Chemical Changes: Crash Course Kids #19.2

Physical Science
https://youtube.com/watch?v=37pir0ej_SE
https://nerdfighteria.info/v/37pir0ej_SE

(CrashCourse Kids Intro plays)

Sabrina: You know what's a really great way to learn about science? Baking. After all, baking is pretty much just chemistry, and chemistry is the science of different kinds of matter, and how that matter can change.

Sure, some of the equipment used in chemistry and in baking isn't quite the same, but both baking and chemistry require careful timing and measuring, and both of them result in the formation of a mixture. For example, you can change matter like eggs, milk, flour, and sugar into a tasty dessert.

Now, you already know that a mixture is anything made by combining two or more different things, and some kinds of mixtures, like the fruit salad we had at our picnic can be separated back into the substances that made them, but that's not true about all mixtures. Sometimes mixing things together makes a whole new substance, we call this a chemical change. But what is a chemical change?

A chemical change is a change that occurs when the particles that make up two or more substances are rearranged to form a new substance. Unlike the mixtures from our picnic, chemical changes usually can't be undone. Let's observe an example of a chemical change. OBSERVE, people. We are not trying this at home.

When we observe a lit match, we see that the match burns. As it burns, it changes into burned wood and ash. We can't change this ash back into a match, so burning is an example of a chemical change that can't be undone.

But wait, there's more! Chemical changes often make matter change color, like the blackened remains of the match. Sometimes chemical changes make smells or release light or gases and lots of chemical changes require either the giving off or taking in of heat.

A burning match gives off light, smoke and heat, all of these things are evidence that when we look at a burning match, we're looking at a chemical change. Now we can do a simple investigation to show how some chemical changes can yield a seriously yummy result.

When we mix the ingredients of a cake, we're mixing together different kinds of matter. Say you have flour, sugar, milk, and eggs. When you put them in a bowl and stir, your mixing several different substances together to make cake batter. And when you pop this mixture into the oven, after a short time you have a new substance: CAKE!

Now, before you eat it, let's check this science-cake for evidence of a chemical change.

Did the reaction give off or take heat? Definitely. The cake batter needed the heat from the oven to change into cake. If we left the batter on the counter, it would stay batter.

Is there a color change? Check. The batter in the pan was yellow, and now it's a nice golden brown.

Is there any smell? Well if you've never been in a bakery or grandma's kitchen or just never smelled a cake baking then I feel bad for you because it smells amazing.

Where any gases released? Let's look at our cake before and after. Before we have a wet gooey batter. After, we have a nice, fluffy cake. As the cake was in the oven, some of its ingredients released carbon dioxide gas. We can see evidence of carbon dioxide when we cut the finished product. All the little holes in this spongy-looking cake are caused by this gas.

Our last piece of evidence that we've witnessed a chemical change: this change can't be undone. For example, we can't get the batter we put into the batter back out of this cake. Even if we were to squeeze it really hard, we'd get crumbs. So let's not try.

So a chemical change is a change that occurs when the particles that make up two or more substances are rearranged to form a new substance. Most of the time, chemical changes can't be undone, and we can tell they're occurring by observing them and noting changes in color, release of smell or light, and whether they take in or give off heat. All in all, I'd say that sniffing out chemical changes can be a piece of cake.

(endscreen)