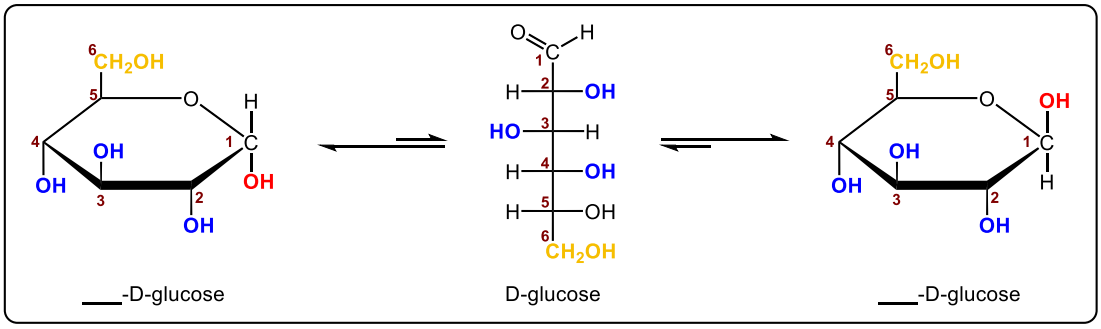
CONCEPT: CYCLIC STRUCTURES OF MONOSACCHARIDES

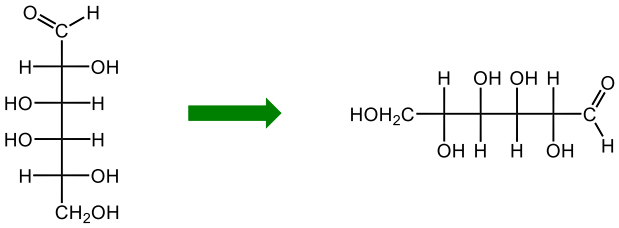
- Monosaccharides exist as cyclic hemiacetals in aqueous solutions.
  - □ Cyclization takes place when the penultimate alcohol reacts with the C1 _____ group.



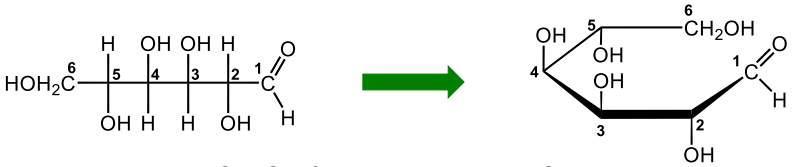
- **Anomers:** epimers produced by cyclization of monosaccharides.
  - □ ***α*-anomer:** anomeric **–OH** and C6 CH_2OH on the _____ sides.
  - □ ***β*-anomer:** anomeric **–OH** and C6 CH_2OH on the _____ side.

EXAMPLE: Draw a Haworth projection for *β*-D-galactose.

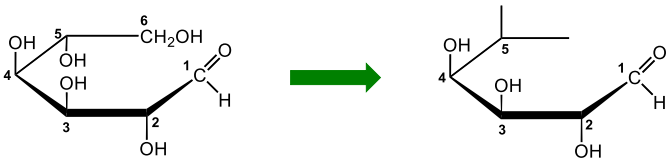
Step 1: Number the Fischer projection and rotate it _____ to turn it on its side.



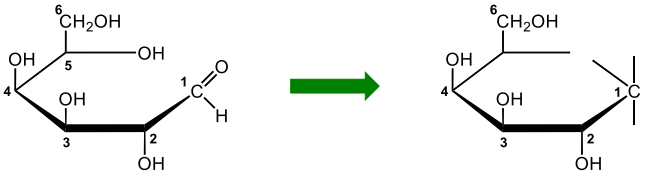
Step 2: _____ the CH_2OH group clockwise, keeping the carbonyl group in the far-_____ corner.



Step 3: Rotate _____ so CH_2OH faces up, bringing –OH group close to the carbonyl group.

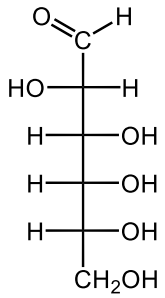


Step 4: Close the ring to form the cyclic hemiacetal and assign *α* or *β* to the anomeric –OH group.



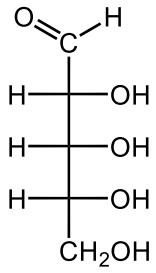
CONCEPT: CYCLIC STRUCTURES OF MONOSACCHARIDES

PRACTICE: Draw a Haworth projection for α-D-altrose.



D-altrose

PRACTICE: D-ribose is an aldopentose sugar that is found in the DNA. It commonly exists as a five-membered β anomer. Draw D-ribose in its cyclic hemiacetal form.



D-ribose