Learning Guide 4D – How Sweet It Is 2
Chem 1010

Review

Where do each of the following sweeteners come from?

sucrose

HFCS

aspartame

Match the sweeteners above with their pictures.

How do they compare in calories?			
How do they compare in sweetness?			

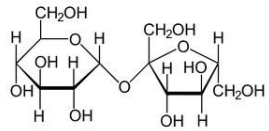
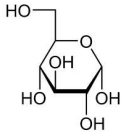
Using the following symbols, represent the first two steps of sucrose digestion.

glucose =

fructose =

sucrose =

Match the following compounds with where they occur in the picture.

Using the same symbols, represent the process of making HFCS from cornstarch.

cornstarch =

How does the appearance change during this process?

How does the sweetness change?

<u>Other sugar products</u>

How are each of the following related to sugar cane?

Powdered sugar

How is powdered sugar different from table sugar?

What else is it called?

When is it used?

What else is added?

Molasses

Where does molasses come from?

What is it used for?

What is blackstrap molasses?

Does molasses have any health benefits?

Brown sugar and natural brown sugar

How is brown sugar normally made?

What is the difference between dark and light brown sugar?

What is it used for?

What is natural brown sugar?

Is it really more healthy than regular sugar?

Rum

Where does rum come from?

How is rum flavoring used?

How is rum used in Australia?

Maple syrup

Where does maple syrup come from?

How is it made?

What kind of sugar is in it?

How does it compare to pancake syrup?

Honey

Where does honey come from?

What sugar does it contain?

How does the sweetness of honey compare to table sugar?

What do you get if you ferment honey?

Agave nectar

Where does agave nectar come from?

What does it look like?

What sugars does it contain?

How does its sweetness compare with sucrose?

How can we show the relationship between all of these products?

sugar cane

maple syrup

pancake syrup

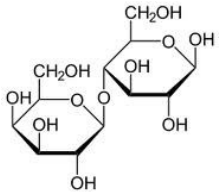
honey

agave nectar

Notice that all of these products come from plants.

Are there any sugars made by animals?

What kind of sugar is lactose?



How sweet is lactose?

Who is milk intended for?

Why are some people unable to drink milk after infancy?

Non-nutritive sweeteners

Products which do not contribute a significant amount of calories to the diet are called non-nutritive sweeteners.

What are some examples?

Some of these are classified as high-intensity sweeteners, while others are bulk sweeteners.

high-intensity sweeteners:

bulk sweeteners:

Some of these compounds are found in nature, while others are produced chemically.

1) sweetener obtained from nature

stevia

comes from:

contains two sweet compounds:

Stevia has been used extensively in Japan and South American, but is slowly catching on in the US.

2) sweeteners found in nature but obtained by manufacturing

sorbitol

found in:

manufactured from:

Sorbitol is used in products like mouthwash, toothpaste, mints, and sugar-free chewing gum.

xylitol

found in:

made from:

Xylitol is used in toothpaste, mouthwash, and can also be used in baking. It is commonly sold as Xylosweet.

3) artificial sweeteners

saccharin

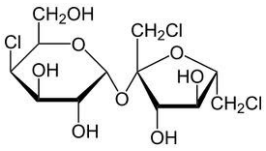
Saccharin was the first artificial sweetener, discovered in 1879. From 1970-2001 there were warning labels about it causing cancer, but these were lifted when it was found to only affect rats.

aspartame

Aspartame was first synthesized in 1965 and approved for use by the FDA in 1974. The patent expired in 1992.

sucralose

Sucralose was discovered in 1976. It is made from sugar,
but it isn't digested, and doesn't contribute to calories.
It has 3 Cl atoms in place of the OH's in sucrose.



If high-intensity sweeteners are so sweet, how can they be packaged in the same size packets as sugar?

Are any of the non-nutritive sweeteners actually good for you?

xylitol

stevia

Are there any other sweet compounds that are not used as sweeteners?

lead acetate

ethylene glycol