Ch. 3: Carbon & the Molecular Diversity in Life
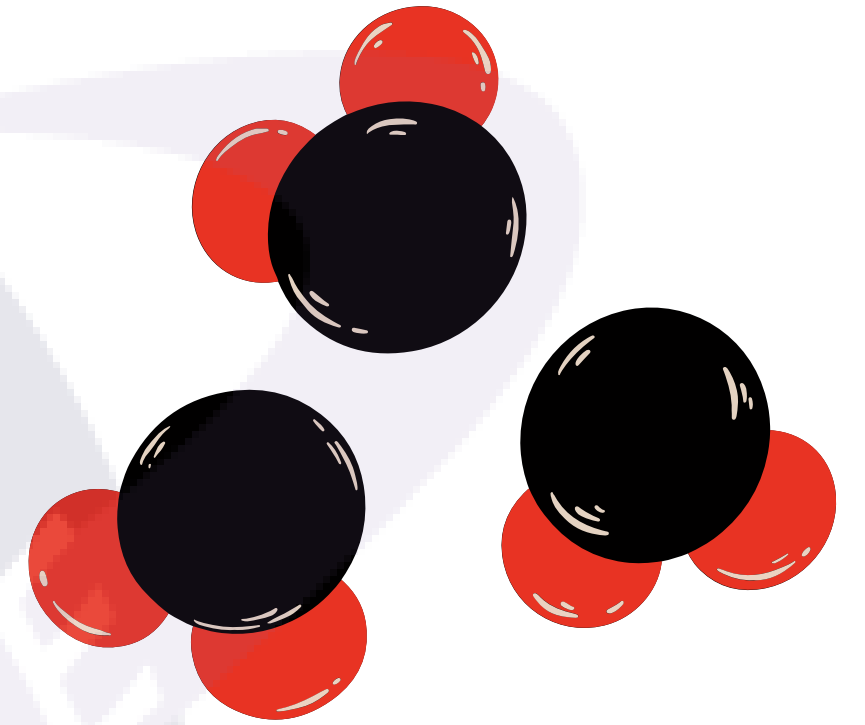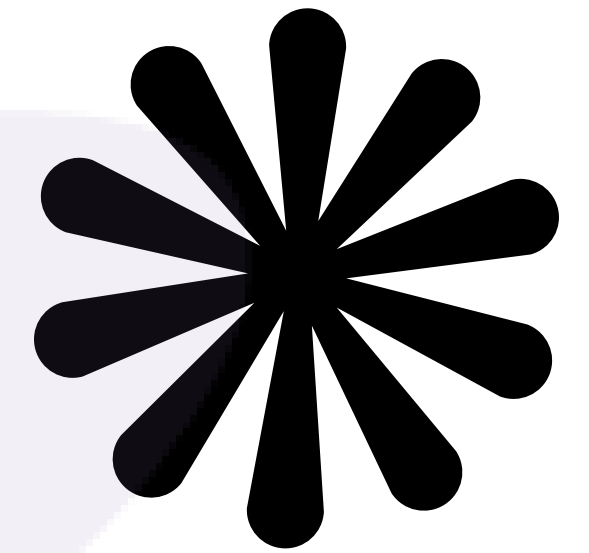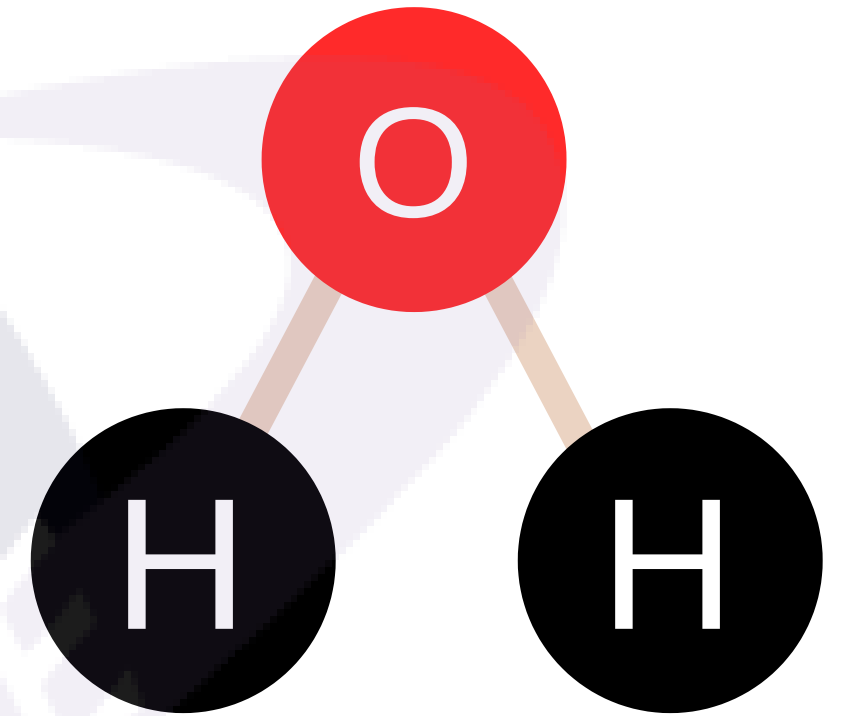
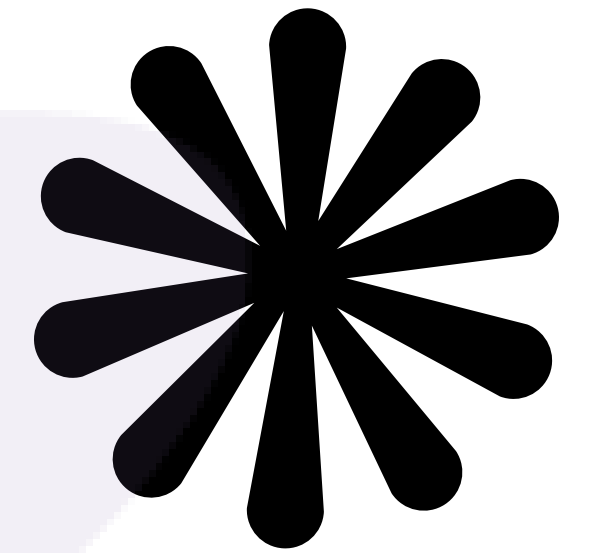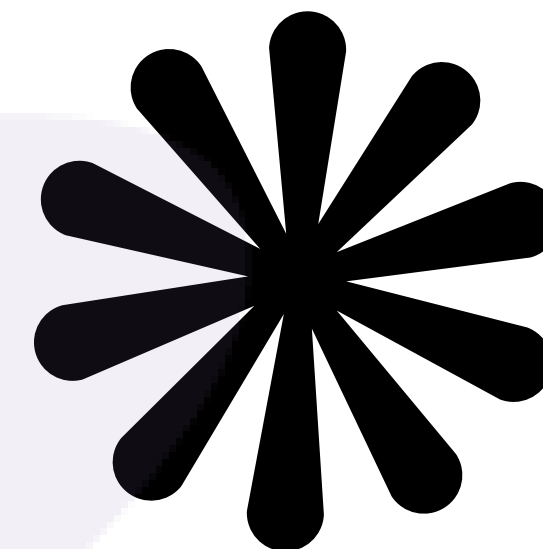CO$_2$

Carbon with a valence of 4, bonds to various atoms:

Forms the skeleton of organic compounds

Hydrocarbons - Consist of carbon & hydrogen.

Isomers - Same molecular formula & different structure + properties.

Functional groups - Chemical groups attached to the carbon skeleton of organic molecules that effect function and molecular shape.

Main functional groups are:

- Reference sheet available on website
1. Hydroxyl group (Alcohols)
    a. (-OH)
    b. Ex. Ethanol
2. Carbonyl group (Aldehyde/Ketone)
    a. Aldehyde (Ex. Acetone)
    b. Ketone (Ex. Propanal)
3. Carboxyl group (Organic acid)
    a. (-COOH)
    b. Ex. Vinegar (Acetic acid)
4. Amino group (Amine)
    a. (-NH3)
    b. Ex. Glycine
5. Sulfhydryl group (Thiol)
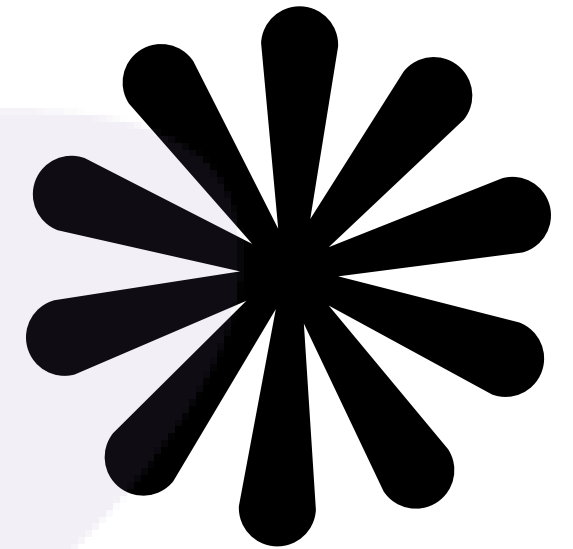   a. (-SH)
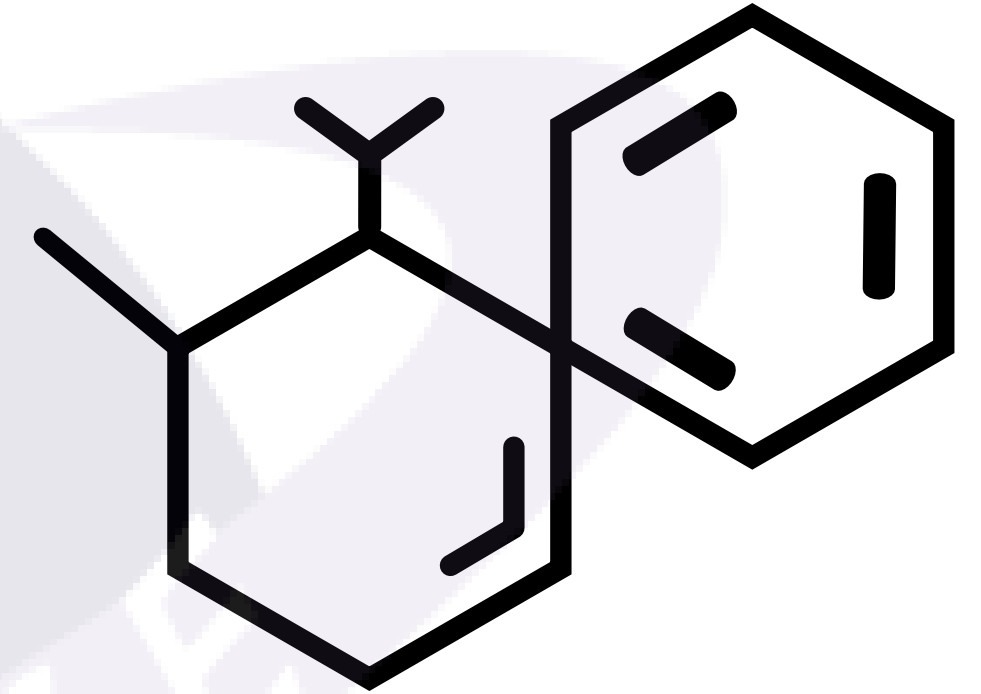   b. Ex. Cysteine
6. Phosphate group (Organic phosphate)
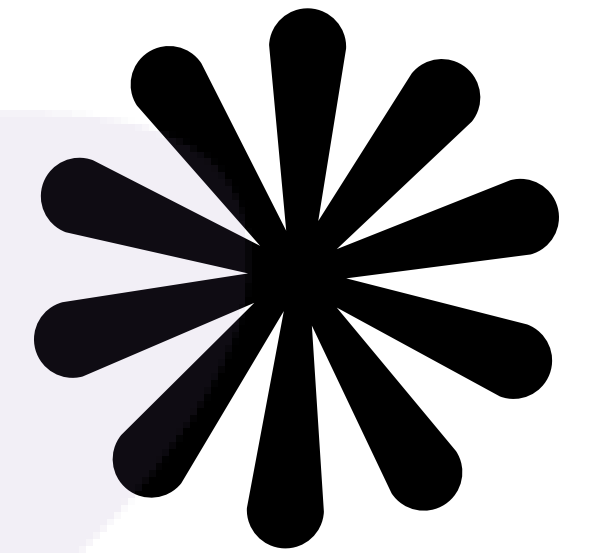   a. (-OPO3^2-)
    b. Ex. Glycerol phosphate
7. Methyl group (Methylated compound)
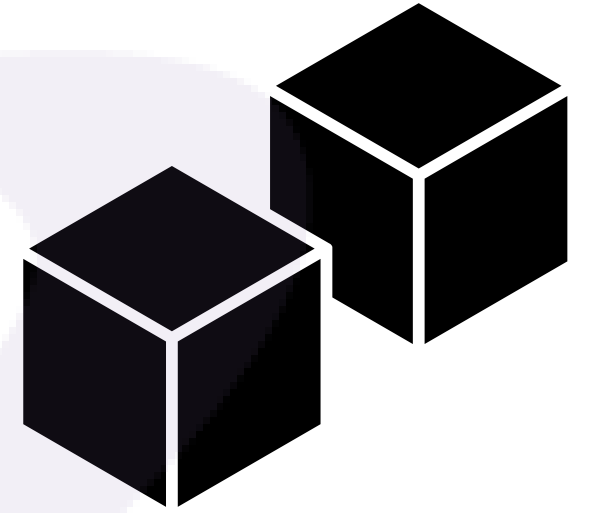   a. (-CH3)
    b. Methyl cytosine

Macromolecules are polymers built from monomers
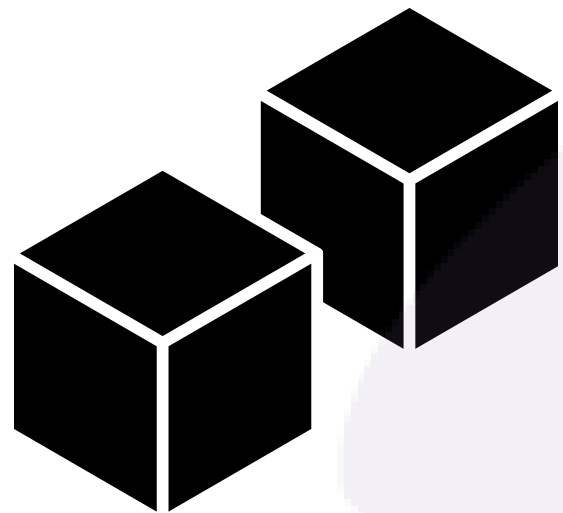
4 biological macromolecules:

Serve as fuel & building material for organisms.

Carbohydrates

Ex. Glucose, Sucrose & Cellulose

Lipids (Fats)

Diverse group of hydrophobic molecules.

Function as an important energy source, and maintain membrane fluidity.

Ex. Saturated (solid at room temp), unsaturated (liquid at room temp) & phospholipids

Proteins

- Form diverse molecules with diverse functions.
- Many functions include, protecting against diseases, catalyzes chemical reactions stores amino acids, transports substances, receives signals & provides structural support.
- Ex. Enzymes, transport proteins, hormones, motor proteins & structural proteins.

Nucleic Acids

Store, transmit & help express hereditary information.

Functions are to stores hereditary information, while RNA is gene expression.

Ex. DNA & RNA