

Learning Objectives

- Describe structure and function of carbohydrates
- Explain and describe the different types of carbohydrates
- Describe and give examples of enantiomers

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Monosaccharides

- The fuel for metabolism
- Used as both energy source and for biosynthesis
- Stored in the liver and muscle cells

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L and D Glucose

- L and D : mirror images
Optical isomers
same molecular formula
different spatial arrangements of atoms
- Configuration (arrangement of elements) is called Fischer's configuration (named after Emil Fischer)
- D glucose: most common hexose
found in fruits, corn syrup , honey
"blood sugar"

Anomers

- Cis (β) the OH molecule is on the same side as the CH_2OH atom
- Trans (α) the OH molecule is on the opposite side of the CH_2OH atom
- The β and α forms are anomers of each other
- Anomers: special type of diastereoisomers
applies to molecules is in the cyclic form

Disaccharides

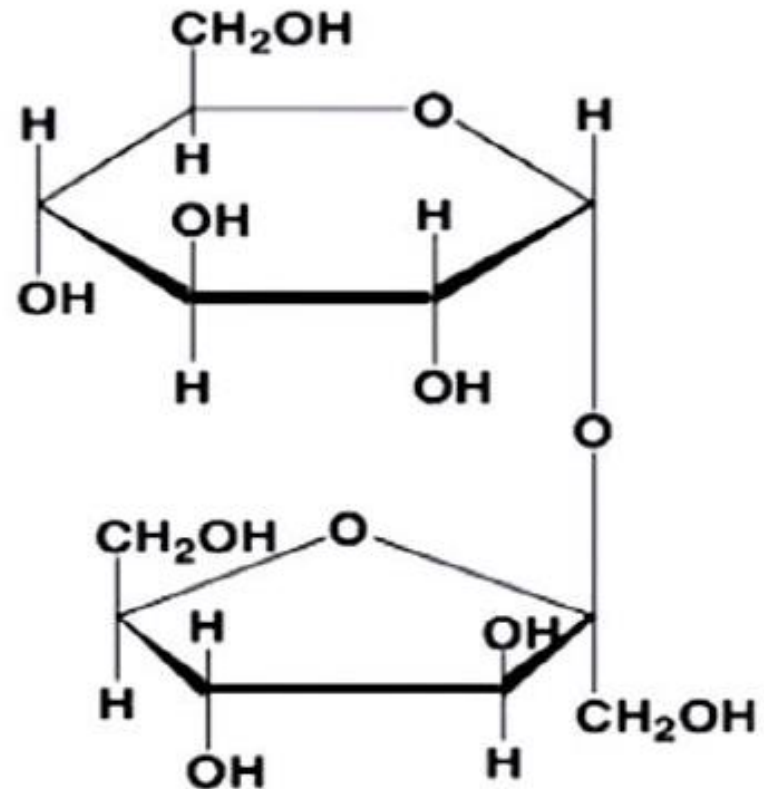


Sucrose

Table sugar - most common sugar in all plants.

Sugar cane and beet, are up to 20% by mass sucrose.

Disaccharide of α -glucose and β -fructose.

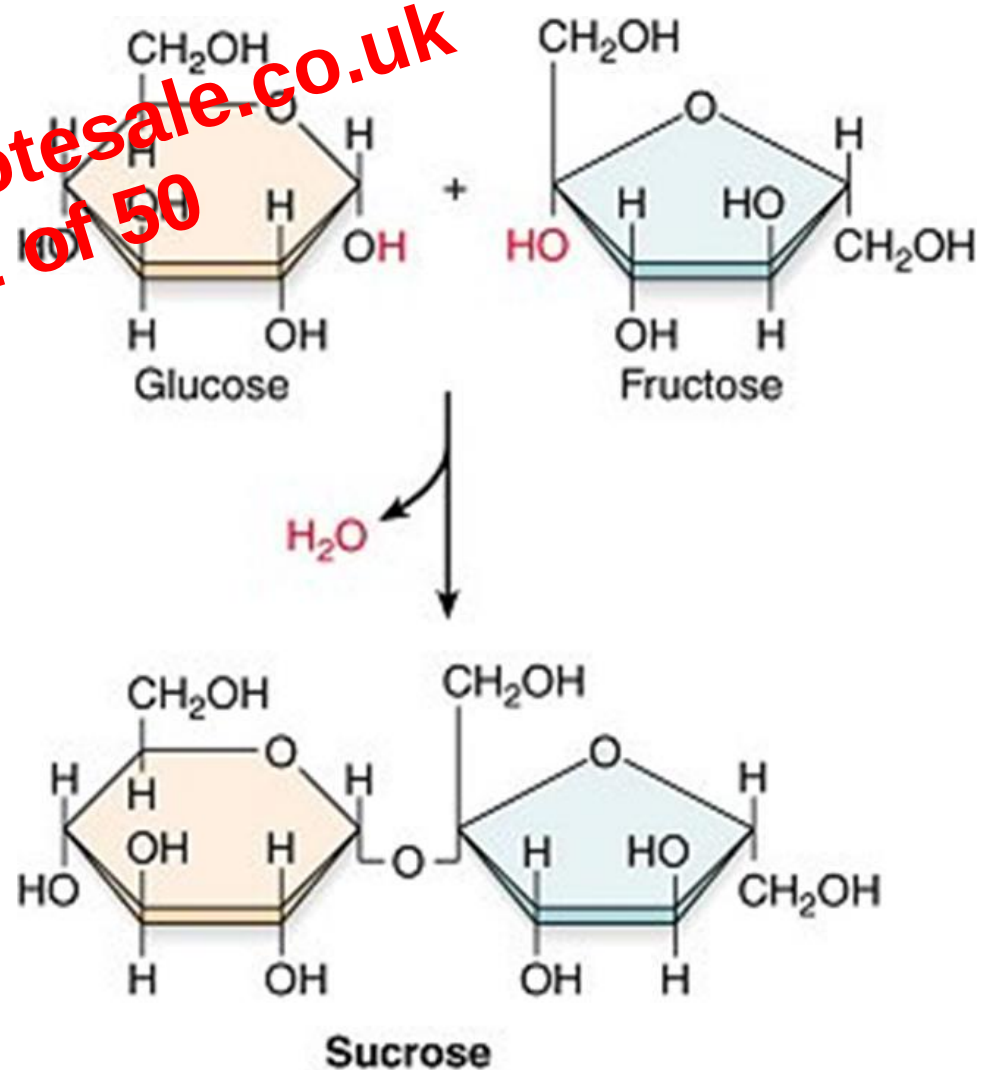


Disaccharides

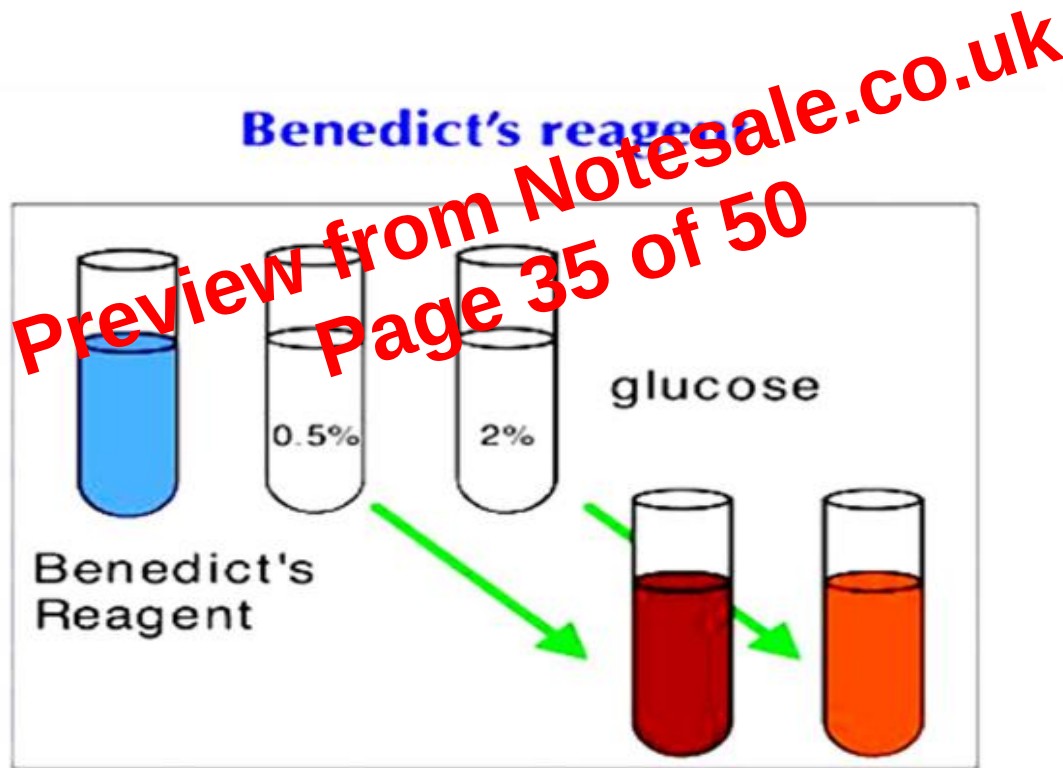
Disaccharide molecules are joined by **Glycosidic bonds**

Covalent bond

dehydration reaction
(removal of H_2O molecule)



Benedict's Test



Detected by ability to reduce $\text{Cu}^{2+} \longrightarrow \text{Cu}^{+}$ with
Benedict's reagent (Blue---red orange)

Test for glucose in the blood : solution (Benedict's reagent) changes from blue to orange

Soluble Fiber

Soluble Fiber

▪ Functions of Soluble Fiber

- bind with fatty acids
- prolong stomach emptying time so that sugars released and absorbed more slowly

▪ Benefits of Soluble Fiber

- lower total cholesterol and **LDL cholesterol (the Bad cholesterol)** therefore reducing the risk of heart disease
- regulate blood sugar for people with diabetes

▪ Food Sources of Soluble Fiber

- **Oat/Oat bran**
- Dried beans and peas
- **Nuts**
- **Barley**
- **Flax seed**
- Fruits such as oranges and apples
- Vegetables such as carrots
- **Psyllium husk**

