

CRAZY ABOUT YEAST INVESTIGATION

Name: _____

Date: _____

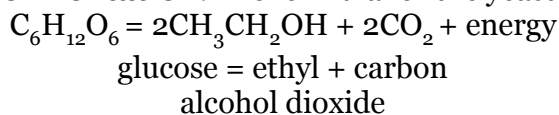
Yeast are tiny single-celled (**unicellular**) fungi. The organisms in the **Kingdom Fungi** are not capable of making their own food. Fungi, like any other organism, need food for energy. They rely on sugar found in their environment to provide them with this energy so that they can grow and reproduce.

Yeast, like bacteria grow in or on their food source. They produce and release digestive proteins (**enzymes**) into their environment where the sugar molecules are found. Sugar molecules then break down into smaller molecules that can be absorbed by the yeast and used for food (**energy**).

There are many **species** of yeast, and each has a particular food source.

- Certain yeast feed on a variety of natural sources of sugar such as fruits, nectar from plants, and molasses from the plant crop called sorghum.
- Others break down wood and corn stalks. In doing this, a compound called ethanol is produced. This compound can be used in our cars like gasoline.
- Another species break down sugar from grain into alcohol. Others break down fruits into wine, which is another type of alcohol.
- Bread recipes rely on yeast to break down sugar in our dough.

All of these processes are called **fermentation**. The formula for the yeast fermentation reaction is:



For the yeast cell, this chemical reaction is necessary to produce the energy for life. The alcohol and the carbon dioxide are waste products produced by the yeast. It is these waste products that we take advantage of.

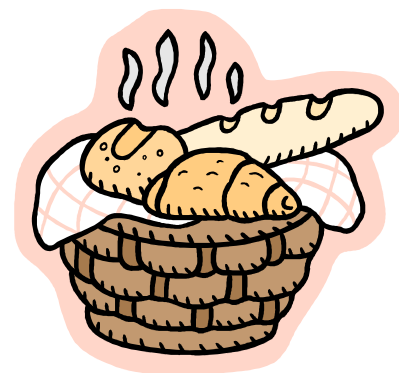
The chemical reaction, known as fermentation can be watched and measured by the amount of carbon dioxide gas that is produced from the breakdown of glucose.

When yeast feeds on sugar, carbon dioxide is produced. The bubbles you will see in your centrifuge tube are carbon dioxide. The bubbles are an indicator of fermentation. In this investigation the dependent variable is the rate of fermentation, seen as the bubbles.

In this investigation, you will carry out an experiment to **test whether your choice of independent variables affect the rate of fermentation in yeast** and analyze the results.

You will:

1. Use the brainstorm handout to establish a **list of possible independent variables**. Example of an independent variable: temperature of the water
2. Use the fishbone handout to pick **at least two** of your independent variables that will be used for your investigation.



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3. Carry out your investigation using the material listed below. Modify your independent variable to see how it affects your dependent variable.

Material:

- Centrifuge tubes
- Yeast
- Water
- Sugar



Independent variable

- whatever you need!
- Example: hot water, cold water, tap water, graduated cylinder

Method

- Mix yeast, water and sugar in a centrifuge tube.

EXAMPLE: If you chose to investigate the affect of different water temperatures on yeast fermentation, you may decide to measure the amount of bubbles produced when adding yeast to boiling water, tap water and ice water.

In your report include:

- Your hypothesis
- Your method
- Your results (include a table that lists the amount of bubbles produced)
- Your discussion (what happened, was there more bubbles with boiling water, tap water or ice water, what does that mean?)

Modified on March 17, 2012 from Thiel T. (n.d). *At a Glance*. Retrieved on March 15, 2012 from <http://www.umsl.edu/~microbes/pdf/Its%20a%20Gas.pdf>