

Chapter Resources

Rocks and Minerals

Includes:

Reproducible Student Pages

ASSESSMENT

- ✓ Chapter Tests
- ✓ Chapter Review

HANDS-ON ACTIVITIES

- ✓ Lab Worksheets for each Student Edition Activity
- ✓ Laboratory Activities
- ✓ Foldables—Reading and Study Skills activity sheet

MEETING INDIVIDUAL NEEDS

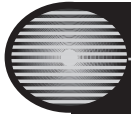
- ✓ Directed Reading for Content Mastery
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- ✓ Note-taking Worksheets

TRANSPARENCY ACTIVITIES

- ✓ Section Focus Transparency Activities
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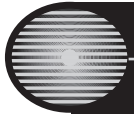
Teacher Support and Planning

- ✓ Content Outline for Teaching
- ✓ Spanish Resources
- ✓ Teacher Guide and Answers

**Overview**
Rocks and Minerals

Directions: For each of the following, write the letter of the term or phrase that best completes the sentence.

- _____ 1. _____ are ideal for jewelry because they can be cut and polished.
a. Rocks b. Gems c. Foliated rocks d. Minerals
- _____ 2. _____ rocks form from existing rocks that have been heated and squeezed.
a. Sedimentary b. Igneous c. Metamorphic d. Detrital
- _____ 3. _____ rock is an igneous rock that forms on Earth's surface.
a. Extrusive b. Intrusive c. Foliated d. Nonfoliated
- _____ 4. Rocks _____ change from one form to another.
a. sometimes b. rarely c. never d. constantly
- _____ 5. Minerals like quartz that break into pieces with jagged edges have _____.
a. cleavage b. hardness c. crystals d. fracture
- _____ 6. _____ must be mined, smelted, and refined before they can be processed into useful everyday materials.
a. Ores b. Gems c. Rocks d. Sediment
- _____ 7. _____ rocks can form from the evaporation of a solution.
a. Detrital b. Foliated c. Chemical d. Extrusive
- _____ 8. Intrusive rocks have _____ crystals because they cooled _____.
a. large; quickly
b. large; slowly
c. small; quickly
d. small; slowly
- _____ 9. So far, around _____ minerals have been identified.
a. 120 b. 400 c. 4,000 d. 100,000
- _____ 10. Clues to a mineral's identity are _____.
a. cleavage and fracture
b. color and hardness
c. streak and luster
d. all of the above


**Section 1 ■ Minerals—
 Earth's Jewels**

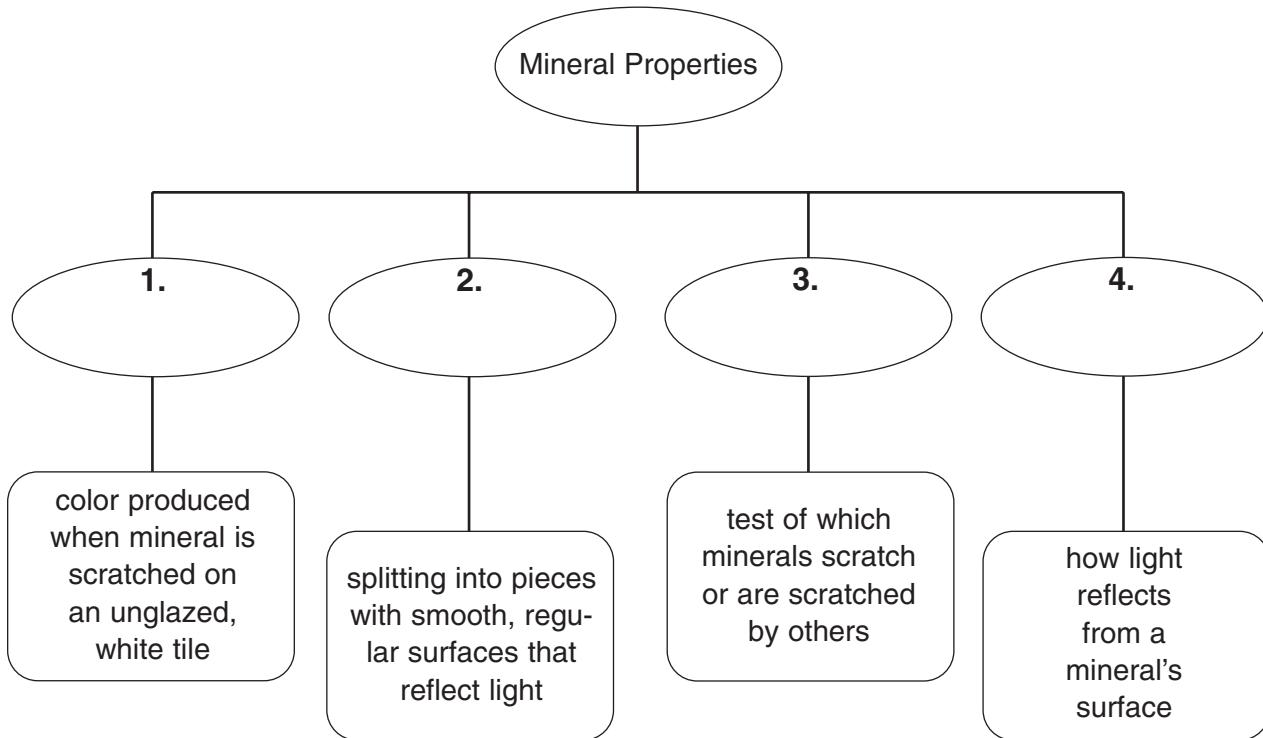
Directions: Use the following terms to complete the concept map below.

luster

streak

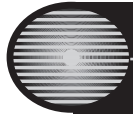
cleavage

hardness



Directions: Correctly complete each sentence by underlining the better of the two choices in parentheses.

5. A mineral is an (organic/inorganic) solid material found in nature.
6. A crystal is a solid material with a (random/repeating) pattern of atoms.
7. If a mineral has (streak/cleavage) it will break in pieces with smooth, regular surfaces.
8. A (gem/crystal) is a rare mineral, such as a diamond, that can be cut and polished.
9. A mineral is a(n) (ore/gem) if it contains something useful and can be sold for a profit.
10. (Hardness/Specific gravity) compares the weight of a mineral with the weight of an equal amount of water.
11. (Streak/Luster) describes how light reflects from a mineral.

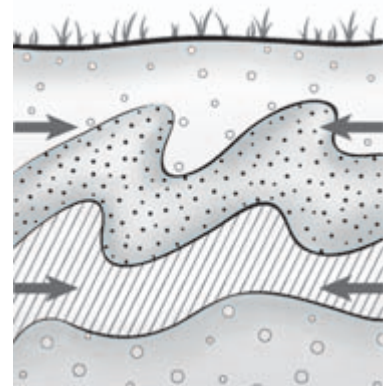


Directed Reading for
Content Mastery

Section 2 ■ Igneous and Sedimentary Rocks

Section 3 ■ Metamorphic Rocks and the Rock Cycle

Directions: Identify the kind of rock that is being formed in each picture.



1. _____

2. _____

3. _____

Directions: Draw a line between the description on the left and the correct term on the right.

4. has two kinds: intrusive and extrusive

nonfoliated rock

5. does not have distinct layers or bands

foliated rock

6. has distinct bands of minerals that have been heated and squeezed into parallel layers

igneous rock

7. sedimentary rock formed from living matter that has died and been compressed

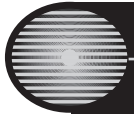
chemical rock

8. sedimentary rock formed from the evaporation of a solution

rock cycle

9. a diagram of rock processes

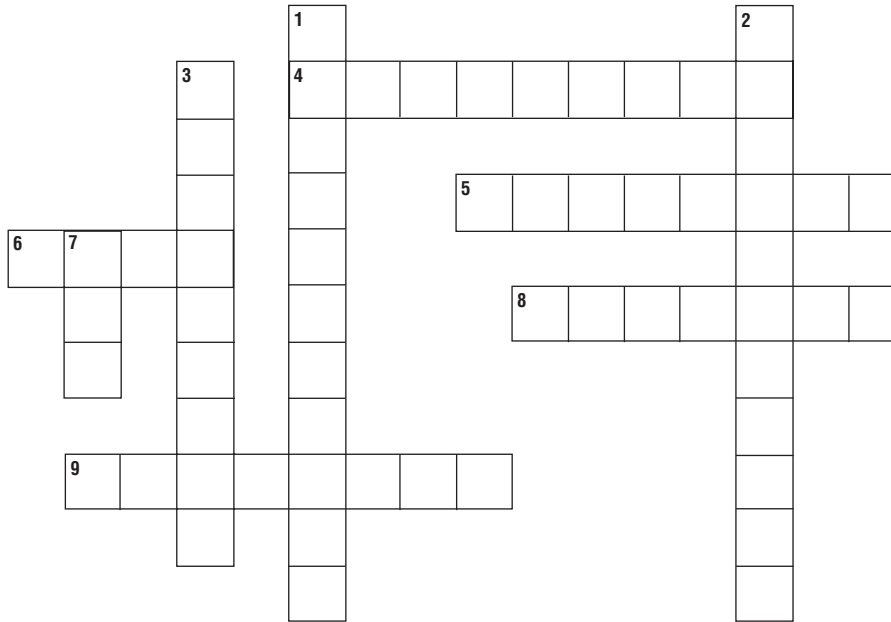
organic rock



Key Terms

Rocks and Minerals

Directions: Use the clues below to complete the crossword puzzle.



Across

4. Igneous rocks that form when melted rock cools on Earth's surface
5. Solid materials that have a repeating pattern of atoms
6. Usually made of two or more minerals
8. Rocks created when melted rock from inside Earth cools
9. Metamorphic rocks that have parallel bands of minerals

Down

1. Rocks created when pieces of other rocks, plant and animal matter, or dissolved minerals collect to form layers
2. Rocks that are created when existing rocks are heated or squeezed
3. A diagram that shows how rocks change from one type to another
7. A mineral that contains something that is useful and sold for a profit

SECTION 1

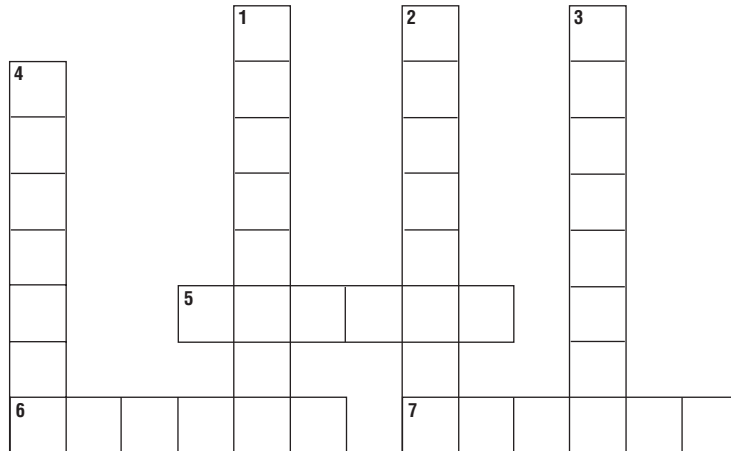
Reinforcement

Minerals—Earth's Jewels

Directions: Complete the following sentences using the correct terms.

1. A(n) _____ is a naturally occurring, inorganic solid with a definite structure and composition.
2. A(n) _____ is usually composed of two or more minerals.
3. A solid with a smooth face, sharp edge, and points is called a(n) _____.
4. A mineral that is rare and can be cut and polished is called a(n) _____.
5. A mineral is called a(n) _____ if it contains something that is useful and sold for a profit.

Directions: Use the clues below to complete the crossword puzzle.



Across

5. Magnetite will attract this
6. How light reflects from a mineral's surface
7. Color of powdered mineral

Down

1. A break with smooth, regular edges
2. The Mohs scale classifies minerals according to this property
3. A break with jagged or rough edges
4. A solid with a repeating pattern of atoms

SECTION
2 Reinforcement

Igneous and Sedimentary Rocks

Directions: Complete the following sentences using the correct terms.

1. When melted rock cools or hardens on or under Earth's surface, it forms _____ rock.
2. Igneous rock that forms on Earth's surface is called _____.
3. Igneous rock that forms beneath Earth's surface is called _____.
4. Rocks that are formed of pieces of other rocks, plant and animal matter, or dissolved minerals are called _____ rocks.
5. Magma that flows onto Earth's surface is called _____.
6. Chalk and coal are examples of a kind of sedimentary rock called _____ rock.
7. Melted rock can ooze out from below Earth's surface through a crack in the crust called a(n) _____.
8. Rocks called _____ are made up of pebbles cemented together with other sediments.

Directions: Classify the terms you used above so that the terms in each group are related.

9. Group 1

10. Group 2

Meeting Individual Needs

SECTION
3

Reinforcement

Metamorphic Rocks and the Rock Cycle

Directions: Match the term in the first column with its description in the second column by writing the correct letter in the space provided.

- | | |
|----------------------|---|
| _____ 1. marble | a. nonfoliated metamorphic rock |
| _____ 2. metamorphic | b. consisting of layers of different minerals |
| _____ 3. foliated | c. a model of the way rocks change form |
| _____ 4. nonfoliated | d. pieces of rock deposited by wind, ice, gravity, or water |
| _____ 5. rock cycle | e. metamorphic rock having a uniform consistency |
| _____ 6. sediment | f. having a changed or different form |
| _____ 7. gneiss | g. foliated metamorphic rock |

Directions: Answer the following questions on the lines provided.

8. What is the rock cycle?

9. What is the difference between foliated and nonfoliated metamorphic rocks?

10. How are metamorphic rocks formed?

11. What are three examples of foliated metamorphic rocks?

12. What are three examples of nonfoliated metamorphic rocks?

SECTION

1

Enrichment

Unusual Mineral Characteristics

Besides distinguishing minerals by color, cleavage, streak, luster, or hardness, scientists (and you) can look at other properties for clues about a mineral's identity. Magnetism, effervescence, birefringence, fluorescence, and taste are five additional characteristics that offer measurable methods to identify minerals.

Imbalance in Iron Ions

Very few minerals exhibit magnetic properties. Magnetism happens because of an imbalance in the arrangement of the iron ions found in the mineral. Minerals with an imbalance of iron ions can have a great deal of magnetism (more than enough to lift a steel rod) or very little magnetism (just enough to move a compass needle). Some may not be magnetic at all, but can be attracted to magnets. Magnetite is one of the more common minerals that exhibit the property of magnetism.

Effervescence—The Fizz Test

The way minerals react to acids is known as effervescence. Using the “fizz test,” scientists drop hydrochloric acid (HCl) onto a mineral to see if it will fizz or bubble on the surface. If it does, scientists know that the mineral contains carbonate ions. In particular, scientists look at how strongly the mineral reacts to the acid. Calcite is the most common carbonate mineral and reacts actively to the fizz test.

Birefringence and Fluorescence

Anyone looking through a birefringence mineral will see twice as much. That's because a ray of light entering a birefringence mineral is split into two—one very fast ray, and one slow ray. As the rays of light shine through the crystal, each is bent at a different angle. The result is double refraction or double vision.

Another unusual mineral characteristic is fluorescence. Fluorescent minerals glow when placed under an ultraviolet (UV) light. This glow, called photoluminescence, is a result of the mineral's chemicals reacting with the UV light. Essentially, these minerals emit visible light when activated by the UV rays. One of the most common fluorescent minerals is fluorite.

Taste Test Alert

Taste is another characteristic used to identify minerals. Some minerals have a strong, identifiable taste. Halite, for example, tastes salty. Keep in mind, however, that even though scientists sometimes taste minerals, you should not. In fact, scientists don't lick the mineral to taste it; they merely place the tip of their tongue very briefly on the mineral, or they wet a finger, touch the mineral, then taste the finger. They do this carefully because some minerals are actually poisonous.

Other properties that scientists use to identify minerals, include odor, feel, and transparency (or diaphaneity). But sometimes a mineral can be identified only through a chemical test or by X-ray analysis.

Directions: Use a field guide to rocks and minerals to complete the following table of unusual mineral characteristics, providing at least one example for each. Do not use the mineral examples mentioned in the passage.

Unusual characteristics	Mineral
Magnetism	
Effervescence	
Birefringence	
Fluorescence	
Taste	

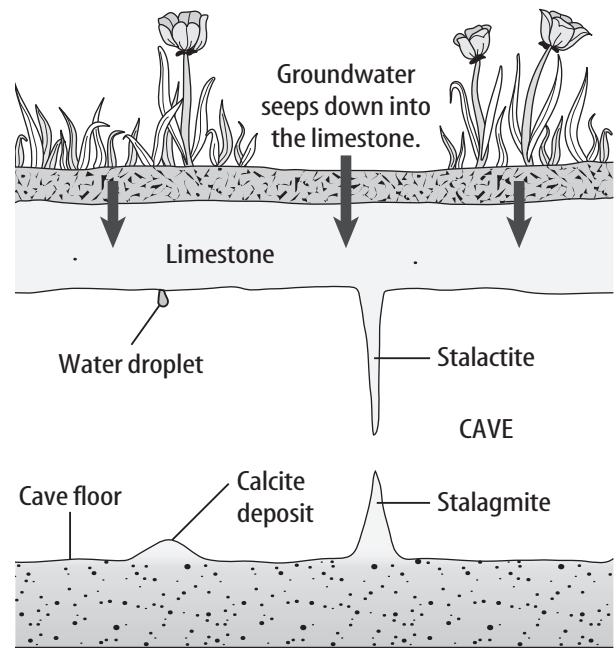
SECTION 2

Enrichment

Stalactites and Stalagmites

If you have ever been inside a cave, you may have seen beautiful, icicle-like objects hanging from the ceilings. These stone formations are stalactites, and they are found in many limestone caves. Often, formations similar to stalactites grow on the floors of caves. These look like upside-down icicles and are called stalagmites. (These names are often confusing. A good way to remember which is which is that stalactites are on the ceiling, and stalagmites are on the ground.)

How do stalactites and stalagmites form? They form when groundwater that contains carbonic acid seeps through limestone. As the water seeps through, it dissolves a mineral called calcite in the limestone. The water then forms droplets that hang from the ceilings of caves. As the droplets hang, the carbon dioxide they contain is lost into the air of the cave. This leaves small amounts of calcite that slowly accumulate and grow. Over hundreds or thousands of years, these calcite deposits grow into stalactites. Stalagmites form from



the calcite that drips from cave ceilings onto cave floors. These deposits accumulate upward. Often, a stalagmite will grow directly below a stalactite as shown in the figure.

1. Why do you think some stalactites grow without a stalagmite below them, or some stalagmites grow without a stalactite above them?

2. Are stalactites and stalagmites igneous or sedimentary? Explain your answer.

SECTION 3

Enrichment

Analyzing Rocks

In this activity, you will identify rocks from a group of unidentified rock samples.

Materials



rock samples (9)
paper and pencil
streak plate
magnifying lens

Procedure

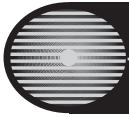
1. Refer to the rock identification chart in the appendix of your textbook. Also, see the National Audubon Society's *Field Guide to North American Rocks and Minerals*. On a piece of paper, copy the table with headings as shown below. Add seven rows to your table so that you can note your observations on each of the nine rock samples. Some observations are filled in. Label each unidentified rock with a number, 1–9.
2. Observe the grains, crystals, banding, and other characteristics of the rock samples.
3. Record your observations of the unidentified rock samples on the table you made. When you feel confident about your conclusion, write it down in the last column. Label each rock with your conclusion.

Observations

Rock Sample Observations				
Rock	Color	Observations/Ideas	Description	Conclusion
1	gray	hard, has lots of little pores	light and floats	pumice
2				

1. What were the first observations you made to help you decide which rock was which?

2. Vinegar is slightly acidic. How could vinegar help you draw your conclusions about which rock is which?

**Note-taking
Worksheet**

Rocks and Minerals

Section 1 Minerals—Earth's Jewels

- A. _____—inorganic solid material with a particular chemical makeup and orderly arrangement of atoms
1. **Rocks** are usually composed of two or more _____.
 2. Minerals form from _____ or lava or through evaporation or precipitation.
 3. Mineral formation clues include _____ and how mineral crystals fit together.
- B. Properties—characteristics used to _____ minerals
1. Solid materials with a repeating pattern of atoms are called _____.
 2. Some minerals have _____, splitting into thin sheets; other minerals have _____, breaking into rough edges.
 3. Color or _____ (color of a powdered mineral) helps identify minerals.
 4. _____ describes how light reflects from a mineral's surface.
 5. Mohs scale uses _____ to classify minerals from 1 (softest) to 10 (hardest).
 6. _____—compares weight of mineral with weight of an equal volume of water.
 7. Other properties of minerals include _____, double refraction, taste, or reactions with acid.
- C. Common minerals—most rock-forming minerals are _____
or _____.
1. Rare minerals which can be cut and polished are _____.
 2. Diamonds are produced under _____ beneath Earth's surface and brought to the surface by special volcanic eruptions.
 3. An _____ contains enough useful mineral to be sold at a profit.
 4. Ores must be _____ to extract the mineral.

Note-taking Worksheet (continued)**Section 2 Igneous and Sedimentary Rocks**

- A. _____—form from melted rock that cools
- _____ igneous rocks form when melted rock cools on Earth's surface.
 - _____ igneous rock forms when melted rock cools beneath Earth's surface.
 - Light-colored often intrusive igneous rocks containing a high percentage of silica are called _____.
 - Dark-colored often extrusive igneous rocks containing iron, magnesium, or calcium are called _____.
 - _____ is melted rock that reaches Earth's surface and forms extrusive igneous rock when it cools.
 - _____ can erupt, bringing a lava flow to Earth's surface.
 - Large cracks or _____ can allow melted rock to ooze out in a lava flow.
 - _____ is melted rock that does not reach Earth's surface; intrusive igneous rocks form as magma slowly cools under the surface.
 - Crystal _____ is the main difference between intrusive and extrusive igneous rock.
 - _____ igneous rocks have large crystals.
 - _____ igneous rocks do not have large crystals.
- B. _____ rocks form in layers from broken rock, shells, plants, and other materials.
- _____ rocks—made of grains from minerals or other rocks that have been compressed
 - _____ rocks—form when mineral-rich water evaporates and from other chemical processes
 - _____ rocks—form from dead plants and animals that have been compressed
 - If the rock is produced from layers of plants, it is called _____.
 - If the rock is produced from organic sediment in the _____, it is usually classified as limestone.
 - Chalk is a kind of limestone made from the _____ of tiny animals and algae.

Note-taking Worksheet (continued)**Section 3 Metamorphic Rocks and the Rock Cycle**

- A. Time, _____, and heat, and events such as erosion and moving land masses, make new rocks out of old rocks.
1. _____—form when existing rocks are heated or squeezed; they recrystallize and might change chemically.
 2. Rocks having visible layers or elongated mineral grains are called _____ rocks; _____ rocks do not have layers or bands.
- B. _____—rocks change from one type to another over millions of years.
1. The model, or _____, shows each rock on a continuing journey.
 2. A rock in _____ part of the cycle could become any other kind of rock.