

Chemical Change

A chemical change represents a change in the chemical makeup of a substance. That is, a new substance is formed, and this substance is chemically different from the old substance. It also has physical properties that are different from those of the original substance.

Chemical changes occur during chemical reactions. During chemical reactions, the atoms of reactants rearrange to form products with different properties. So the new substances formed (the products) have different physical and chemical properties than the substances they came from (the reactants).

Below are some examples of chemical changes:

- metal rusting, coins tarnishing
- coal, wood, gas, or oil burning
- firecrackers exploding
- cake baking
- photosynthesis

Signs of a Chemical Change

- Odor
- Change in color
- Formation of solid/different substance
- Heat is given off
- Formation of bubbles.

Law of Conservation of Mass

The law of conservation of mass states that the mass of the material you start with in a chemical reaction must equal the mass of the final compound.

If you are baking a cake, then the mass of the ingredients must equal the mass of the finished cake. You can figure out the mass of an ingredient, if you know the mass of the finished cake and the mass of the other ingredients.

Ingredients	Mass (grams)
milk	20
flour	200
sugar	150
Baking soda	?
Finished cake	400

$$\text{Ingredients} = 20 + 200 + 150 + ? = 370 + ?$$

$$\text{Finished Cake: } 400 - 370 = ?$$

baking soda is 30 grams.

Physical & Chemical Changes

During a **physical change**, a substance takes on different physical properties, but it keeps the same chemical makeup. During a **chemical change**, a substance takes on a different chemical composition.

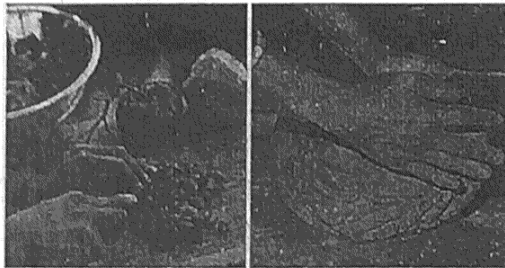
Physical Change

Physical properties include size, shape, color, texture, temperature, quantity, and mass. Physical change represents a change in one or more physical properties. For example, tearing a piece of paper changes the size of the piece of paper.

Physical changes can be reversed. For example, two torn halves of a piece of paper can be taped or glued back together. Chemical changes cannot be reversed with physical changes.

Below are some examples of physical changes:

- Changes in state of matter
- painting your red wagon green
- cutting a string in half to make it shorter
- making a piece of clay into a ball
- making a salad by cutting up vegetables
- heating water on the stove
- chopping wood into smaller pieces

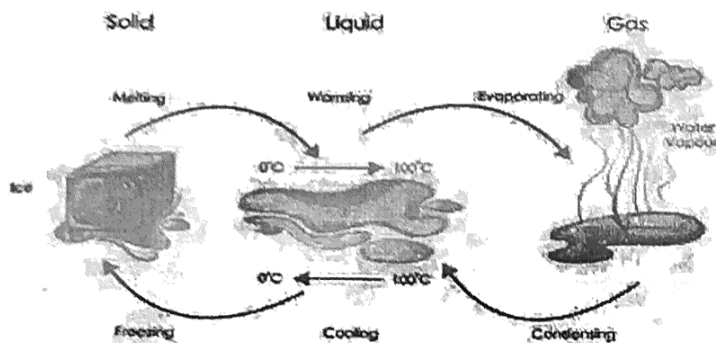


Making a salad and shaping clay into a ball are both physical changes.

Changing the State of Matter-

As you remove or add heat energy from a substance, it will change its state. The molecules will begin to move faster as you add heat energy, and slow down as you remove heat energy.

Change of State



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