

Minerals ▪ *Section Summary*

Properties of Minerals

Guide for Reading

- What is a mineral?
- How are minerals identified?

A mineral is a naturally occurring, inorganic solid that has a crystal structure and a definite chemical composition. For a substance to be a mineral, it must have all five of these characteristics. To be classified as a mineral, a substance must be formed by processes that occur in the natural world. A mineral must also be **inorganic**. This means that the mineral cannot form from materials that were once part of a living thing. A mineral is always a solid, with a definite volume and shape. The particles of a mineral line up in a pattern that repeats over and over. The repeating pattern of a mineral's particles forms a solid called a **crystal**.

A mineral has a definite chemical composition or range of compositions. This means that a mineral always contains certain elements in definite proportions. Almost all minerals are compounds. Some elements occur in nature in a pure form, and not as part of a compound with other elements. Elements such as copper, silver, and gold are also minerals.

Each mineral has characteristic properties that can be used to identify it. Color can be used to identify only those few minerals that always have their own characteristic color. A streak test can provide a clue to a mineral's identity. The **streak** of a mineral is the color of its powder. Another simple test to identify a mineral is to check its luster. **Luster** is the term used to describe how light is reflected from a mineral's surface. Each mineral has a characteristic density. When you identify a mineral, one of the best clues you can use is the mineral's hardness. The **Mohs hardness scale** ranks ten minerals from softest to hardest. A mineral can scratch any mineral softer than itself, but can be scratched by any mineral that is harder. The crystals of each mineral grow atom by atom to form that mineral's particular crystal structure. Geologists classify these structures into six groups based on the number and angle of the crystal faces.

The way a mineral breaks apart can help to identify it. A mineral that splits easily along flat surfaces has the property called **cleavage**. Most minerals do not split apart evenly. Instead, they have a characteristic type of **fracture**, which describes how a mineral looks when it breaks apart in an irregular way.

Some minerals can be identified by special physical properties. Magnetism occurs naturally in a few minerals. Minerals that glow under ultraviolet light have a property known as fluorescence.

Minerals ▪ *Review and Reinforce*

Properties of Minerals

Understanding Main Ideas

Fill in the blanks in the table below.

Mineral Property	Test
1. _____	Perform scratch test
Color	Observe surface of mineral
2. _____	Observe color of powder on unglazed tile
Luster	Observe how mineral reflects light
3. _____	Find mass per unit volume
4. _____	Observe number and angle of crystal faces
Cleavage and Fracture	Break mineral apart to see if it splits along flat surfaces

Answer the following questions on a separate sheet of paper.

- List the five characteristics necessary for a substance to be a mineral.
- Explain why each mineral has its own properties, different from every other mineral.

Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term in the left column.

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|-------------------------------|--|
| _____ 7. cleavage | a. how a mineral reflects light from its surface |
| _____ 8. streak | b. a substance composed of a single kind of atom |
| _____ 9. luster | c. the property of splitting evenly along flat surfaces |
| _____ 10. fracture | d. how a mineral breaks apart when it does not split evenly |
| _____ 11. Mohs hardness scale | e. the repeating pattern of a mineral's particles in a solid |
| _____ 12. crystal | f. the color of a mineral's powder |
| _____ 13. element | g. a ranking of minerals from softest to hardest |