

KNOT YOUR AVERAGE YEAST LOB

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Have you ever wondered what makes dough rise? Believe it or not, dough rises because of a fungus; a tiny, living, 1-celled organism called yeast. When dried, yeast are in a state of suspended animation. But when you add warm water & sugar, watch out! The yeast get active & go into a feeding frenzy. What's left behind is carbon dioxide (CO₂) & alcohol.

Day 1: Activate Those Yeast Cells!

- Clean / dry 4 red cups and 4 plastic spoons, each numbered 1-4. Clean / dry your table.
- Add 1½ teaspoon (tsp) of yeast to each cup.
- Add ingredients to each beaker according to the following directions:
 - Cup 1: 1½ cup warm water
 - Cup 2: 1½ cup warm water and 1½ tsp sugar
 - Cup 3: 1½ cup hot water
 - Cup 4: 1½ cup hot water and 1½ tsp sugar
- Use the labeled plastic spoons to gently stir the contents of the cup for 1 minute. Only use spoon #1 in cup #1, spoon #2 in cup #2, etc. Wait three minutes.
- Use the magnifying glass & observe the contents of each cup for a few seconds. What is happening in the cups? Record & explain your observations in the chart below

Day 1 Materials

- 4 large cups
- 4 plastic spoons
- active dry yeast
- sugar
- warm water (40°C)
- hot water (80°C)
- stirring spoon
- large mixing bowl
- flour
- 1 gallon-size plastic bag
- plastic sheet

Cup #1: warm water & yeast	Cup #2: warm water, yeast, & sugar
Cup #3: hot water & yeast	Cup #4: hot water, yeast, & sugar

6. What do your lab results tell you about the effect temperature has on the carbon-dioxide production of yeast?

7. Is sugar necessary for the yeast to produce carbon dioxide? Explain. _____

8. Which cup is the best-suited for making pretzels? _____ Why this cup? _____

9. Pour the contents of the cup you selected into the large mixing bowl. Make sure that all of the mixture is transferred to the bowl.

10. Add ½ cup of flour and 1½ tsp of salt to the yeast mixture, and mix well. Slowly add more flour until the dough begins to form. You will add approximately 3 cups of flour.



11. Make sure your large plastic sheet is clean, then spread it out on your desk. Sprinkle a handful of flour evenly on the sheet's surface. Turn the dough onto the floured surface and begin to knead it. Knead by repeatedly pushing the palms of your hands into the dough. Every few seconds, turn the dough a quarter turn, and fold the dough over. You will need to add more flour to the surface of the dough and the plastic sheet as the dough gets sticky. Continue kneading for about 5 minutes. Stop kneading when the dough no longer feels sticky and is smooth and elastic.
12. Place the dough in the labeled plastic bag. Give the bag to your teacher to refrigerate overnight.

Day 2: Let's All Do the Twist!

13. Remove the dough from the refrigerator. What differences do you notice in the dough's appearance? Record your new observations. _____

14. Using your observations from the day before, explain why the dough's appearance has changed. _____

15. Separate your dough into 4 equal pieces for each group member. From your section, pull off a piece of dough the size of a golf ball. On the sheet, roll the dough into a long, snakelike shape, about the thickness of a finger. You may need to add a little bit of flour. Fold the dough into a pretzel shape using the diagram below as your guide. You may have 1 large pretzel or several mini pretzels.



- Day 2 Materials**
- Refrigerated dough
 - Plastic sheet
 - Flour
 - Paper plates
 - Cinnamon & sugar
 - Salt
 - Microwave

16. Place the pretzel(s) on a paper plate. You may choose to lightly sprinkle the unbaked pretzel with cinnamon & sugar, or salt. Cook the pretzel using ONE of the following methods:
 - Microwave: 30% power for 3 minutes 40 seconds
 - Toaster Oven: Remove pretzel from the paper plate & place on a sheet of tin foil. Toast for 5-6 minutes at 350°
17. Carefully remove the pretzel(s) from the oven, and allow them to cool for 5 minutes. Break a piece off the end of the pretzel and look inside.

Hey, What Happened?

18. What does the inside of the pretzel look like? _____
19. What caused the inside of the pretzel to look like it does? _____
20. Do you notice any evidence of the alcohol that the yeast produced? Explain. _____

21. If you had to use the contents of a different cup to make the dough, how might the pretzels have been different? _____

22. The heat from the oven killed the yeast and no more carbon dioxide was produced. So why did the dough continue to rise during the baking process? _____