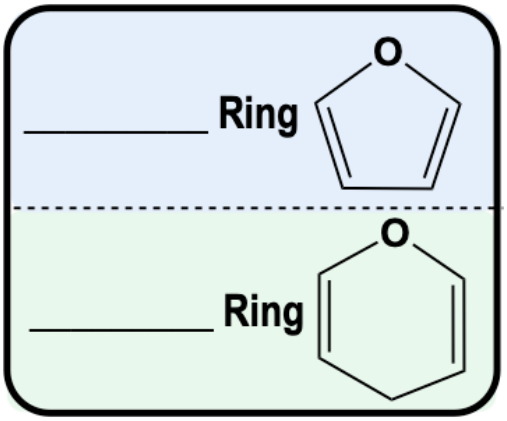
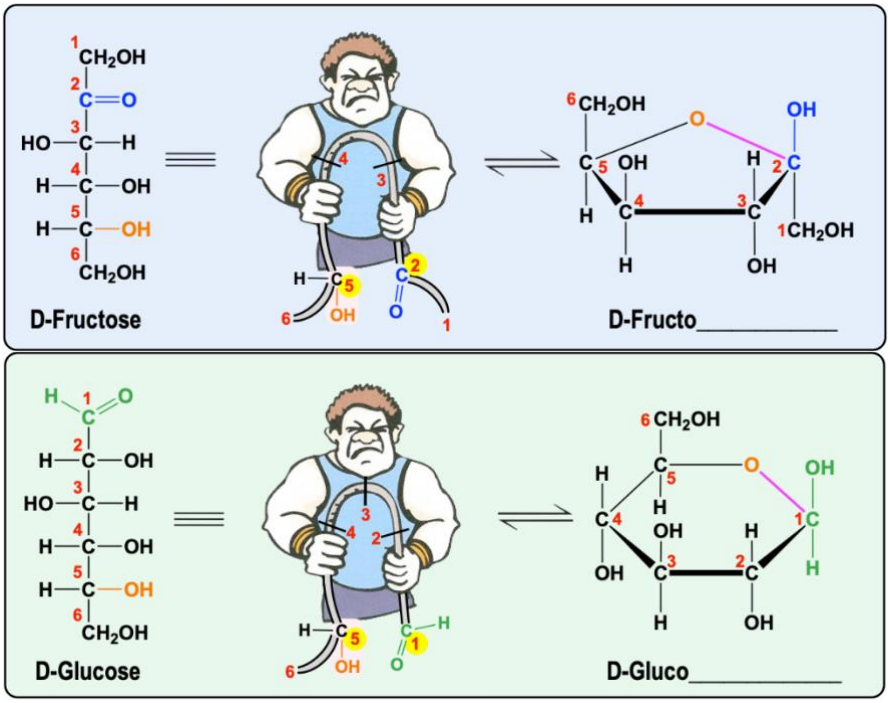
CONCEPT: CYCLIC MONOSACCHARIDES

●Monosaccharides can cyclize to form many different rings, but 5 & 6-membered rings are *most* _____.

□ *Furanose*: monosaccharide with a _____-*membered* ring.

□ *Pyranose*: monosaccharide with a _____-*membered* ring.





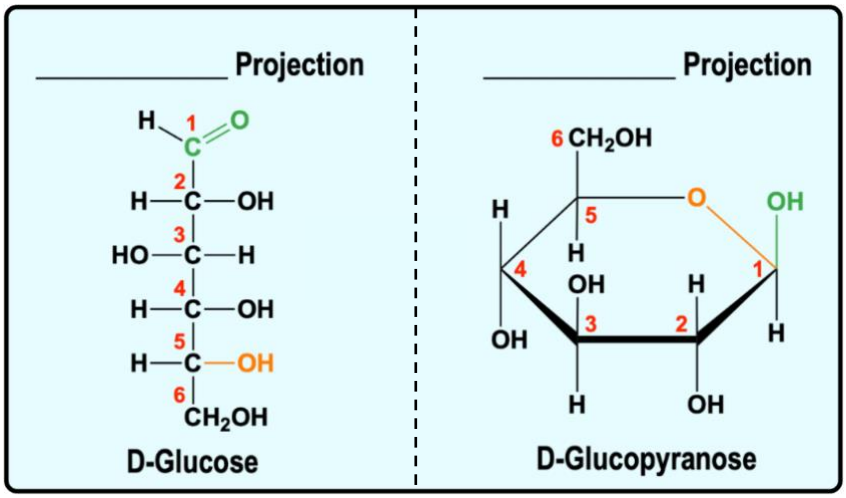
Haworth Projections

●Cyclic monosaccharide structures are commonly depicted with _____ Projections.

□ **Darker/thicker lines** pop out of the page, _____ to us.

□ Lighter/thinner lines go into the page, _____ away from us.

●Haworth projections can be *misleading* since cyclic monosaccharides are NOT planar (due to tetrahedral carbon bonds).



Standard Haworth Projection:

- Anomeric carbon is on _____-side.

- Highest numbered carbon points _____.

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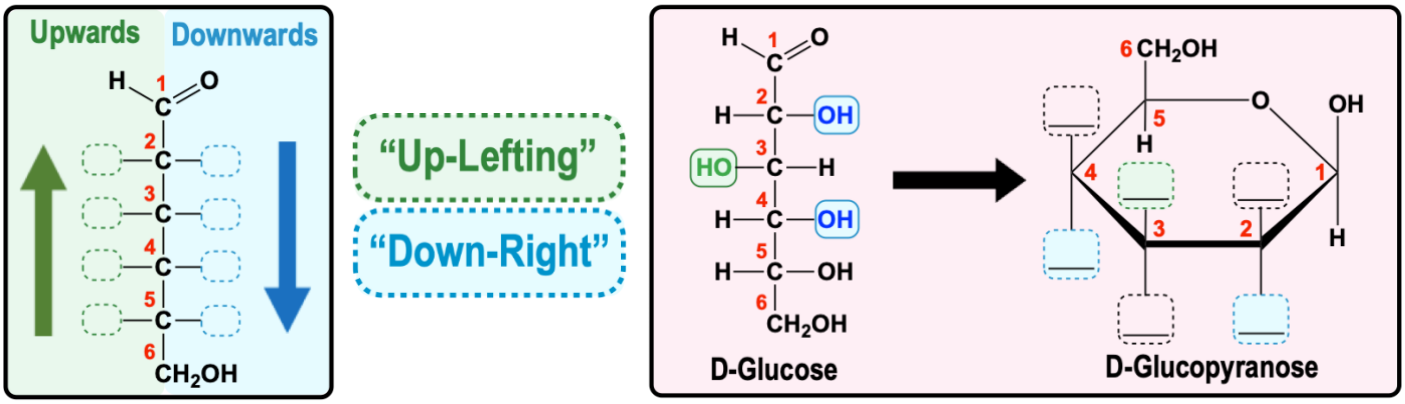
Converting Fischer Projections to Haworth Projections

●Chemical groups pointing _____ of a Fischer Projection point _____ in a Haworth Projection.

●Chemical groups pointing _____ of a Fischer Projection point _____ in a Haworth Projection.

EXAMPLE: Convert the D-glucose Fischer Projection into the D-glucopyranose Haworth Projection.



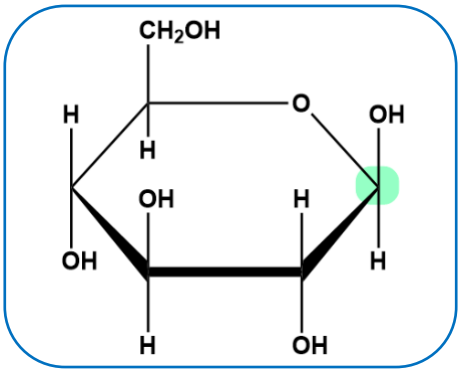
Assigning Numbers to the Carbons of Cyclic Monosaccharides

●Carbon atoms in cyclic monosaccharides are numbered based on positioning of the _____ *carbon*.

□ *Anomeric carbon*: only ring carbon covalently attached to _____ *oxygen atoms*.

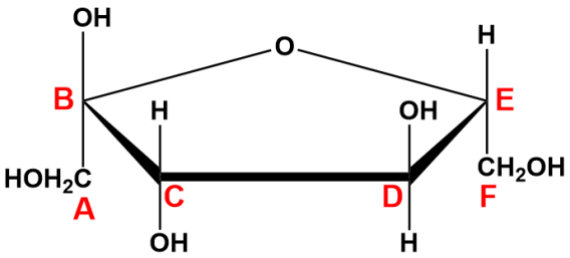
□ *Anomeric carbon* should be assigned the _____ possible number.

EXAMPLE: Appropriately number the carbon atoms in the following cyclic form of glucose below.



PRACTICE: Below is the structure for a cyclic D-monosaccharide. Which labeled carbon is the anomeric carbon?

a) A. b) B. c) C. d) D. e) E. f) F.



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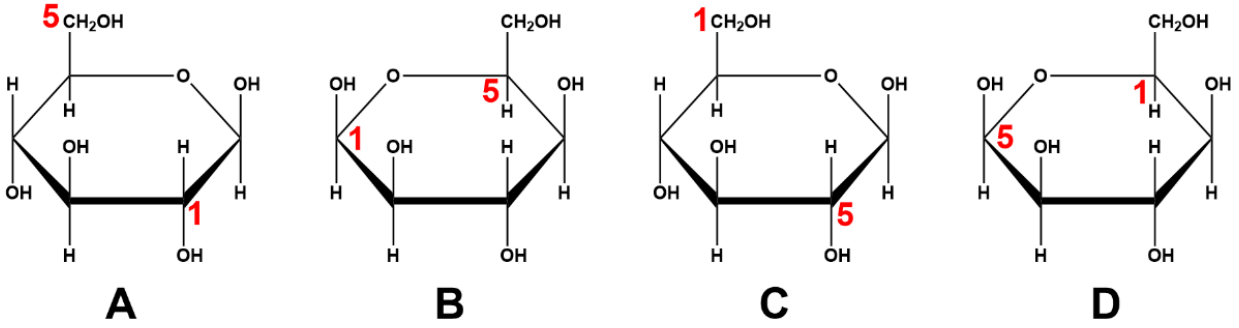
PRACTICE: Which image represents the proper convention for carbon numbering of cyclic sugars?

a) A.
b) B.
c) C.
d) D.



PRACTICE: Which of the following is the correct Haworth projection of D-Gulose?

a) A.
b) B.
c) C.
d) D.