

Two Kinds of Changes

Physical Change

A **physical change** occurs when the appearance of a substance changes, but chemically the substance is the same. The individual molecules do not change, and no new matter is formed. During some physical changes, matter simply changes from one state to another. Evaporating, melting, freezing, and sublimating are examples of physical changes in which matter changes from one state to another. During **evaporation**, a substance changes from a liquid to a gas. When a substance **melts**, it changes from solid to liquid. When a substance **freezes**, it changes from a liquid to a solid. During **sublimation**, a substance changes from a solid directly to a gas.

There are other types of physical changes. During some physical changes, an object's size or shape is altered. A physical change also occurs when substances are mixed and something dissolves.

Chemical Change

Chemical change occurs when a chemical reaction takes place. The substances produced during a chemical reaction are different from the original substances. Energy is involved in all chemical reactions. Chemical changes are always accompanied by physical changes. Here are some signs that a chemical reaction has taken place:

- A solid precipitate forms at the bottom of a test tube.
- Heat or light is produced.
- A gas is produced.
- A color change occurs.

Examine the list of changes below. Write *C* before each chemical change. Write *P* before each physical change.

 P 1. erosion of a riverbed by water

 P 2. carving a statue out of marble

 P 3. ice cream melting

 C 4. baking a cake

 C 5. the lights from a fireworks display

 C 6. cooking waffles

 P 7. mothballs disappear over time

 C 8. the bubbling that occurs when vinegar is mixed with baking soda

 C 9. leaves changing color

 P 10. sanding a piece of wood

 C 11. gunpowder exploding

 P 12. chocolate melting

 C 13. a red mark appears after a bee sting

 C 14. lighting a match

 C 15. plants undergo photosynthesis

 C 16. a drop of hydrochloric acid on marble produces carbon dioxide gas