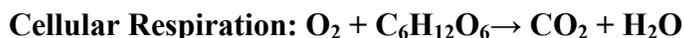


Respiration: Sugar vs. Sweetener



Have you ever noticed the Calorie difference in sugar free food and food with sugar? What is a Calorie? The goal of this activity is to examine the energy in sugar and sweetener. We will use a microscopic fungus called yeast to show us the difference in energy associated with these two molecules your body recognizes as tasting sweet. Yeast will break the bonds of large organic molecules and convert that to chemical energy using the following chemical reaction:



Groups of 4:

Names: _____, _____,
_____, _____

Materials:

2 water bottles	Measuring tape	Timer (cell phones are fine)
2 balloons (pink and blue)	30 mL of sweetener	
500 mL of yeast mixture	30 mL of sugar	

Procedure:

1. You'll first need to prepare a yeast solution. Break up into teams of 2 (a sweetener team and a sugar team). I will give you dry yeast and you need to dissolve 7 grams in 150 mL of warm water.
2. Stir the yeast into solution then add the yeast solution into a bottle.
3. Give the bottle 2-3 good shakes.
4. One bottle will receive 30mL of sweetener solution (50%) and a pink balloon.
5. The other bottle will receive 30 mL of sugar solution (50%) and a blue balloon.
6. Observe your balloon for 10 min. and fill in the following table.

Discussion/interpretation:

What molecule provided the yeast with more energy?

Sucrose (table sugar, glucose+fructose... a disaccharide) or sucralose (sweetner: Splenda)

What filled the balloon (look at the chemical formula at the top of the 1st page)?

Sweetener is often labeled as a “zero Calorie sugar alternative” what does this mean?

Where is energy stored in an organic molecule, like sucrose or sucralose?

Why do you think we are unable to process the sweetener molecules?