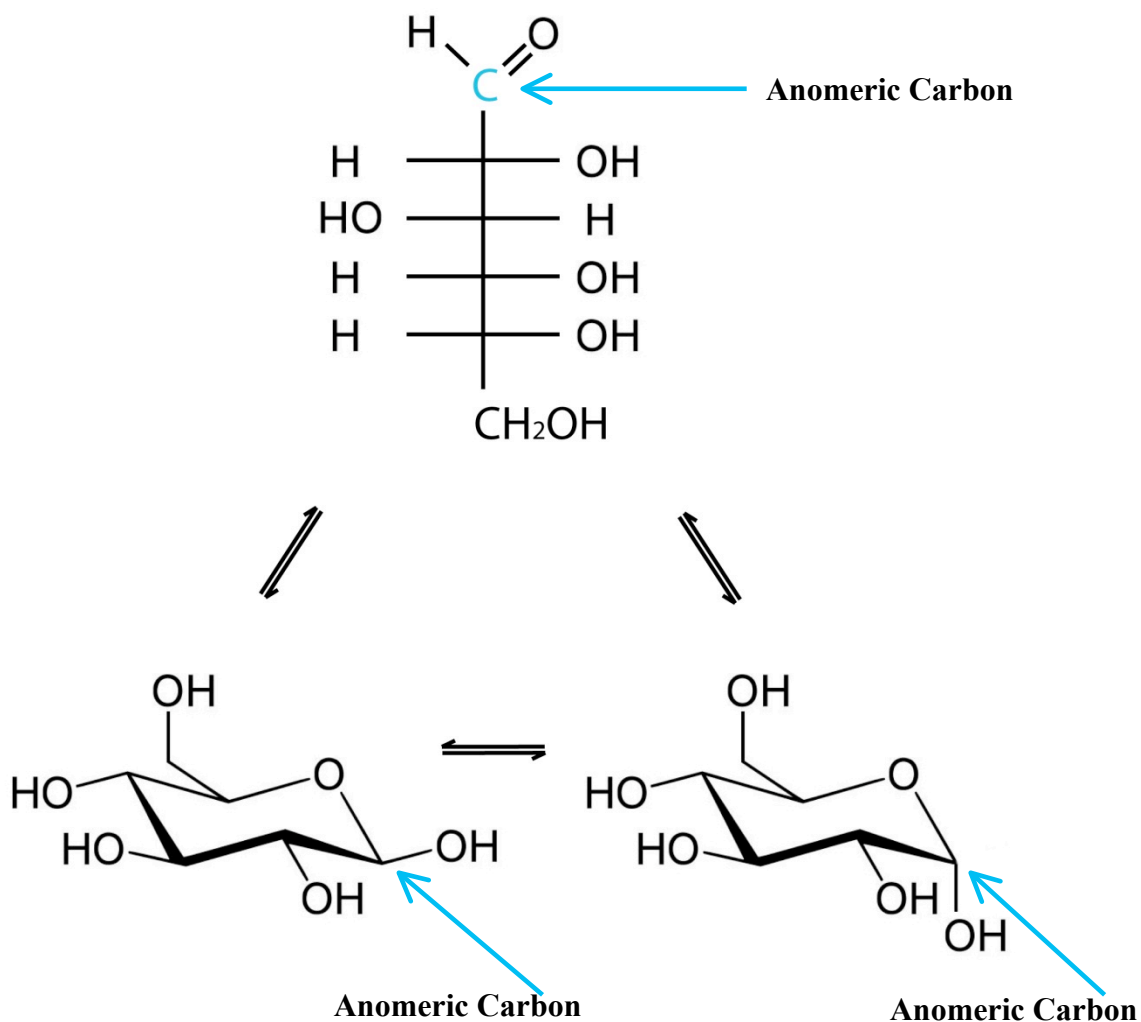


What is an anomeric carbon?

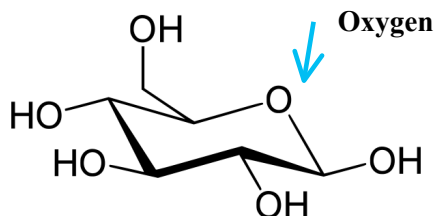
Often times, a carbohydrate exists in a cyclic or an acyclic form. During cyclization, the carbonyl carbon transforms into a new stereocenter.

Cyclization causes the formation of 2 new diastereomers. They differ in the position of the attachment of a certain group (discussed later) to the new stereocenter. The new stereocenter is referred to as the **anomeric carbon**.

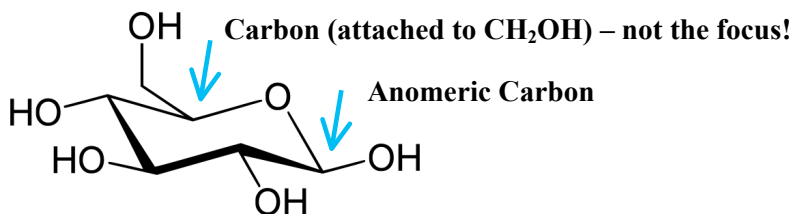


How do I locate the anomeric carbon?

Step 1: Locate the oxygen inside the ring



Step 2: Look at the carbons on either side of the oxygen. One will be attached to a CH_2OH group. Do not focus on this one. The carbon on the other side is the anomeric carbon!



α and β : What's the difference?

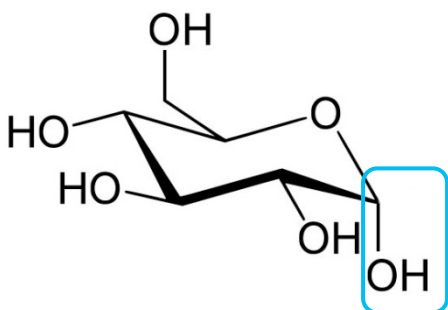
The anomeric carbon is a stereocenter. An important feature is the direction of the OH group attached to the anomeric carbon.

Depending on the direction of the OH group, the anomeric carbon is either α or β .

α : equatorial DOWN or axial DOWN

β : equatorial UP or axial UP

Let's take a look at some examples.

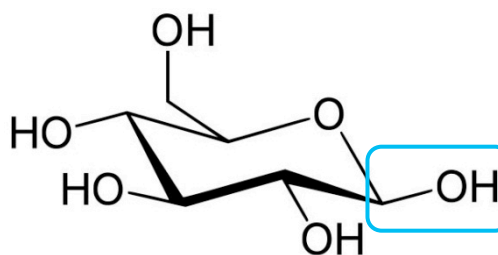


The OH group is **axial DOWN**.

Thus, the anomeric carbon is α .

This sugar is known as:

α -D-glucopyranose



The OH group is **equatorial UP**.

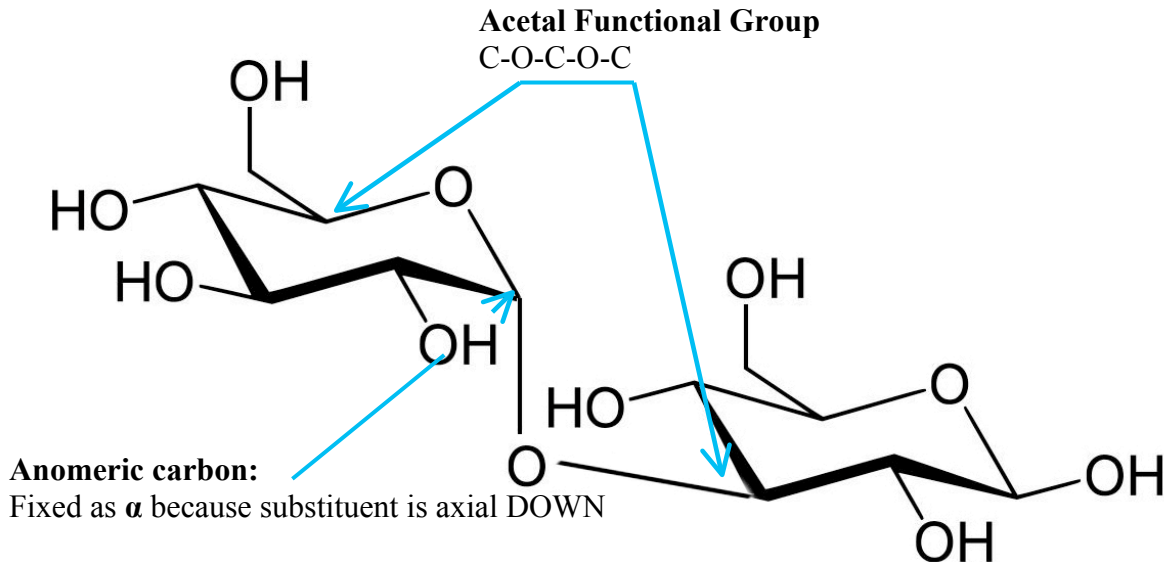
Thus, the anomeric carbon is β .

This sugar is known as:

β -D-glucopyranose

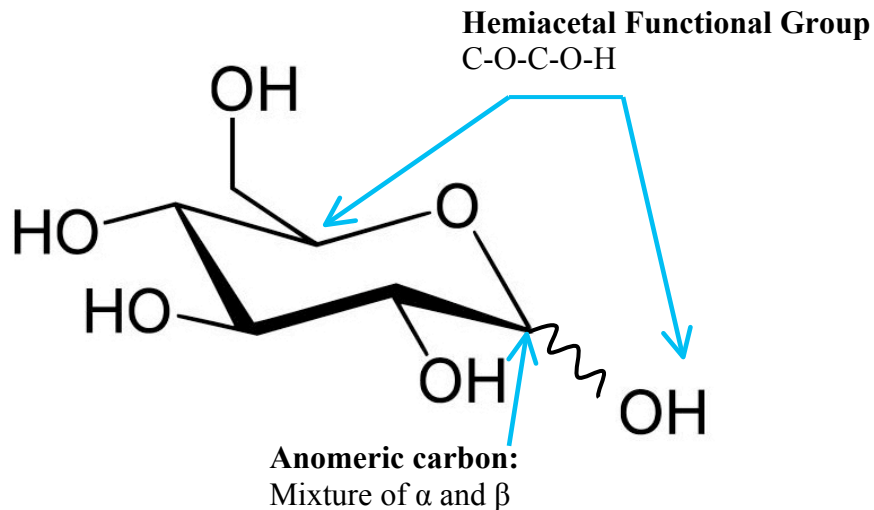
Acetal Functional Groups

When 2 monosaccharides join, they are linked by an **acetal** functional group. Once this happens, the anomeric carbon becomes **fixed** in either the α or β position



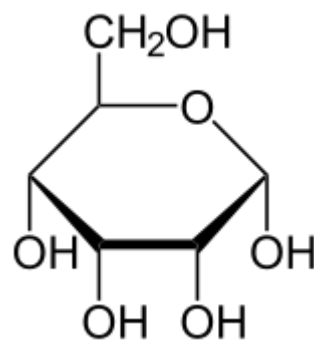
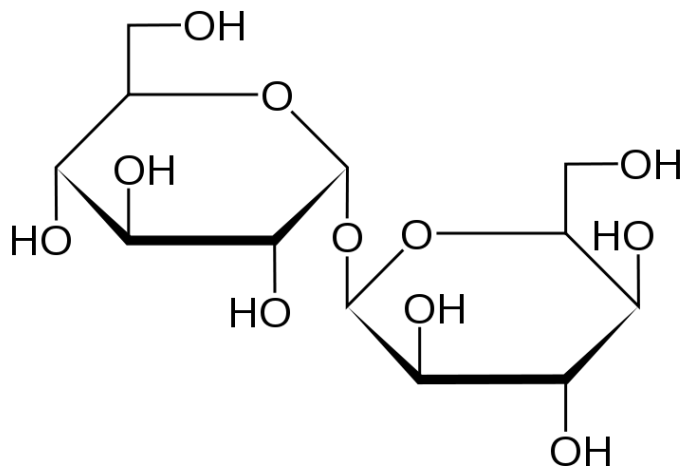
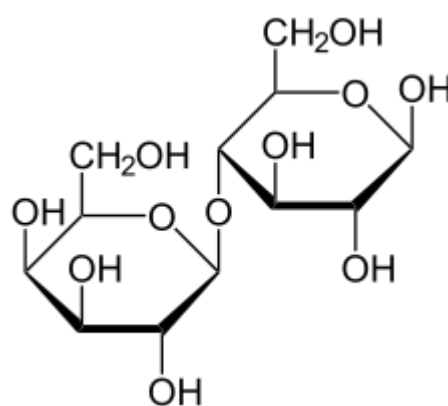
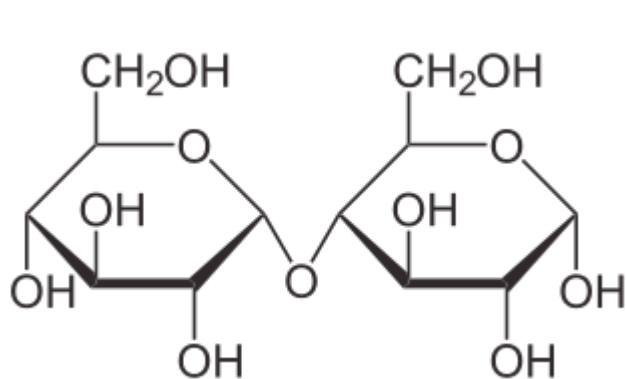
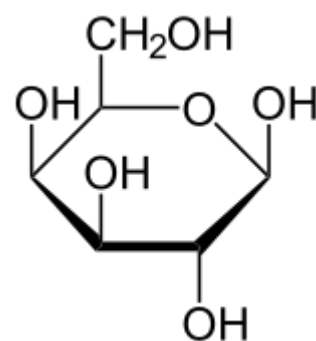
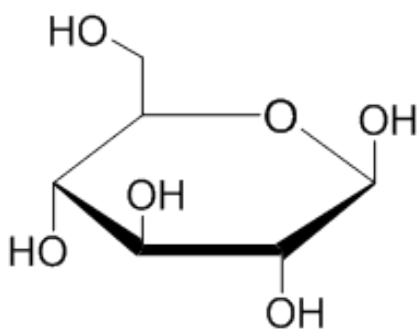
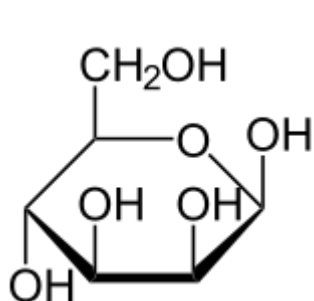
Hemiacetal Functional Groups

When the hydrogen is still attached, and the oxygen is not bonded C-O-C, this is called a **hemiacetal functional group**. Because the OH group can open and close to either form, in a mixture of these molecules, some will exist as α and some will exist as β .

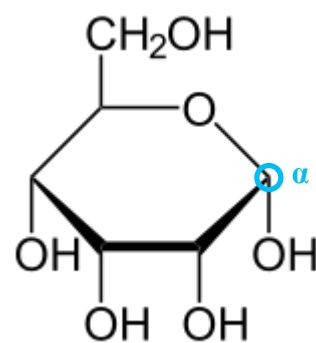
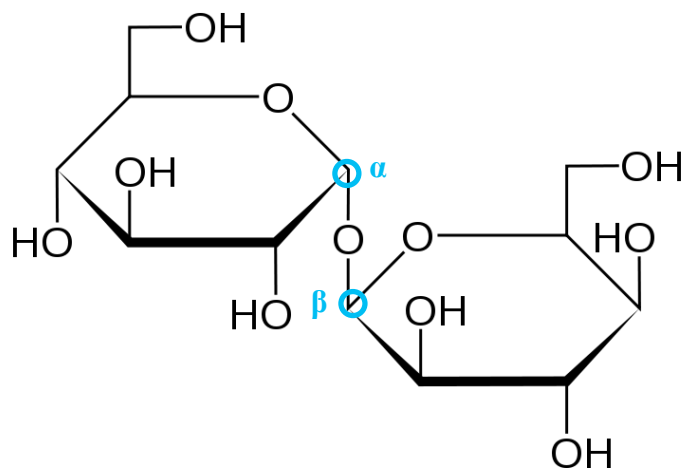
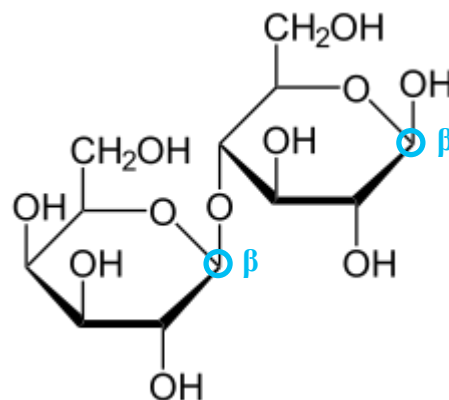
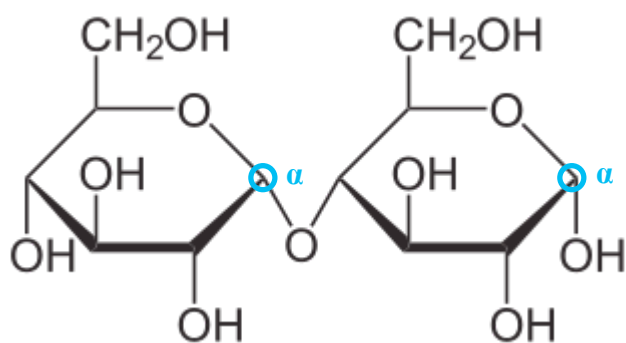
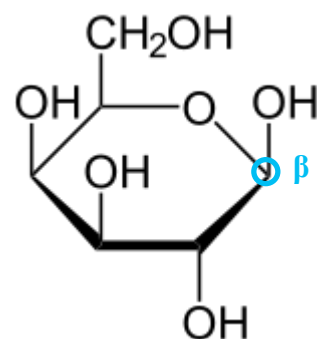
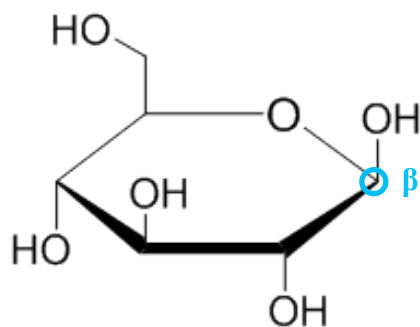
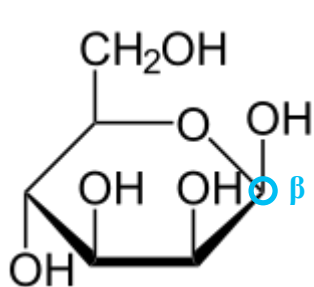


Practice Problems

Directions: Circle the anomeric carbons in the following molecules. Identify them as α or β .



Practice Problem Solutions



Works Cited

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