Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class Period:\_\_\_\_\_

**Respiration in Yeast - Lab**

**Problem**: To observe how organisms use sugar to create energy

**Background Information:**

***Respiration*** is the process by which cells take in oxygen and release carbon dioxide and energy. It is the step-by-step breakdown of high-energy glucose molecules to release energy.

It takes place day and night in ***all*** living cells.

***All*** animalcells carry out the process of ***cellular respiration*** in order to meet their energy needs.

**Energy**, produced from glucose by cellular respiration, is required for the survival of all living things.

The organelle where cellular respiration takes place in the cell is the

***mitochondrion.*** The mitochondrion is the organelle that makes energy from food for the cell's activities.

When living things respire they produce heat energy.

The chemical equation for respiration is:

**Glucose (C6H12O6) + Oxygen (6 O2) 🡪 Carbon dioxide (6CO2) +Water (6H2O) + Energy**

**In this lab, we will use yeast (organisms belonging to the fungi kingdom) to show that cells extract energy from sugar using oxygen and release carbon dioxide and water as a by-product.**

**Fun Fact: It’s the carbon dioxide being released from yeast that makes bread rise when you bake it**

|  |
| --- |
| http://elinow-bioreview2.wikispaces.com/file/view/cycle.gif/191496710/cycle.gif |

**Purpose:** to observe evidence of aerobic and anaerobic respiration in yeast

Define- **Aerobic**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Anaerobic**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What is Yeast?** Yeast are a group of unicellular fungi a few species of which are commonly used to leaven bread and ferment alcoholic beverages.

**Materials:**

* 3 Large Test Tubes (per group)
* 3 flasks or beakers (per group)
* teaspoon
* yeast
* sugar packets
* juice
* balloons
* graduated cylinder

**Hypothesis**: Which test tube do you think will produce the most gas? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Procedure**:

1. Label the Test Tubes A, B, and C.
2. Label your flasks/beakers A, B,C.
3. Add ½ teaspoon yeast to each flask.
4. Add the correct amount of water and sugar for each labeled flask (see below).
5. Mix until the sugar is dissolved and transfer immediately to the test tube with the matching label.
6. Cover the test tube tightly with a balloon.

**Student Experiment:**

Test Tube A: 25 mL water + 2 sugar packet or (1/2teaspoon)

Test Tube B: 25 mL water + 4 sugar packets or (1 teaspoon)

Test Tube C: 25 mL water + 8 sugar packets or (2 teaspoon)

**Teacher Demo:**

Test Tube D: 25mL pop

Test Tube E: 25 mL Juice

Test Tube F: 25 mL syrup

Test Tube G: 25 mL water only (no yeast)

1. Shake the test tube to speed up reaction time.
2. Observe what happens inside test tube and to balloon at 5, 10, and 20 minutes. Measure circumference of a balloon using a piece of string. Then use a ruler to measure the string in centimeters.
3. Graph balloon circumferences vs time.

**Results:**

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| Table 5.1: Observations | | | | | | |
| Test Tube | 5 minutes | | 10 minutes | | 20 mintues | |
| inside test  tube | circumference  (cm) | inside test  tube | circumference  (cm) | inside test  tube | circumference  (cm) |
| A |  |  |  |  |  |  |
| B |  |  |  |  |  |  |
| C |  |  |  |  |  |  |
| D |  |  |  |  |  |  |
| E |  |  |  |  |  |  |
| F |  |  |  |  |  |  |
| G |  |  |  |  |  |  |

Graph: Make a line graph for balloon circumference vs. time. Remember the titles and labels.

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Conclusions: Answer the questions below in your conclusion on the lab write-up.

1. What is the gas that filled the balloon? Where did it come from? Explain your answer.
2. Which test tube produced the largest volume of gas? Why might this be so?
3. How are photosynthesis and cellular respiration connected in Science?
4. What is the overall equation of cellular respiration? Circle the reactants, Place a box around the products.
5. What two reactants are needed for a cell to extract energy (hint: look at the first formula on the front page)?