

TEACHING GUIDE: EXPLORING YEAST

Level: Easy!

Duration: 15-20 minutes

Unusual Materials: None – all standard kitchen materials

Remember to record your experiment in a lab notebook! Download yours at www.FoodScienceSecrets.com

Purpose: Help your student understand yeast, and why it is an ingredient in bread-making!

Objectives: By the end of this lesson, your student will understand:

- Yeast is a microorganism
- Yeast “eats” sugar and produces gas (carbon dioxide) which helps make bread rise
- If no sugar is present, yeast will not work!
- Additional objectives: use the scientific method to practice STEM skills such as: critical thinking, problem solving, data collecting and interpretation

EXPERIMENT

Start with these questions:

What is yeast? Why is yeast added to bread?

Background:

Yeast is a micro-organism (micro = tiny, organism = living thing) that can be found all around us. There are many different kinds of yeasts. Some naturally-occurring yeast can be found on our skin. Other naturally-occurring yeasts can be found on the skins of fruits and vegetables. Some yeasts are used to make industrial products like ethanol (which is used as fuel to make cars run).

However, many of us are most familiar with the type of yeast we use to make bread. The scientific name of this type of yeast is *Saccharomyces cerevisiae*. Baking yeast can be found in the grocery store under names like: “active yeast,” or “instant yeast,” and

TEACHING GUIDE: EXPLORING YEAST

can be found in packets or jars. Most of us home cooks are familiar with yeast that takes the form of dehydrated granules (you may think the granules look like sand).

Yeast is fed with a sweetener, like sugar or honey. When the yeast eats sugar, carbon dioxide gas is produced and little bubbles get trapped in the bread. It's important that the carbon dioxide gas is produced gradually, and not all at once. The gradual process allows the bread to rise, and makes bread fluffy inside. (The gluten network in bread dough also helps contribute to the rise. Air bubbles get trapped the gluten, leaving a nicely leavened loaf.)

When the loaf of bread is baked, the heat ends up killing the yeast. However, the gas bubbles that were trapped in the loaf can enlarge during baking as the entrapped air can expand, and water converts to steam.

Materials needed:

- 2 small, clean, empty bottles with a neck (About 8oz. A clear pop bottle works great. Make sure the bottle is large enough that the water only fills it 2/3 full.)
- 1 cup warm water, divided. Make sure the water is not too hot or cold! (Try to get water 100-110F)
- 4 packets of quick rise instant yeast
- 1 tsp. sugar
- 2 latex gloves, or balloons
- 2 rubber bands
- Clock or stopwatch
- Tape and marker to label the bottles

Procedure:

1. Prepare your experiment. Stick a piece of tape on each clean, empty bottle. On one bottle mark "Contains Sugar," and on the other bottle write "No Sugar." *Explain to your scientist that the water must be the right temperature so the yeast is not too hot or too cold. Yeast activates in temperatures approx. 100-110F.*
2. Add 1/2c warm water to each bottle. *Explain to your scientist that the yeast is inactive, or "sleeping." Let them observe the yeast before adding it to the water.*
3. In the bottle marked "Contains Sugar," add 1tsp sugar to the water and swirl to dissolve. *Explain to your scientist that the sugar will "feed" the yeast.*
4. Sprinkle 1 packet of yeast into each bottle and swirl to mix.
5. Immediately cover the top of both bottles with the gloves (or balloons) so the opening of the glove is fastened over the opening of the bottle, fingers pointing

TEACHING GUIDE: EXPLORING YEAST

up. Rubber band the gloves tightly to the bottle. *Explain to your scientist that you're going to watch what happens to the glove.*

Observations: *(Record all observations in a lab notebook!)*

- What do you observe about the experiment? Are the gloves flat, or inflated?
- Which glove inflated?
- How long does it take the glove to inflate?

Discuss with your scientist what they see, hear, smell, etc. All observations are important! Encourage your scientist to record their observations in a way that makes sense for them. Draw pictures, make notes, graph, and/or describe their observations to a scribe (you)!

Conclusions:

Which glove inflated? Why?

Discuss with your scientist how the yeast "eats" sugar. After the yeast consumes the sugar it and makes a gas (carbon dioxide), which blew up the glove just like a balloon. Yeast works much the same way in bread-making – the gas helps bread rise! Review what was learned during the experiment.

Explore more!

*For more ideas on STEM in the kitchen with kids,
visit www.FoodScienceSecrets.com*

