

## Bake a Chemistry Cake

Next time you bake a cake, consider this. The cake dough is not really a cake, but when it's heated in the oven, a chemical reaction occurs and new bonds are formed. How does heat change things? When it comes to heat changing a chemical reaction, there are two types. One is "exothermic," a reaction that produces heat, and the other is "endothermic," a reaction that takes heat in. When you make a cake, you are producing an endothermic chemical reaction which changes batter to baked!

A few things can happen when you bake a cake. Some chemical reactions to keep in mind while doing this tasty experiment are:

1. Heat helps baking powder produce tiny bubbles of gas, which makes the cake light and fluffy.
2. Heat causes protein from the egg to change and make the cake firm.
3. Oil keeps the heat from drying out the cake.



### What You Need:

- small bowl
- several sheets of aluminum foil
- pie pan
- cooking oil
- measuring spoons
- cup or mug
- index card
- pencil
- science journal (optional)

### Ingredients for one cake:

You'll need to measure and mix this set of ingredients four times to complete all four experiments—with the exceptions that are given below.

- 6 tablespoons flour
- 3 tablespoons sugar
- 1 pinch of salt
- 2 or 3 pinches of baking powder
- 2 tablespoons milk
- 2 tablespoons cooking oil
- 1/4 teaspoon vanilla
- butter knife
- 1/3 of an egg (Break egg into a cup; beat until mixed, then use approx. 1/3 of it. Save the rest for 2 of the other cakes.)

### What You Do:

1. Wrap several sheets of aluminum foil around the outside of the small bowl to form a mold.
2. Remove your foil "pan" and put it in the pie pan for support.
3. Ask a parent to help you coat the inside of the foil "pan" with the cooking oil, or cooking spray so the cake doesn't stick.
4. Have a parent pre-heat the oven to 350 degrees.

5. Mix all of the dry ingredients together.
6. Now, add the wet ingredients (as stated in the ingredient list, only use 1/3 of the egg; save the rest for use with the other cakes, below).
7. Stir the wet and dry ingredients until smooth and all the same color.
8. Pour batter into the "pan."
9. Bake in oven for 15 minutes.
10. After 15 minutes, remove the cake from the oven, set aside, and let cool for tasting later (yum).
11. Label the first cake #1 on an index card. Make sure to label each cake with its number to separate differences when all they are all baked. Next, continue on to make three more cakes, but do the following:
  - Leave the oil out of one. Label the cake "#2 NO OIL"
  - Leave the egg out of another. Label the cake "#3 NO EGG"
  - Leave the baking powder out of the third. Label the cake "#4 NO BAKING POWDER"
12. After baking, have your child cut each cake in half and look inside.
  - Do the cakes look different from each other?
  - Do they taste different from each other?
  - What did the chemical change and use of heat do to cakes # 1-4?
13. Discuss all of the reactions that occurred with cakes #1-4. Tell your child to write about, or draw pictures of what they observed in a science journal.