Chemical Change with Yeast Balloons
4th Grade

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References:

- **http://exploratorium.edu/cooking/bread/activity-yeast.html**

Benchmarks & Objective:

SLC/GLI# PS2 Identify characteristics of a simple chemical change
SI-3, 4, 5, 6 (Benchmark C): Develop, design, and safely conduct scientific investigations and communicate the results.

Materials:

- Dry Active Yeast (1 packet per bottle)
- Water Bottles (1 per group of 2-5 students, better to have smaller groups)
- Warm water
- Sugar (1 tsp per bottle)
- Balloons (1 per bottle)

Target Concepts:

- Chemical change produces new products.
- Chemical change is not reversible.
- Bread leavening is the result of chemical change, yeast respiration releases gas that causes bread to rise.

Initial Introduction:

Students will be asked to remember the biscuit making activity. They will be asked to remember what made the bread rise (baking soda and buttermilk reacting similarly to vinegar and baking soda and releasing gas). Students will be asked if they know what yeast is. (Many will know that it helps make bread rise, but they will not know why). I will then ask them how do they know that they are alive (They will mention breathing, or this can be acted out to get them to say it). The students will then be told if the yeast are fed (sugar) and given warm water they will breathe too.

Procedure:

Students will be given a supplies list and asked to identify the solids, liquids and gases? After making this list, they will be asked how they can determine if yeast really do breathe? You can blow up a balloon in front of them and this will get them to think of putting the balloon on top of the bottle. (This will also introduce gases to the states of matter previously identified). Students

will decide if they want to test multiple factors (amounts of sugar, water temperature, amounts of water or yeast). They will need to decide on a few control variables (I would suggest amount of yeast and amount of water- that way the kids don't have to touch the hot water, the instructors can pour).

After all of the kids activate their yeast balloons they can be asked which of their experiments worked best and why?

For the experiments the balloon, they can be asked what is different about the original ingredients than what all of them combined produce? They will note that a gas is released. After they make this observation, ask them if the experiment is reversible, can they get the original ingredients back. They will note that the gas would be lost as the yeast breathe.

Target Observations:

- Chemical change is not reversible.
- Yeast breathe and release gas, this gas makes bread rise.
- The gas released by active yeast is lost to the system and that is why this experiment is not reversible.
- Students should also note that yeast and sugar are solids, water a liquid, and bread a solid.

Summary & Discussion:

Students should discuss other examples of chemical change. They can review the definition of chemical change and find examples from in the classroom. Students should feel confident that breathing is a chemical change.

Extensions (Optional):

Students may feed their yeast alternative ingredients of their choice. This is good to setup after all of the original experiment is performed. The kids enjoy the chance to be creative.