Edexcel IAL Biology A-level

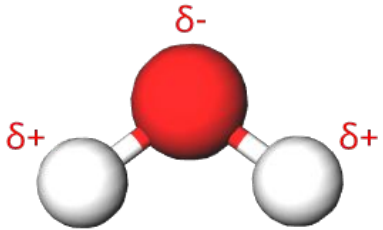
1.1-1.5 - Biomolecules

Flashcards

Describe the structure of a water molecule

Describe the structure of a water molecule

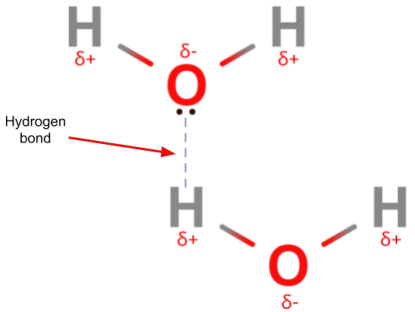
- One oxygen atom covalently bonded to two hydrogen atoms
- Oxygen is more electronegative than hydrogen which leads to polar bonds and an uneven charge distribution



What is a hydrogen bond?

What is a hydrogen bond?

- A type of strong intermolecular force
- Hydrogen atoms which are directly covalently bonded to a highly electronegative atom (O, N or F) are attracted to highly electronegative atoms in other molecules.



What is a solvent?

What is a solvent?

Any substance which solutes can dissolve in to form a solution.

State 6 important properties of water

State 6 important properties of water

- Acts as a solvent
- Acts as a metabolite
- High surface tension
- High specific heat capacity
- High latent heat of vaporisation
- Strong cohesion and adhesion forces

Why is cohesion useful in biological systems?

Why is cohesion useful in biological systems?

Cohesion is the main force supporting columns of water as they are pulled up the xylem in plants. The water molecules stick together as a constant column.

Why is adhesion useful in biological systems?

Why is adhesion useful in biological systems?

It allows water to move against the pull of gravity up the xylem.

What are carbohydrates?

What are carbohydrates?

Molecules that consist of carbon, hydrogen and oxygen only.

What are monosaccharides?

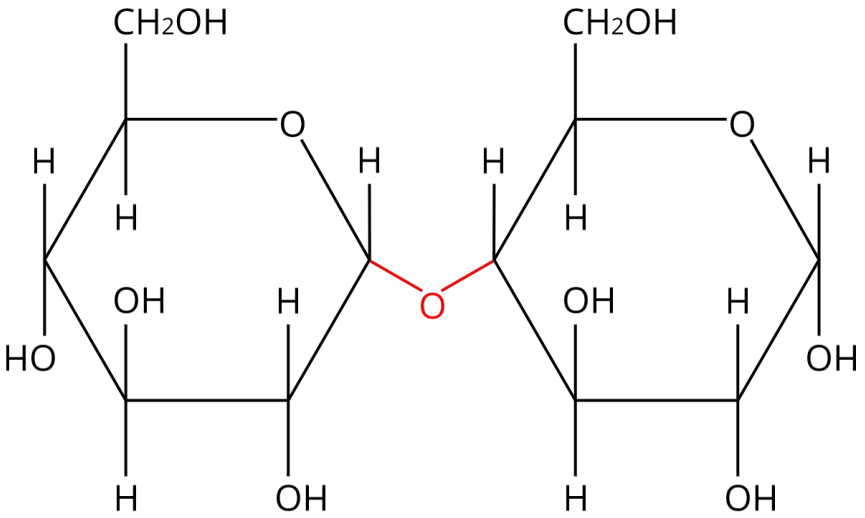
What are monosaccharides?

One individual monomeric sugar unit.

What is a disaccharide?

What is a disaccharide?

Two monosaccharides covalently linked by a glycosidic bond.



What is a polysaccharide?

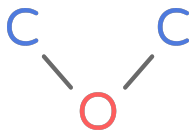
What is a polysaccharide?

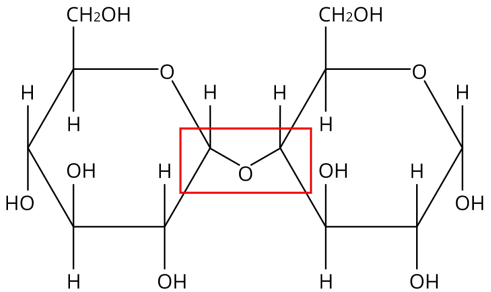
A polymer made of many monosaccharides covalently linked by glycosidic bonds.

What is a glycosidic bond?

What is a glycosidic bond?

A type of bond which joins a monosaccharide to another molecule (usually another monosaccharide to form a disaccharide). It has the following structure:





What type of reaction forms a glycosidic bond?

What type of reaction forms a glycosidic bond?

A condensation reaction

Describe what happens in a condensation reaction

Describe what happens in a condensation reaction

Two molecules are joined together and water is removed.

What type of reaction breaks a glycosidic bond?

What type of reaction breaks a glycosidic bond?

A hydrolysis reaction

Describe what happens in a hydrolysis reaction

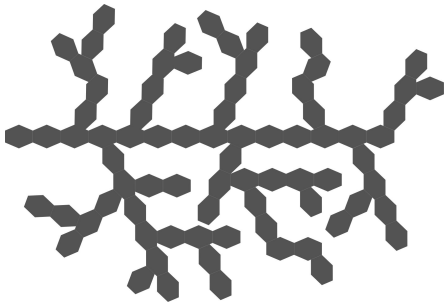
Describe what happens in a hydrolysis reaction

A molecule is broken apart using water.

Describe the structure of glycogen

Describe the structure of glycogen

- Made up of many alpha glucose molecules joined by either alpha 1-4 or alpha 1-6 bonds
- Highly branched
- Compact



Describe the structure of starch

Describe the structure of starch

- Made of amylose (joined by alpha 1,4 bonds) and amylopectin (joined by alpha 1,4 and alpha 1-6 bonds)
- Coiled and branched

Why is glycogen useful as a storage molecule in animals?

Why is glycogen useful as a storage molecule in animals?

- It is highly compact
- It is highly branched so it can be broken down by enzymes easily for respiration
- It insoluble

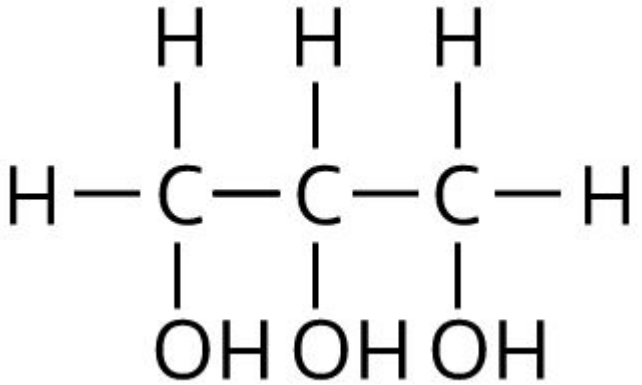
What 3 elements are triglycerides made up of?

What 3 elements are triglycerides made up of?

Carbon, hydrogen and oxygen.

Draw the structure of glycerol

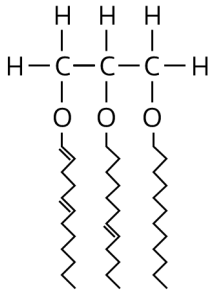
Draw the structure of glycerol



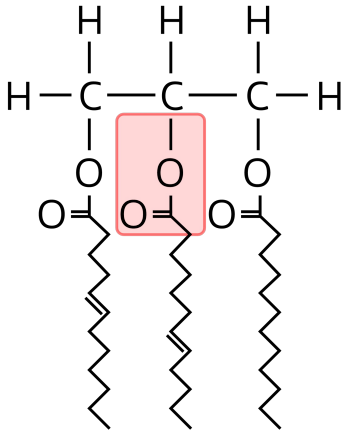
Describe the structure of a triglyceride

Describe the structure of a triglyceride

- One molecule of glycerol
- Attached to 3 fatty acid chains by ester bonds
- Fatty acid chains may or may not contain double bonds

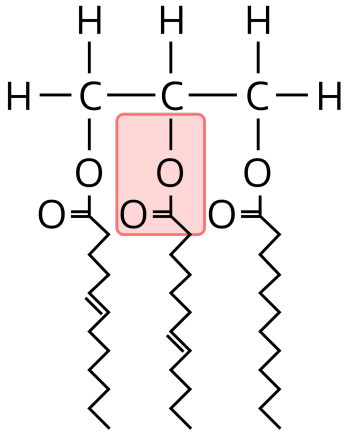


What type of bond is highlighted below?



What type of bond is highlighted below?

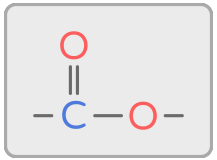
An ester bond

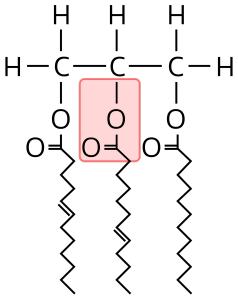


What is an ester bond?

What is an ester bond?

A type of covalent bond which is found in triglycerides and phospholipids. Ester bonds join the fatty acid tails to the glycerol molecule and have the following structure:





What is the difference between saturated fatty acids and unsaturated fatty acids?

What is the difference between saturated fatty acids and unsaturated fatty acids?

Unsaturated fatty acids contain C=C double bonds whereas saturated fatty acids only contain C-C single bonds.