₂H)

Note that the organic acids are characterized by the presence of the functional group -COOH as shown:



This is also known as the CARBOXYL GROUP

Thus all organic acids have the following general formula: R-COOH.