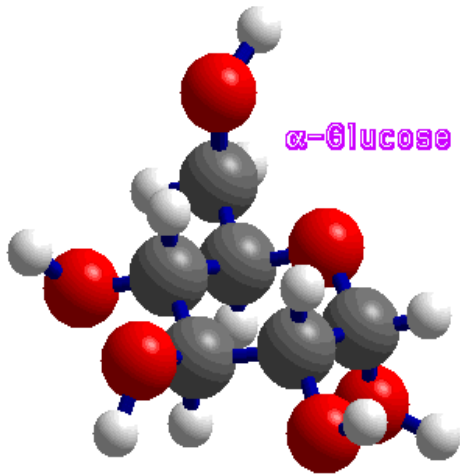


Carbohydrates and Lipids

Carbohydrate Facts and Main Points

- the majority of carbohydrates end in **-ose** such as sucrose and cellulose
- carbohydrates usually consist of carbon(C), hydrogen (H) and oxygen (O)
- the ratio of C:H:O is **1:2:1**, such as $C_6H_{12}O_6$
- a single carbohydrate is called a **monosaccharide** (literally means “one sugar”) and a monosaccharide is the monomer of carbohydrates
- a double carbohydrate is called a **disaccharide** (“two sugars”)
- a carbohydrate made of many monosaccharides is called a **polysaccharide** (“many sugars”)



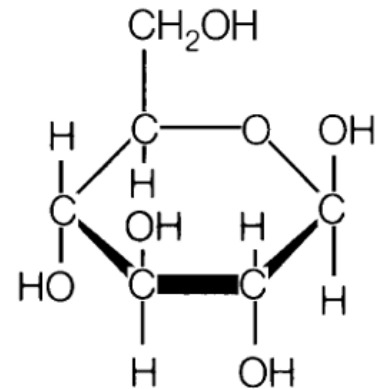
Glucose

- the most common carbohydrate is a glucose molecule.
- an example of a food with glucose is Smarties, the candy.

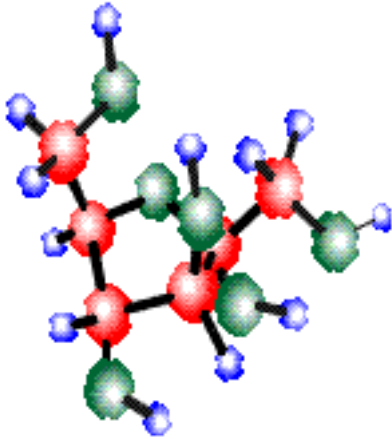
-glucose is a monosaccharide and is known as a “simple sugar”.

- also known as dextrose

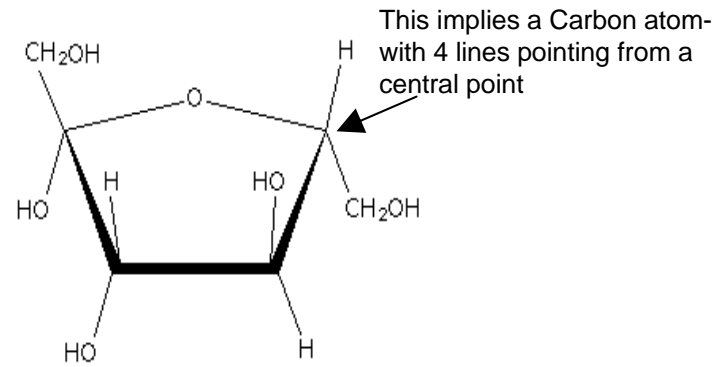
- glucose is the sugar that plants make in photosynthesis and the molecule that all organisms use for energy



Fructose



- another example of a monosaccharide is fructose.
- an example of a food with fructose is corn syrup
- fructose is the natural sugar found in fruit and honey



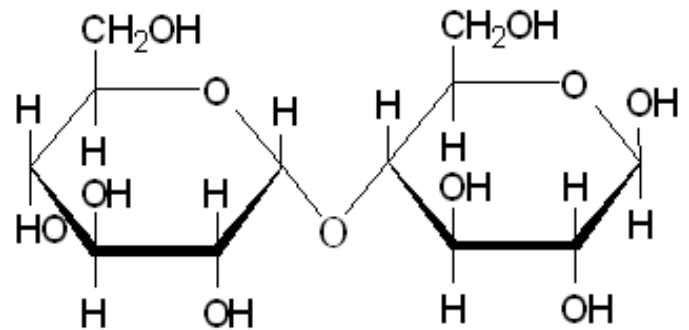


Maltose

- maltose is an example of a disaccharide and it is made up of two glucose molecules joined together
- an example of a food with maltose is a whopper candy.

-a molecule of maltose is made through dehydration synthesis, which removes a water to bond 2 molecules.

- the formula for maltose is $C_{12}H_{22}O_{11}$, which shows the ratio of 2 H: 1 O



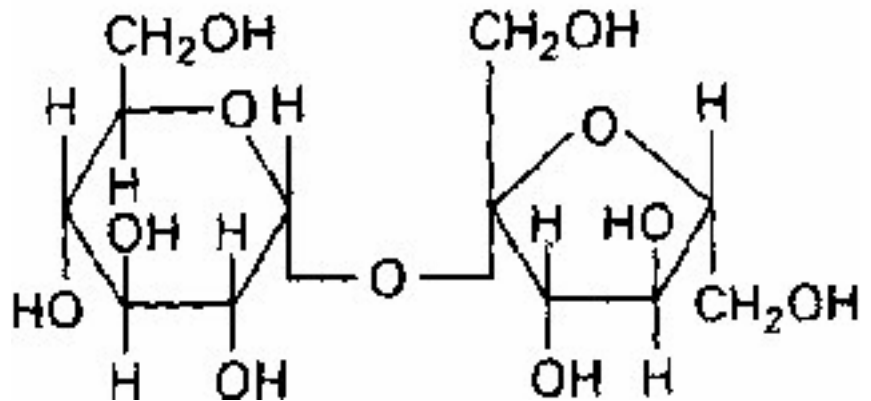
Sucrose



- sucrose is a disaccharide made up of 1 glucose and 1 fructose
- the glucose and fructose molecules in sucrose are joined together through dehydration synthesis
- an example of a food with sucrose is sugar

- sugar can cause tooth decay due to bacteria in the mouth converting sucrose into acids that eat away at the teeth

- the formula for sucrose is $C_{12}H_{22}O_{11}$

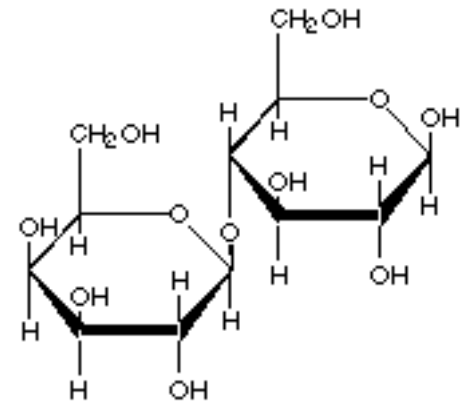


Lactose

- an example of a food with lactose is milk
- lactose is a disaccharide and is made up of one glucose and one galactose (a compound similar to glucose)
- the formula for lactose is $C_{12}H_{22}O_{11}$



- your body breaks down lactose through the enzyme lactase. Lactase breaks the glucose and galactose bond through Hydrolysis, the addition of water to a molecule.



Lactose

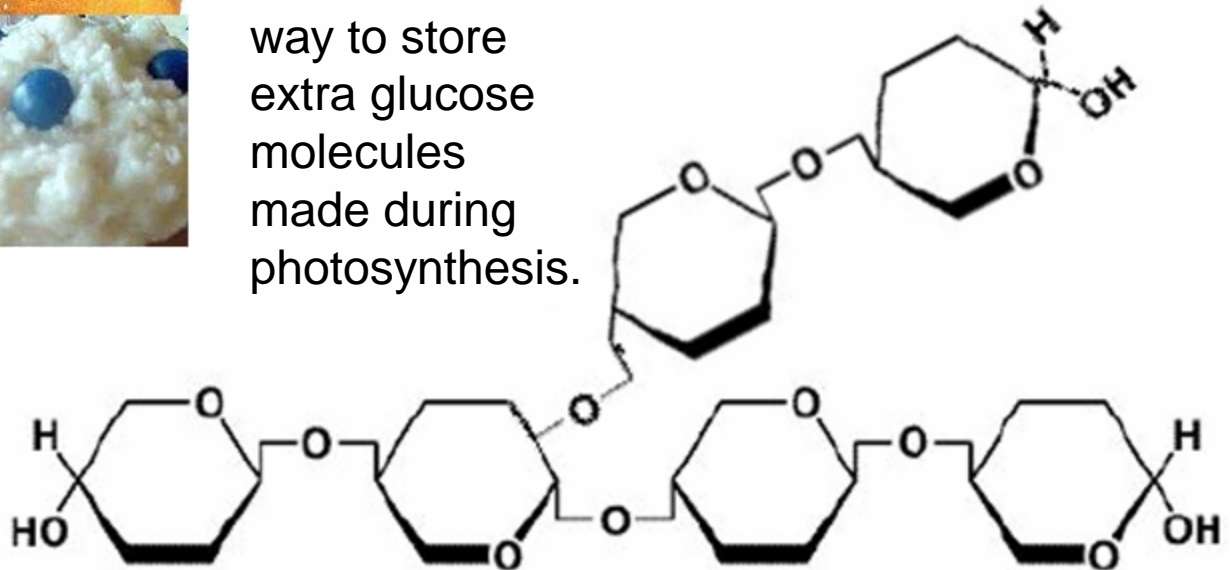
(Galactose (β 1-->4) Glucose)

Starch

- starch is a polysaccharide that is made up of many glucose molecules. One starch molecule can be made of 50 to thousands of glucose molecules

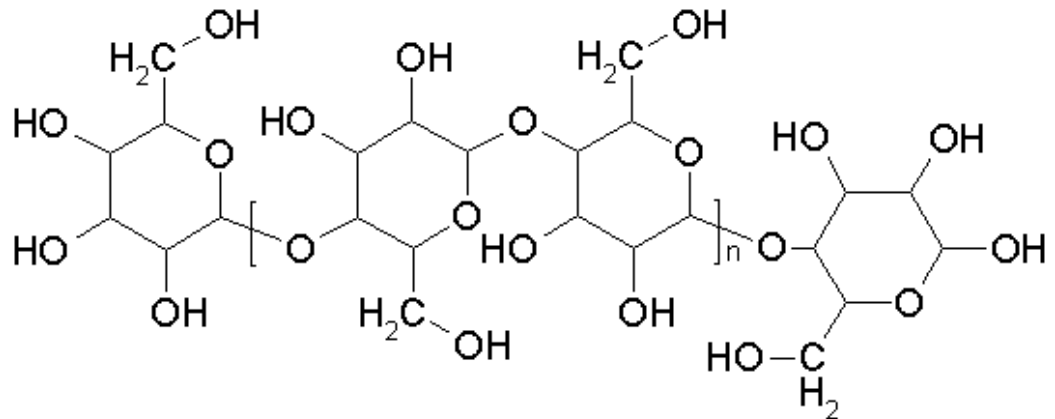
- starch is found in the roots and seeds of plants- such as potatoes and corn kernels.

Plants use starch as a way to store extra glucose molecules made during photosynthesis.



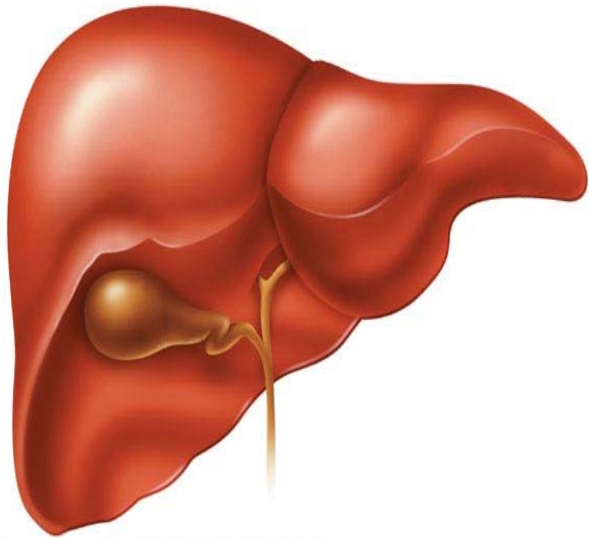
Cellulose & Chitin

- just like starch, cellulose & chitin are made of many glucose molecules and are polysaccharides
- an example of a food with cellulose is celery and a food with chitin is mushrooms
- cellulose is found in the cell walls of plant cells and is a source of fiber in human diets (humans can not digest cellulose)
- chitin is the molecule that makes up the exoskeletons of insects and is found in the cell wall of fungi, such as mushrooms.



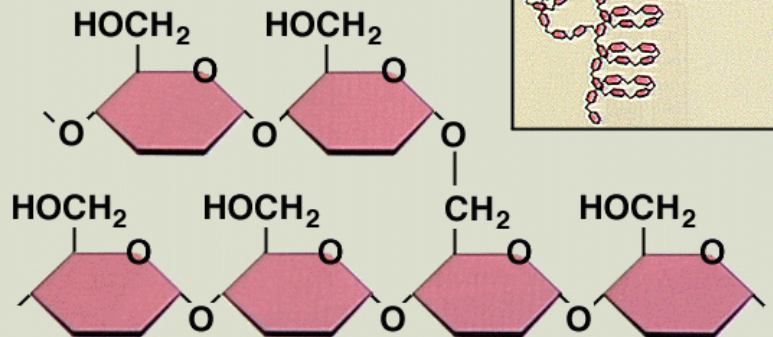
Glycogen

- just like starch, cellulose & chitin, glycogen is made of many glucose molecules and is a polysaccharide



- glycogen is found in human livers and is the molecule that animal cells use to store extra glucose molecules

Glycogen



Lipid Facts and Main Points

- Examples of lipids are fats, phospholipids (found in cells), steroids and waxes
- a lipid monomer is called a **fatty acid**. A specific type of fat is called a triglyceride and contains 1 glycerol molecule and 3 fatty acids (a glycerol molecule is an alcohol)
- lipids are composed mainly of carbon, hydrogen and oxygen
- a lipid whose fatty acids contains as many H as possible and lots of single bonds is called a **saturated fat**
- a lipid whose fatty acid does NOT contain as many H as possible and has double bonds is called an **unsaturated fat**

Saturated Fats

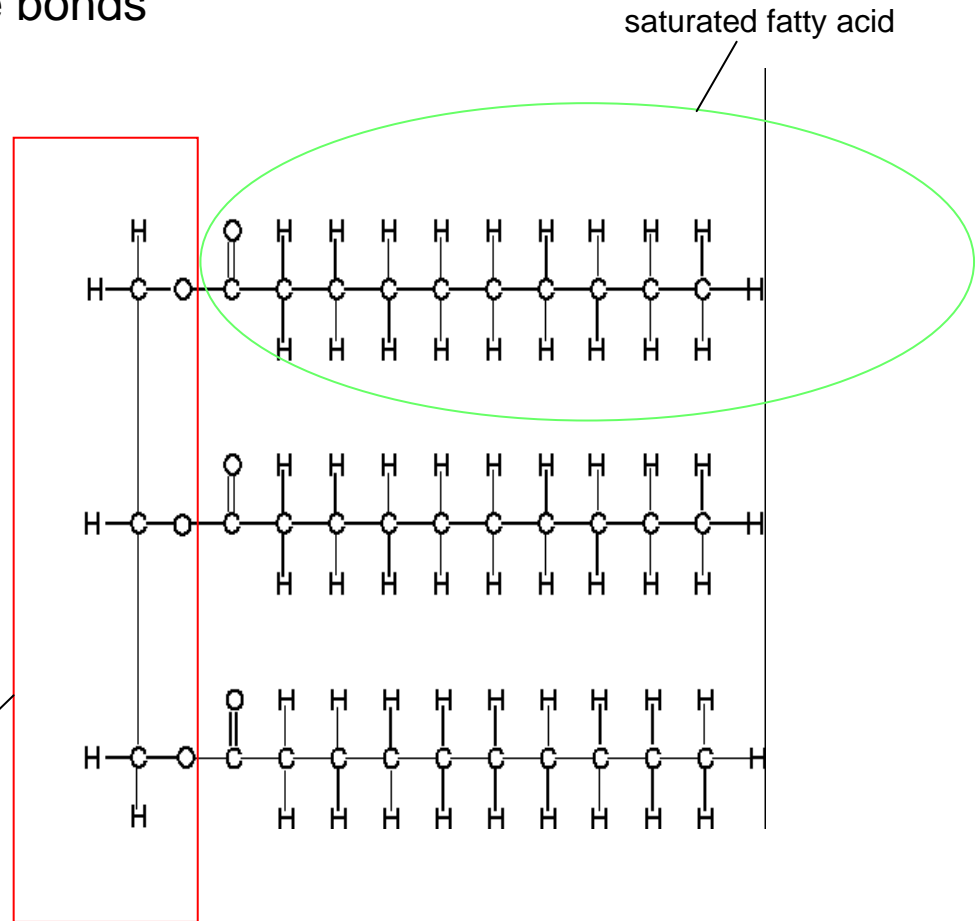
- foods that have saturated fats are butter and lard

- saturated fats have single bonds between the carbon atoms and have LOTS of hydrogens

- these fats are unhealthy for you and are a solid at room temperature

- they can solidify in your arteries, cause a blockage and not allow the blood to flow freely.

glycerol molecule



Unsaturated Fats

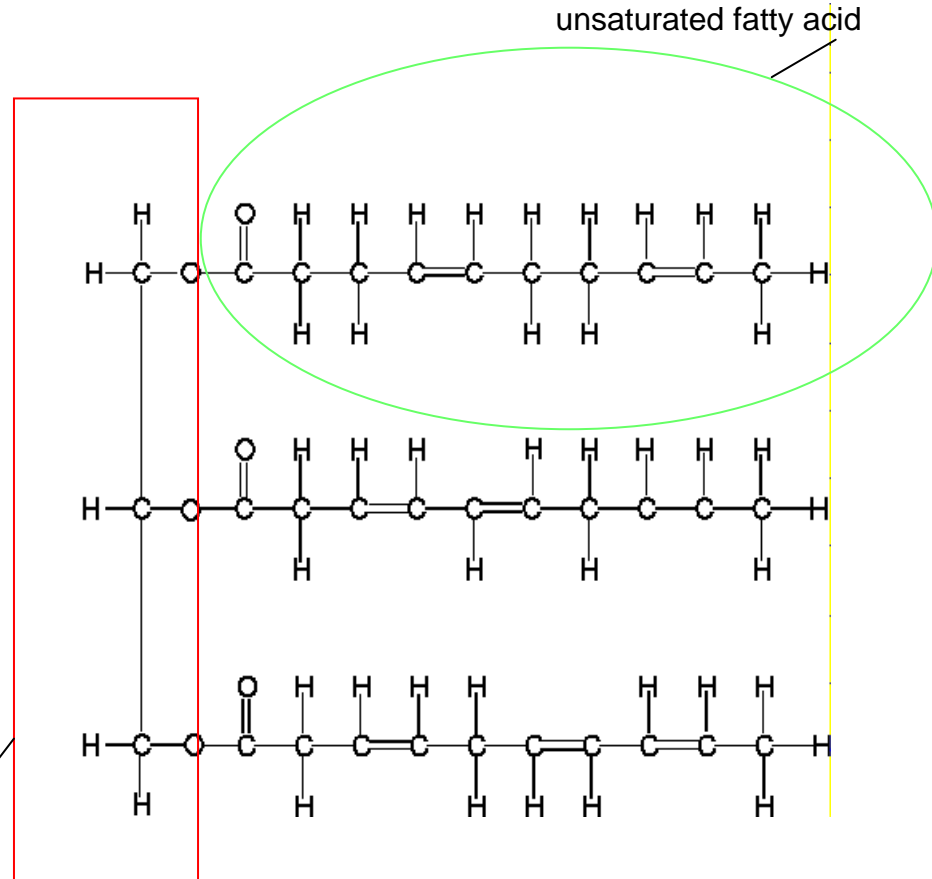
- foods that are unsaturated fats are oils, such as vegetable & olive oil

- unsaturated fats have double bonds between the carbon atoms and have less hydrogens.

- these fats are healthier for you and are a liquid at room temperature

- Hydrogenation is the process of converting unsaturated fats into saturated fats by adding hydrogens to the molecule

glycerol molecule



Waxes

- waxes are produced by both plants and animals
- examples are ear wax (used for water proofing and protection) and bees wax
- plants also produce wax to water proof the tops of leaves and fruits
- waxes contain 2 fatty acids instead of 3 fatty acids, like fats

