Investigation 2 Science Lab: Effects of Environmental

Changes on a Yeast Population

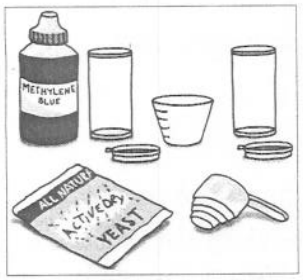
In this activity, students will observe the effects of environmental changes on a yeast population by observing changes in the amount of oxygen in the environment.

Preparing

- If a freezer is not available, provide ice water for students to set their vials in.
- Heat a pan of water to boiling on a hot plate.

Safety Tips

- Caution students to be careful with the boiling water.
- Caution students not to taste the methylene blue.



Materials

Here's what you'll need for 6 cooperative groups of 4 students:

Materials provided in kit:

- 12 vials with caps
- 6 measuring scoops
- 1 bottle of methylene blue

You supply:

- copies of the "Effects of Environmental Changes on a Yeast Population" Science Lab
- 6 packages of yeast
- masking tape
- sugar
- warm tap water
- a freezer or ice water
- boiling water

For refills of consumable materials, contact Delta Education at 1-800-442-5444.

Sample Completed Student Chart

Yeast Population Observations					
	Stage 1 *Yeast and warm water*	***Stage 2*** *Yeast, water, and sugar*	***Stage 3*** *After 20 min. in freezer*	*After adding boiling water*	***Stage 4*** *After 20 min. at room temperature*
Vial 1 Color changes	*Blue*	*Bubbles up; volume increases; gradually becomes colorless*	*Blue begins to return*		*Volume increases; blue begins to disappear*
Vial 2 Color changes	*Blue*	*Bubbles up; volume increases; gradually becomes colorless*		*Blue returns. Yeast drop to bottom.*	*Water is still blue. Yeast is at bottom of vial.*

Answer Key for What It Means Section

1. How did each of the following factors affect the yeast population?

   (Sample answer) Sugar: The sugar caused the yeast to start using up the oxygen for respiration. The population grew.

   Cold temperature, followed by return to room temperature: The cold caused the yeast to stop growing and using oxygen. When the yeast were returned to room temperature, they began to grow again.

   Boiling water: The boiling water killed the yeast.

2. How was the growth of the yeast affected by sugar, and by temperature changes?

   (Sample answer) The sugar provided the yeast with food, which is why they began to grow and reproduce. The cold caused the yeast to stop growing, but they remained alive and began to grow again when returned to room temperature. The boiling water killed the yeast.

Answer Key for Advising the Team Section

Like yeast, all living things must live in an ecosystem where they can find food, ideal temperatures, and much more. What are some of the things sea otters need to survive that are provided by the kelp forest? What is one environmental change that you think could cause the sea otter population to increase? Why? What is one change that could cause the population to decrease? Why?

(Sample answer) Sea otters need to eat about 25 pounds of food each day. They also need to breathe air and keep warm. They also have to live in a place where the water is not too deep so that they can dive for food. The sea otter population might increase if the amount of food increased, because there would be more for them to eat and less competition for food. The sea otter population would decrease if there were an oil spill because the oil would coat their fur and make it difficult for the sea otters to keep warm.