eisco

Trust | Deliver | Learn

MOLECULAR MODEL SET INORGANIC & ORGANIC

CAT NO. SET00604

Instruction Manual

MOLECULAR MODEL

SET FOR BASIC INORGANIC & ORGANIC

CONTENTS

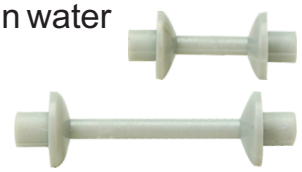
S.No.	Element	Qty	Colour	Holes	Dia. mm.
1	Carbon	8	Black	4	22
2	Hydrogen	15	White	1	15
3	Nitrogen	4	Blue	4	22
4	Oxygen	6	Red	2	20
5	Sulphur	1	Yellow	4	22
6	Sulphur	1	Yellow	6	22
7	Phosphorous	1	Purple	5	22
8	Halogen	6	Green	1	20
9	Metal	2	Grey	1	15
10	Metal	2	Grey	2	22
11	Metal	2	Grey	3	22
12	Metal	2	Grey	4	22
13	** sp^3	1	Brown	4	22
14	** dsp^3	1	Brown	5	22
15	** d^2sp^3	1	Brown	6	22
	LINKS				
16	Medium	24	Grey		
17	Long Flex.	12	Grey		
18	Medium	6	Purple		
19	Instruction	1	Leaflet		

**** Atom-parts** The 3 elements shown ** represent any element having the structures :
Sp3, tetrahedral, dsp3 trigonal bipyramid, d2sp3 octagonal

Note : sp3 (4 - holes tetrahedral) can be used as 3-hole pyramidal in nitrogen since the angles are almost the same and the unused hole has a theoretical significance, i.e. Location of a lone-pair of electrons.

INTRODUCTION

LINKS There are 3 types of links in this set to represent the following bonds.



Medium grey links are used for single covalent bonds as in water **H-O-H**.

Long grey links are flexible and are used for double (as in oxygen) or triple covalent bonds.

Purple medium links are used for contrast in the following case.

a. Dative or coionic bonds as in complex ions, e.g. Tetraaquo -copper ion.

b. Representation of ionic bonds in the empirical formula of ionic compounds such as **Na+..Cl-**

Note: Some compounds have both covalent and ionic bonds in the same molecucle e.g. **Na+...-O-H.**

INTRODUCTION TO MOLECULAR MODELS

ATOM Each plastic ball represents an atom, and the plastic balls are colour coded & vary in size representing different elements.

One Atom is represented by a symbol which is a capital letter. e.g. Carbon **C** Oxygen **O** Nitrogen **N.**

The symbol of some elements need 2 letters e.g. Chlorine Cl. The first letter only is capital.

A MOLECULE is a group of 2 or more atoms joined together. e.g. A Hydrogen molecule **H - H**.

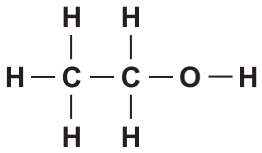
A COMPOUND is a substance in which two or more different elements are joined together. e.g. Two atoms hydrogen join with one atom oxygen to form one molecule of water.

MOLECULAR FORMULA

This shows the exact number of the atoms of each elements joined to form one molecule e.g. C_2H_6O. This molecule contains 2 carbon, 6 hydrogen, and 1 oxygen atoms.

STRUCTURAL FORMULA

This is a plan view of the arrangement of the atoms in a molecule. Symbols and lines are used to represent the atoms and links.



DOUBLE BONDS

Carbon has a valency of 4 and can form a compounds with oxygen (valency 2). The structural formula is O=C=O Carbon dioxide.

INORGANIC COMPOUNDS

Elements

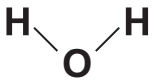
Hydrogen	H — H	
Chlorine	Cl — Cl	
Oxygen	O = O	Note double bond
Nitrogen	N ≡ N	Note triple bond

HYDRIDES

These are compounds of hydrogen with another element

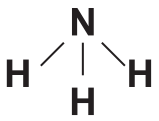
Hydrogen Chloride H — Cl

Water Angular



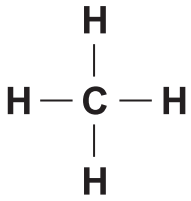
In water Oxygen has a bond angle of 105^0

Ammonia Pyramidal



In ammonia nitrogen has a bond angle of 107^0

Methane Tetrahedral

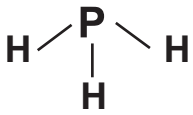


In methane carbon has bond angles of 109.5^0

Hydrogen Sulphide

Use 2-hole sulphur Bond angle 92^0

Phosphine

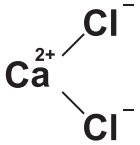


Pyramidal bond angles 94^0 Use tetra ** atom

HALIDES chlorides & fluorides

Sodium Chloride Ionic $Na^+ + Cl^-$

Calcium Chloride Ionic

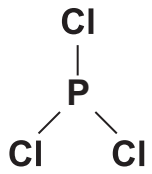


Beryllium Chloride

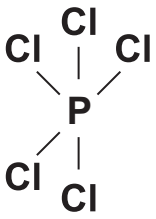
Cl — Be — Cl *6-hole metal linear axis***

Phosphorus Trichloride Trigonal

Planar: Use 5 hole

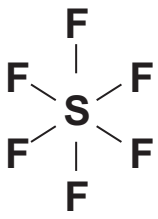


Phosphorus Pentachloride Trigonal Bipyramid



Sulphur Hexachloride

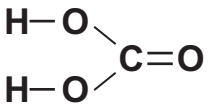
Use 6-hole sulphur



NON - METAL OXIDES and ACIDS

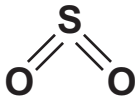
Carbon Dioxide Linear

Carbonic Acid



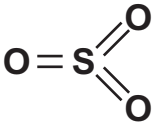
Sulphur Dioxide

Use 6-hole sulphur Angular 119^0



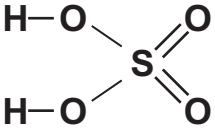
Sulphur Trioxide

Trigonal planar use 6-hole

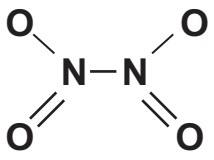


Sulphuric Acid

Use 6-hole planar

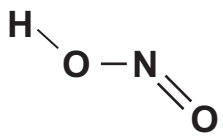


Dinitrogen Tetroxide Planar Molecule Use two 4-hole nitrogen, four 2-hole oxygen



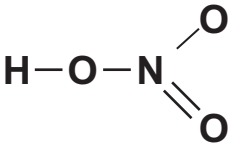
Nitrous Acid Planar Molecule

Use 4-hole nitrogen
phosphorus



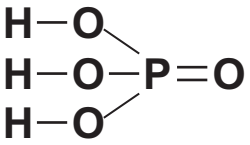
Nitric Acid

Nitrate group trigonal



Phosphoric Acid

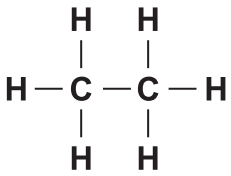
Use 6-hole
planar Use 4-hole nitrogen



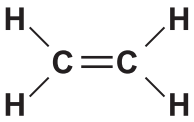
ORGANIC COMPOUNDS

Elementary Selection

Ethane

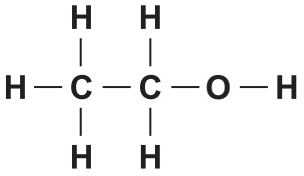


Ethene

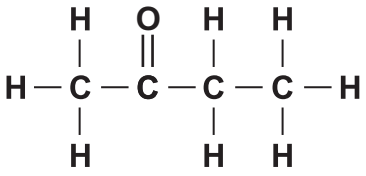


Ethyne

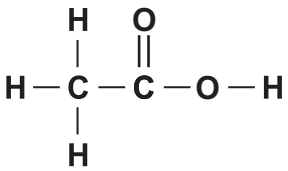
Ethanol



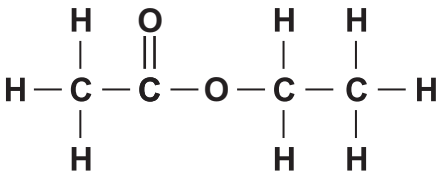
Butanone



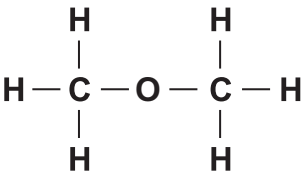
Ethanoic Acid



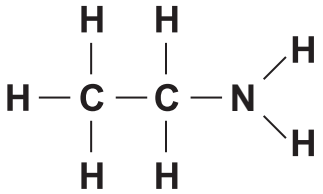
Ethyl Ethanoate



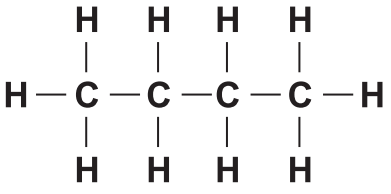
Dimethyl Ether



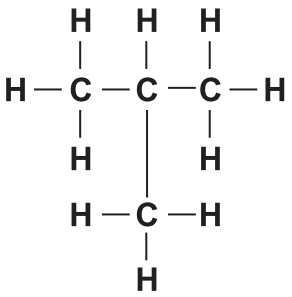
Aminoethane



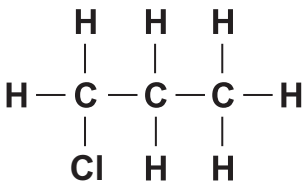
Butane



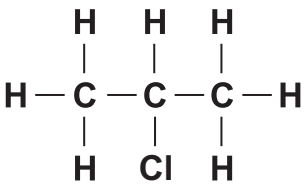
Iso-butane



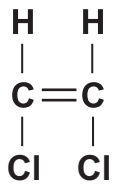
1-chloropropane



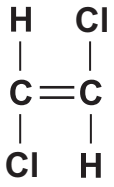
2-chloropropane



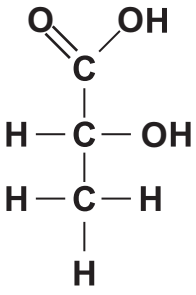
Cis 1,2-dichloroethene

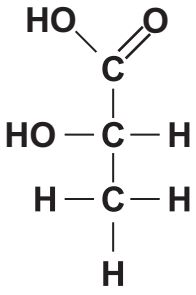


Trans 1,2-dichloroethene

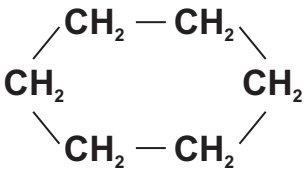


Lactic acid

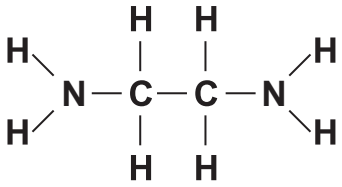




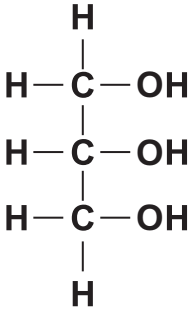
Cyclohexane



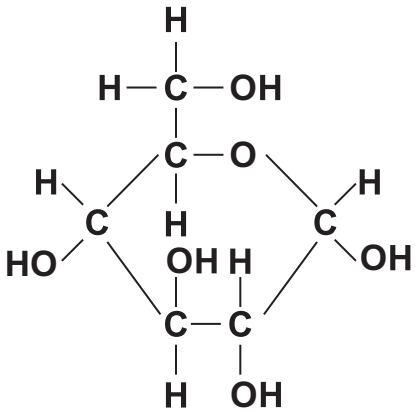
Ethylene diamine



Glycerol



D-(+)-Glucose



Manufactured by :

www.eiscolabs.com

U.S. Distributor:

Eisco Scientific

788 Old Dutch Road, Victor, NY 14564

Website: www.eiscolabs.com