

Bowwow Barker Training 003: Fizzy Fermentation

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Biblical Integration

“Now faith is confidence in what we hope for and assurance about what we do not see.”
Hebrews 11:12

Objective

Using the super sleuth skills of observation, measurement, and analysis, watch a demonstration of an invisible chemical reaction called fermentation.

Vocabulary

- **Fermentation:** the process by which a substance breaks down into a simpler substance
- **Chemical reaction:** a process by which one or more substances (i.e. the reactants) are converted to one or more different substances (i.e. the products).

Materials

- Granulated sugar
- Empty plastic water bottle (with label removed, keep the bottle cap)
- Funnel
- Warm water
- Measuring spoons
- Latex balloon
- Packet of yeast
- A timer
- Pencil
- Data sheet

Lesson: Fizzy Fermentation

Baking is not just a fun and tasty activity—it's also filled with lessons about science!

One such lesson is the concept of chemical reactions. A **chemical reaction** is a process by which one or more substances (the reactants) are converted to one or more different substances (the products).

A common chemical reaction that takes place in baking is called **fermentation**. Fermentation is the process by which a substance breaks down into a simpler substance.

During the baking process, yeast ferments sugar into alcohol. This gives the yeast energy, which causes the dough to rise. As the dough bakes, carbon dioxide is trapped as tiny pockets of air. These pockets of air expand under the heat, making the dough rise further.

Though the fermentation process is invisible, the rising dough is proof of a chemical reaction occurring.

As Christians, when we ask Jesus into our hearts, He does an invisible work within us to help us to become more like Him. We, in turn, are asked to have faith in Jesus as we learn more about Him and trust Him with all of the different circumstances that happen in our lives.

As Hebrews 11:1 tells us, "Now faith is confidence in what we hope for and assurance about what we do not see."

Faith, just as fermentation, is an invisible process—but both processes produce visible results. In baking, we get a fluffy and delicious baked good. With our faith, we gain a rich life of growing close to God and experiencing the peace that He lavishly showers on us.

Today, you will use the materials listed to see the visible effects of fermentation.

Procedure

- #1. Gather the materials for this experiment. Answer Question 1 on the data sheet.
- #2. Using the empty water bottle, measuring spoons, funnel, and granulated sugar, add 1 tablespoon of sugar to the bottom of the empty water bottle.
- #3. Fill the water bottle halfway with the warm water. Answer Question 2 on the data sheet.
- #4. Using the funnel, add the full packet of yeast to the water bottle.

- #5. Put the cap in the bottle and shake for 10 seconds.
- #6. Remove the cap and place the balloon on top of the bottle.
- #7. Set the timer for 15 minutes. When the timer goes off, answer Question 3 on the data sheet.
- #8. Set the timer for 15 more minutes. When the timer goes off, answer Question 4 on the data sheet.
- #9. Set the timer for 15 more minutes. When the timer goes off, answer Question 5 on the data sheet.
- #10. Set the timer one more time for 15 minutes. When the timer goes off, answer Question 6 on the data sheet.
- #11. Answer Question 7 on the data sheet.
- #12. Read the Bible verse together. Answer Question 8 on the data sheet.

Data Sheet

- 1) Observe the materials. How do you think they will be used?

- 2) Hypothesis: What do you think will happen when the yeast is added to the water?

- 3) After fifteen minutes, what has changed about the balloon?

- 4) After thirty minutes, what has changed about the balloon?

- 5) After forty-five minutes, what has changed about the balloon? What do you think will happen after fifteen more minutes?

- 6) After the final set of fifteen minutes, was your guess correct? What changed about the balloon?

- 7) Analysis: Was your hypothesis correct?

- 8) After reading the Bible verse, would you say that faith is something that you can see or not see? Why is faith in God important?

Conclusion

Yeast is a tiny, microscopic fungus which eats sugar when two substances are combined. As fermentation occurs, carbon dioxide is released. It fills the bottle and the balloon as more gas is created.

As you discovered, this process is not immediate. It takes time. When we put our trust and faith in Jesus, it also takes time to grow. It is always worth the wait to trust Him even when we cannot see what He is doing in our lives. He has our best interests in mind and will help us in the ways He knows are best.

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