Name:_____ Date:_____
Class:_____

# Measuring the Rate of Respiration in Yeast Cells

**Objective:**

To determine if the amount of sugar affects the rate of respiration?

**Materials:**

- yeast
- sucrose solutions of varying concentrations
- Pipets
- Scoop
- warm water baths
- six test tubes
- stop watch
- ruler
- safety goggles

**Procedure:**

1. Formulate a hypothesis on what will happen to the height of the gas bubble if you increase the amount of sugar.
   Ex: If the amount of sugar _____, then the height of the bubble will _____. [2 pts]

_____

_____

2. Label six test tubes with the various sucrose percentages. Add the appropriate Sucrose solution to each test tube.

| Tube Number | Water (mL) | Sucrose (g) | Sucrose (%) |
|---|---|---|---|
| **1** | 5 | 0.0 | **0** |
| **2** | 5 | 0.05 | **1** |
| **3** | 5 | 0.1 | **2** |
| **4** | 5 | 0.2 | **4** |
| **5** | 5 | 0.5 | **10** |

3. Using the provided scoop. Scoop a small amount (fill to the blue line) of yeast into each test tube. The test tube may start bubbling. This is ok, don't panic!
4. Using your thumb to cover the end of the test tube, mix each solution. Continue mixing until all of the yeast has dissolved.
5. Start timing the reaction. Record the time that you observe gas being produced in each tube. The bubbles will form from the bottom of the tube (like a glass of soda).
6. At 15 minutes measure the amount of bubbles, or froth, at the top of the tube in centimeters and record the data.

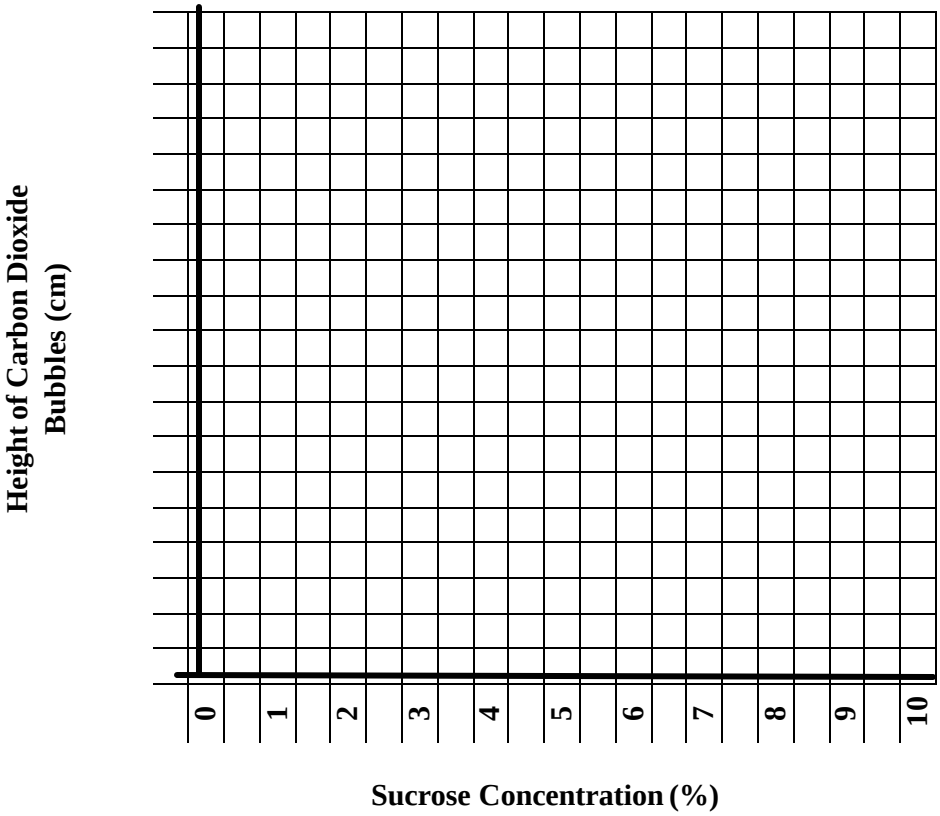
**Data (5 pts):**

| Tube Number | Sucrose Concentration (%) | Time Gas Observed | Height of Gas Bubble after 15 minutes (cm) |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

7. Using a line graph, show the relationship between the **concentration of sucrose** and the **height of the bubbles**.

**Graph (4 pts)**

**The Effect of Sucrose Concentration on Carbon Dioxide Production by Yeast**




**Analysis Questions (Answer using one or more complete sentences):**

1. How did the amount of sucrose in the tube affect the time at which gas started being produced in the tube? ( 2 pts)

_____

_____

2. What is the relationship between sucrose concentration and rate of respiration?

_____

_____

3. What gas is used by the yeast cells as they carry out aerobic cellular respiration?
_____

4. Was there any measurable gas being produced in tube number 1? Why did this tube have to be included in the investigation? ( 2 pts)

_____
_____
_____
_____

5. Yeast is used in making breads and other baked goods that need to rise. Sugar is commonly added to dough as food for the yeast. What gas does the yeast give off causing the bread to rise?

_____
_____

6. What would happen if you mixed dough together for a loaf of bread but did not add any sugar? Explain your answer. ( 2 pts)

_____
_____

7. Could flour function as the food source for the yeast? How would you set up an experiment to test this in the laboratory? (5 pts) Describe/ Draw what you would do.

_____
_____
_____
_____
_____
_____
_____
_____