

# FEASTING ON YEAST

## BENCHMARKS and TASKS

**SC.B.2.2.1** The student knows that some source of energy is needed for organisms to stay alive and grow.

**SC.G.1.2.1** The student knows ways that plants, animals, and protists interact.

- The student recognizes that some source of energy is needed for all organisms to stay alive and grow.
- The student categorizes populations of organisms by the function they serve in an ecosystem: plants and some microorganisms as *producers* that make their own food; animals, including humans, as *consumers*, which obtain food by eating other organisms; and *decomposers*, primarily bacteria and fungi, recyclers that break down dead plants and animal materials into elements that return to the soil, water, and air for use again.

## KEY QUESTION

How does yeast react in different liquids?

## BACKGROUND INFORMATION

**Protists**, such as fungi, slime molds, and bacteria, act as **decomposers**. Decomposers chemically break down the organic matter into nutrients such as nitrogen, phosphorus, and potassium. The nutrients are then more available to the plants growing in the soil. Fungi are non-green organisms with no roots, stems, flowers, seeds, or leaves. They lack chlorophyll and cannot make their own food the way seed plants can. They rely on organic matter, living or dead, for nourishment. As long as fungi have a moist environment, they are capable of digesting almost anything. Fungi reproduce by forming spores rather than seeds. Mold, mushrooms, and other fungus spores are in the air all the time, but we only become aware of them when they fall on a suitable material and begin to reproduce. Yeast, a group of microscopic, one-celled fungi, reproduce by budding. A bud, the beginning of a new cell, gradually forms on the surface of the parent cell. When the bud matures, it may break off or it may stay attached and form buds of its own until a whole chain of cells has developed. In its dormant state, yeast can survive for long periods without water or food and at low or high temperatures. When yeast cells are living and growing, they change sugars into alcohol and carbon dioxide gas. Trapped below the surface, the carbon dioxide forms bubbles that make the yeast culture expand. For bakers and wine makers, yeast byproducts are important. The winemaker is interested in alcohol production, and the baker is interested in carbon dioxide that becomes trapped in the dough and causes the dough to rise.

## MATERIALS

### Per class

various liquids (e.g., grape juice, milk, vinegar, water, soda, coffee, orange juice)

1 measuring cup per liquid

clock

*Strega Nona's Magic Lesson*, Tomie DePaola

### Per group

1 permanent ink pen

3 clear, plastic 9 oz. cups

masking tape

3 tablespoons (or pkgs.) of yeast

*Feasting on Yeast* observation sheet

3 stirrers

### Per student

1 small bit of bread  
1 hand lens  
science journal

### TEACHING TIPS

1. Provide the same amount of yeast for each group. Students can measure one tablespoon per cup of liquid or use one package of yeast in each cup. Three packages of yeast, one per cup, may be easier than having students measure from a jar of bulk yeast, but it will also be more expensive.
2. Make available large containers with various liquids such as grape juice, orange juice, milk, vinegar, water, soda, and coffee. Also, dissolve some sugar in water; use one tablespoon of sugar per two cups of water. **Very important: All liquids must be at room temperature.**
3. Label each of the containers of liquid so that students can copy the words onto the masking tape labels.

### ENGAGE

1. Read or tell the story, *Strega Nona's Magic Lesson*. Stress the problem Big Anthony had when he didn't follow directions for yeast.
2. Ask students if they've ever made, or seen anyone make, bread. Give each student a small piece of bread to observe with a hand lens. Ask students what they think made the holes in the bread.
3. Create a circle map for recording students' background knowledge about yeast.
4. Pass some yeast around for students to smell. Tell them they will be observing how yeast reacts when it is put into different liquids.

### EXPLORE

1. Show the class the different liquids that are available. They should decide as a group which three liquids they will investigate and then label the cups using the masking tape and the permanent ink pen.
2. Students should measure  $\frac{3}{4}$  cup of each liquid into the labeled cups.
3. Have students predict what they think will happen when yeast is added to the liquids.
4. One package (or one Tbsp.) of yeast should be added to each liquid and then stirred.
5. Students should record the time and their observations in the first section of the *Feasting on Yeast* record sheet.
6. Ask: *How does your prediction compare to what actually happened?*
7. Students should observe the cups of yeast and liquid three more times at ten-minute intervals and record.
8. Remind students to also use their sense of smell when making observations.
9. Ask students to compare the contents of the three cups.

### EXPLAIN

*What changes did you notice when the yeast became active?*

*In which liquid did you notice the most changes? . . . the least changes?*

*How long had the yeast been in the liquid before you first noticed any change?*

*How did the yeast react in each liquid?*

*What about the liquid do you think caused the change in the yeast?  
Can you identify the odors in some of the liquids?*

### **EXTEND/APPLY**

Discuss:

*What liquid would you use if you wanted to get the most reaction from yeast? Why?*

*After doing this investigation, why do you think bread has holes in it?*

*Why would a baker use yeast?*

### **EXTENSIONS**

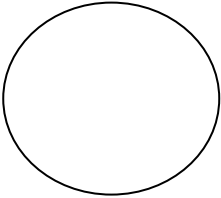
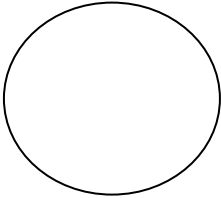
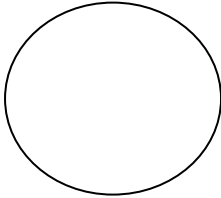
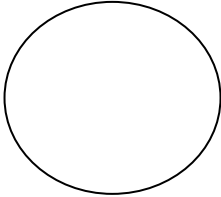
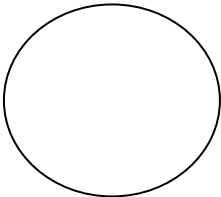
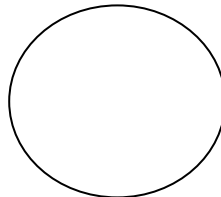
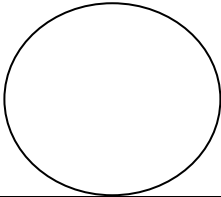
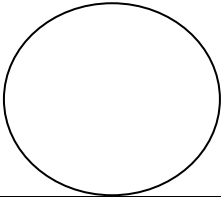
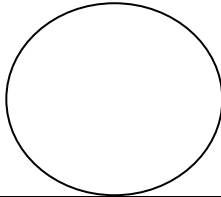
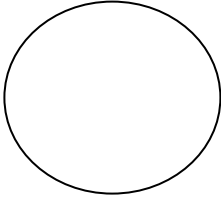
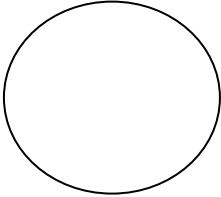
1. Repeat the investigation using rapid-rise yeast.
2. Repeat the investigation using different temperature variables.

### **ASSESSMENT**

Have students compare and contrast the reaction of yeast in two different liquids. Look for careful observations in the science journals.

Names \_\_\_\_\_

## FEASTING ON YEAST

<b>Observation #1</b> <b>Time:</b>	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 
<b>Observation #2</b> <b>Time:</b>	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 
<b>Observation #3</b> <b>Time:</b>	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 
<b>Observation #4</b> <b>Time:</b>	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 	<b>Liquid:</b> <b>Observations:</b> 