Lending Library: Molecules of Life© (ML)

Teaching Points

Many introductory biology and biochemistry courses introduce students to the modular approach employed in living organisms, covering various subunits and the mechanism by which they are joined through condensation reactions (dehydration synthesis) to generate macromolecules. Rarely do students get to compare the relative size of the monomers and polymers.

This activity features monomers and polymers of four classes of macromolecules: carbohydrates, lipids, proteins and nucleic acids, as well as water molecules and an ice lattice for comparison. All models are constructed on the same scale, two million ($2 \times 10^6$) times magnified. A poster allows students to match the subunits with each of the macromolecules and learn about their function. The content of the poster has been duplicated on 5 smaller placemats for use as lab stations.

Models in this Collection

- Ice Lattice
- Amylose (starch)
- Glycogen
- Cellulose
- Phospholipid Bilayer
- Beta Globin
- DNA Double Helix
- Monomers: 4 water, 2 glucose, 2 phospholipids, 2 histidines, 2 adenosine monophosphates
Documentation Included

- How do the models fit back in the suitcase?
- 1 placemat each
  - Water
  - Carbohydrates
  - Lipids
  - Amino Acids
  - Nucleic Acids
- Molecules of Life Poster

General Model Information

- All models are made of plaster with the ZCorp printer.
- Models are in spacefill format.
- Each polymer has a single monomer colored green.
- CPK coloring:

| Carbon | Oxygen | Nitrogen | Phosphorus | Hydrogen |

Model Details

- **Ice Lattice** (PDB: ice_lh)
- **Amylose (starch)** (PDB: 1c58)
  - Yellow dot on C6 carbon of each glucose subunit
- **Glycogen** (PDB: 540glycogen)
  - Yellow dot on C6 carbon of each glucose subunit
- **Cellulose** (PDB: 540cellulose)
  - Yellow dot on C6 carbon of each glucose subunit
- **Phospholipid Bilayer** (PDB: theoretical)
- **Beta Globin** (PDB: 4hhb)
  - Heme is colored yellow
- **DNA Double Helix** (PDB: Daves_dna2)
- **Monomers**
  - Water (PDB: ice_lh)
  - Glucose (PDB: d_glucose)
  - Phospholipid (PDB: theoretical)
  - Histidine (PDB: 4hhb)
  - Adenosine Monophosphate (PDB: Daves_dna2)