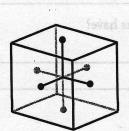
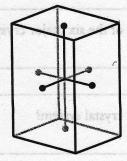
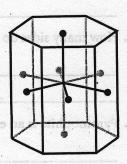
Use with Chapter 4 Section 4.1

# **Crystal Systems**





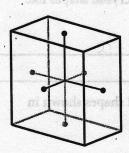




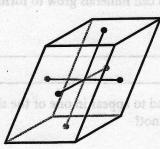
Il. What is a crystall

**Cubic** Tetragonal

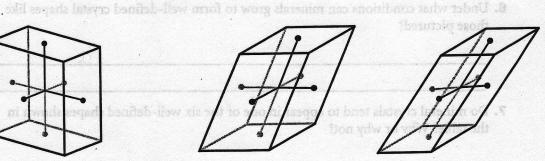
Hexagonal



Orthorhombic



**Monoclinic** 



**Triclinic** 

5. Name a mineral in the triclimic crestal system.

### **TEACHING TRANSPARENCY**

Use with Chapter 4 Section 4.1

# **Crystal Systems**

What is a crystal?	*v .				¥
How many sides do crystals of each of the size	x major crystal sy	stems have?	÷ ι		
		*		E .	
		<u> </u>	1 70.0	-	
Pyromophite is an example of what crystal s	ystem?				
How would you use crystal structure to tell a of gypsum?	a crystal of pyrite	from a crystal			
	2	8		T	
Under what conditions can minerals grow to				5	1
	o form well-defin	ed crystal shap	es like		
	o form well-defin	ed crystal shap	es like		
	o form well-defin	ed crystal shap	es like		
those pictured?  Do mineral crystals tend to appear in one of					
those pictured?  Do mineral crystals tend to appear in one of					
those pictured?  Do mineral crystals tend to appear in one of					
those pictured?  Do mineral crystals tend to appear in one of					
Do mineral crystals tend to appear in one of the table? Why or why not?  How are atoms arranged in crystalline struct	the six well-defi				

Use with Chapter 4 Section 4.2

# **Mohs Hardness Scale**

Mohs Hardness Scale		
Ha	ardness	Hardness of Common Objects
Talc	1 (softest)	TO DEED SECURE SELECTION TO ACCOUNT AND SECURITY TO
Gypsum	2	fingernail (2.5)
Calcite	3	piece of copper (3.5)
Fluorite	4	iron nail (4.5)
Apatite	5	glass (5.5)
Feldspar	6	steel file (6.5)
Quartz		streak plate (7)
Topaz	8	scratches quartz
Corundum	9	scratches topaz
Diamond	10 (hardest)	scratches all common materials

### **TEACHING TRANSPARENCY**

Use with Chapter 4
Section 4.2

# **Mohs Hardness Scale**

- **1.** What does the property of mineral hardness measure?
- **2.** What is the softest mineral shown, and what is its hardness on the Mohs scale?
- 3. What is the hardest mineral shown, and what is its hardness on the Mohs scale?
- **4.** Explain how you could estimate the hardness of a mineral that does not appear on the Mohs scale.

- **5.** Which common object will scratch feldspar?
- **6.** Which minerals on the Mohs scale will scratch apatite? Which will apatite scratch?
- **7.** What is the hardness of a mineral that scratches gypsum but cannot scratch calcite? Explain your answer.

STUDY GUIDE

## **SECTION 4.1** What is a Mineral?

In your textbook, read about mineral identification.
Use each of the terms below just once to complete the passage.

cleavage	color	fracture	hardness			
luster	specific gravity	streak	texture			
Geologists use	Geologists use physical properties to identify minerals. For example, the (16)					
of a mineral i	of a mineral is caused by the presence of different trace elements. The way a mineral reflects light from its					
surface is called (17), which is described as metallic or nonmetallic. How a						
mineral feels	to the touch is called (18)	•	A mineral's (19)			
is the color of	f a mineral when it is broken	up and powdered. A r	neasure of how easily a mineral can be	į		
scratched is ca	alled <b>(20)</b>					
Another pr	operty describes how a mine	ral will break. If a min	eral splits easily and evenly along one	ē		
or more plane	es, it has the property of (21)	13	, while minerals that break along			
			ensity of a mineral is usually			
expressed as (	<b>(23)</b>	which is the ratio of the	ne weight of a substance to the weight			
of an equal vo	olume of water at 4°C.					
•	ok, read about mineral identif ollowing questions.	ication.				
<b>24.</b> Can all m	ninerals produce a streak on a	porcelain plate? Why	or why not?			
2752	angabat it would be to be a page of					
			engt will discharge			
<b>25.</b> Can mine	erals with cleavage have more	than one cleavage pla	ne? If so, give an example.			
8						
<b>26.</b> What is the	he difference between density	and specific gravity?				
	*					
	10, 20, 000					
				***		
	ny minerals are represented on the range of hardness of those		ineral hardness?			
			w.			

STUDY GUIDE

## SECTION 4.1 What is a Mineral?, continued

Circle the letter of the choice that best completes the statement.

- 28. Identification tests for minerals are based on their
  - a. scientific names.

c. color.

**b.** physical and chemical properties.

- d. chemical composition.
- 29. The appearance of milky quartz is caused by

a. its high density.

c. its magnetism.

**b.** its hardness.

- d. trapped bubbles of gas and liquid.
- 30. A mineral's hardness with respect to other minerals can be determined by

a. its specific gravity.

c. the Mohs scale of mineral hardness.

**b.** its cleavage planes.

- d. its magnetic properties.
- **31.** Minerals break along planes where atomic bonds are
  - a. weak.
- b. strong.
- c. dense.
- d. magnetic.
- **32.** Minerals, such as quartz, that break along jagged edges are said to have
  - a. cleavage.
- **b.** density.
- **c.** fracture.
- d. special properties.
- 33. The ratio of the weight of a substance to the weight of an equal volume of water at 4°C is its
  - a. chemical composition.

c. specific gravity.

**b.** weight.

d. hardness.

In your textbook, read about special properties of minerals.

Circle the letter of the choice that best completes the statement or answers the question.

- **34.** In double refraction, light is
  - a. bent in two directions.

**c.** obscured by gas bubbles in the crystal.

**b.** bent in one direction.

- **d.** changed to a magnetic field.
- 35. Which mineral bubbles when it comes in contact with hydrochloric acid because the calcite releases?
  - a. quartz.

c. feldspar.

b. calcite.

- d. mica.
- **36.** Lodestone can pick up iron filings. What special property does lodestone have?
  - a. a sticky texture

**c.** magnetism

**b.** extreme heaviness

**d.** a rotten-egg smell

# **Minerals**

### What is a mineral? SECTION 4.1

In your textbook, read about mineral characteristics.

Answer the following questions.

- 1. What is a mineral?
- 2. Why is salt classified as a mineral, but sugar is not?
- **3.** Can minerals occur as liquids? Why or why not?
- **4.** Can the chemical composition of a single mineral vary? Explain your answer.
- **5.** What is a crystal?
- **6.** How does forming in a restricted space affect the structure of a crystal?
- 7. What does the definite crystalline structure of a mineral consist of?
- 8. Why are feldspars considered to be minerals even though their compositions can vary?

2/61911/1

S. What is a crystall

## CHAPTER <

### What Is a mineral?, continued SECTION 4.1

In your textbook, read about minerals that formed from magma and that formed from solution. For each statement, write true or false.

- 9. Minerals can form from the cooling of magma.
  - 10. Density differences can force magma upward into cooler layers of Earth's interior.
    - 11. If magma cools slowly, atoms do not have time to arrange themselves into large crystals.
    - 12. Small crystals form from rapidly cooling magma.
      - **13.** When liquid evaporates from a solution, the remaining elements cannot form crystals.

4. Can the chemical composition of a single mineral vary? Explain your answer

2. What does the definite crystalline stove ture of a mineral consist of

8. Why are feld ours considered to be minerals even though their compositions can vary?

- 14. Minerals can form from elements dissolved in a solution.
- 15. If a solution remains unsaturated, mineral crystals may precipitate.

Organia a Edith Schemel Geology, the Emirorment, and the

## SECTION 4.2 Types of Minerals

In your textbook, read about mineral uses. Answer the following questions.

1. What makes a mineral an ore?

2. Is aluminum an ore? Explain your answer.

3. Can the classification of a mineral as an ore change? If so, how?

4. How are ores deep beneath Earth's surface removed?

**5.** How are ores near Earth's surface removed?

6. What two problems can result from removing waste material from ores?

In your textbook, read about mineral groups.

Complete the table by filling in the following terms: silicates, carbonates, oxides.

Mineral Group	Description
7	Calcite, dolomite, and rhodochrosite are examples.
8.	Readily form silica tetrahedrons
9	Composed of one or more metallic elements with the carbonate compound CO <sub>3</sub>
10	Composed of silicon, oxygen, and another element
11	Compounds of oxygen and a metal
12	Magnetite and hematite, both sources of iron, are examples.
13	The most common minerals, feldspar and quartz, are examples.
14	Primary minerals in limestone and marble

Class

STUDY GUIDE

## Types of Minerals, continued

In your textbook, read about mineral uses.

Use each of the terms below to complete the statements.

open-pit mines	ore	underground mining	overlourden
<b>15.</b> A(n)	<i>a</i>	is a mineral that c	ontains a useful substance tha
can be mined at	a profit.		
<b>16.</b> An ore located o	leep within	Earth's crust is removed b	by
<b>17.</b> An ore near Ear	th's surface	is obtained from large	•
<b>18.</b> Unwanted rock	and dirt, kn	own as	, are dug up along
with valuable or	re.		
		s. complete the statements. gem	trace elements
g 0			
<b>19.</b> A(n) beauty.		is a valuable mine	eral prized for its rarity and
20. Because of their	relative rar	eness, rubies and	are mor
valuable than d	Killer		
more colorful a	nd thus mo	re prized than other varie	
			,
can also be four	nd as rubies	and sapphires.	