Bake a Chemistry Cake

Is baking a cake a chemical change? Next time you bake a cake, think about this: The cake dough isn't 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? It creates chemical reactions. When it comes to heat and baking, there are two types of chemical reactions to consider; one is “exothermic,” a reaction that produces heat, and the other is “endothermic,” a reaction that takes heat in. As you bake a cake, you are producing an endothermic chemical reaction that changes ooey-gooey batter into a fluffy, delicious treat!

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 noted 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
- ¼ teaspoon vanilla
- Butter knife
- â…“ of an egg (Break egg into a cup; beat until mixed, then use approximately one third 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. Help your child coat the inside of the foil "pan" with the cooking oil, or cooking spray so the cake doesn't stick.
4. Preheat 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 one third of the egg; save the rest for the other cakes).
7. Stir the wet and dry ingredients until they're smooth and all the same color.
8. Pour batter into the "pan."
9. Bake in the 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 so it's easy to identify them once they're all baked. Then, go on to bake three more cakes, but with the following differences:
    - 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 examine them.
    - Do the cakes look different?
    - Do they taste different?
    - 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 he observed in his journal.