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## 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 $\qquad$ ,
then $\qquad$ .

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: $\qquad$
Dependent Variable: $\qquad$

Controls: $\qquad$

## Materials:

1 Balloon
5 mL of Yeast

> Funnel
> 25 mL of Warm Water
Ruler
Graduated Cylinder

## 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 $\qquad$
2. Use a sharpie 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.

Data and Observations:
Table 1: Balloon \# $\qquad$

| Time | Circumference of <br> Balloon in cm |  |
| :---: | :---: | :--- |
| 2 |  |  |
| 4 |  |  |
| 6 |  |  |
| 8 |  |  |
| 10 |  |  |
| 12 |  |  |
| 14 |  |  |
| 16 |  |  |
| 18 |  |  |
| 20 |  |  |

Date Table 2: All Balloons

| Time | Circumference of <br> Balloon 1 in cm <br> (no sugar) | Circumference of <br> Balloon 2 in cm <br> (5 mL sugar) | Circumference of <br> Balloon 3 in cm <br> (10 mL sugar) | Circumference of <br> Balloon 4 in cm <br> $(15 \mathrm{~mL}$ sugar) |
| :---: | :---: | :---: | :---: | :---: |
| 2 |  |  |  |  |
| 4 |  |  |  |  |
| 6 |  |  |  |  |
| 8 |  |  |  |  |
| 10 |  |  |  |  |
| 12 |  |  |  |  |
| 14 |  |  |  |  |
| 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.
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$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

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?
