### Fermentation in a Balloon Lab

**Purpose and Key Concepts:** In this lab, student will use the respiration products of yeast to blow up balloons. This activity will reinforce the basic principles of respiration as a fundamental process for living organisms using yeast as a model. It will also explore how humans use the biological knowledge in everyday life. Student will also observe the effects of sugar amounts on yeast activity.

### Directions: Make sure to delete all lines when typing this up.

Question: How does the amount of sugar in a yeast mixture affect the size of inflation of a balloon?

Hypothesis: If \_\_\_\_\_\_,

then

Lab Safety:

- Reminder: There is NO eating or drinking in the lab
- Students must not attempt to inflate the balloons with their mouths, especially after it is filled with reacting agents.

## Variables:

Independent Variable: \_\_\_\_\_\_
Dependent Variable: \_\_\_\_\_

Controls: \_\_\_\_\_

## Materials:

1 Balloon	Funnel	Ruler	String
5 mL of Yeast	25 mL of Warm Water	Graduated Cylinder	5, 10, or 15 mL of Sugar

### **Procedure:**

- 1. Assign different jobs to each group member. The jobs are as follows:
- Leader: The leader is in charge of making sure everyone is staying on task and completing their job. Also, the leader is in charge of getting and returning the supplies.
- **Timer:** The timer is charge of keep track of the two minute time intervals.
- **Measurer 1:** Measurer 1 is in charge of carefully measuring the circumference around the balloon with the string and handing the string to Measurer 2.
- Measurer 2: Measurer 2 is in charge measuring the length of the string measurer one made.

My job is \_\_\_\_\_

- 2. Use a sharple to number your group's balloon with a 1 4.
- 3. Use the following procedure for the corresponding balloon number. TIME IS IMPORTANT! You may want to break this up within your team members.

### Balloon 1:

- Place a funnel into the opening of the balloon.
- Pour 5 mL of yeast into a graduated cylinder and then into the balloon.
- Add 25 mL of warm water into a graduate cylinder, and then slowly pour the water into the balloon.
- Note the time on your lab chart.
- Tie the end of the balloon into a knot & shake your balloon contents for 10 seconds to mix it up.
- After two minutes, use a string to determine the circumference of your balloon.
- Compare this to a ruler to determine the length in centimeters.
- Fill out the data reading in the table.
- Retake the measurements every 2 minutes for 20 minutes.

#### Balloon 2:

- Place a funnel into the opening of the balloon.
- Pour 5 mL of yeast into a graduated cylinder and then into the balloon.
- Pour 5 mL of sugar into a graduate cylinder, and then pour the sugar into the balloon.
- Add 25 mL of warm water into a graduate cylinder, and then slowly pour the water into the balloon.
- Note the time on your lab chart.
- Tie the end of the balloon into a knot & shake your balloon contents for 10 seconds to mix it up.
- After two minutes, use a string to determine the circumference of your balloon.
- Compare this to a ruler to determine the length in centimeters.
- Fill out the data reading in the table.
- Retake the measurements every 2 minutes for 20 minutes.

#### Balloon 3:

- Place a funnel into the opening of the balloon.
- Pour 5 mL of yeast into a graduated cylinder and then into the balloon.
- Pour 10 mL of sugar into a graduate cylinder, and then pour the sugar into the balloon.
- Add 25 mL of warm water into a graduate cylinder, and then slowly pour the water into the balloon.
- Note the time on your lab chart.
- Tie the end of the balloon into a knot & shake your balloon contents for 10 seconds to mix it up.
- After two minutes, use a string to determine the circumference of your balloon.
- Compare this to a ruler to determine the length in centimeters.
- Fill out the data reading in the table.
- Retake the measurements every 2 minutes for 20 minutes.

#### Balloon 4:

- Place a funnel into the opening of the balloon.
- Pour 5 mL of yeast into a graduated cylinder and then into the balloon.
- Pour 15 mL of sugar into a graduate cylinder, and then pour the sugar into the balloon.
- Add 25 mL of warm water into a graduate cylinder, and then slowly pour the water into the balloon.
- Note the time on your lab chart.
- Tie the end of the balloon into a knot & shake your balloon contents for 10 seconds to mix it up.
- After two minutes, use a string to determine the circumference of your balloon.
- Compare this to a ruler to determine the length in centimeters.
- Fill out the data reading in the table.
- Retake the measurements every 2 minutes for 20 minutes.
- 4. Collect data from other groups.

Time	Circumference of	Observation
	<b>Balloon in cm</b>	
2		
4		
6		
8		
10		
12		
14		
16		
18		
20		

# **Date Table 2: All Balloons**

Time	Circumference of Balloon 1 in cm	Circumference of Balloon 2 in cm	Circumference of Balloon 3 in cm	Circumference of Balloon 4 in cm
	(no sugar)	(5 mL sugar)	(10 mL sugar)	(15 mL sugar)
2				
4				
6				
8				
10				
12				
14				
16				
18				
20				

### Analyzing and Interpreting the Data:

What does your data show? Compare and contrast the data from all four balloons. Be specific and descriptive.


### **Conclusion:**

Discuss the answers to the following questions for your conclusion. Turn the answers to these questions into a paragraph for your conclusion.

- 1. What was the problem you were testing for this experiment?
- 2. What was your hypothesis? (restate your hypothesis here)
- 3. Was your hypothesis supported or rejected? Why or why not?
- 4. What is the relationship between the amounts of sugar used to how big the balloon got?