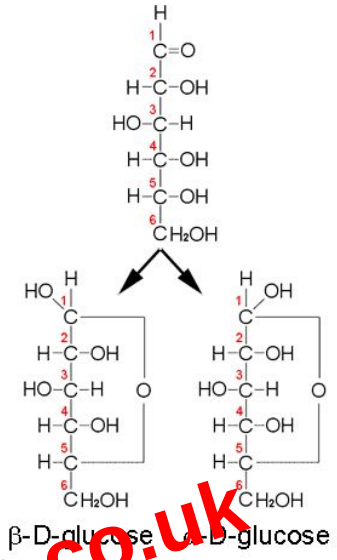
## Ring structures:

- Pentoses and Hexoses have carbon chains long enough to close in on itself and form a more stable ring. Above is an example of a glucose ring structure.
- Carbon 1 joins to Carbon 5, leaving Carbon 6 out of the ring.
- The hydroxl group in glucose, -OH, can be above or below Carbon 5.
- **α Glucose (alpha): -OH is below the ring**
- **β Glucose (beta): -OH is above the ring**
- These are called isomers (two forms of the same chemical).




## Roles of monosaccharides in living organisms:

2 major functions ↓

- Commonly used as a source of energy in respiration, due to the large number of carbon-hydrogen bonds
- ADP+ Phosphate = ATP
- Monosaccharides are important as building blocks for larger molecules

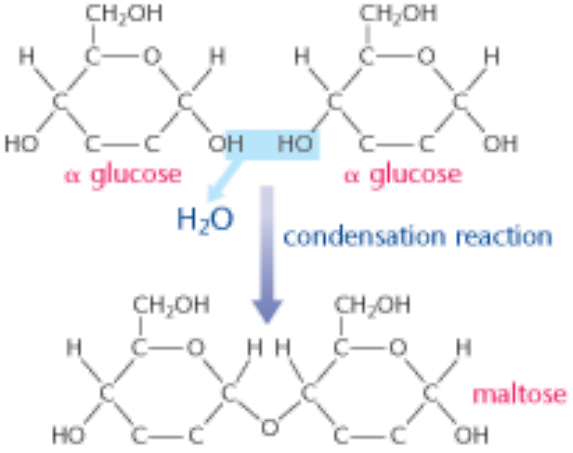


## Disaccharides and the glycosidic bond:

Disaccharides are sugars

| Disaccharide | Glucose | Fructose | Galactose |
|---|---|---|---|
| Maltose | □□ | | |
| Sucrose | □ | □ | |
| Lactose | □ | | □ |

The joining of 2 monosaccharides take place by a process known as **condensation**




*Monosaccharide: is a molecule consisting of a single sugar unit with the general formula $(CH_2O)_n$*

*Disaccharide: is a sugar molecule consisting of 2 monosaccharide joined by glycosidic bonds*

## Density and freezing properties:

- Ice is less dense than water.
- Below 4C, density of water starts to decrease,
- Ice floats on water, insulating the water underneath it.
- Reduces chances of large bodies of water (eg. lakes) to freeze completely, and makes it more likely for aquatic life surviving in cold conditions.
- Changes in water density move nutrients in the ocean

## High surface tension and cohesion:

- Cohesion: Tendency of molecules to 'stick' to each other.
- Water has high cohesion because of hydrogen bonding.
- Helps water move in long, unbroken columns through and up vascular tubing in plants.
- This also results in high surface tension at the surface of water
- Small organisms, such as pond skaters, can 'skate' over water without falling in, providing a good habitat for them.



## Water as a reagent:

- Water can take part in some chemical reactions
- **Photosynthesis**: Sunlight is used to separate hydrogen from water. The hydrogen is then used as a fuel to produce energy needed for the plant - eg. making **glucose** ($C_6H_{12}O_6$), which is rich in energy,
- The plant produces oxygen as a waste product, which is then used by aerobic organisms for respiration.
- Water is also used for hydrolysis reactions, where water is needed for large molecules to be broken down eg. digestion