

Read About the Conservation of Matter

THE CONSERVATION OF MATTER DEFINITION

The *Law of Conservation of Matter* says that the amount of matter stays the same, even when matter changes form. Sometimes it may seem that matter disappears during a science experiment, but this law tells us that matter cannot magically appear or disappear, it simply changes from one form to another. Another way to explain the law of conservation of matter is to say that things cannot be magically created or destroyed.

To better understand how the law of conservation of matter works....

LET'S BREAK IT DOWN!

Matter never vanishes.

Matter is anything that has weight and takes up space. Anything you can see and touch is matter. Remember, matter has three main forms: solid, liquid, and gas.

Matter can change from one form to another. For example, water can be boiled, which turns it into a gas. It might seem like the boiling water vanished, but it just changed into a form we cannot see, called water vapor.



When a substance dissolves, it simply changes form.

Some matter, like sugar, can also be dissolved into a liquid. This is another way matter can change form. In our full properties of matter episode, we show that when sugar is dissolved in water, it seems to disappear. It didn't.

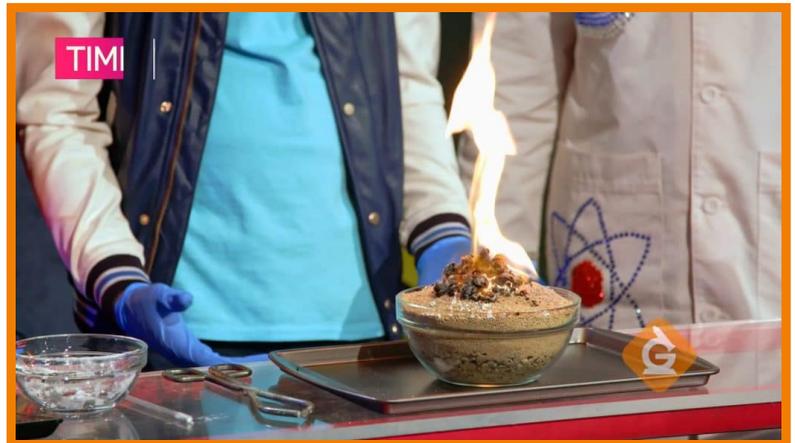
The sugar simply dissolved into the water and you could no longer see it. Later, when the water was evaporated through boiling, the sugar crystals reappeared. They were there the whole time.



When a new substance is made, it is created from existing matter.

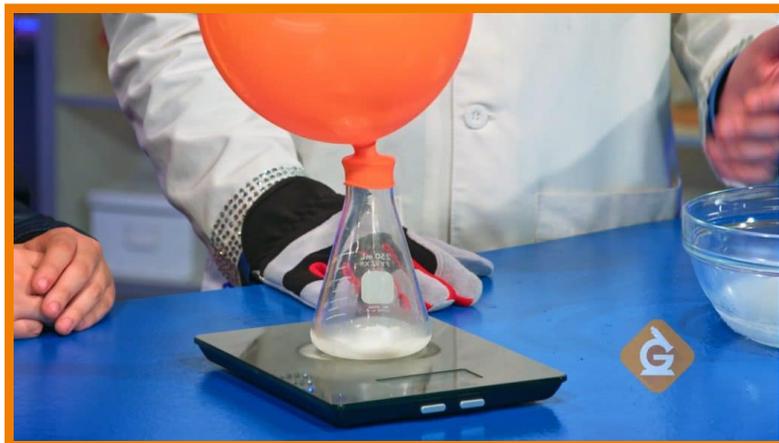
Some science experiments make it seem like new things are magically created. Like when Dr. Jeff made a fire snake in the video, it seemed like the snake magically appeared.

To prove that nothing magical took place, the materials were weighed before and after the experiment. The weight after the experiment was almost exactly the same as the weight before the experiment. That's because the amount of matter was conserved.



The amount of matter is conserved when a substance changes form.

When matter changes drastically it is not actually destroyed. This can be tested by weighing all the materials involved in an experiment before starting it, and again after the experiment. Comparing the weights proves that there is still the same amount of matter. It simply changes form.



For example: dry ice is made of solid carbon dioxide. If you watch dry ice, it might seem like it is disappearing. By putting it in a flask and sealing it off with a balloon, you can capture the gas and show that the weight of all the materials together does not change.

CONSERVATION OF MATTER EXAMPLES



When something burns up, the matter does not vanish.

The materials simply turn into gases you cannot see.



When you bake, food seems to magically get larger.

Expanding air bubbles caused the baked treats to expand, but more matter was not formed.



Candles change form when they are burned.

It looks like the candle wax is disappearing, but it is not. Burning a candle turns the wax into carbon dioxide and water.

LAW OF CONSERVATION OF MATTER VOCABULARY

Matter

Anything that has weight and takes up space.

Law of Conservation of Matter

Tells us that the amount of matter stays the same even when a substance changes form.

Dissolve

To mix in with another substance. For example: when salt is added to water, it forms saltwater.

Gram

A scientific unit of measuring how heavy something is. A US dollar bill weighs about 1 gram.

Dry Ice

A solid form of carbon dioxide that is very cold and turns directly from a solid into a gas.

Conserve

Saved, kept the same.

LAW OF CONSERVATION OF MATTER DISCUSSION QUESTIONS

When the team mix 25 grams of sugar into 150 grams of water, the sugar seems to disappear! Where does it go?

The sugar dissolves into the water. It is still there, it simply changes into a form we can't see.

What evidence tells us that the sugar is still there, even though we can't see it?

The sugar water weights 175 grams which is the same as all the sugar (25g) plus all the water (150g). This is evidence that the sugar is still there even though we can't see it.

When Dr. Jeff boils the sugar water, what happens?

As the water is heated it changes forms from liquid to gas. The sugar is left behind as a solid, providing us with evidence that it was in there the whole time.

During the fire snake investigation, what caused the snake to be so much larger than the ingredients it came from (sugar and baking soda)?

When the sugar and baking soda were heated, a chemical reaction caused the ingredients to release gases that formed bubbles. Those bubbles expanded and made the snake look much larger than the original amount of ingredients.

Why did the fire snake weigh a little bit less than the ingredients it came from?

When Zoe weighs the ingredients (sugar and baking soda), it weighs 25 grams in total. When she weighs the "snake" it weighs 23 grams. This is because some carbon dioxide gas produced during the chemical reaction escapes into the air.

When dry ice appears to be smoking, what is actually happening?

The “smoke” coming from dry ice is actually carbon dioxide gas, which is turning from a solid into a gas. (Dry ice, or solid carbon dioxide, changes directly from a solid to a gas without becoming a liquid first.)
