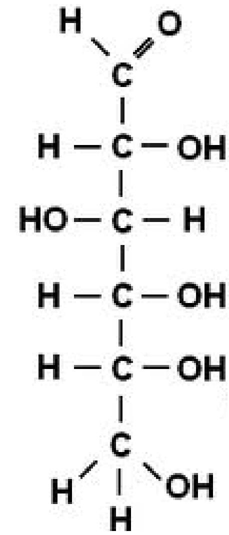
CARBOHYDRATES, INTRO

Fischer projection:



revised 12Sept2016
(fr. Curtis 5th, p 58-64), Campbell 6th: 62-68, 7th p 70-74, Sadava: 49-51, Campbell's 10th: 66-72

DEMO: take: molecular models, three bottles of sugars, light box, polarizing filters, five sugars to taste, sugar score sheet.

LEARN: General formula of **CH_2O** ("hydrated carbon")**,** carbohydrates: sugars and polysaccharides

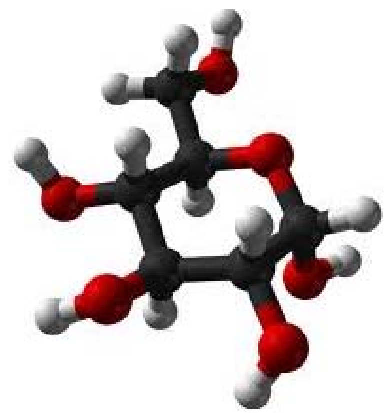
Review general **alcohols, aldehydes and ketones** (remind about the **carbonyl** functional group)

LEARN: Sugar is chemically defined as a ***polyhydroxy- aldehyde or ketone*** (p 68)

LEARN: Asymmetrical carbons: a single carbon carrys four distinct functional groups (**chirality**)

lead to **enanitomers** ("opposite unit" or "in-against-unit")
or stereoisomers ("solid-same-unit").
sugar hydroxyls attached on L or R of an asymmetric carbon atom
Fischer projection orientation: horizontal bonds towards you, vertical bonds, away.

LEARN:
Leads to **optical activity**: ability to rotate plane polarized light
polarized light: light with photons all oriented in same plane
Show polarizing filters, filtration of glare with light box

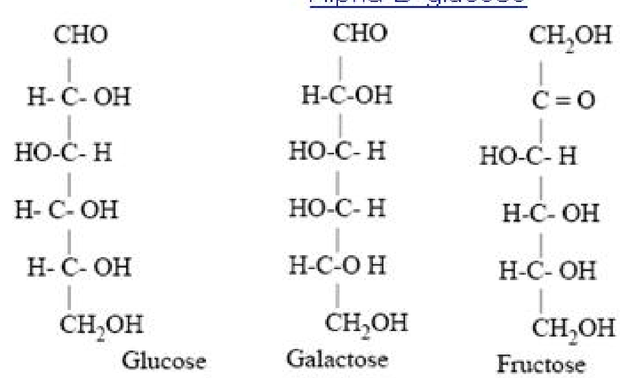


Alpha-D-glucose

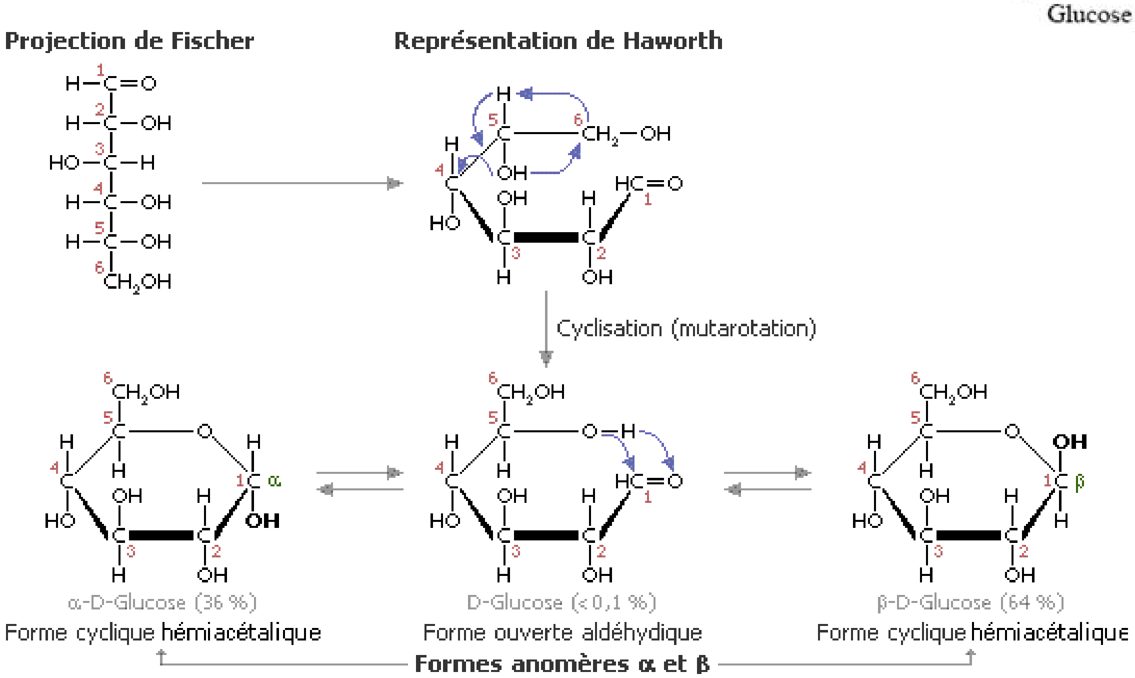
dextrose ("right (rotating) sugar") **levulose** ("left sugar") sinister, ambidextrous, dexterity

LEARN: **Draw glucose: straight chain formation** (Fischer projection) (p 68 left)
Note: it is a **hexose**, an **aldose**, and has **four asymmetric carbons**

galactose like glucose: aldose but C_4 has -OH to left.
fructose ketose, has carbonyl on C_2



In water, glucose forms **ring formation** (Haworth),
aldehyde opens up, forming α or β -OH at number 1 carbon. (p 69)



LEARN:
ring configuration of glucose:
alpha vs beta
(α vs β)