

## Yeast science

### Introduction:

Ask your students if any of them have heard about yeast. Ask them what yeast is used for in cooking. See if any of your students know what yeast is. If they don't, that's okay, we're going to find that out.

### **Yeast balloon**

#### Supplies:

- 4 water bottles
- Warm water
- Cold water
- Yeast
- Measuring spoons
- Sugar
- 4 Balloons

#### Procedure:

1. Label each of the four water bottles as "cold, sugar", "cold, no sugar", "warm, sugar", "warm, no sugar"
2. Blow up each of the balloons 3 times and then let the air out. This is to stretch out the balloon to make it easier to fill with gas.
3. Add half an inch of either hot or cold water to each.
4. Add 1 Tbsp of sugar to both of the water bottles which are labelled that way.
5. Add 2 tsp of yeast to each of the water bottles.
6. Cover the top of the water bottle with a balloon.
7. Wait a few minutes. If the yeast is working, the balloon will fill up with carbon dioxide

While you are waiting, you can start discussing microscopes (see next page)

Record in the following table which balloons inflated and which didn't. Also record what the yeast mixture on the inside looks like, whether it has bubbles, etc.

	Cold Water	Warm Water
Sugar		
No sugar		

What's happening?

The yeast is a living organism! When it produces gas, it is doing the same process we do when we breathe. It takes in oxygen and a food source and "breathes" out carbon dioxide and water. The yeast grains contain a small amount of food, but when sugar is added to the yeast mixture, the yeast can grow and produce much more carbon dioxide.

Baking yeast is sold dehydrated. In order to become active, it needs to rehydrate, which is why it needs water. Warm water will work better than cold water because the yeast will be more active at higher temperatures. The yeast grains contain a small amount of food, but when sugar is added to the yeast mixture, the yeast can grow and produce much more carbon dioxide.

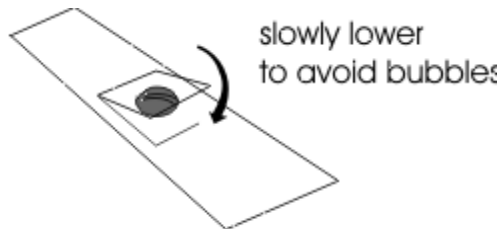
This carbon dioxide is why we use yeast in baking. It's what makes bread dough rise and what creates the holes in bread.

### Yeast under a microscope:

We're going to be using a microscope for the next part of the lesson to look at individual yeast pieces. Ask the students if any of them know what microscopes are used for. Microscopes work by using lenses to magnify the object you're looking at. This is very similar to how a magnifying glass works, but much more powerful. With it we'll be able to see the yeast to get a better idea of what it is.

Tips for using the microscope:

- When placing the cover slip, prevent trapping air bubbles by lowering one edge of the slip to the slide first, then the other side (see picture)



- Use the lowest magnification first to focus then go to higher magnifications to see the individual yeast cells. You may have to find some yeast cells for them. See if you can see movement or gas production or budding.

If you have extra time:

- Try different combinations of ingredients in the water bottle to see which produce yeast faster or slower. We have flour and salt as well.
- Try looking at the yeast from some of your water bottles under the microscope. What looks different? What looks the same? The yeast mixture in the container has been sitting for several hours, where the yeast in your water bottles has only been there for a few minutes.