What Are Physical and Chemical Changes?

Chapter 10 Lesson 5

ByDesign Science, Level 4
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Get Ready to Learn

- Did you know that changes in matter happen around us every day?
- Some changes affect the appearance of matter.
- What changes happen when you get a haircut?

Get Ready to Learn

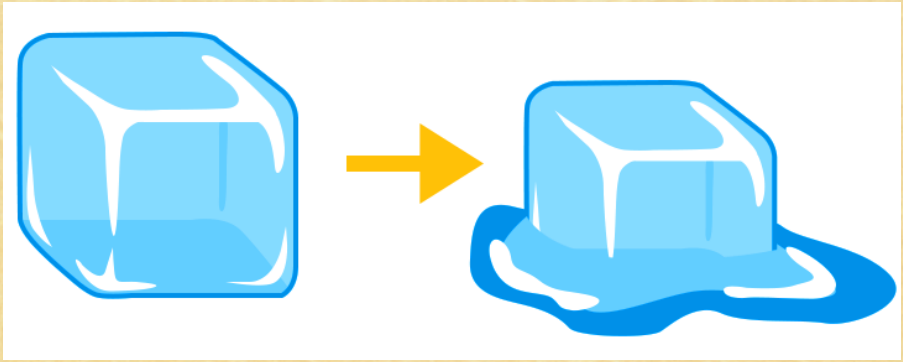
- Other changes affect how matter is put together.
- What changes happen when an egg is fried?
- In this lesson, we will learn the difference between physical and chemical changes.

Physical Changes

- The artist in the picture is carving wood.
- As he carves, he changes the wood's shape.
- The changes he makes do not change the wood into something else. It is still wood.

Physical Changes

- A change in an object's appearance, but not in what it is made of, is a **physical change**.
- A lot or block of wood can be sawed until nothing is left, but a pile of sawdust, but the sawdust is still wood.

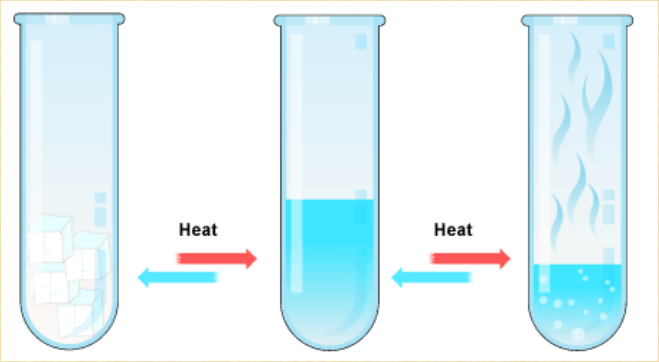


Physical Changes

- A change is shape is one kind of physical change.
- Change in size is another kind of physical change.
- For example, a balloon will stretch when you blow it up.

Physical Changes

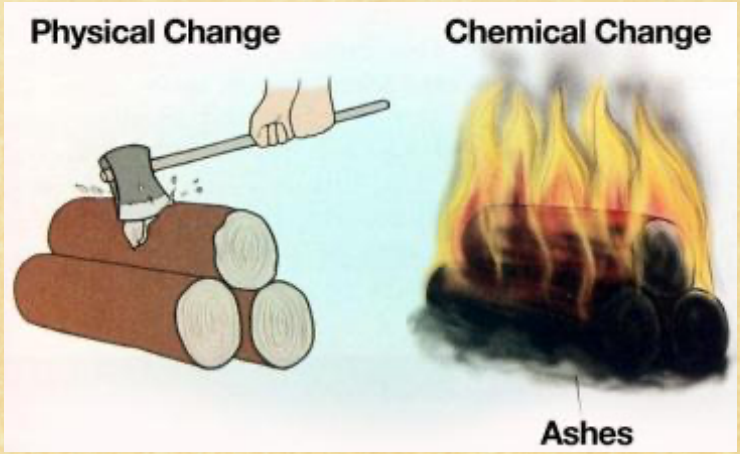
- A change of state is also a physical change.
- Water is still water when it is ice or water vapor.



- Other examples of physical change include:
  - pulling copper into a thin wire
  - cutting any substance, such as hair, wood, or cake
  - breaking glass
  - inflating or deflating a basketball
  - drying wet clothes in a clothes dryer

Chemical Changes

- When you carve a piece of wood, you cause a physical change. The wood remains wood.
- However, when you burn wood, as in a campfire, what you have left is not wood.
- The molecules that make up wood join with oxygen molecules in the air.
- The wood is no longer the same.



Chemical Changes

- A **chemical change** is a change in which one or more new substances are formed.

- When wood burns, ashes, water vapor, and carbon dioxide gas are the new substances formed.
- The ash is a soft, gray powder.
- Water vapor and carbon dioxide are colorless, odorless gases.

Chemical Changes

- New substances formed in a chemical change do not look or act like the original substances.
- Burning is a common chemical change, or **chemical reaction**.

- When a substance burns, it combines with oxygen.
- This reaction gives off heat and light.

Chemical Changes

- Chemical reactions can also be shown by changes in color and odor.
- A chemical change can also release a gas, or a solid might form.

Chemical Changes

- Rusting is another common chemical reaction.
- If your bike gets a chip in the paint, it may end up with a rust spot on it.

- **Rusting** is a chemical change between iron and oxygen in the air.
- A new compound, iron oxide, or rust, forms.

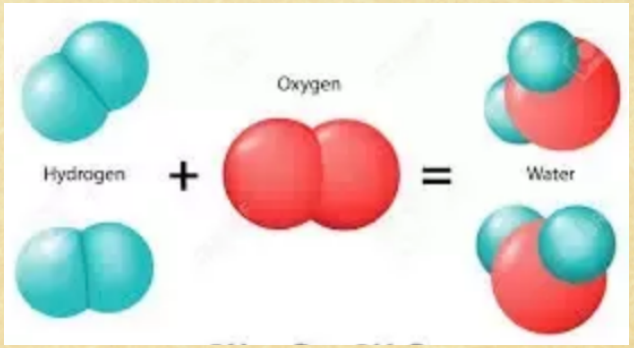
Conservation of Mass

- During a chemical change, new substances are formed.

- However, the amount of matter, or mass, does not change.
- It is the same before and after the reaction takes place.

Conservation of Mass

- The number of each kind of atom does not change.
- The atoms just get rearranged.
- No mass is made, and none is lost during a chemical change.



Physical vs. Chemical Change