Kitchen Chemistry: The Magic Cake Experiment!

Introduction (5-10 minutes)

Hello future scientist and baker! Today, we're going to do a super fun experiment in the kitchen. We're going to bake a cake! Did you know that baking is actually a type of science called chemistry? Chemistry is all about mixing things together and seeing how they change. Let's look at our ingredients. Can you help me decide if they are solids (hard things you can hold, like rocks or powder) or liquids (wet things you can pour, like water)? (Go through flour, sugar, salt, baking soda, milk, oil, egg, vanilla, identifying each).

Activity: Mixing & Observing (20-25 minutes)

Okay, let's be chemists! We need to measure carefully. Science needs good measurements!

1. **Prepare the Pan (Adult Step):** Let's get our cake pan ready. An adult should spray it or grease and flour it so our cake doesn't stick. An adult should also preheat the oven to 350°F (175°C). Ovens are very hot and only adults should touch them!
2. **Mix Dry Ingredients:** In our big bowl, let's measure and add the solids: flour, sugar, salt, and baking soda. Look! They are all powders. Let's gently whisk them together. Do they look different now? (They are mixed, but still powders).
3. **Mix Wet Ingredients:** In a separate smaller bowl or measuring cup, let's measure the liquids: milk, oil, vanilla. Let's crack the egg (an adult can help if needed) - look, it's liquidy inside! Whisk these liquids together. How do they look now? (Mixed into one liquid).
4. **Combine!:** Now for the magic! Pour the wet ingredients into the big bowl with the dry ingredients. Let's stir, stir, stir until it's all combined and smooth. What happened? It's not powder or thin liquid anymore - it's thick batter! We changed it by mixing! Do you see any bubbles starting to form? That's the baking soda starting to work!
5. **Pour into Pan:** Let's carefully pour our batter into the prepared cake pan.

Activity: The Heat Change! (Baking Time - ~30 minutes, plus observation)

1. **Baking (Adult Step):** An adult will carefully place the pan into the hot oven using oven mitts.
2. **Observation/Discussion (While baking):** What do you think the heat from the oven will do to our wet, gooey batter? Hot air cooks things. It's causing a chemical reaction! Those little bubbles from the baking soda will get bigger and help make the cake fluffy. The heat helps all the ingredients stick together in a new way. (Optional: Draw a picture of the batter before baking, and predict/draw what it will look like after).
3. **Check for Doneness (Adult Step):** After about 30 minutes, an adult will check if the cake is done (a toothpick inserted comes out clean).
4. **Cooling & Observing (15+ minutes):** An adult will carefully remove the hot pan using oven mitts and place it on a safe spot or cooling rack. Look at the cake! Is it still liquid batter? No! It's solid! It changed color, it rose up, and it smells delicious! The heat caused a big change – that's chemistry!

Conclusion (5-10 minutes)

Wow! Look at what we made with science! We took solids and liquids, mixed them to make batter (a physical change), and then used heat to turn the batter into a yummy cake (a chemical change)! The baking soda made gas bubbles to make it fluffy, and the heat cooked everything together. You were a great kitchen chemist today! Once it's cool, we can have a taste of our successful experiment!