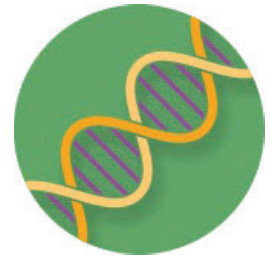


Aerobic and Anaerobic Respiration



Use this worksheet to guide your learning as you explore the AR activity.

Objective

Cellular respiration is the process of producing energy from the breakdown of food molecules (glucose).

- Aerobic respiration occurs with without the presence of oxygen.
- Anaerobic respiration occurs with without oxygen.

In this AR activity, you'll

test the ability of yeast to respire under different conditions.

Here are the steps you'll follow:

1. Set up five glasses with different conditions and add yeast to each glass.
2. Measure and record the height of the layer of foam that forms in the glasses.
3. Analyze your observations.



Yeast is a live organism! When yeast undergoes respiration, it produces carbon dioxide gas (CO₂). During the experiment, the gas appears as foam at the top of the liquid.

My Experimental Data

	Foam Height (cm)				
	0 min	15 min	30 min	45 min	60 min
Glass A lukewarm water, yeast	0	0	0	0	0
Glass B lukewarm water, sugar, yeast	0	1.5	3.5	4.5	5.5
Glass C hot water, sugar, yeast	0	0	0	0	0
Glass D cold water, sugar, yeast	0	0	0.5	1	1
Glass E lukewarm water, sugar, yeast (cover with plastic wrap after yeast is added)	0	1.5	3.5	4.5	5.5

? Question

Observe each glass throughout the experiment. What do you notice about the plastic wrap on Glass E by the end of the experiment?

The plastic wrap became stretched out like a balloon above the glass.

Analysis

- Which ingredients were the same in the glasses in which respiration occurred?

Sugar, yeast, and either lukewarm or cold water.

- Aerobic respiration occurred in glasses A B C D E.
- Anaerobic respiration occurred in glasses A B C D E.
- Respiration did not occur in glasses A B C D E. Why did respiration not occur?

In glass A, there was no sugar and so respiration did not occur because the yeast did not have a food source. In glass C, the water was hot and so respiration did not occur because the heat caused the yeast to die.

Reflection

Based on the experiment you performed, determine the:

- ❖ Independent variable(s) – variable whose value is specified before the experiment begins.

Size and material of glass, volume of water, amount of yeast, duration of experiment, and the temperature of the surrounding room.

- ❖ Dependent variable(s) – variable whose value is determined by on or more other variables.

Presence of sugar, temperature of water, and being covered by plastic wrap.

- ❖ Thinking about variables tested in this AR experiment, what could be another variable that can be tested? How would you set up the experiment to test this variable?

Answers may vary. Possible answers include:

- Use different organisms or cells. Add another 5 glasses to the experimental setup using a different type of cell (e.g., potatoes).
- Use more food. Add a 6th glass to the experimental setup that duplicates glass B but with double the sugar.