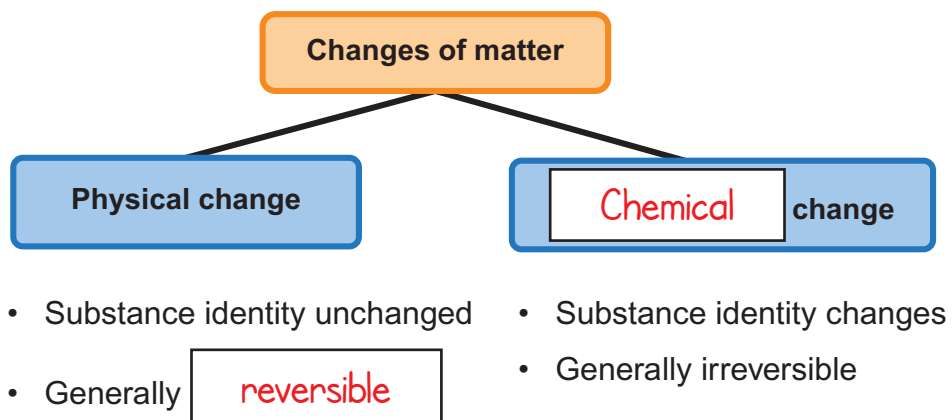


Classifying Changes in Matter



Lesson Objectives

By the end of this lesson, you should be able to:

- Explain what happens during a chemical **reaction**.
- Identify the **indicators** of a chemical reaction.

Science Practice: Compare scenarios to determine whether a chemical reaction has occurred.

W
2K**Words to Know**

Fill in this table as you work through the lesson. You may also use the glossary to help you.

chemical reaction	a process that changes one or more reactants into one or more <input type="text" value="products"/>
reactant	a <input type="text" value="substance"/> that enters into a chemical reaction
product	a substance formed as a <input type="text" value="result"/> of a chemical reaction
precipitate	a solid substance that does not <input type="text" value="dissolve"/> in a solution
endothermic reaction	a chemical reaction that <input type="text" value="absorbs"/> energy
exothermic reaction	a chemical reaction that <input type="text" value="releases"/> energy

Instruction

Evidence of Chemical Reactions

Slide

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Lesson Question

What occurs when two or more chemicals react with each other?

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Chemical Changes and Chemical Reactions

A **chemical reaction** accompanies every chemical change that is observed.

Chemical
change

=

Chemical
reaction**Chemical Reactions**

Chemical reaction:

- is a rearrangement of the atoms in **reactants**.
- results in a new substance.

Iron reacts with **oxygen** to form iron oxide (**rust**).

Instruction

Evidence of Chemical Reactions

Slide

2

How to Represent a Chemical Reaction

Starting substances → ending substances

Reactants → products

reactant: starting substance in a chemical reaction**product:** substance produced during a chemical reaction

Example:

Iron + oxygen → iron oxide

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Rate of a Chemical Reaction



Fast

chemical reaction



Slow chemical reaction

One thing many people misunderstand about chemical reactions is the

speed

at which they occur. People often think that a chemical reaction has to be a process like fireworks. But this is not true. Chemical reactions are

sometimes extremely

slow

. For example, limestone statuary

reacts

with

acid

rain over very long periods of time.

Slide

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Indicators of Chemical Reactions

Evidences of a chemical reaction include:

- **gas** formation.
- solid formation.
- color change.
- **temperature** change.
- **light** emission.

Gas or Solid Formation

A chemical reaction involves the rearrangement of atoms in reactants to form

products. Some products differ from reactants in that they are either:

- a gas.
- a solid (**precipitate**).

Color Change

A chemical reaction involves the rearrangement of atoms in **reactants** to

form products. Some products differ from reactants in **color**.

Instruction

Evidence of Chemical Reactions

Slide

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Evidence of Energy Change

Every chemical reaction involves a change in energy.

- **Endothermic** reactions absorb energy from the surroundings.
 - Temperature decreases.
- **Exothermic** reactions release energy into the surroundings.
 - Temperature increases (heat is released).
 - Light is **emitted**.

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Limitations of Indicators of a Chemical Reaction

Indicators of a chemical reaction are not proof of a chemical reaction.

- Some **physical** changes are accompanied by:
 - gas formation.
 - **solid** formation.
 - temperature change.
 - **color** change.

Summary

Evidence of Chemical Reactions

**Lesson Question**

What occurs when two or more chemicals react with each other?

**Answer**

(Sample answer) When two or more chemicals react with each other, a chemical reaction takes place. The starting substance is called a reactant and the resulting substance formed due to the rearrangement of atoms is called a product. Evidence of a chemical reaction, such as the formation of a gas or solid, release of heat, or change of color, may also be present.

Slide

2

Chemical Reactions Defined

- Atoms in substances are rearranged.
- Rearrangement of **atoms** results in new substances.
- Starting substances are **reactants**.
- Ending substances are **products**.

Reactants → Products

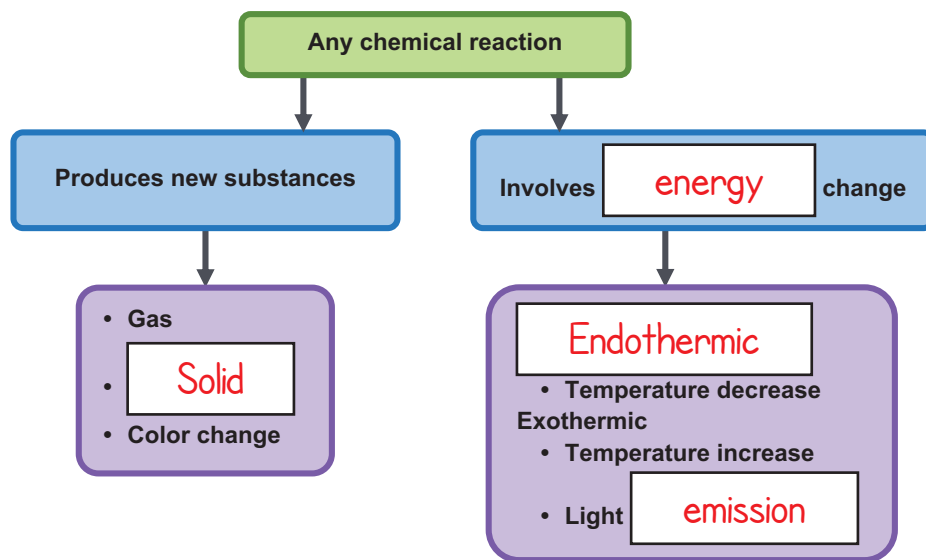
Summary

Evidence of Chemical Reactions

Slide

2

Indicators of a Chemical Reaction



Use this space to write any questions or thoughts about this lesson.