

3-8 What are metals and nonmetals?

Objective

Identify the properties of metals and nonmetals.

Key Terms

metal: element that has the property of shiny luster, ductility, and malleability

luster (LUS-tuhr): the way a material reflects light

malleable (MAL-ee-uh-buhl): able to be hammered into different shapes

ductile (DUK-tuhl): able to be drawn into thin wires

nonmetal: element that lacks most of the properties of a metal

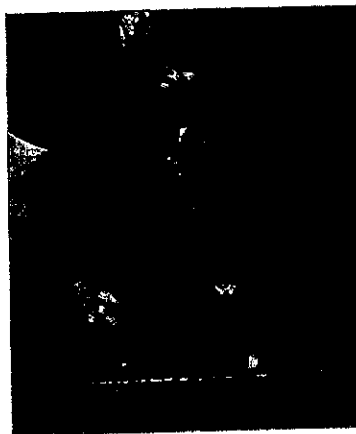
Metals and Nonmetals If you look at the periodic table, you will see a dark zigzag line running from the top of Group 13 to the bottom of Group 16. This line separates two different types of elements. The elements to the left of the line, with the exception of hydrogen, are metals. The elements to the right of the line are nonmetals.

1 NAME: What are two different types of elements?

Properties of Metals Metals are elements that have the properties of shiny luster, ductility, and malleability. All metals, except mercury, are solids at room temperature. Mercury is a liquid. The properties of metals are as follows:

- Some metals are shiny. A gold ring is shiny. The way a material reflects light is called its **luster**.
- Most metals are **malleable**. They can be hammered into thin sheets and different shapes. Aluminum can be hammered into a thin sheet and into the shape of a pot or pan.
- Metals are **ductile**. They can be made into thin wires. Most of the wires in electrical appliances are made of metals.
- Some metals allow electricity to flow through them easily. These metals are good conductors of electricity. Electricity flows easily through wires made of copper.

- Most metals are good conductors of heat. They allow heat to flow easily through them. This is the reason why radiators, pots, pans, and irons are made of metals.

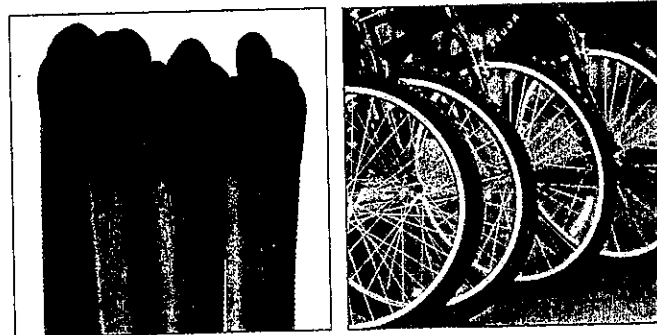


◀ **Figure 3-27** Metals can be hammered into different shapes.

2 LIST: What are three properties of metals?

Properties of Nonmetals Elements that lack most of the properties of a metal are called **nonmetals**, so they look dull. Most solid nonmetals are brittle. They are easily broken. They cannot be pounded into different shapes or pulled into thin wires. Nonmetals are poor conductors of electricity and heat. Nonmetallic elements may exist at room temperature as solids, liquids, or gases.

Nonmetals are very useful elements. For example, phosphorus is used in matches. Sulfur is used to make rubber. Nonmetals are also important to all living things in other ways. The nonmetals nitrogen and oxygen are found in the air that we breathe. Nitrogen helps organisms to make proteins. Most organisms need oxygen to breathe.



▲ **Figure 3-28** Matches and rubber are made from nonmetals.

3 RELATE: Why do nonmetals look dull?

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Lesson Review

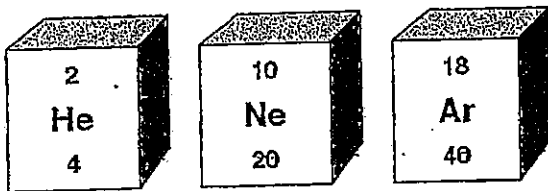
Decide whether each item is likely to describe a metal, a nonmetal, or both. Write *M* for metal, *N* for nonmetal, or *B* for both in the spaces provided.

- _____ 1. may be an element
- _____ 2. can be hammered into different shapes
- _____ 3. can carry an electrical current
- _____ 4. is located to the right side of the zigzag line on the periodic table
- _____ 5. may be a solid
- _____ 6. can be drawn into thin wires
- _____ 7. has shiny luster
- _____ 8. is a poor conductor of heat

Skill Challenge

Skills: interpreting a diagram, identifying

The diagram below shows three squares from the periodic table. Refer to the diagram as you answer the questions.



- 1. What is the name of the middle element? _____
- 2. How many electrons does each element have? _____
- 3. How many electrons are in the first energy level for each element? _____
- 4. How many electrons are in the second energy level for each element? _____
- 5. How many electrons are in the third energy level for each element? _____
- 6. What do all three elements have in common? _____