

# Fermentation in a Bag

## Cellular Respiration

Edgenuity Unit: Cell Biology

Lesson: Energy in Cells

Time: ~60 minutes



### Learning Target

I can construct an explanation for the production of gas during fermentation.

### Materials

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| <ul style="list-style-type: none"><li>• Dry active yeast</li><li>• Sugar</li><li>• 100mL graduated cylinder</li></ul> | <ul style="list-style-type: none"><li>• Teaspoon</li><li>• Snack-size Ziplock bags</li><li>• Bag labels</li></ul> |
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To release stored energy from glucose (sugar) molecules, humans and other animals use a type of **cellular respiration** called **aerobic respiration**. This process requires oxygen (**aerobic** means "with oxygen"). Some organisms do not use oxygen, however. In this case, the respiration is **anaerobic**.

**Fermentation** is the metabolic process used by yeast and other living **organisms** without oxygen (**anaerobic**). Yeast use this process to convert sugar into ethyl alcohol (with carbon dioxide as a byproduct). The ethyl alcohol can then be **distilled** into pure ethanol that can be used to fuel vehicles. While most fuel ethanol in the US is currently made from corn grain, the Great Lakes Bioenergy Research Center is studying the use of corn stalks and other **cellulosic biomass** (like grasses from prairies) as an alternative source.

Procedures:

In a pre-labeled Ziplock snack bag, combine 1 tsp. of sugar and 1 tsp. of yeast.

Add 50mL of warm tap water and zip the bag closed, removing as much air as possible.

Mix gently. Lay bag on a flat surface and watch for results (15-20 minutes).

Observe and answer the following questions:

If the bag is inflating, what is filling it up?

Warning: the bag will expand - it may even pop! Be sure to monitor the bag and release the gas if it becomes too inflated.

Are you observing **fermentation**? How do you know?

Where are the new gas particles coming from?

Discard bag and contents into garbage and make sure any mess is cleaned up!

Source: Great Lakes Bioenergy Research Center