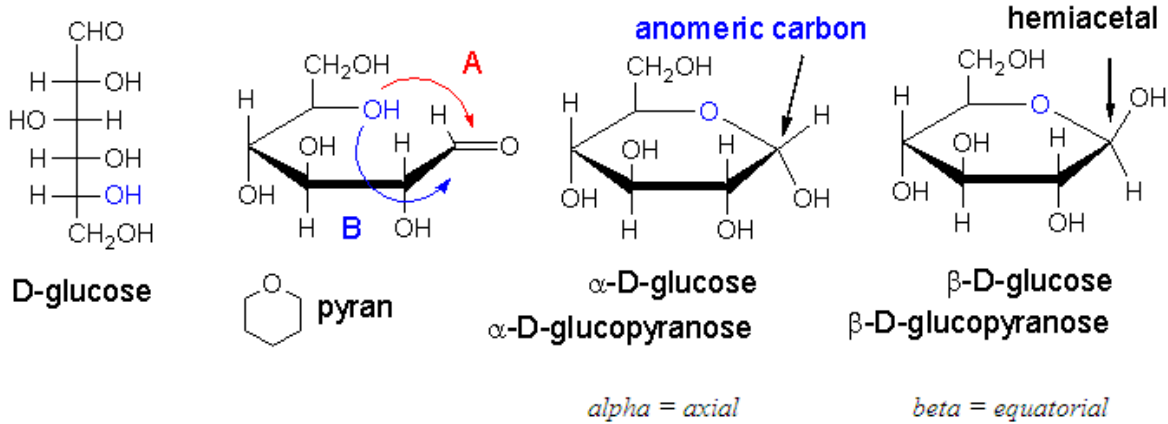


The most abundant monosaccharide is D-glucose.

Recall: aldehydes + alcohol \rightarrow hemiacetal

Glucose cyclizes into a hemiacetal using the penultimate OH group as the alcohol.

The result is a cyclic hemiacetal. These structures are called Haworth formulas.



Stereoisomers that differ in configuration at the anomeric center are called anomers.

The anomeric carbon of aldoses is C-1 and the anomeric carbon of ketoses is C-2

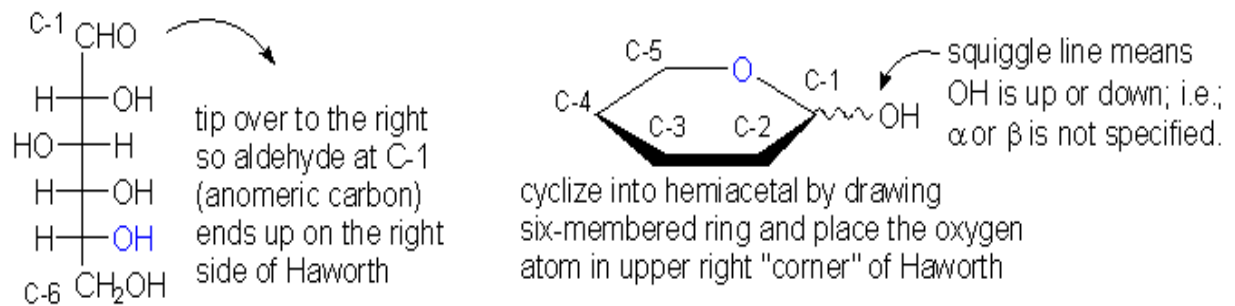
α -D-glucose and β -D-glucose are anomers.

Notice:

If the OH group is on the right in a Fischer structure, that OH group is down on the pyranose ring.

If the OH group is on the left in a Fischer structure, that OH group is up on the pyranose ring.

Conversion of Fischer projection into a Haworth formula.

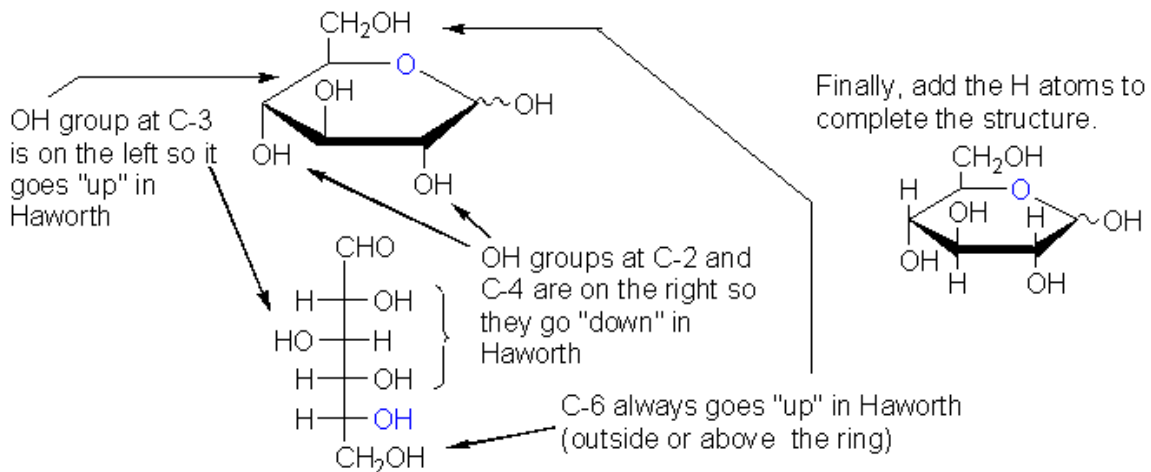


Now add the OH and H atoms on the ring.

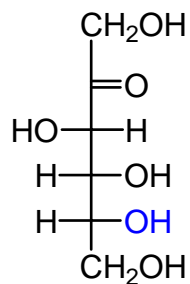
If the OH is on the right side of Fischer then it ends up "down" in Haworth.

Only consider OH at C-2, C-3 and C-4; the OH group at C-5 is part of the acetal.

The C-6 carbon (CH_2OH group) is always drawn "up" in Haworth.



Fructose is another abundant monosaccharide- it is a ketohexose.



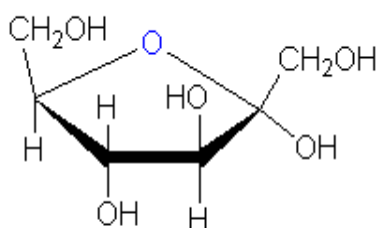
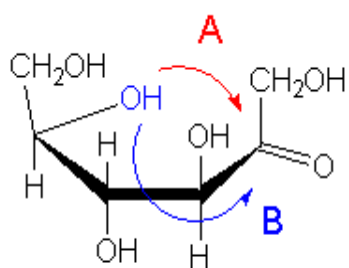
D-fructose

cyclic hemiacetal formation gives a furanose



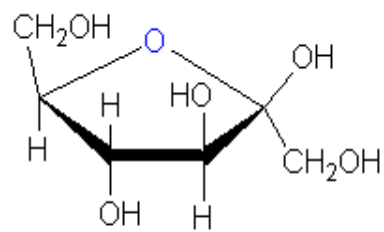
furan

furanose hemiacetals exists as anomers



α -D-fructose

α -D-fructofuranose



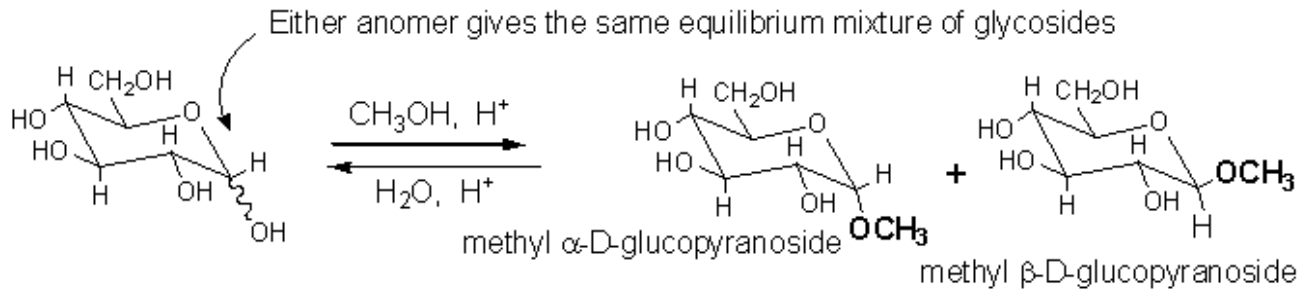
β -D-fructose

β -D-fructofuranose

Glycosides- cyclic acetals

Treatment of monosaccharide with alcohol gives cyclic acetal.

Monosaccharides exist mostly in hemiacetal form; conversion to acetal occurs easily:



“**ose**” suffix- hemiacetal (may be open-chain aldehyde or ketone)

“**oside**” suffix- acetal

An **aglycone** is the group bonded to the anomeric carbon atom of a glycoside; in the example above, methanol is the aglycone.

In the examples below, the **aglycone** is the ring substructure attached to the anomeric carbon.

