Chemical Reactions at Home

Background:

What do you think of when you hear the word "chemistry?"

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Well, chemistry is really just the science of matter. Matter consists of solids, liquids, and gases. Sometimes when matter interacts with other matter, a brand new substance is created. This is called a chemical reaction.

Here are some everyday examples of chemical reactions:
- Digesting food
- Rust forming on iron
- Cooking an egg
- Baking bread

There are different ways you can tell that a chemical reaction has occurred. These may be:
- Bubbles forming
- Change in color
- Change in temperature
- New smell
- Completely new substance is created

Can you think of any other examples?

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Experiment 1: Classic Baking Soda and Vinegar Experiment

Materials:
- Baking soda
- Vinegar
- Empty water bottle
- Balloon
- Funnel (optional)

Procedure:
1. Fill an empty water bottle about ¼ of the way with vinegar.
2. Use the funnel at the mouth of the balloon to put in some baking soda; you can measure about a tablespoon, or you can just estimate.
3. Allow the baking soda to settle at the bottom of the balloon.
4. Attach the balloon to the mouth of the bottle. Tip the balloon so the baking soda pours into the bottle.
5. Watch what happens when the chemical reaction occurs!

Draw a picture of what happens here:

What's going on?
The baking soda reacted with the vinegar to produce something that wasn't there before – carbon dioxide (CO_2). The CO_2, a gas, is trying to escape the bottle. Since it can't do that, it instead fills up the balloon!

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What did you learn about chemical reactions from this experiment?

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What other ways can you think of reacting baking soda and vinegar?

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Experiment 2: Lava Lamp

Thanks to Little Bins for Little Hands –

https://littlebinsforlittlehands.com/earth-day-science-activity-lava-lamp/

Materials:
- Cooking oil
- Clear glass jar
- Water
- Food coloring (you choose the color!)
- Alka-Seltzer tablet(s) (generic brands are fine, too!)

Procedures:
1. Fill up your jar about 2/3 of the way with oil. This does not have to be exact.
2. Pour water to fill up the rest of the jar.
3. Add a few drops of food coloring to the jar. Watch what happens! Record your observations here:

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4. Drop in your Alka-Seltzer tablet. Here is where the chemical reaction takes place!

Describe what happened:

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Draw and color a picture of your lava lamp:

What's going on?
This time, the Alka-Seltzer tablet reacts with the water to create a chemical reaction. The combination of these two ingredients results in the formation of carbon dioxide (CO_2). The CO_2 shows through the bubbles you see! As the bubbles move around, they "pick up" the color. You also see density of liquids come into play with this project. Did you see that when you poured the water in after the oil, the water sank straight to the bottom? That is because water is more dense than oil. Differences in density also affect the movement of the bubbles.

Extensions:
- Add another Alka-Seltzer tablet to continue the reaction. Add two tablets at the same time and see what happens!
- Try it again with a different color, or combine 2 colors!
- Test different water temperatures – what is different if you choose hot water instead of room temperature or cold water?

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What did you learn about chemical reactions from this experiment?

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What other ways can you think of to experiment with your lava lamp?

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Experiment 3: Rey's Bread

Thanks to Jenn Fujikawa – https://www.starwars.com/news/reys-portion-bread

Chemical reactions happen every day in your kitchen! When you combine these ingredients to make a small portion of bread, a chemical reaction will occur!

Materials:
- Microwave-safe mug
- Spoon or stirrer
- Microwave
- Vegetable oil (1/2 teaspoon)
- Sugar (1-1/2 tablespoons)
- Cake flour (4 tablespoons)
- Baking powder (1/4 teaspoon)
- Salt (1 pinch)
- Whole milk (2 tablespoons)
- Vanilla extract (1/4 teaspoon)
- OPTIONAL: Matcha powder (1/2 teaspoon)

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Procedures:
1. Pour the oil into the mug. Carefully swirl it around to grease the inside of the mug.
2. Add the cake flour, sugar, baking powder, salt, and optional matcha into the mug. Stir it all together.
3. Pour in the milk and vanilla.
4. Cook in the microwave on high for 45 seconds.
5. Remove CAREFULLY with an adult's help – it will be hot!
6. Let cool slightly before eating. Enjoy! 😊

What's going on?
Anytime you bake a cake, it's an example of a chemical reaction. Think of all of the ingredients you started with. You then added heat when putting it into the microwave for 45 seconds. After it baked in the microwave, the result was something completely new! One way to know that a chemical reaction occurred is the fact that you won't get any of those individual ingredients back – they have completely changed.

What did you learn about chemical reactions from this experiment?

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What other examples of chemical reactions can you think of in cooking or baking?

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