



Bready or Not:

All You Knead to Know About Yeast

Ages: 5-12 with parent supervision and help

STEAM Concepts: Science, Art, Math

Time: 35 minutes (experiment) and/or 2+ hours (bread baking)

Hello everyone! We've noticed a lot of people have picked up baking as a hobby, and we thought it—specifically how yeast works—would be a fun topic for our STEAM Studio program!

We've split our focus into two parts

- 1) demonstrating how yeast works by blowing up a balloon as an experiment, and
 - 2) showing how it works in a bread recipe to make the dough rise!
- The experiment: yeast is a single-celled, living organism (it's actually a fungus!) that is dormant when you buy it in the stores.
 - When you use it in a recipe and mix it with warm water, sugar, and flour, the sugar and starches from the flour feed the yeast and wake it up.
 - After the yeast is fed, it then does something called anaerobic respiration: it breathes without using oxygen! (unlike humans, who require oxygen to breathe and use aerobic respiration)
 - The process of anaerobic respiration in yeast converts the sugar to energy and also creates carbon dioxide
 - The carbon dioxide is what makes bread dough rise, and in the case of our first experiment, blow up the balloon!

If you decide to make bread using the recipe we provide, or another one, we'd love for you to share it with us on Facebook!

Let's get started!

Bready or Not

VOCABULARY

Yeast

- Single-cell organism
- Is alive (dormant when you buy it at store)
- Can be found as many different types: active dry, quick rising, pizza

Aerobic Respiration

- Needing oxygen to breathe

Anaerobic Respiration

- Not needing oxygen to breathe
- Yeast uses anaerobic respiration to produce energy and carbon dioxide

Bready or Not

Blowing Up a Balloon With Yeast

Materials: Water bottle
Warm (not hot) water
1 package Active Dry Yeast
(quick rising or traditional)
1 tsp of sugar
balloon
Optional: funnel

Instructions:

- Blow up your balloon a few times to stretch it out
- Fill your water bottle (or other clear drink holder) with about 3cm of warm water—if it is too hot it might kill the yeast!
- Carefully pour your packet of yeast (or use a funnel) into the water bottle
- Swirl the water and yeast around to dissolve the yeast
- Add 1 tsp of sugar into the water bottle, and swirl again
- Cover the water bottle's opening with a balloon
- Watch your balloon grow as it fills with carbon dioxide from the yeast over the next 30 minutes!



How it works: the yeast becomes activated (wakes up) when it is mixed with warm water and then fed sugar. It then begins the process of anaerobic respiration, which produces energy and carbon dioxide.

Carbon dioxide created by yeast is what makes your bread dough rise after you mix it together and let it rise somewhere warm.

Sometimes recipes will ask for yeast to be bloomed (mixed with warm water), sometimes you mix in the water after mixing the yeast in with the rest of the dry ingredients.

Bready or Not

Basic Bread Recipe

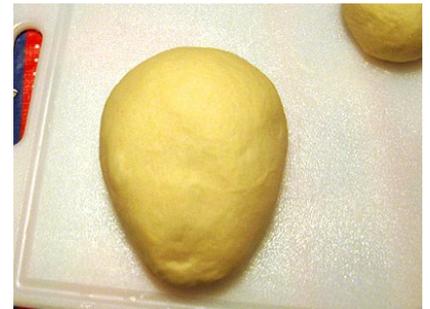
(Adult help and supervision required)

Ingredients: 6 cups flour
2 teaspoons salt
2 teaspoons yeast (regular active dry or traditional)
1/4 cup sugar
2 cups lukewarm milk* (or soy milk)
1/4–1/2 cup water (more if using soy milk)
Extra flour

Materials: 2 large mixing bowls
spatula
measuring spoons/cups
stand mixer with dough hook (optional)

Instructions:

- Measure out your flour 1 cup at a time and sift into a large bowl
- Add in the salt, yeast, and sugar
- Mix everything in the bowl together
- Heat the milk by **30 second intervals** (microwave for 30 seconds, test and stir, microwave for another 30 seconds, test and stir)
- The milk **should only be lukewarm**, not very warm or hot
- Add the milk and enough water to the dry ingredients so it can be mixed together to form a ball
- The dough ball should be **tacky** (like a sticker) but **not sticky** (like a glue stick)
- Knead the dough with the heel of your palm for 10 minutes (OR knead with a dough hook on low speed)
- The ball of dough should be **smooth after kneading** and there should be no shaggy bits falling off.
- Grease another large mixing bowl, place the dough inside, cover with plastic wrap, and **let rise for 90 minutes** (1 and 1/2 hours) in a warm place
- After 90 minutes the dough should have **doubled in size** thanks to the **yeast making carbon dioxide**
- **Shape your bread into anything you want!** I've made a giant frog and ladybugs—you can also do rolls or loaves
- Let rest/rise for another 30 minutes after shaping, & preheat your oven (with parent help!) to 350°F
- Once the oven is preheated and after 30 minutes, have an adult place the tray inside and you can watch your bread bake and grow even more
- For 6-8 buns: 25-30 minutes, for 1 loaf: 40-45 minutes
- Let bread cool for 30 minutes to 1 hour (after an adult has helped take it out)



Kneaded Bread

*I have tried this recipe with both regular and soy milk, but not almond or oat yet. You may need to add more water or use less, depending on how the dough forms

DIY Seed Bombs

Resources

Websites:

Blowing up a Balloon with Yeast <https://www.science-sparks.com/blowing-balloons-respiration-style/>

<https://study.com/academy/lesson/cellular-respiration-in-yeast.html>

Frog Bread (Bread Recipe) <http://www.thefreshloaf.com/recipes/frogbread>

Books from the Catalogue

- *Flour Water Salt Yeast* by Ken Forkish
- *The Complete Baking Book for Young Chefs* by America's Test Kitchen
- *The Ultimate Kids' Baking Book* by Tiffany Dahle
- *Baking Class* by Deanna F. Cook
- *My First Baking Book* from Cico Kidz



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