

Science: Genie in a Bottle!

Ages: 7 - 13

Hello everyone. This is Bill from the Okanagan Regional Library System. Welcome to the fun and inventive world of making STEAM projects in your own home. Each month, I will share a fun and interesting project that you can make using materials commonly found in your own home.

This month's project: Genie in a Bottle: A Classic Yeast Experiment

Genie in a Bottle



Yeast are single-celled fungi. As fungi, they are related to the other fungi that people are more familiar with, like the mushrooms that you buy at the store. A common yeast that is used in many homes is baker's yeast used in baking bread. Yeast cells are egg-shaped and can only be seen with a microscope. It takes 20,000,000,000 (twenty billion) yeast cells to weigh one gram.

The scientific name for the yeast that bakers use is *Saccharomyces Cerevisiae*, or "sugar-eating fungus". A very long name for such a tiny organism! This species of yeast is very strong and capable of fermentation, the process that causes bread dough to rise.

Yeast cells digest food to obtain energy for growth. Their favorite food is sugar in its various forms. In this experiment we will see which type of sugar is best for growing our yeast.

Materials Needed:

- 4 squeeze bottles
- 4 water balloons
- Tape
- Baker's yeast (packets or bottle)
- 3 types of sugar (brown sugar, white sugar, and honey)
- Warm Water
- 1 Teaspoon measuring spoon



Time: 30 minutes to 1 hour

Steps:

1. Take the lids off the 4 squeeze bottles. Place a balloon over the spout of each lid and use tape to ensure a tight fit.



2. Pour 1 teaspoon of yeast into each bottle.



3. Add one type of each sugar (2 teaspoons each) to 3 of the bottles. Do not add sugar to the fourth bottle. Using some tape, label each bottle so that you know which kind of sugar is in each.



4. Now add $\frac{1}{2}$ cup of warm water to each of the four bottles.



5. Put the lids back on to each bottle, shake the bottles to mix everything up, and let them sit for at least 30 minutes.



6. What happens if you leave them for 1 hour?



Read World Science: Baking Bread



Breads that use yeast are different from all other baked goods. It takes several steps to bake bread, and one step is to put the dough in a warm place and wait for it to rise. But why is that step so important—and why does bread dough rise, anyway?

Bread recipes call for “active dry yeast.” You may be surprised to know that yeast is a living thing. It needs to eat, like anything that’s alive, and it loves sugar. In a process called fermentation, the yeast feasts on any sugar in the bread dough and then *burps!* In the bread world, burping isn’t rude—the yeast is creating air bubbles in the bread dough.

The stretchy part of bread that holds the gas is called gluten. Gluten is formed when the proteins in flour come in contact with water, and as the two ingredients are kneaded, more and more gluten forms. This stretchy molecule traps air bubbles inside the dough.

Bread rises because yeast eats sugar and burps carbon dioxide, which gets trapped by the bread's gluten. The more sugar your yeast eats, the more gas that gets formed, and the higher the bread rises!