Carbohydrates

Carbohydrates

are organic compounds containing carbon, hydrogen, and oxygen in the ratio 1:2:1 (carbon:hydrogen:oxygen)

Carbohydrates

are made by <u>plants</u> (autotrophs)

Carbohydrates

are the body's primary source of energy

Carbohydrates

are made of monomers (building blocks) called <u>monosaccharides</u>

Carbohydrates

come in three basic forms: monosaccharide, disaccharide, and polysaccharide

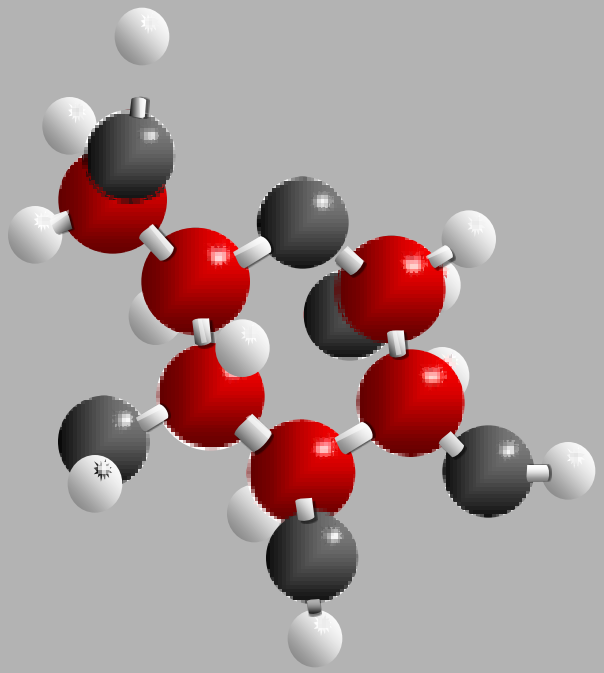
Monosaccharides (simple sugars) are easily identified by their sweet taste.

Glucose is a monosaccharide.

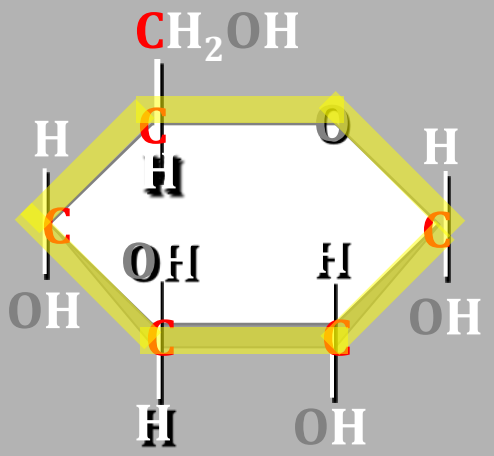
$C_6 H_{12} O_6$

Other monosaccharides:
fructose (fruit sugar)
galactose (milk sugar).

$C_6 H_{12} O_6$

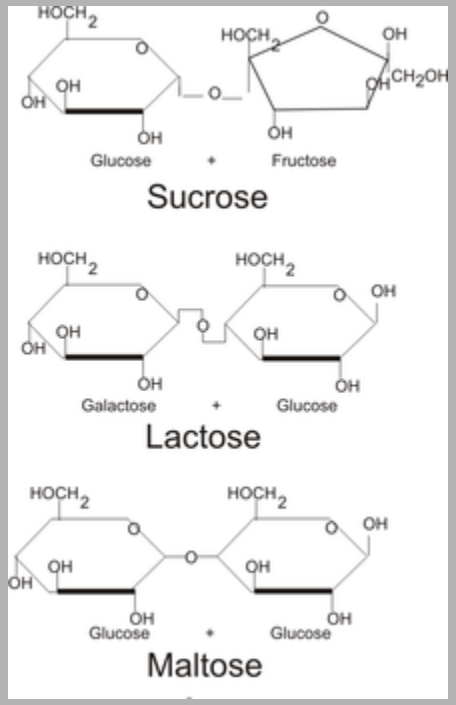


Note the <u>ring shape</u> of the molecule.



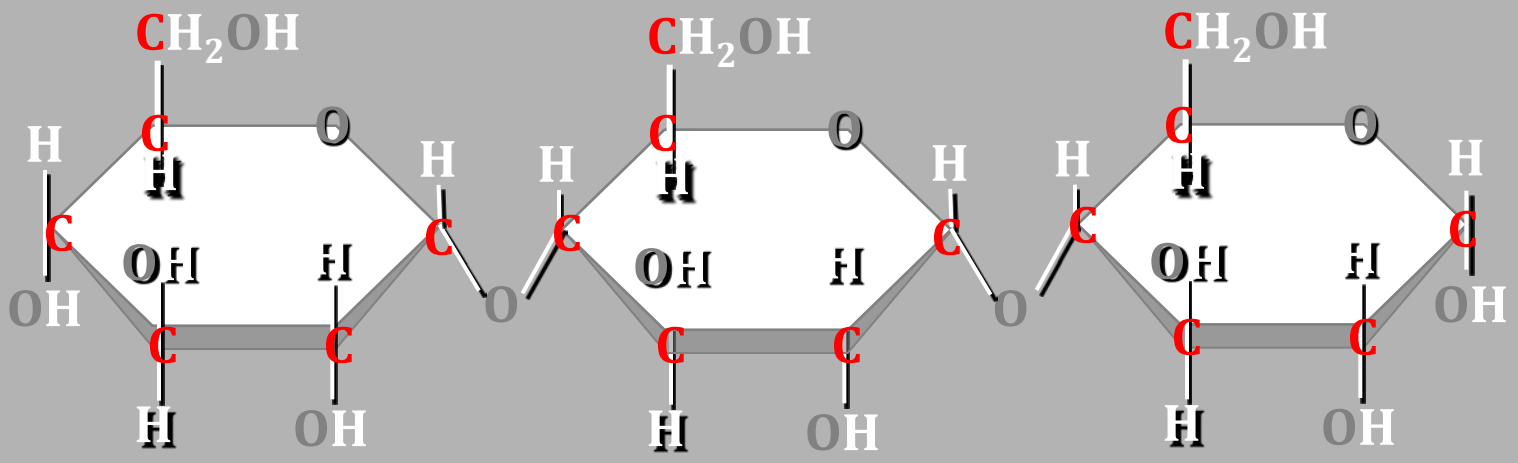
Disaccharides are made of **two monosaccharides together.**

Lactose (found in dairy products), sucrose (table sugar), and maltose are examples of disaccharides.

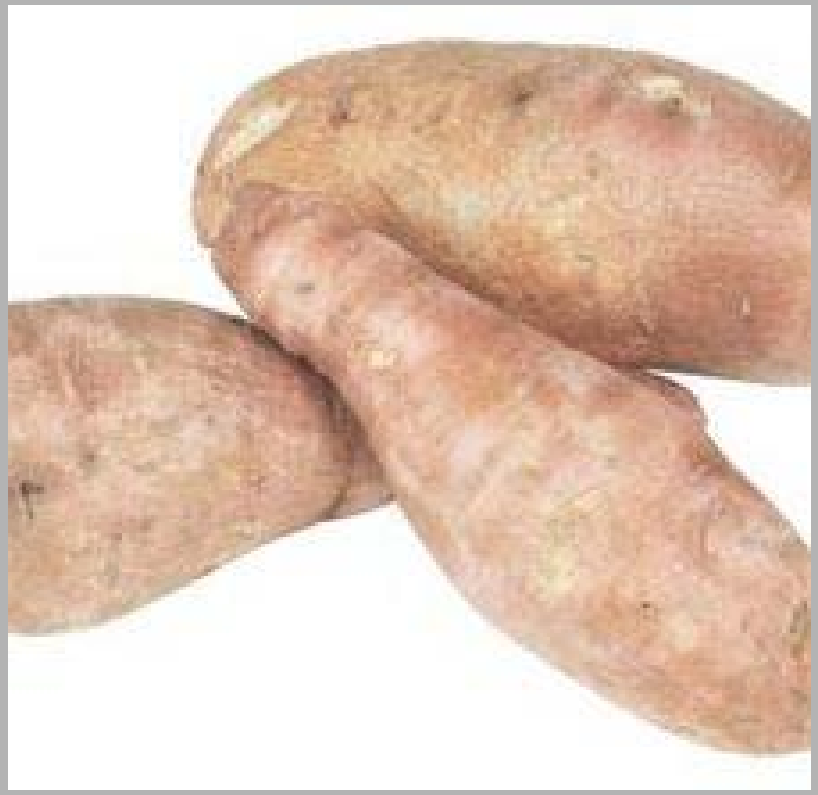


Polysaccharides are complex carbohydrates made of long chains of monosaccharides.

<u>Starches</u> (bread, cereals, and pastas) and <u>cellulose</u> (plant cell walls) are common sources of complex carbohydrates.



Stored as <u>starch in plants</u>.



Stored as glycogen in animals(in muscles and liver) .

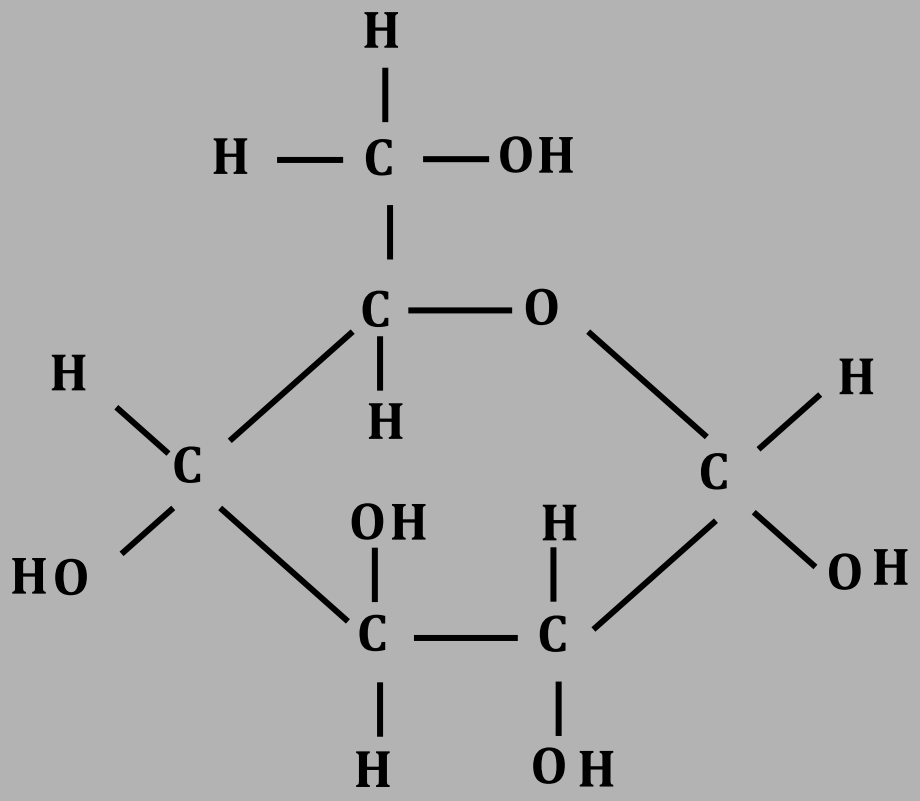
Carbohydrates

Elements: C, H, O

Monomers: Monosaccharide

Structure:

Glucose ($C_6H_{12}O_6$)



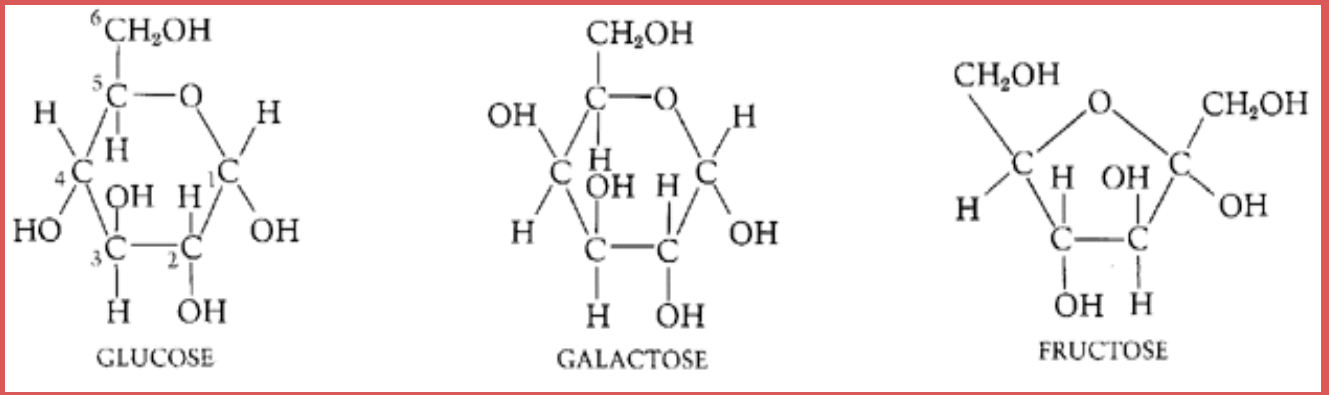
Carbohydrates

Carbohydrates have 3 monomers:

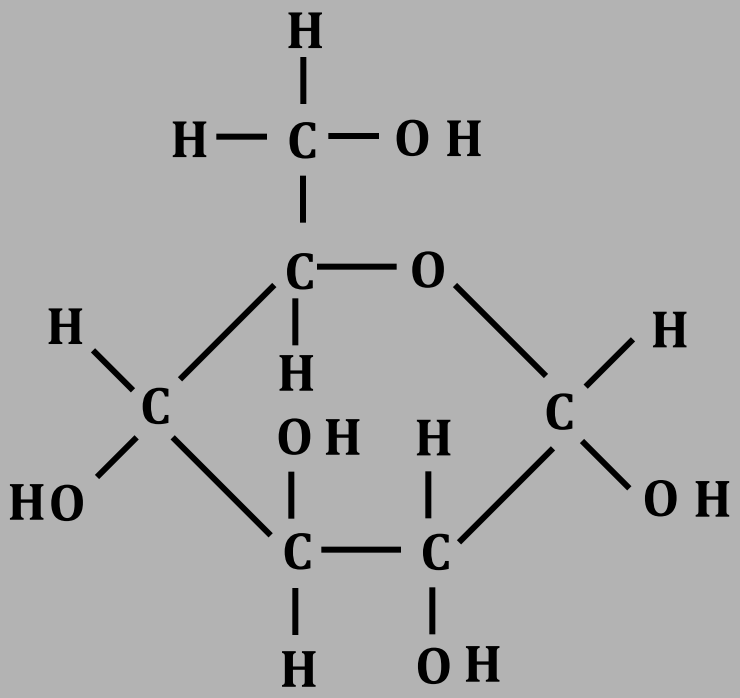
-Glucose
-Fructose
-Galactose

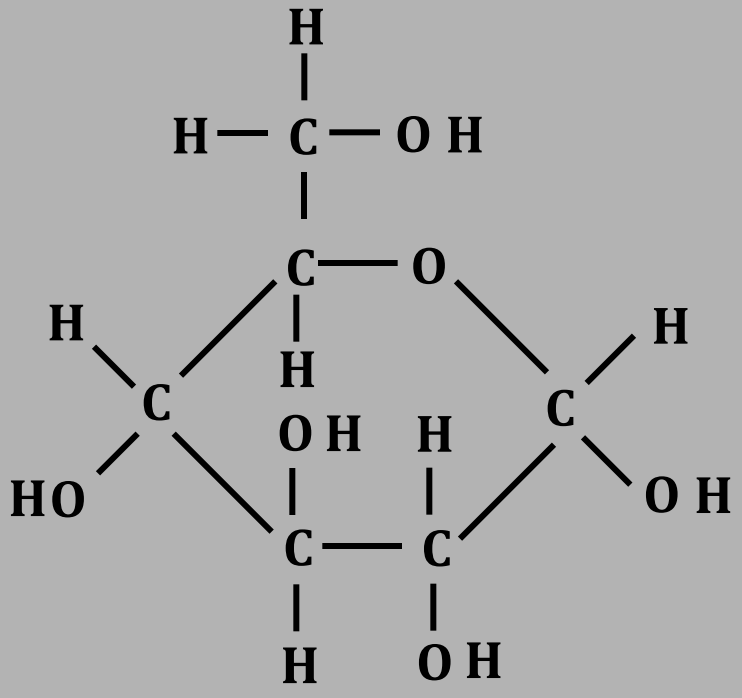
} **"ose" indicates sugar**

What would this tell you about the taste of monosaccharides?



Building Carbohydrates





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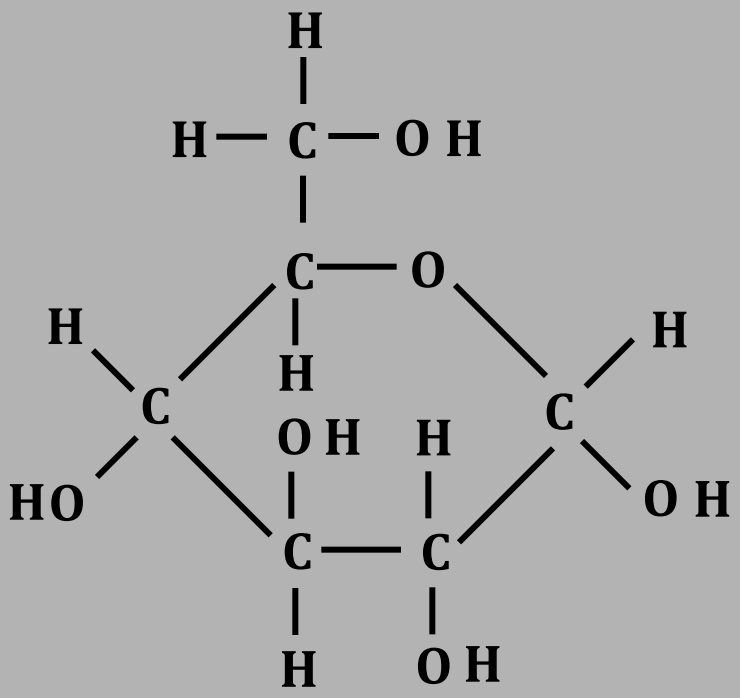

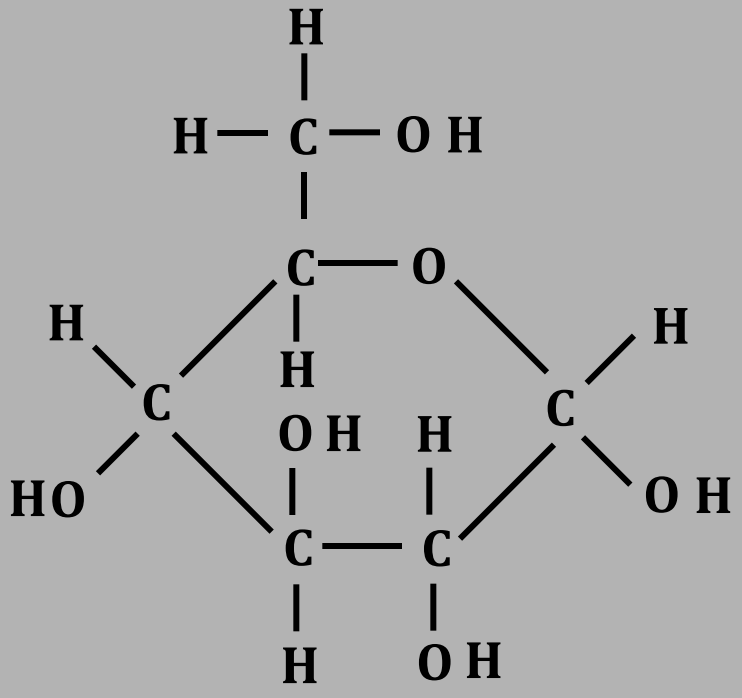

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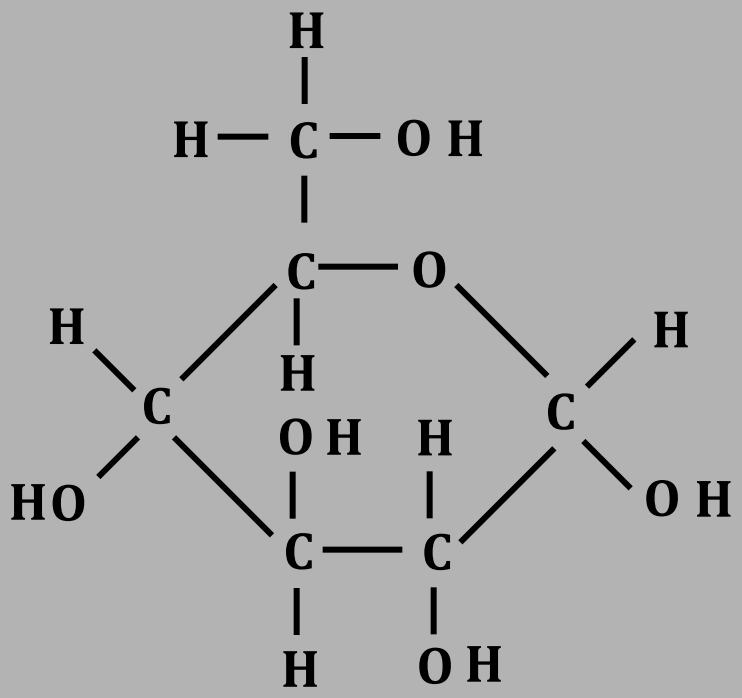

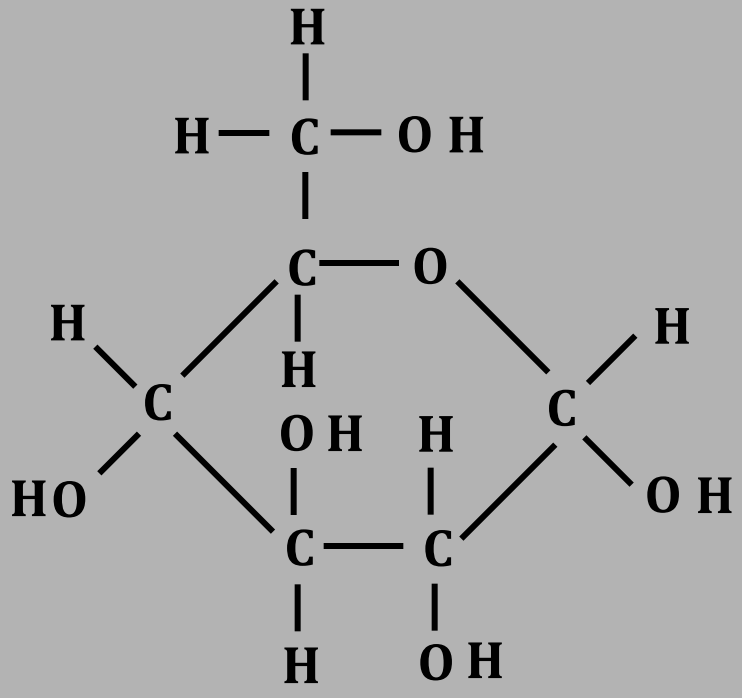

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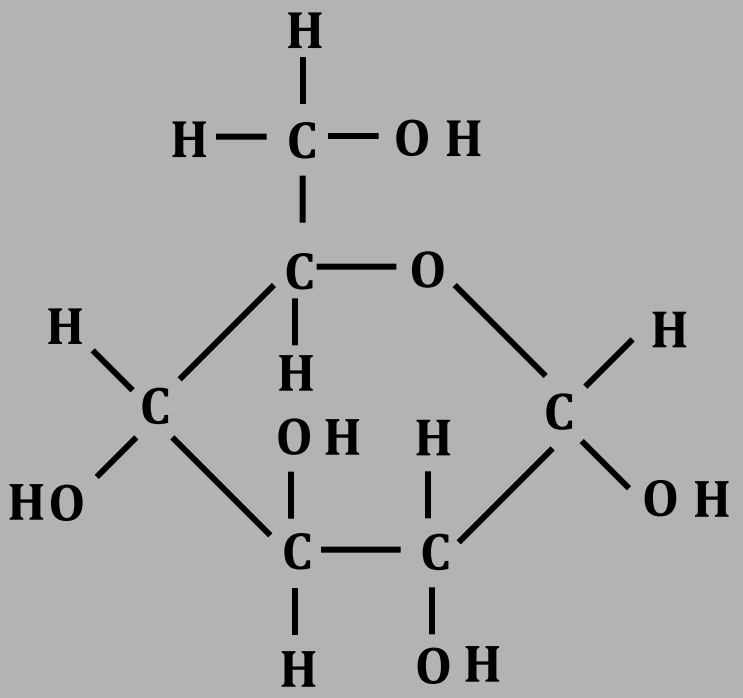

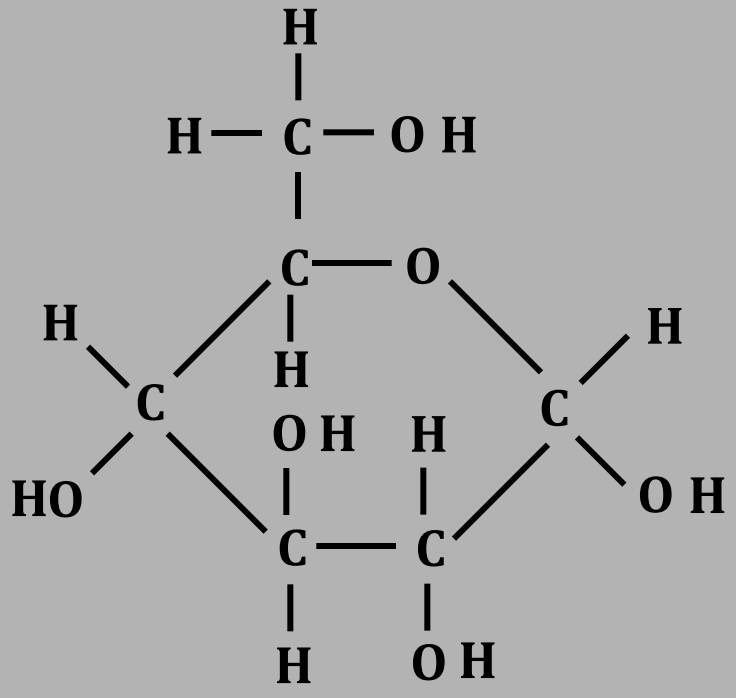

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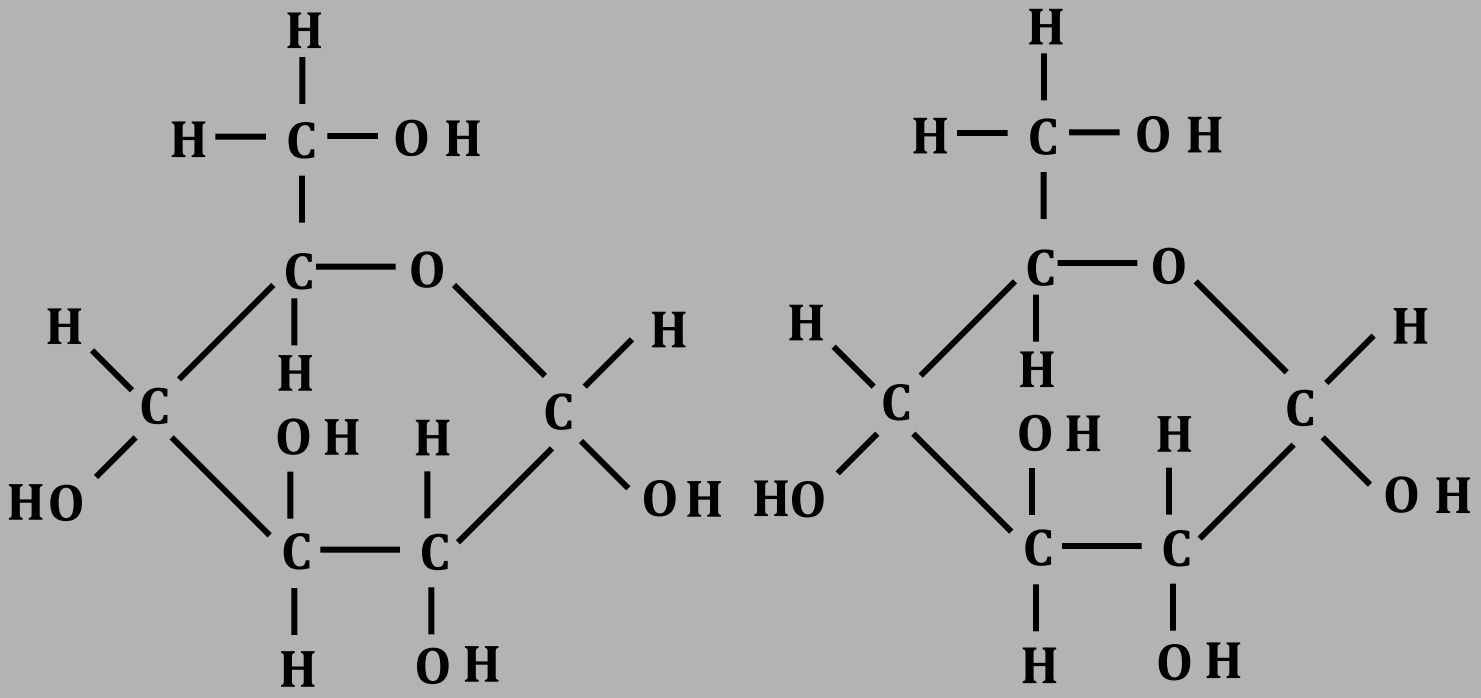

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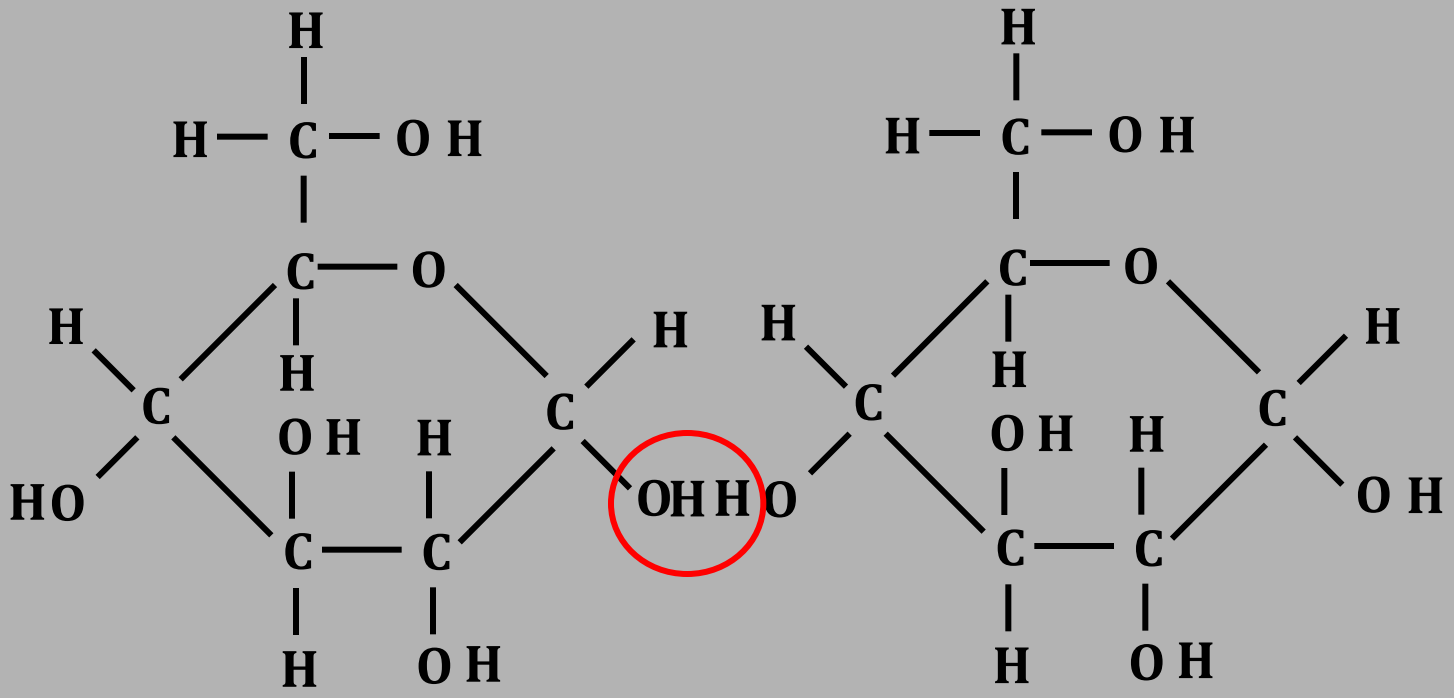

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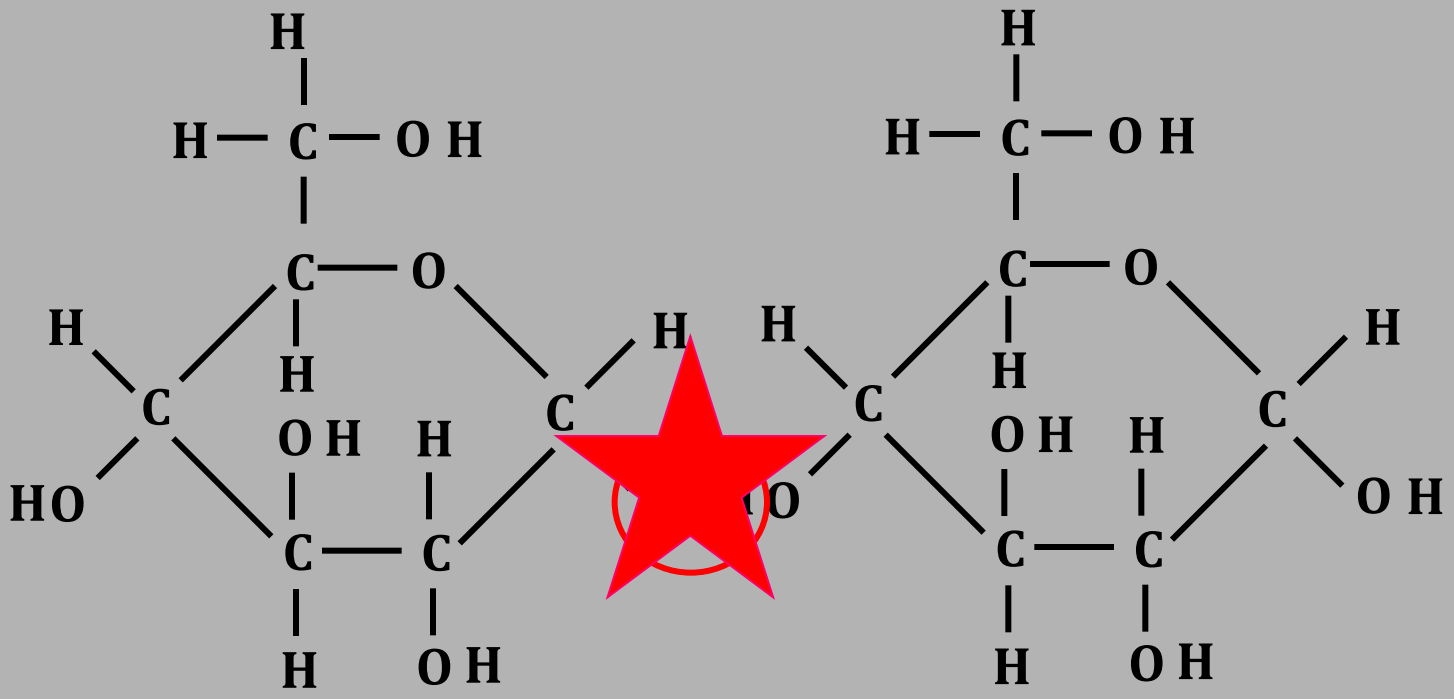

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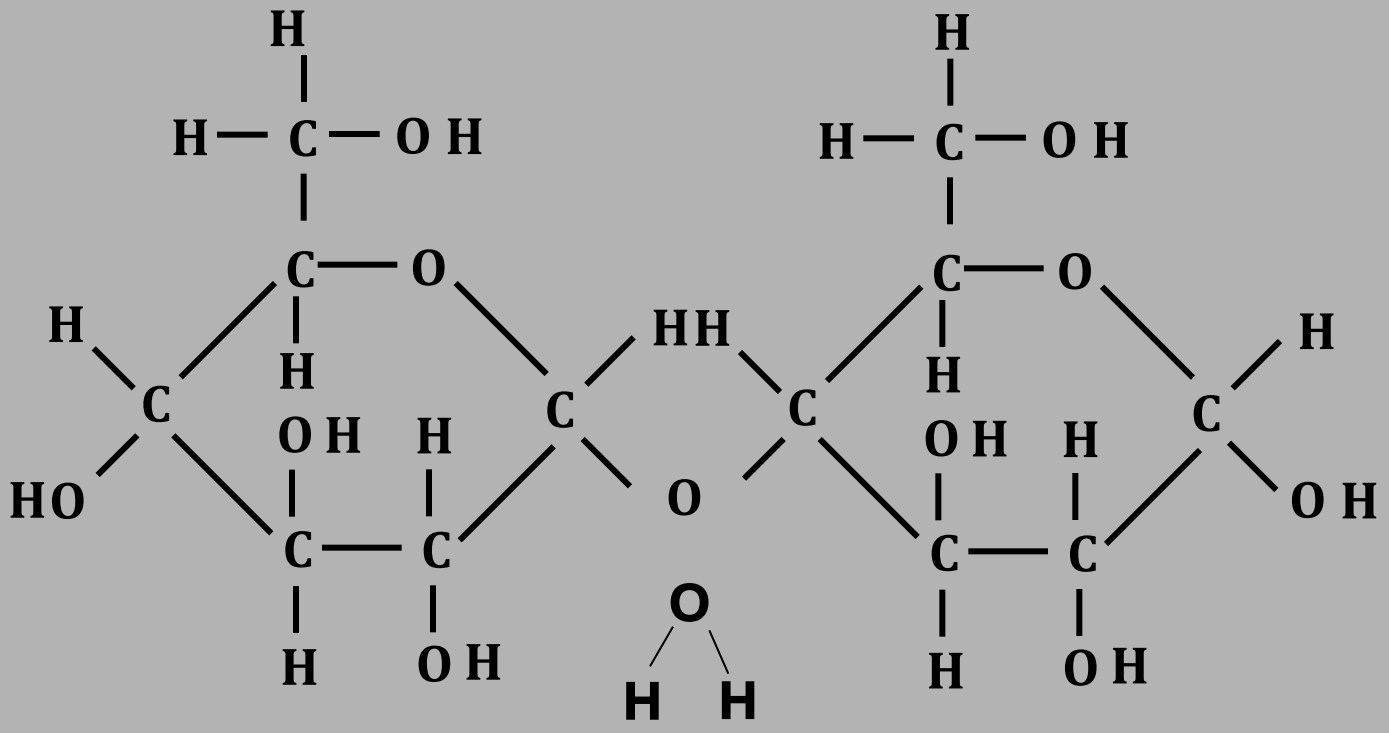

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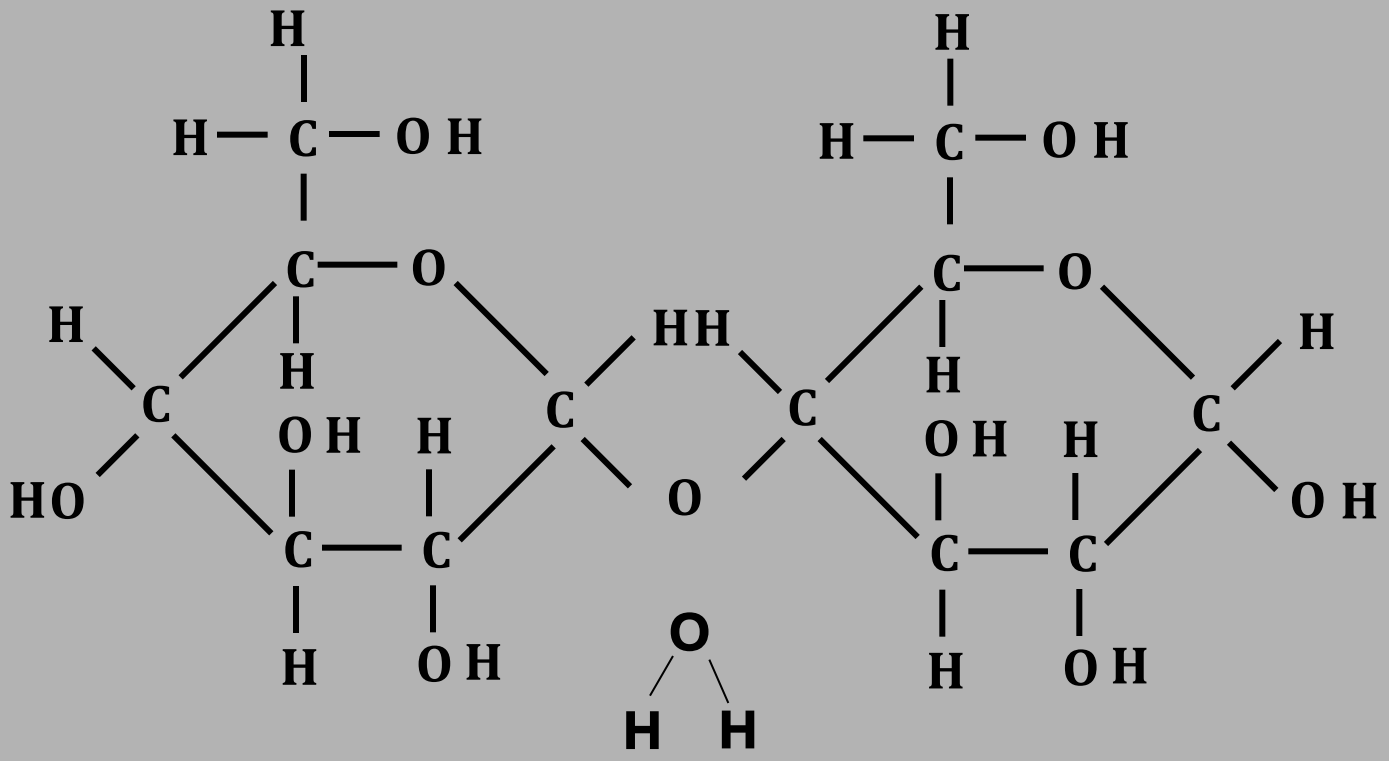
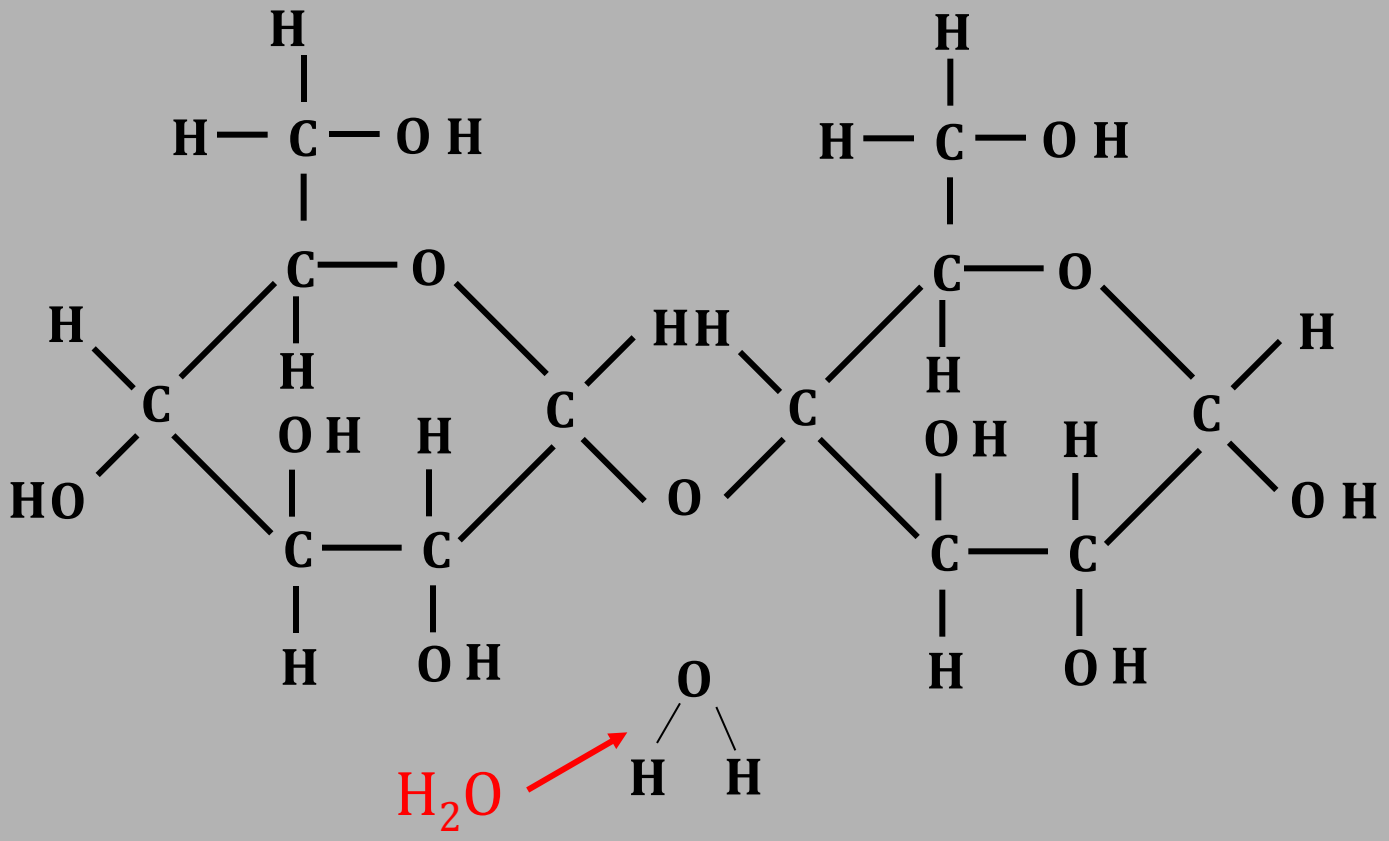


Building Carbohydrates

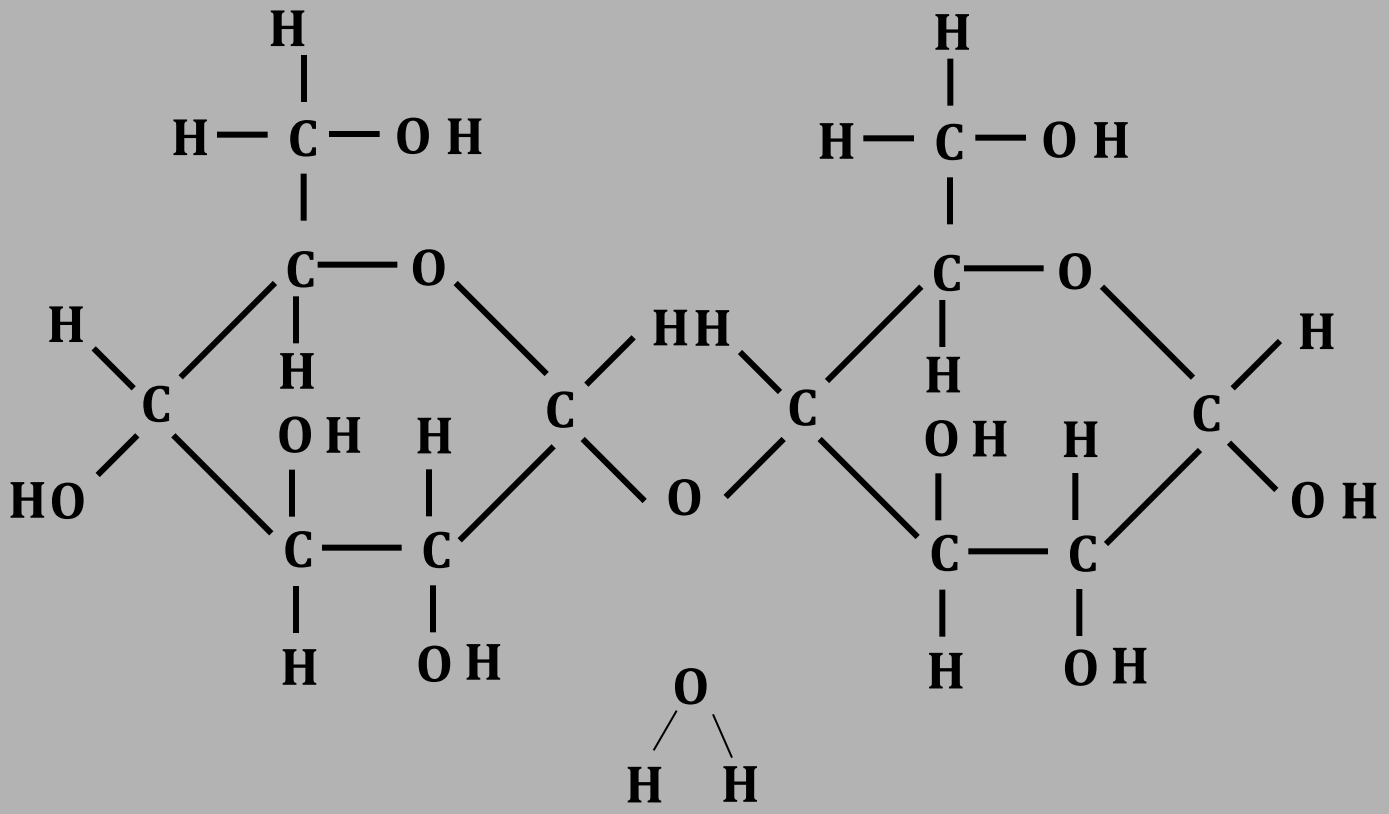
Would this compound taste sweet as well?

The process of bonding 2 monosaccharides together is called dehydration synthesis.



Building Carbohydrates

What happens to a piece of bread once you eat it?



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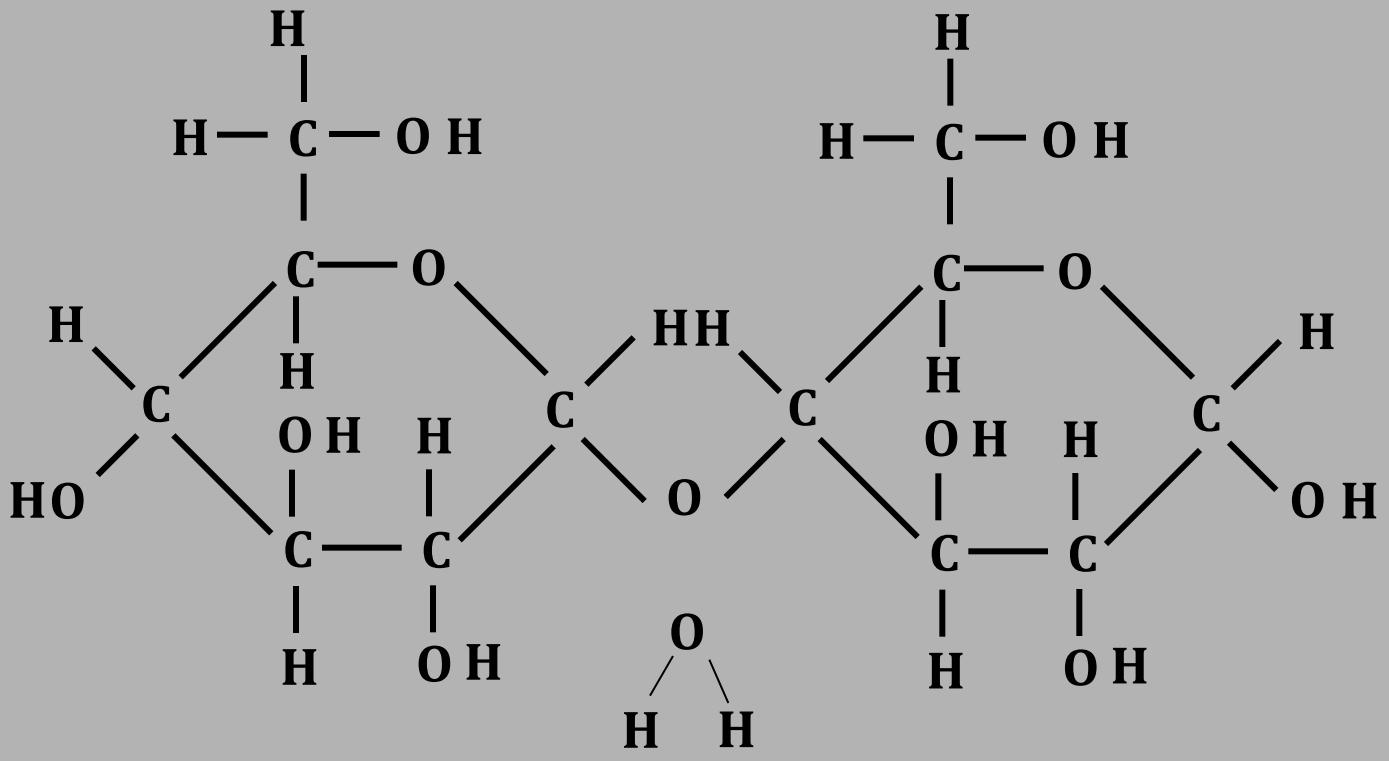

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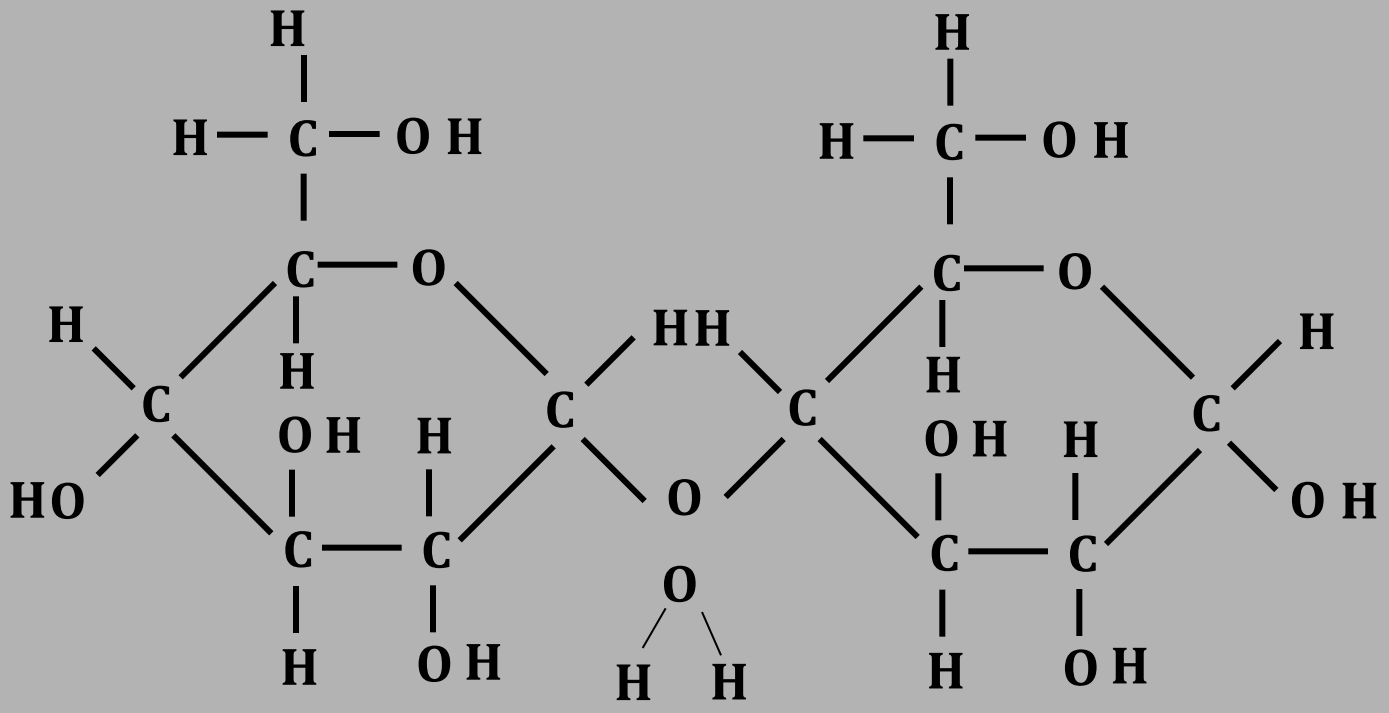

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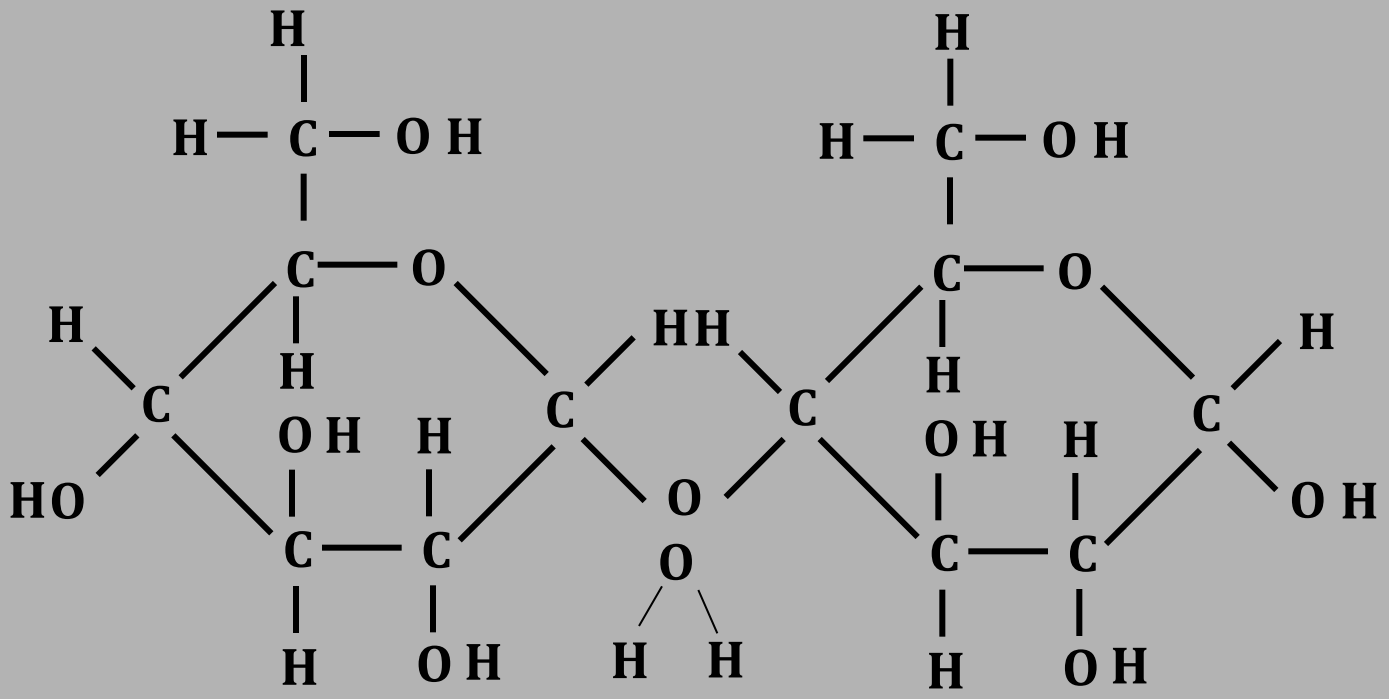

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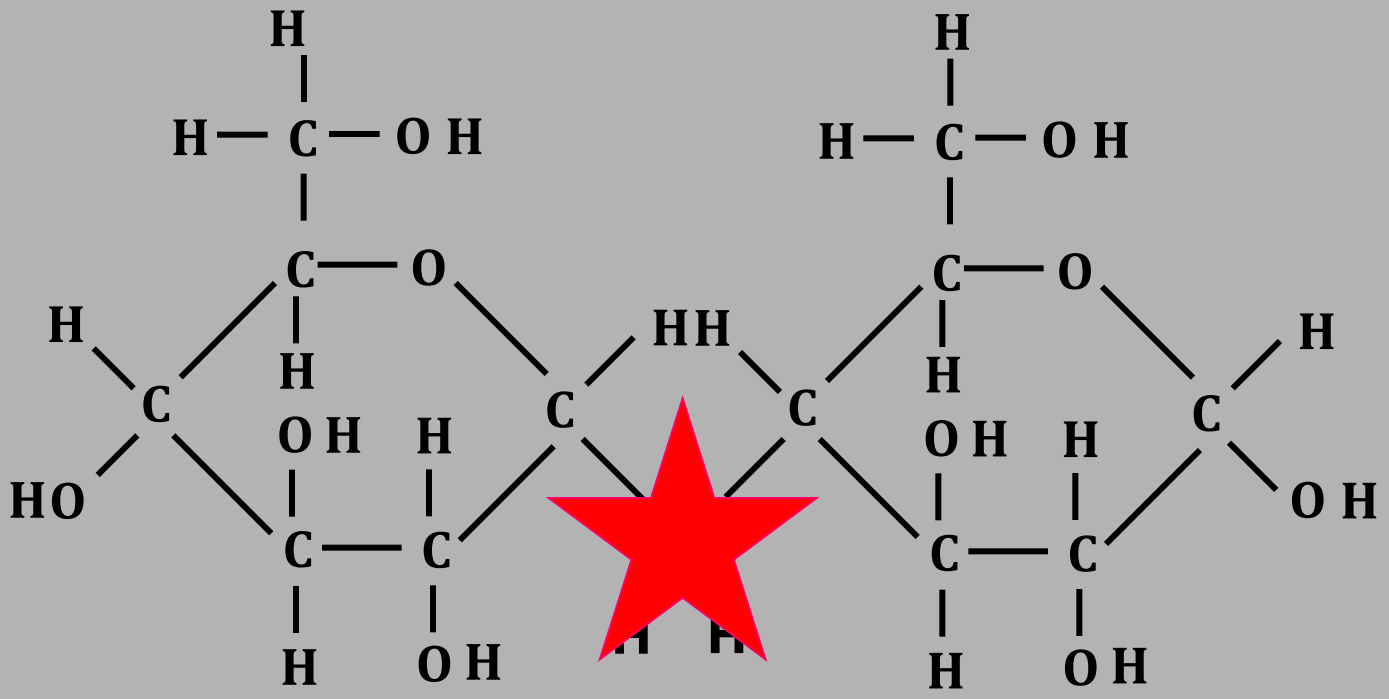

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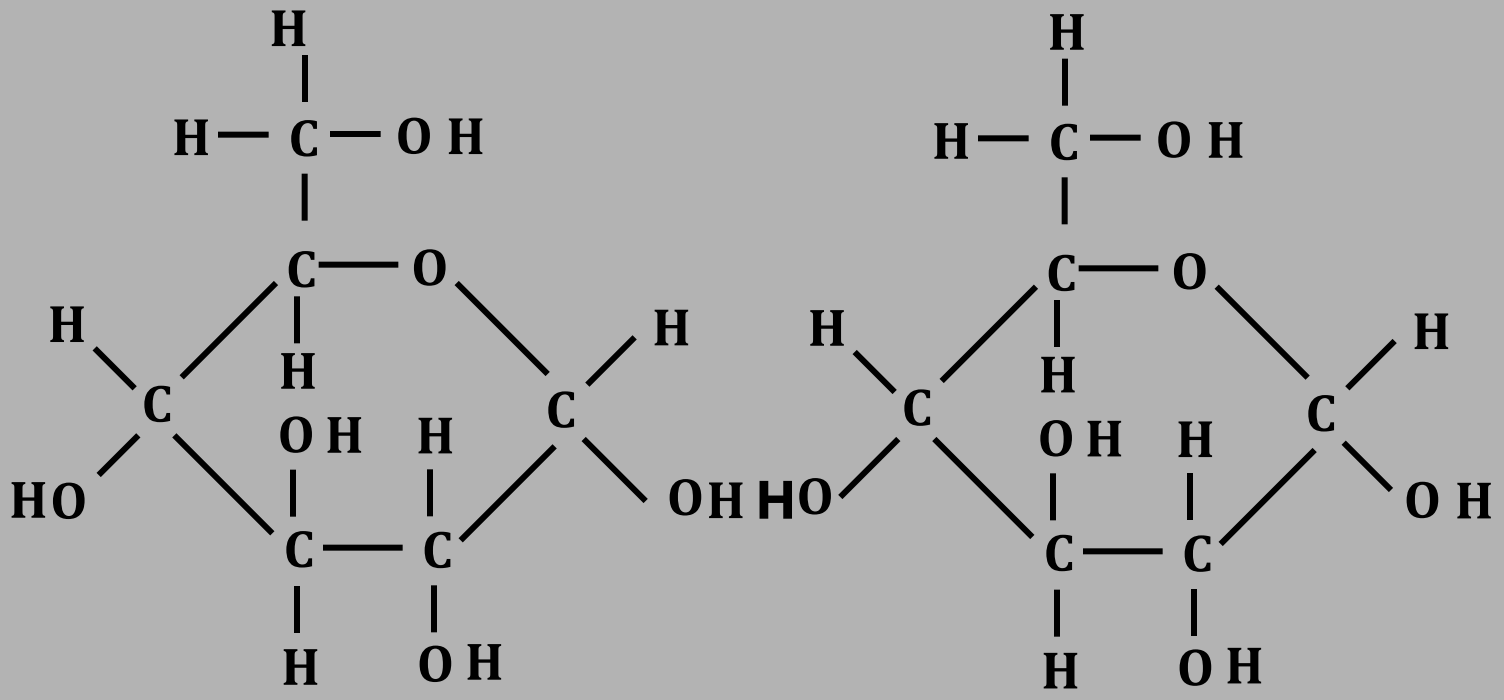

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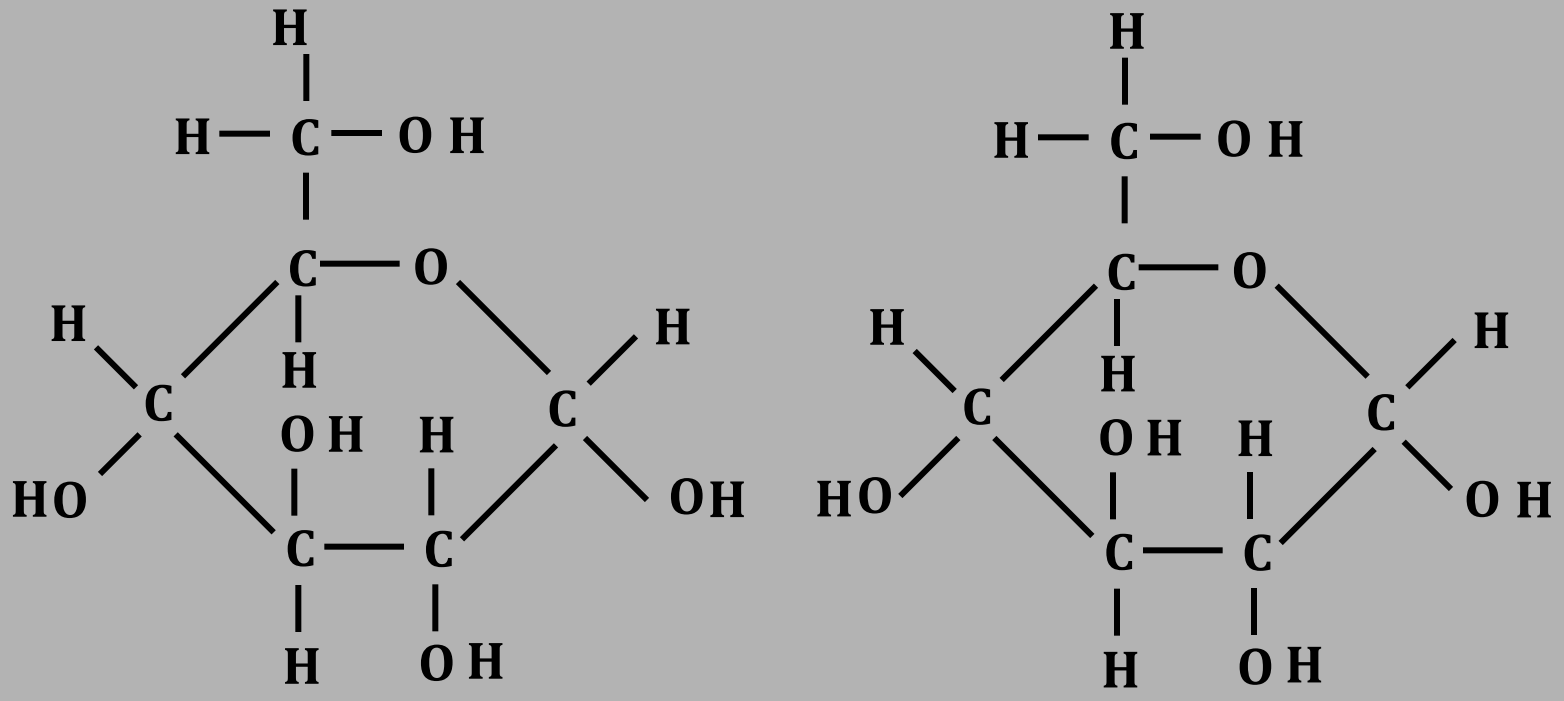
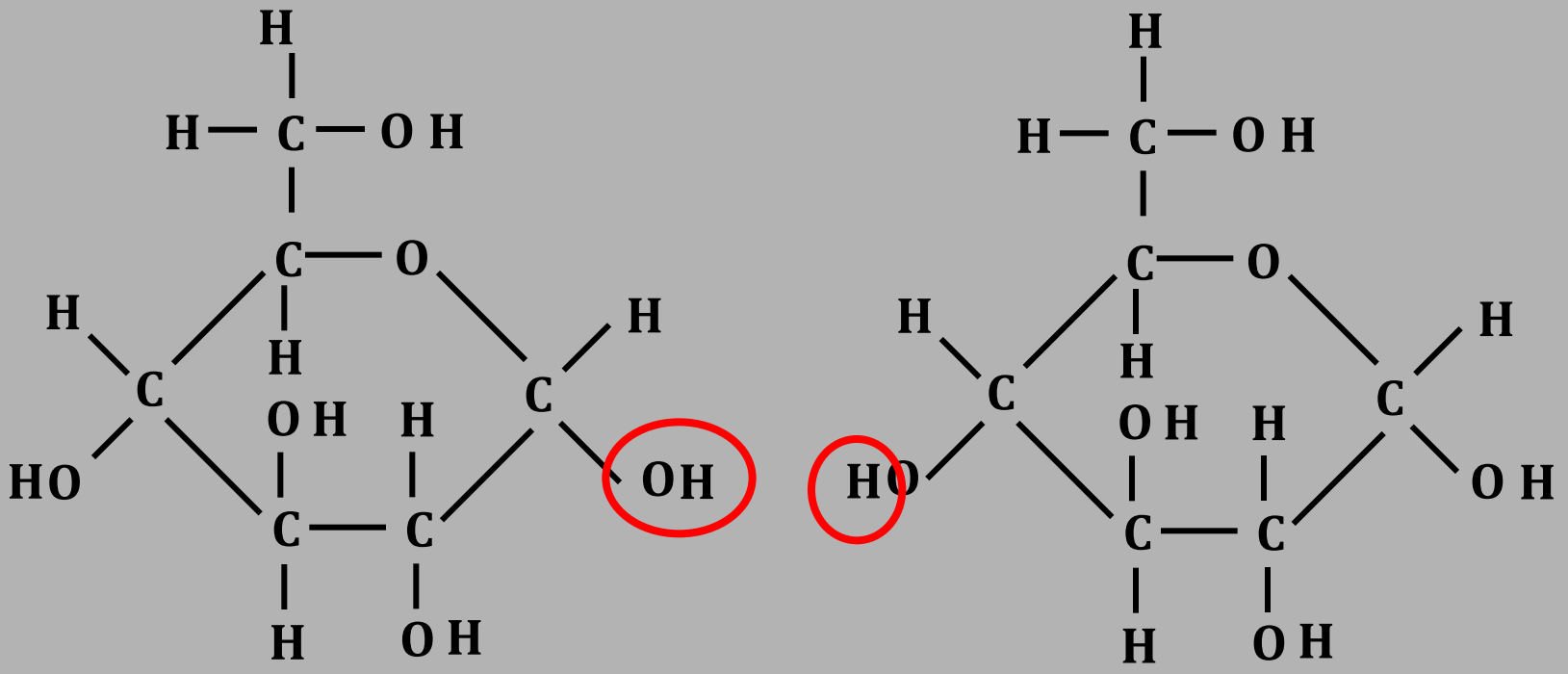


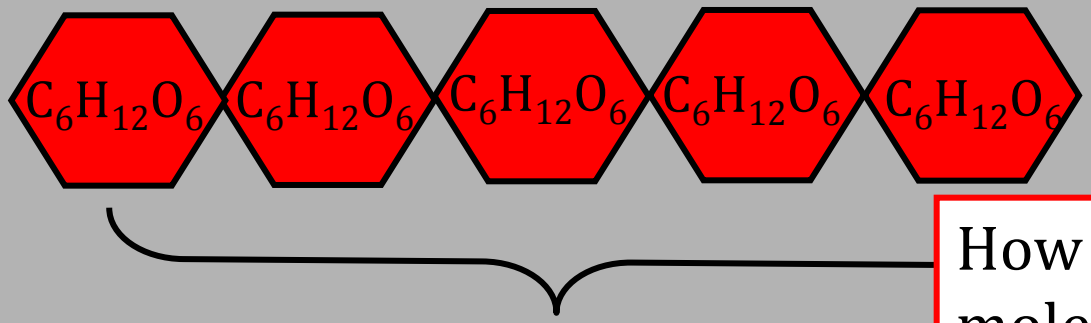
Building Carbohydrates

The **process of breaking compounds into smaller molecules by adding a water back to the monomer** is called hydrolysis.



Building Carbohydrates

Many monosaccharides bonded together form polysaccharides.



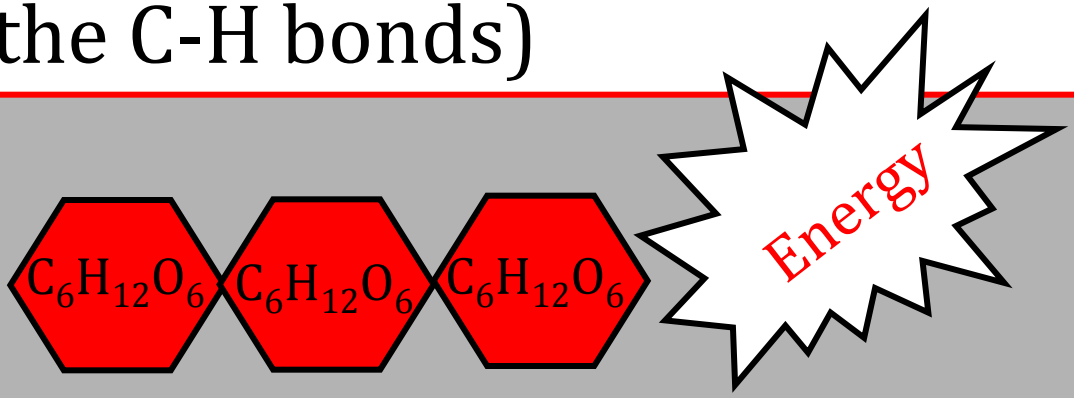
How many water molecules would be removed by making the polysaccharide?

Polysaccharides are known as starches.

Will the taste of starches be the same as simple sugars?

Functions of Carbohydrates

1. To provide a quick source of energy (by breaking the C-H bonds)



2. Provide structure and support.

Carbohydrates Review

What is the monomer (subunit) for carbohydrates?

monosaccharide (simple sugars)

What are the functions of carbohydrates?

energy storage (short-term), structure or support

Name examples of carbohydrates.

glucose, starch, cellulose