



SCIENCE *of Baking*

➔ Yeast is a microorganism.

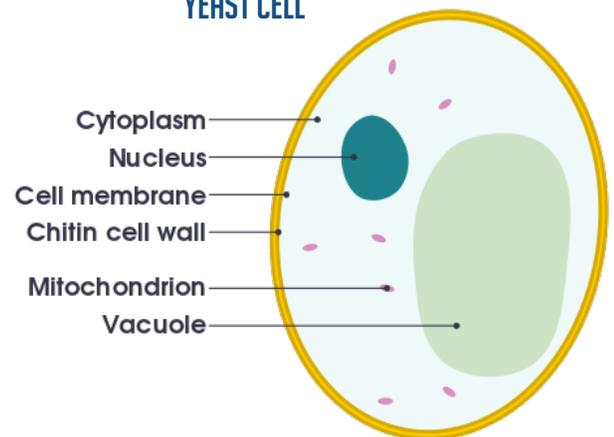
The fascinating world of yeast and gluten

This Thanksgiving, make a loaf or two of yummy yeast bread to share with family and friends, but let's think about the science that is behind it as you bake it up!

WHAT IS YEAST?

Yeast is a live microorganism from the Fungi kingdom that consumes simple sugars, and converts them into carbon dioxide and alcohol (a process called fermentation). There is yeast all around us, but when it comes to baking, we typically use commercial yeast in dried form.

YEAST CELL



WHY DOES BREAD RISE?

In bread making, the yeast organisms expel carbon dioxide and alcohol as they feed off of sugars. As the carbon dioxide is formed, the bubbles are trapped by gluten in the wheat flour; this is why the dough volume increases or 'rises'. As the bread dough warms and bakes in the oven both the carbon dioxide expands and moves and the alcohol evaporates creating even more air pockets.

WHAT IS GLUTEN?

Gluten is the combination of two proteins (glutenin and gliadin) in wheat flour. Most bread recipes have you knead the dough, this creates the gluten by mixing the two proteins together. As you knead, the network of gluten gets stretchier - this stretchy, elastic substance helps hold the carbon dioxide produced by the yeast. You then have to let the bread rest (proof) in order to allow the yeast to eat, create carbon dioxide, and thus the bread rises a bit more before baking. When you bake the bread, this solidifies the gluten with all of the air bubbles trapped. The result is fluffy, yummy bread.

Try the recipe on the following page from [AllRecipes.com](https://www.allrecipes.com).



The Biology of Bread

Tell us how your experiment goes by sharing photos and tagging The Works on social media: **#attheworks** and **#STEMActivity**

MATERIALS

- 2 cups warm water (not too hot, it will kill the yeast!)
- 2/3 cup white sugar
- 1 1/2 tablespoons active dry yeast
- 1 1/2 teaspoons salt
- 1/4 cup vegetable oil
- 6 cups bread flour



METHOD

1. In a large bowl, dissolve the sugar in warm water, and then stir in yeast. Allow to proof until yeast resembles a creamy foam.
2. Mix salt and oil into the yeast. Mix in flour one cup at a time. Knead dough on a lightly floured surface until smooth. Place in a well-oiled bowl, and turn dough to coat. Cover with a damp cloth. Allow to rise until doubled in size, about 1 hour.
3. Punch dough down. Knead for a few minutes, and divide in half. Shape into loaves, and place into two well oiled 9x5 inch loaf pans. Allow to rise for 30 minutes, or until dough has risen 1 inch above pans.
4. Bake at 350 degrees F for 30 minutes.

We hope you enjoyed our STEM Activity of the Month.

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