

Take Notes

I. Atoms interact in chemical reactions. (p. 69)

1. How does a chemical reaction change the way atoms are arranged?
- _____

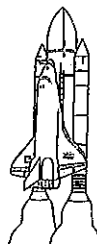
A. Physical Changes and Chemical Changes (pp. 70-71)

2. Below each picture, write whether the picture shows a *chemical change* or a *physical change* and what happens to the molecules during each type of change.

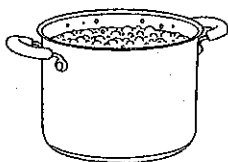
(A)



(B)



3. Circle the chemical reaction.



A.



B.

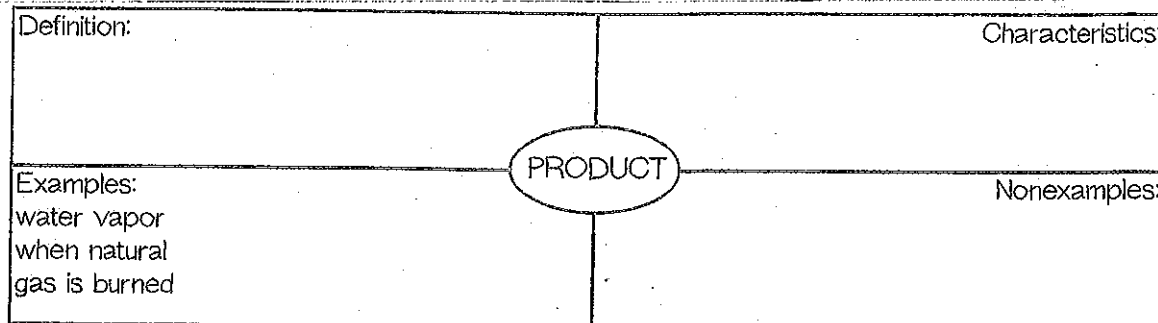
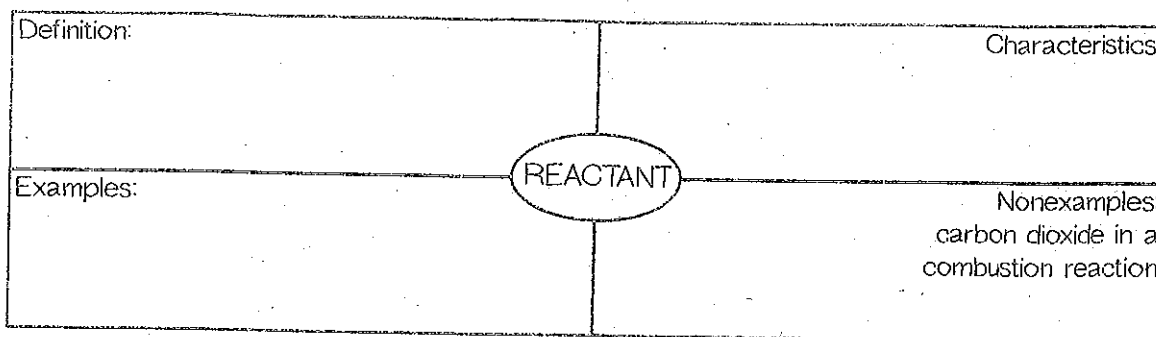
A. Physical Changes and Chemical Changes (pp. 70-71)

4. Compare and contrast physical and chemical changes in the chart below.
Circle the correct answers.

Physical Change	Chemical Change
Properties may change, but the substance does not change.	The properties of a substance change / do not change.
Changes of state are examples of physical changes.	Substances are changed / are not changed into different substances.

E. Reactants and Products and Evidence of Chemical Reactions (pp. 71-72)

3. Fill in the four-square diagrams for *reactant* and *product*.



B. Reactants, Products, and Evidence of Chemical Reactions (pp. 71-72)

5. Write reactant or product for each below.

Water made when natural gas burns _____

Natural gas being burned _____

6. List four signs that show evidence of a chemical reaction.

1. _____

2. _____

3. _____

4. _____

List three types of chemical reactions and include a short description for each.

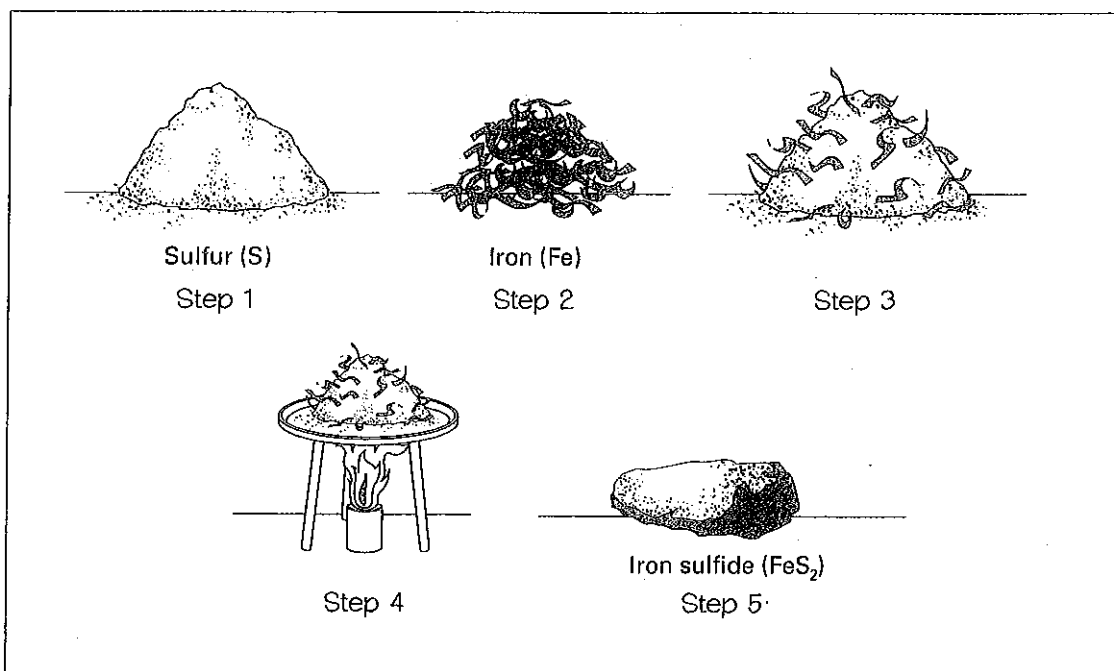
SECTION | CHEMICAL REACTIONS ALTER ARRANGEMENTS OF ATOMS.

3.1 Challenge and Extension

BIG IDEA Chemical reactions form new substances by breaking and making chemical bonds.

KEY CONCEPT Chemical reactions alter arrangements of atoms.

Physical and Chemical Changes Sulfur is a yellow, nonmetallic element. Iron filings are a dark gray metal. Look at the pictures below of a simple experiment involving sulfur powder and iron filings.



1. What type of change occurs in part 3 of the experiment? Give evidence for your answer.

2. What type of change occurs in parts 4 and 5 of the experiment? Give evidence for your answer.

3. What type of chemical reaction most likely occurred during the experiment? Give evidence for your answer.

Option Try the experiment with the supervision of an adult. Begin by writing a question and a hypothesis. Record your results and write a conclusion.

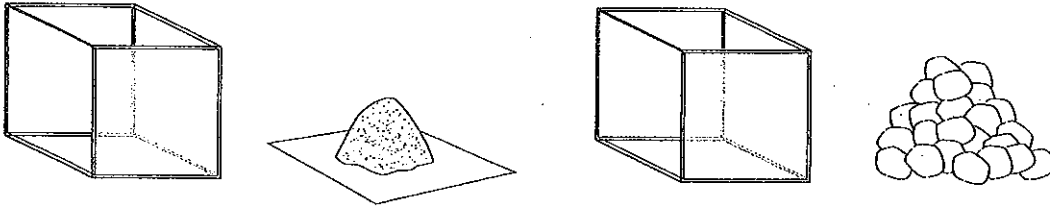
SECTION | MATTER HAS OBSERVABLE PROPERTIES.

2.1 Reinforcing Key Concepts

BIG IDEA Matter has properties that can be changed by physical and chemical processes.

KEY CONCEPT Matter has observable properties.

- 1. Physical properties describe a substance.** Mass and volume are two physical properties. The relationship between mass and volume is described by the property of density. Density is the measure of the amount of matter present in a given volume of a substance. In the picture below, there are two clear containers. Each container has a volume of 1 cubic meter (m^3). A quantity of sand is put into one container to fill it. A quantity of cotton balls is put into the other container to fill it. How would the masses of the filled containers compare? Explain.



- 2. Chemical properties describe how substances form new substances.** The change of one substance into another substance is called a chemical change. Read each of the descriptions below. Indicate whether the change is a chemical change by writing *yes* or *no* on the line. Then explain why the change is or is not a chemical change.

a. The outside of a piece of cheese has turned green from mold.

b. An antacid tablet dissolves in water and forms carbon dioxide.

c. Ice melts and forms a puddle of water.

d. A piece of clay is broken in half.

Chemical Changes

In a chemical change a new substance is produced. Energy changes always are a part of chemical changes. Chemical changes always involve a physical change as well. Match each term in the word box to the description for a chemical change.

catalysts	reaction	enzyme
reactants	products	base
acid	precipitate	combustion
corrosion	flammable	endothermic
exothermic		

- 1 _____ A reaction in which energy is taken in.
- 2 _____ These are chemicals that speed up chemical reactions.
- 3 _____ These are the substances that are present before the reaction.
- 4 _____ This forms when a soluble substance separates and settles out from a solution due to a chemical reaction.
- 5 _____ This describes a protein that starts or quickens a chemical reaction.
- 6 _____ This is the process in which a metal is destroyed by a chemical reaction.
- 7 _____ This is the burning of a substance in the presence of oxygen.
- 8 _____ This is a reaction that gives out energy.
- 9 _____ This is a process in which one or more substances are changed into others.
- 10 _____ These are the substances that are present after the reaction has taken place.
- 11 _____ This is a corrosive substance with a pH of less than 7.0.
- 12 _____ This describes a chemical that catches on fire easily and burns readily.
- 13 _____ This is a substance that has a pH of more than 7.0.

Identifying Physical and Chemical Changes

Read each description and classify it as a physical or chemical change.

- ① _____ Iron rusts.
- ② _____ Sodium hydroxide dissolves in water.
- ③ _____ A safety match ignites and burns.
- ④ _____ A cube of ice melts to form a puddle of water.
- ⑤ _____ Icicles form at the edge of a roof.
- ⑥ _____ Water is heated and changed into steam.
- ⑦ _____ Milk goes sour.
- ⑧ _____ A chocolate bar melts in the sun.
- ⑨ _____ Acid on limestone produces carbon dioxide gas.
- ⑩ _____ Vinegar and baking soda react.
- ⑪ _____ A tea kettle begins to whistle.
- ⑫ _____ Wood and leaves rot to form humus.