Knot Your Average Yeast Lab

2pts EC printing

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 (CO_2) & alcohol.

Day 1: Activate Those Yeast Cells!

1. Clean & dry 4 red cups & 4 plastic spoons. Clean & dry your table.
2. Add ½ a package of yeast to each cup.
3. Add ingredients to each cup according to the following directions:
    - **Cup 1**: 1½ cup warm water
    - **Cup 2:** 1½ cup warm water & 1½ tsp sugar
    - **Cup 3:** 1½ cup hot water
    - **Cup 4:** 1½ cup hot water & 1½ tsp sugar
4. Gently stir the contents of each cup for 1 minute. **Wait three minutes.**
5. Use the magnifying glass & observe each cup for a few seconds. Record your observations below.

Day 1 Materials

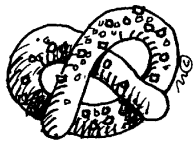
4 large cups
4 plastic spoons
active dry yeast
sugar
warm water (40°C)
hot water (80°C)
stirring spoon
large mixing bowl
flour
1 gallon-size plastic bag
plastic sheet

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

6. Is there a difference between the cups with warm water (#1 & #2) & the cups with hot water (#3 & #4)?

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

8. Which cup is the best 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 & 1½ tsp of salt to the yeast mixture. Mix well. Slowly add more flour until the dough begins to form. You will add approximately 3 cups of flour total.

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.

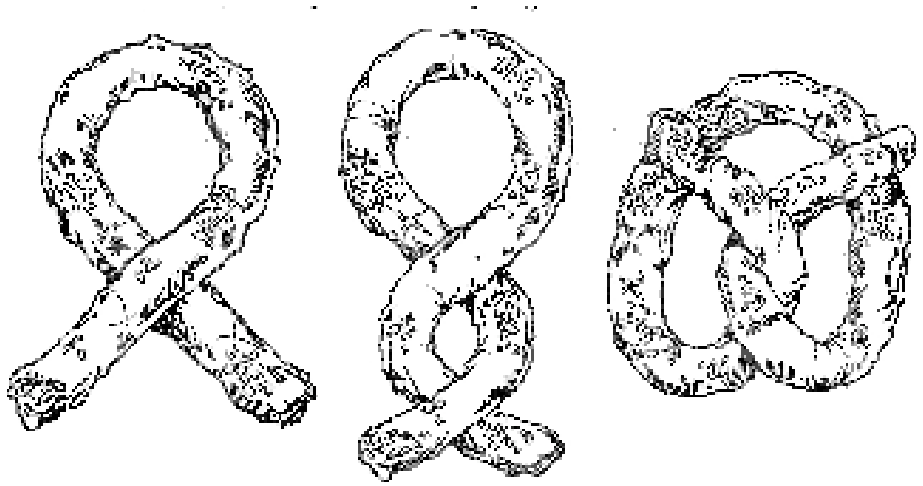
12. Place the dough in the labeled plastic bag. Give the bag to your teacher.

Day 2: Let's All Do the Twist!

13. Remove the dough from the refrigerator. What differences do you notice?

14. Why did the dough 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 a guide. You may have 1 large pretzel or several mini pretzels.



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, & allow them to cool for 5 minutes. Break a piece off the end of the pretzel & 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 alcohol that the yeast produced?

21. How would the pretzels be different if you used cup #3 instead?

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