CONCEPT: CARBOHYDRATES

●**Carbohydrates**: carbon-based-molecules hydrated with many _____ groups (-OH).

□ Also referred to as _____, the Greek word meaning "*sugars*".

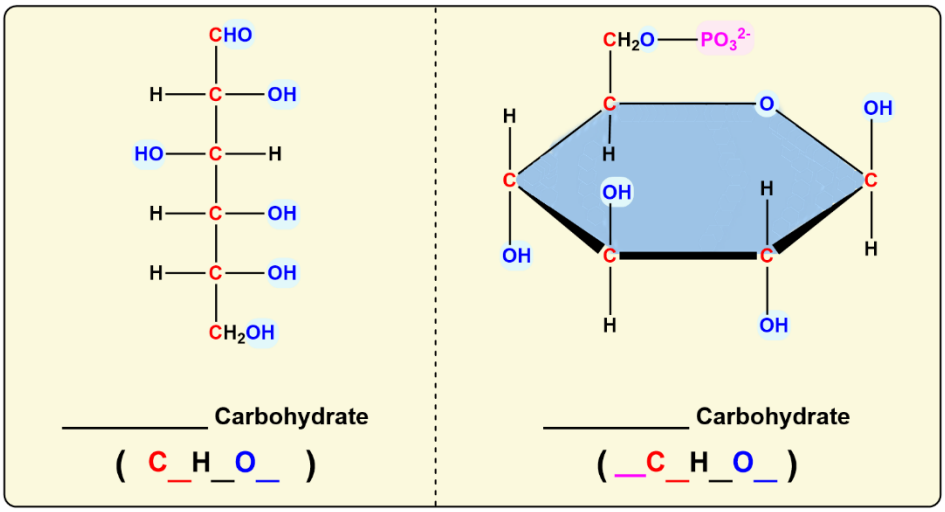
●When "_____" was originally coined, it referred to compounds with the formula $C_n(H_2O)_n$.

□ _____ ***carbohydrates***: fit $C_n(H_2O)_n$ formula exactly (ex. glucose).

□ _____ ***carbohydrates***: can slightly *differ* from $C_n(H_2O)_n$ & can also have ____, N or S atoms too.

EXAMPLE: Simple vs. Complex Carbohydrates.

Carbo-Hydrates



PRACTICE: Which of the following chemical formulas represents that of a simple carbohydrate?

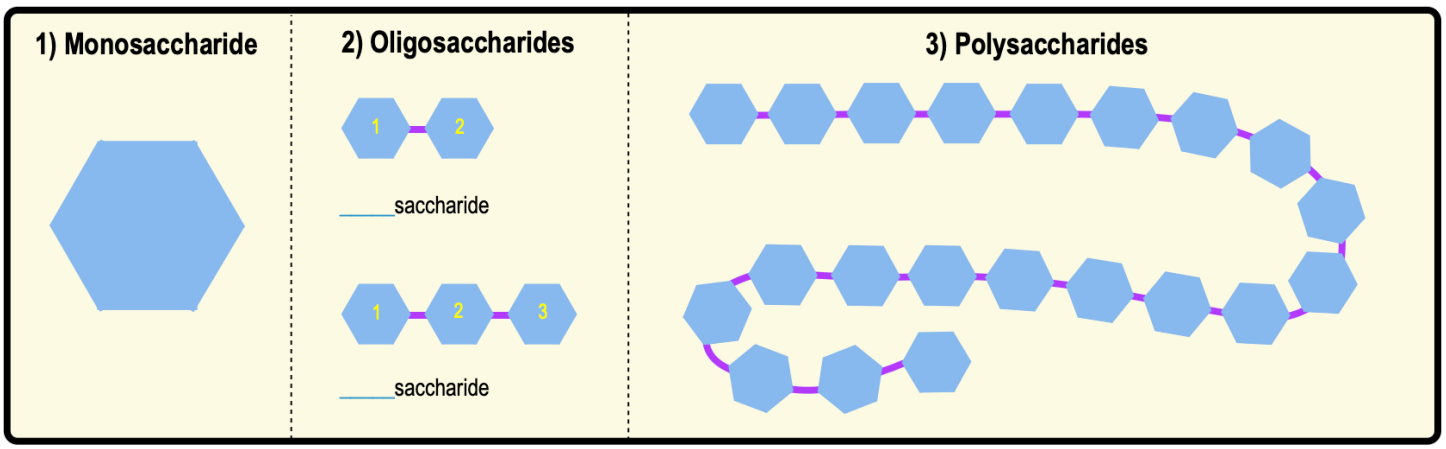
a) $C_2H_2O_2$. b) $C_6H_{12}O_6$. c) $C_5H_4O_3$. d) $C_3H_6O_9$.

3 Size Classes of Carbohydrates

1) _____***saccharide***: a *single* carbohydrate unit or _____ (ex. glucose).

2) _____***saccharide***: 2 to ~_____ covalently linked monosaccharides.

3) _____***saccharide***: _____ 20 covalently linked monosaccharides (_____).



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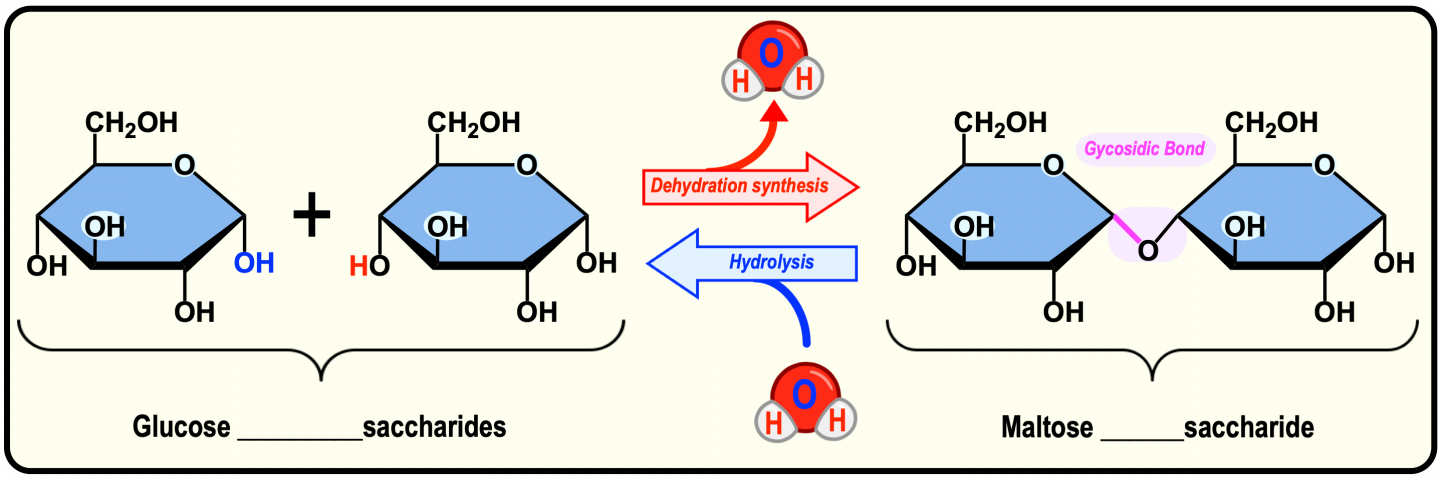
Formation & Breakdown of Polysaccharides

●Recall: *Dehydration Synthesis*: *links* _____saccharides *together* to _____ polysaccharides.

- □ _____ **Bonds**: the *covalent bonds* that link *monosaccharides* together.
- □ *Hydrolysis*: _____ *down* polysaccharides into individual monosaccharides.

EXAMPLE: Formation of a maltose from two glucose molecules.



PRACTICE: Monosaccharides are linked together via a _____ reaction, forming a _____bond.

a) Hydrolysis ; Glycosidic.
b) Dehydration synthesis ; Hydrogen.
c) Hydrolysis ; Peptide.
d) Dehydration synthesis ; Glycosidic.
e) Hydrolysis ; Hydrogen.

PRACTICE: Which of the following chemical reactions results in energy release when glycosidic bonds are broken?

a) Condensation reaction.
b) Dehydration synthesis reaction.
c) Hydrolysis reaction.
d) Hydrogen bonding.

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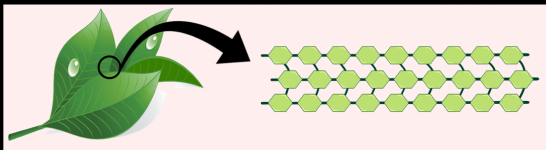
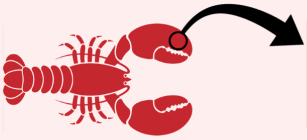
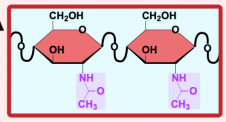
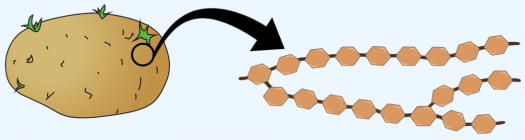
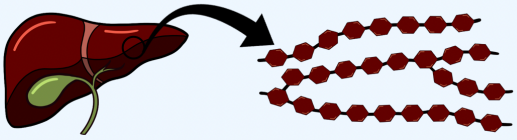
Carbohydrate Functions

●Carbohydrates can be *structurally* & *functionally* _____, but have _____ main functions:

1) ***Structural Support***: used to build _____ (ex. cellulose, chitin, etc.).

2) ***Energy-Storage***: used for _____*-term* _____-storage (ex. starch & glycogen).

EXAMPLE: Polysaccharides in Plants and Animals.

Function	Polysaccharides in Plants	Polysaccharides in Animals
Structural Support 	 _____: most abundant carbohydrate found in *plant cell walls*.	  _____: found in the *exoskeletons* of insects and crustaceans (ex. lobsters).
Energy Storage 	 _____: Storage form of glucose in *plants*.	 _____: Storage form of glucose in *animals*.

PRACTICE: Animal cells store energy in the form of _____, and plant cells store energy in the form of _____.

a) Sucrose ; glucose.

b) Disaccharides ; monosaccharides.

c) Starch ; glycogen.

d) Cellulose ; chitin.

e) Glycogen ; starch.

PRACTICE: Which polysaccharide is an important component in the structure of lobsters and insects?

a) Chitin.

b) Cellulose.

c) Starch.

d) Glycogen.

e) Polypeptides.