Hydrogen bond - Formed by attraction of polar molecules.

Covalent bond - Most biological molecules.

Ionic bond - Occurs between ions. (Types of bonds)
H_2O

- Don't dissolve in
  ice, hydrogen bonds

From H_2O

Hydrophobic - Doesn't like H_2O - Clumps together to get away

Hydrophilic - Likes water - Will dissolve in

Substance

Non-polar

Cell

Hydrophobic

Hydrophilic (Polar)

Remembrances
An organism that makes its own food from light energy or chemical energy without eating.

Organisms that consume other organisms as food. They are not able to make organic molecules from simple inorganic compounds.

An organism that synthesizes food through chemical processes other than photosynthesis.

Match the definition:

- Heterotroph
- Chemotroph
- Autotroph

Synthesizing Biomacromolecules
Proteins

Carbohydrates

Nucleic acid

Example

Polymerisations - joining of monomers to form long chains

Like small repeating molecules

Important
Nucleic Acids

RNA - Uracil
A = U
G = C

Within a living cell, the nucleic acids DNA and RNA are used in DNA replication and transcription, respectively.

DNA is a double helix composed of nucleotides, and RNA is a single-stranded molecule.

Summary Sentence

- DNA is used in DNA replication.
- RNA is used in transcription.
- 5' hydroxyl group is important for translation.
- Link nucleotides together with 3' to 5' link.
- RNA or single strand.
- DNA or double helix.

Facts

- Found nucleotides + hydrogen bond
- Sugar
- Phosphate
- Nucleous base

Diagram
Carbohydrates

- Polysaccharide (starch)
- Cellulose
- Disaccharide (sucrose)
- Monosaccharide (glucose)

Facts
- Dec.on
- Bacteria help animals break it
- 80% nutrient value to humans
- Cellulose - Structural support to plants
- Glycolipids
- Makes glycoproteins
- Source energy and for structural components
Lipids

Diagram

- Structural component of membranes
- Energy storage
- Specific biological function
- Hydrophilic, some hydrophobic, some both

Fats, Oils, and Glyceride

Hydrophilic

Hydrophobic

Phospholipid

Fatty Acids

Saturated

Unsaturated

Max number H bonded

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

Drying bonds

= C =}

Naturce

H

Max number H bonded

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

Drying bonds

= C =}

Naturce

H

Max number H bonded

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

Drying bonds

= C =}

Naturce

H

Max number H bonded

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

Drying bonds

= C =}

Naturce

H

Max number H bonded

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

H - C - O - H

H - C - O

H

H

Drying bonds

= C =}
Protein

- Primary structure: \( \text{N}-\text{C} \rightarrow \text{C}-\text{N} \rightarrow \text{C}-\text{N} \rightarrow \text{C} \rightarrow \text{N} \)
- Tertiary structure: the protein folds into a compact shape due to hydrogen bonds, disulfide bonds, and other interactions.
- Quaternary structure: more than one polypeptide chain, giving the protein its functional role.

- Functions:
  - Enzymes:
  - Catalyze chemical reactions
  - Cell surface receptors:
  - Cell transport:
  - Transport nutrients and waste products
  - Structural:
  - Maintaining cell shape
  - Immuno globulins:
  - Antibodies

Summary sentence: Proteins are essential components of all living organisms, serving a wide range of functions critical to life processes.
What is the reverse called?

Hydrolysis Reaction

Peptide Link

What reaction is this?

Condensation Reaction

-decarboxylation group OH
-make carboxy-
What's my job in the cell? Tell me what each organelle in the cells job is: 

- **Nucleus**: Contains the genetic material (DNA) and controls the activities of the cell.
- **Cell Membrane**: Surrounds the cell and regulates the movement of substances in and out of the cell.
- **Endoplasmic Reticulum**: Rough ER packages proteins and lipids, while smooth ER is involved in detoxification and lipid synthesis.
- **Golgi Apparatus**: Packages proteins for transport throughout the cell.
- **Lysosomes**: Cell defense, containing enzymes for digested material.
- **Vacuoles**: Store water and waste materials.
- **Mitochondria**: Energy production site.
- **Rough Endoplasmic Reticulum**: Site of protein synthesis.
- **Smooth Endoplasmic Reticulum**: Involved in lipid and cholesterol synthesis.
- **Ribosomes**: Site of protein synthesis.
- **Centrioles**: Participate in cell division and cilia formation.
- **Mitochondria**: Energy production site.
<table>
<thead>
<tr>
<th>Organelle</th>
<th>Cell wall</th>
<th>Flagella</th>
<th>Centriole</th>
<th>Chloroplast</th>
<th>Vacuole</th>
<th>Lysosome</th>
<th>Golgi complex</th>
<th>Rough endoplasmic reticulum</th>
<th>Smooth endoplasmic reticulum</th>
<th>Ribosomes</th>
<th>Mitochondria</th>
<th>Nucleus</th>
<th>Nucleus membrane</th>
<th>Cell membrane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant cell</td>
<td>Animal cell</td>
<td>Prokaryotic</td>
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</tbody>
</table>
Enzyme binding site

Changes shape of active site

No longer binding site

Heat

PH

What causes denaturing to occur?

What would denaturing do to this?

Enzyme - substrate

Energy usually released in these reactions

released in these

Enzyme - substrate

Enzyme complex

Inactive site

Active site

Substrate

Lock + key model

Highly specific active site

Enzyme + substrate

Results in breaking bonds
Chemical components add to enzyme to be active

Co-enzymes

Binding

Enzymes - stop function of enzyme

Activity of enzymes - competitive inhibitor

Develop drugs that inhibit the each enzyme unique fit for a function

How to we develop drugs that effect the function of an enzyme?

Can't bind to active site

Alters shape of enzyme

Another part of molecule binds with enzyme of non-competitive

Competitive

Prevents binding of enzyme + substrate

Temporary

Binds active site

What are the 2 ways inhibitors work?
Explain the difference between endocytosis and exocytosis. Use a diagram to help with this explanation.

Active transport - against gradient
Facilitated diffusion - through protein channels
Diffusion - through phospholipids

Use the diagram above to show the following terms:

Endocytosis
Exocytosis
Protein channels
Diffusion
Active transport
Facilitated diffusion
Water, carbon dioxide, glucose, chloride, large, lipid soluble molecules, amino acids.

This cell has a higher concentration of sodium inside the cell but still requires more in order to function well, how will it get into the cell?

For the substances listed below draw in the cell membrane what they require in order to cross the membrane and show how they cross the membrane.
Reactions for Cells

Name and explain the following diagrams.

What is the difference between osmosis and diffusion?

Why do cells need energy?

What is another name for an endobiotic reaction?
What is the equation for photosynthesis?

What is ATP?

What is the chemical equation for ATP?

What is a catabolic reaction?

What is another name for a catabolic reaction?
How does aerobic respiration differ from anaerobic respiration?

1. Electron transport
2. Kreb cycle
3. Glycolysis

Explain the process of respiration.
Explain the photosynthetic process:

1. Light-dependent reaction
2. Light-independent reaction
Add detail to the cycle below to explain what is happening.
To the cycle above add in the ATP–ADP cycle.