

Name: _____

Period: _____

Is It Alive??

Objective: to investigate the characteristics of life, specifically the ability to use energy

Introduction:

To begin to answer the question "Is It Alive?" you will test whether grains of yeast and grains of sand have one of the characteristics of living things -- the ability to use energy (eat!).

When humans, and other living organisms use energy (eat), they break down high-energy molecules like sugar to get the energy they need and give off a gas called carbon dioxide as a byproduct of this reaction.

We will test whether yeast and sand can metabolize sugar and produce a gas, carbon dioxide. If they produce a gas when we "feed" it sugar, it's alive. If no gas is produced, then it does not metabolize (use energy) and we can conclude that it is not alive.

Gas produced = alive
No gas produced = not alive

Pre-lab questions:

1. Humans use yeast every day. What is yeast, and what are some common uses of yeast?
2. Do you think that the little grains of yeast are alive? Why or why not?
3. Do you think that the little grains of sand are alive? Why or why not?
3. To find out whether yeast and sand are alive, we first need to think about what makes something alive. What are some characteristics of living organisms?

I. Purpose:

The purpose of this experiment is to determine if yeast and sand use energy (metabolize) and produce a gas when sugar is available.

Predictions:

- A. Do you expect yeast to produce a gas when sugar is available? _____
- B. Do you expect sand to produce a gas when sugar is available? _____

II. Materials:

- 2 test tubes
- 1 test tube rack
- 1/2 tsp. yeast
- 1/2 tsp. sand
- 2 balloons
- 1 beaker of warm sugar water:
105°-115° F

III. Procedure:

1. Set up two test tubes in a test tube rack.
2. Test tube 1 will have 1/2 tsp yeast.
Test tube 2 will have 1/2 tsp sand.
3. Fill a beaker with 20 mL of warm water--105°-115° F (41° – 46° C).
Add the water to the contents of each of the test tubes, swirling the test tube around to mix the contents.
4. Cover the opening of test tubes with a balloon. The balloons will catch any gas that is formed.
Using the balloon to seal the end of the tests tube, hold a finger over the end of each test tube and shake it vigorously to thoroughly mix the contents.
5. Observe the test tubes and record your observations carefully in the table on the next page.
Then, every 5 minutes for 20 minutes, observe what occurs in the test tubes and any changes in the balloons which cover each test tube, and record your observations.
6. If the sample grains are capable of using energy, it will take some time to produce enough carbon dioxide to see the change in the balloons. Be patient and make careful observations.
While you are waiting for this change, record your observations every 5 minutes in the table.
Between recording observations, work on answering the Lab Experiment Questions provided.
6. After observations and data collection, remove the balloons from the test tubes. Rinse out the test tubes and beaker in the sink. Clean up your lab area and return test tube racks, beakers, and other equipment as you found it.

IV. Data:

- A. **Data Table:** label your test tubes and record descriptive observations of each test tube at 5-minute intervals in the boxes below

	0 minutes	5 minutes	10 minutes	15 minutes	20 minutes
Test tube 1 _____					
Test tube 2 _____					

Lab Experiment Questions:

Hypotheses: Write your hypotheses.

Do you expect yeast to produce a gas when sugar is available? (*Ex: If sugar is added to yeast, then the yeast will produce a gas.*)

Do you expect sand to produce a gas when sugar or other food is available? (*Ex. If sugar is NOT added to yeast, then the yeast will still produce a gas.*)

1. Discuss what you saw during the lab. What do you think it means?

2. When you make bread, if you just mix flour, sugar and water, the dough does not rise, and the bread will be flat and hard. If you include yeast in the bread dough, then the dough rises and the bread is bigger and fluffier. Can you explain how the yeast helps the bread dough to rise?

3. Why did we use two different materials in our test tubes?

V. Conclusion:

The purpose of this lab is _____

The hypothesis was _____ because

A possible source of error could be _____

_____ To fix that error, next time

This relates to class because _____
