

# The Solar System and Beyond

test

Circle the letter of the best answer.

- The closest planet to the Sun is
  - Earth.
  - Mars.
  - Mercury.
  - Pluto.
- Scientists study the greenhouse effect of the planet
  - Jupiter.
  - Saturn.
  - Uranus.
  - Venus.
- The only planet in the solar system known to support life is
  - Earth.
  - Mercury.
  - Neptune.
  - Triton.
- The red planet with a rotation period almost the same as Earth's is
  - Jupiter.
  - Mars.
  - Pluto.
  - Uranus.
- The layer of Earth's atmosphere in which all weather occurs is the
  - mesosphere.
  - stratosphere.
  - thermosphere.
  - troposphere.
- The largest planet in the solar system is
  - Earth.
  - Jupiter.
  - Saturn.
  - Venus.
- The second-largest planet, which is enclosed by seven major rings, is
  - Jupiter.
  - Mercury.
  - Saturn.
  - Venus.

Circle the letter of the best answer.

8. Winds stronger than those found on any other planet and a blue color are traits of
- a. Neptune.
  - b. Pluto.
  - c. Saturn.
  - d. Venus.
9. The smallest of the planets is
- a. Earth.
  - b. Jupiter.
  - c. Pluto.
  - d. Uranus.
10. Any part of a meteoroid that reaches Earth's surface is called a(n)
- a. asteroid.
  - b. comet.
  - c. meteor.
  - d. meteorite.
11. The apparent shift of an object's location when viewed from two positions is called
- a. light-years.
  - b. parallax.
  - c. redshift.
  - d. spectrum.
12. The brightness of a star as you see it in the night sky is its
- a. light year.
  - b. apparent magnitude.
  - c. redshift.
  - d. spectrum.
13. According to the big bang theory, the universe has
- a. contracted.
  - b. expanded.
  - c. stopped expanding.
  - d. become more dense.
14. An extremely bright, distant source of high energy is a
- a. black hole.
  - b. comet.
  - c. quasar.
  - d. nebula.

# Choose-a-Word

Circle the word or phrase that best completes each sentence.

- The bending of waves from one substance to another is \_\_\_\_\_.  
reflection      refection      refraction
- An apparent shift in an object when viewed from two positions is \_\_\_\_\_.  
parallel      parallax      battleax
- A small, rocky object that orbits the Sun is a \_\_\_\_\_.  
meteor      meteorite      meteoroid
- Earth completes one \_\_\_\_\_ every 365 days.  
rotation      revolution      axis
- The distance light travels in a year is a \_\_\_\_\_.  
leap year      wavelength      light year
- Slight changes from high to low tide when Earth, the Sun, and the Moon form a right angle is a \_\_\_\_\_.  
leap tide      new tide      neap tide
- A large, flat, dark area on the Moon is a \_\_\_\_\_.  
meteor      crater      mare
- Beyond Pluto's orbit, the \_\_\_\_\_ contains thousands of comets.  
Asteroid Belt      Kepler Belt      Kuiper Belt
- The pink layer of the Sun just below the corona is the \_\_\_\_\_.  
photosphere      coronasphere      chromosphere
- A \_\_\_\_\_ shines as brightly as a trillion stars.  
pulsar      quasar      nebula

# Crack-a-Code

### Code Key

□	○	△	◼	◐	▲	▤	◑	▴	◓	▲	☆	☾	◼	◑	★	◼	◑	
A	C	D	E	F	G	H	I	L	M	N	O	P	R	S	T	U	W	Y

Use the Code Key to help you decode each word. Then draw a line to its meaning.



1. \_\_\_\_\_

a. rock-and-metal object orbiting the Sun



2. \_\_\_\_\_

b. group of stars that form a pattern



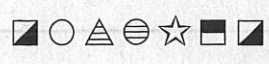
3. \_\_\_\_\_

c. blocks the view of the Sun or Moon



4. \_\_\_\_\_

d. depression in the Moon's surface



5. \_\_\_\_\_

e. ice and rock object that orbits the Sun



6. \_\_\_\_\_

f. the distance light travels in a year



7. \_\_\_\_\_

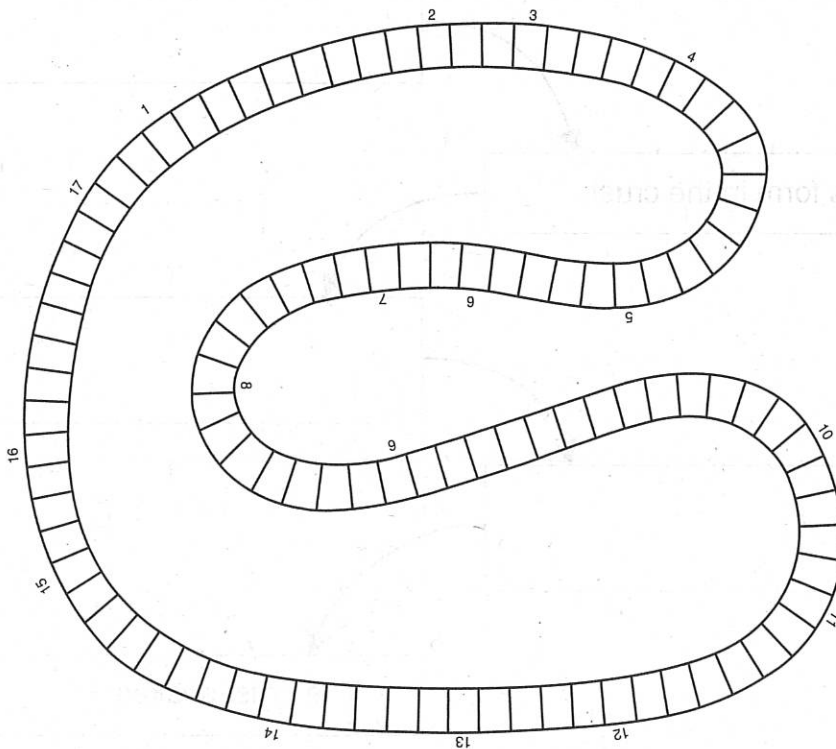
g. blinking neutron star



# Swirl of Words

In this kind of word puzzle, the last letter of one answer is the first letter of the next answer! Read each clue, then write your answers.

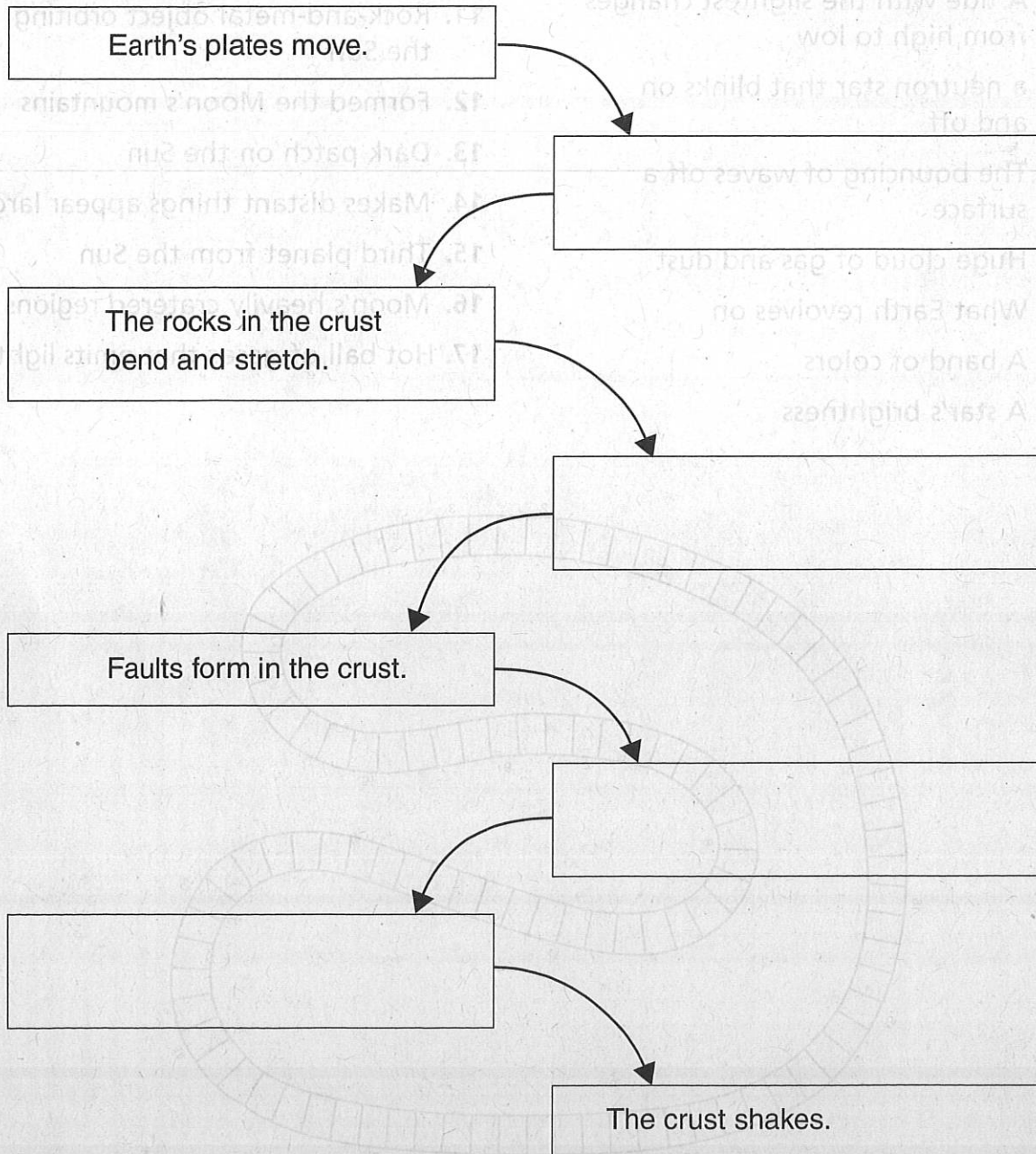
1. The bending of light waves as they move from one substance to another
2. A tide with the slightest changes from high to low
3. a neutron star that blinks on and off
4. The bouncing of waves off a surface
5. Huge cloud of gas and dust
6. What Earth revolves on
7. A band of colors
8. A star's brightness
9. Kind of spectrum, with light waves in order by wavelength
10. The outermost part of the Sun
11. Rock-and-metal object orbiting the Sun
12. Formed the Moon's mountains
13. Dark patch on the Sun
14. Makes distant things appear larger
15. Third planet from the Sun
16. Moon's heavily cratered regions
17. Hot ball of gases that emits light




# Earth's Moving Crust

A cause-and-effect diagram uses boxes and arrows to show how a series of events is related. The event written in the first box causes the event written in the second box. The event in the second box causes the event in the third box and so on. The cause-and-effect diagram below shows the events that lead to an earthquake.

**Complete the diagram by filling in the blank boxes.**



# Moving Plates

Fill in the blanks.  Reading Skill: Cause and Effect - questions 4, 6, 16, 18

## Are the Continents Moving?

1. Geologists study Earth's solid surface, called the \_\_\_\_\_.
2. To determine if the surface is moving, they look for evidence of changes in position of surface features and \_\_\_\_\_.
3. Many kinds of rocks form in flat, horizontal layers. This is called \_\_\_\_\_.
4. Alfred Wegener believed that Earth's continents fit together like puzzle pieces, and once formed a supercontinent called \_\_\_\_\_.
5. Wegener's theory that the continents split into pieces and drifted apart is known as \_\_\_\_\_.

## What Is Sea Floor Spreading?

6. According to the \_\_\_\_\_ model, new crustal material forming at ocean ridges causes the old sea floor to spread apart.
7. Just below the ridges of the sea floor there is hot, melted rock called \_\_\_\_\_.

## What Evidence Supports Sea-Floor Spreading?

8. Rocks that make up the continents are much \_\_\_\_\_ than rocks of the ocean floor.
9. The youngest ocean floor rocks are found at the \_\_\_\_\_.
10. The rocks of the sea floor reveal a record of the reversal of Earth's \_\_\_\_\_.



## What Is Plate Tectonics?

11. In the late 1960's, scientists built a new model to explain how continents and the sea floor move called \_\_\_\_\_.
12. Each plate includes material from a layer below the crust called the \_\_\_\_\_.
13. The plates can move away from each other, \_\_\_\_\_, or slide past each other.

## What Happens at Plate Boundaries?

14. Places where plates move apart are \_\_\_\_\_ boundaries.
15. Places where plates are colliding are \_\_\_\_\_ boundaries.
16. The collision of two ocean plates can produce undersea volcanoes or deep \_\_\_\_\_.
17. Boundaries where plates slide past each other are called \_\_\_\_\_ faults.

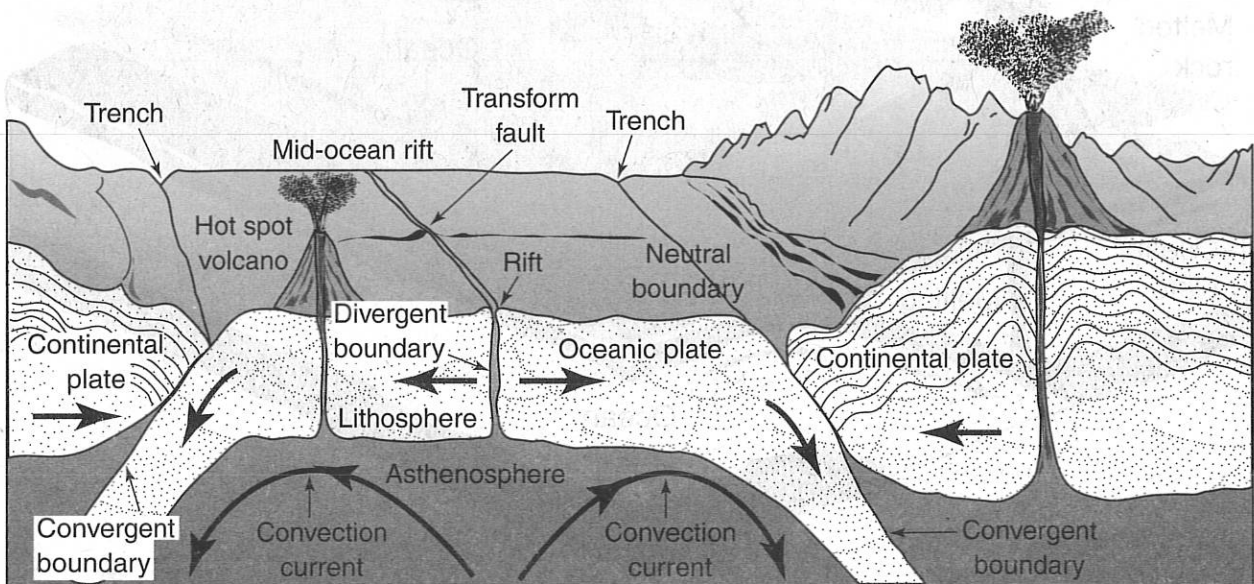
## How Is Earth's Crust Recycled?

18. Older rock is destroyed by \_\_\_\_\_ in ocean trenches as new rock is forming in mid-ocean ridges.
19. The islands of Japan are a volcanic \_\_\_\_\_.



# What Happens at Plate Boundaries?

Some diagrams provide a view of something that you cannot see easily. The diagram below shows features found beneath Earth's surface. Look at the diagram carefully. Read the labels to discover the names of the features shown.



Use the diagram to answer the questions.

1. What is happening at the divergent boundary?

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2. What is occurring at the convergent boundary?

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3. What do the arrows along the bottom of the diagram represent?

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4. What does a trench look like?

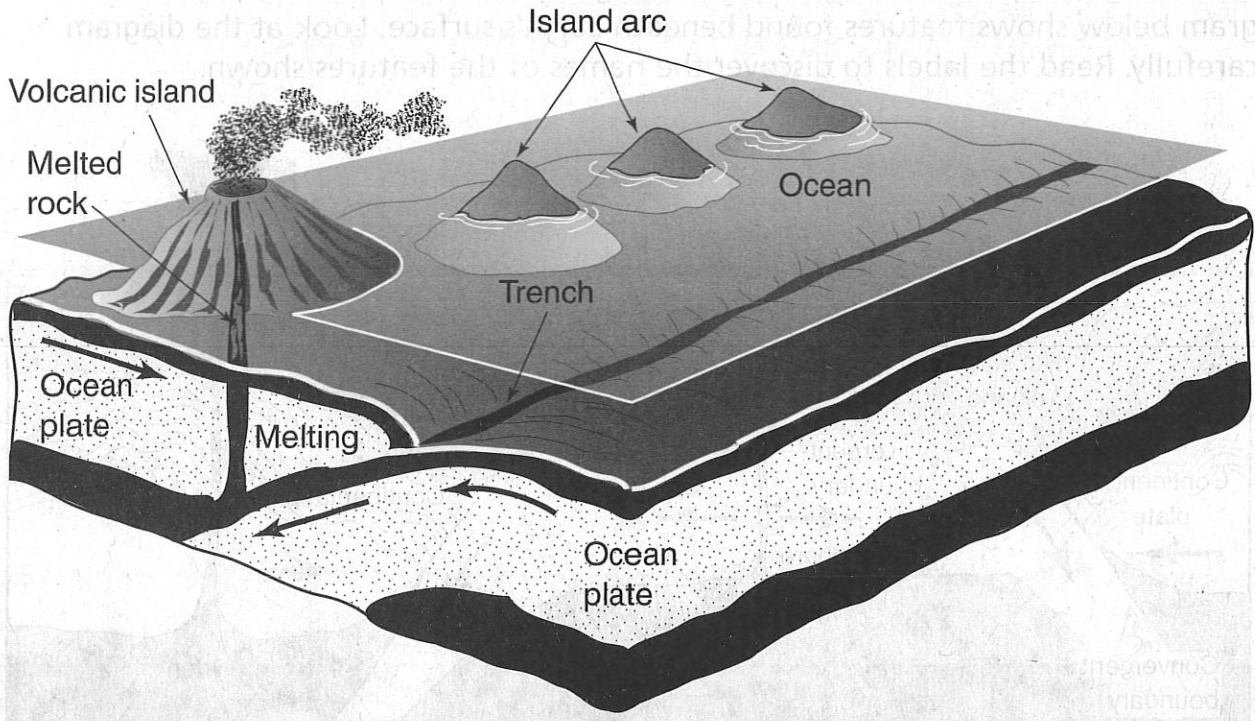
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5. Where does the material that spews out of a hot spot volcano come from?

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# How Is Earth's Crust Recycled?

A diagram can show how the parts of a process are related. Look at the diagram below. Think about the process it illustrates. Follow the arrows and read the labels.



Use the diagram to answer the questions.

1. What process does the diagram illustrate? \_\_\_\_\_
2. What is colliding in the diagram? \_\_\_\_\_
3. What features are forming as a result of this collision?  
\_\_\_\_\_
4. What feature shown in the diagram is sinking down into the mantle?  
\_\_\_\_\_
5. What is released from a volcanic island? \_\_\_\_\_
6. Which feature shown in the diagram could represent Japan?  
\_\_\_\_\_

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## Moving Plates

Match the correct letter with the description.

- \_\_\_\_\_ 1. name of the process when a denser ocean plate may slide under another plate
- \_\_\_\_\_ 2. rocks that form in flat, level layers
- \_\_\_\_\_ 3. Earth's solid surface
- \_\_\_\_\_ 4. hot, molten rock beneath the sea floor
- \_\_\_\_\_ 5. idea that new crust forming at ridges spreads apart the old sea floor on both sides of the ridges
- \_\_\_\_\_ 6. hypothesis that a supercontinent split into pieces and the pieces moved away from each other
- \_\_\_\_\_ 7. model that explains the movement of continents and the sea floor
- \_\_\_\_\_ 8. the layer beneath Earth's crust
- \_\_\_\_\_ 9. boundaries where plates slide past each other

### Vocabulary

- a. magma
- b. plate tectonics
- c. subduction
- d. mantle
- e. transform faults
- f. crust
- g. continental drift
- h. sea-floor spreading
- i. original horizontality

Answer each question.

10. What fuels does Earth's crust provide?

\_\_\_\_\_

11. How does Earth's magnetic field affect magma?

\_\_\_\_\_

12. What causes Earth's plates to move?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. What forms if there is a continent on each side of convergent boundaries? Give an example.

\_\_\_\_\_  
\_\_\_\_\_



# Moving Plates

## Vocabulary

sea-floor spreading

cracks

sounders

magma

rock material

canyons

ridges

Atlantis

### Fill in the blanks.

Researchers aboard the ship \_\_\_\_\_ explored the sea floor. They used depth \_\_\_\_\_ to map the bottom surface of the Atlantic Ocean. These researchers discovered the Mid-Atlantic Ridge—mountains separated by \_\_\_\_\_ and valleys. A model called \_\_\_\_\_ states that new crustal material is forming at the ridges in the sea floor. It pushes apart the old sea floor on both sides of the \_\_\_\_\_ as it forms. Beneath, there is molten rock called \_\_\_\_\_. This flows up through the \_\_\_\_\_, then cools and hardens. This process makes new \_\_\_\_\_ while pushing older rock material away along the sea floor.



# Earthquakes

Fill in the blanks.  Reading Skill: Cause and Effect - questions 1, 4, 7, 9, 12, 13

## How Do Earthquakes Happen?

1. An earthquake is a sudden trembling of ground caused by something happening in Earth's \_\_\_\_\_.
2. About 80 percent of all earthquakes happen along the edges of the \_\_\_\_\_ plate.
3. Earthquakes are less likely to happen at the \_\_\_\_\_ of plates.
4. The different kinds of motion that occur at the three kinds of plate boundaries produce different kinds of \_\_\_\_\_, or cracks in the crust.
5. The three kinds of plate boundaries are:
  - a. \_\_\_\_\_,
  - b. \_\_\_\_\_, and
  - c. \_\_\_\_\_.

## How Do Earthquakes Make Waves?

6. The point where an earthquake starts is the \_\_\_\_\_.
7. Sudden motion along a fault causes vibrations to travel through the crust in the form of \_\_\_\_\_.
8. The point on Earth's surface directly above the focus is the \_\_\_\_\_.
9. After the initial shock, further shaking of the crust, called \_\_\_\_\_, can occur.
10. The fastest seismic waves are \_\_\_\_\_ waves or P waves.
11. Seismic waves that travel slower than primary waves are called \_\_\_\_\_ waves, or \_\_\_\_\_ waves.

12. The motion of \_\_\_\_\_ waves can cause structures built on Earth's surface to tear apart.
13. Huge ocean waves called \_\_\_\_\_ are produced when the focus of an earthquake lies beneath the sea floor.

### What Can We Learn from Seismic Waves?

14. To study patterns in seismic waves, scientists utilize a(n) \_\_\_\_\_.
15. Knowing the time lag in the arrival of seismic waves at three different seismograph stations can indicate the location of an earthquake's \_\_\_\_\_.

### How Destructive Is an Earthquake?

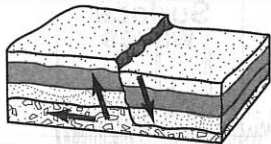
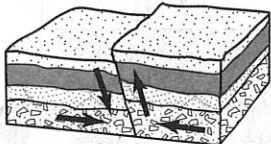
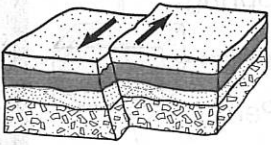
16. The height of a wave on a seismograph is a measure of the \_\_\_\_\_ of an earthquake.
17. Magnitude is the amount of \_\_\_\_\_ released by an earthquake.
18. Each increase of 1 on the Richter scale means an increase of about \_\_\_\_\_ times the energy released.
19. While the Richter scale measures energy, the \_\_\_\_\_ scale measures the amount of damage done at a given location.

### How Can We Prepare for Earthquakes?

20. Many new building designs have huge \_\_\_\_\_ in their foundations that absorb much of the wave motion of an earthquake.
21. Newer buildings are built with \_\_\_\_\_ materials that will more likely bend rather than break during an earthquake.

# How Do Earthquakes Happen?

Certain charts can help you compare and contrast similar items. Look at the chart below. Think about how the faults are alike. Look for differences.

Three Kinds of Faults				
Fault	Where produced	How produced	How rocks move	Example
 <p><b>Normal fault</b></p>	Divergent boundaries	Plates pull apart.	Rocks above the fault surface move down.	Sierra Nevada in California
 <p><b>Reverse fault</b></p>	Convergent boundaries	Plates push together.	Rocks above the fault move upward.	Himalayas in India
 <p><b>Strike-slip</b></p>	Transform boundaries	Plates slide past each other without moving up or down.	Rocks slide past each other in different directions.	San Andreas Fault in California

Use the chart to answer the questions.

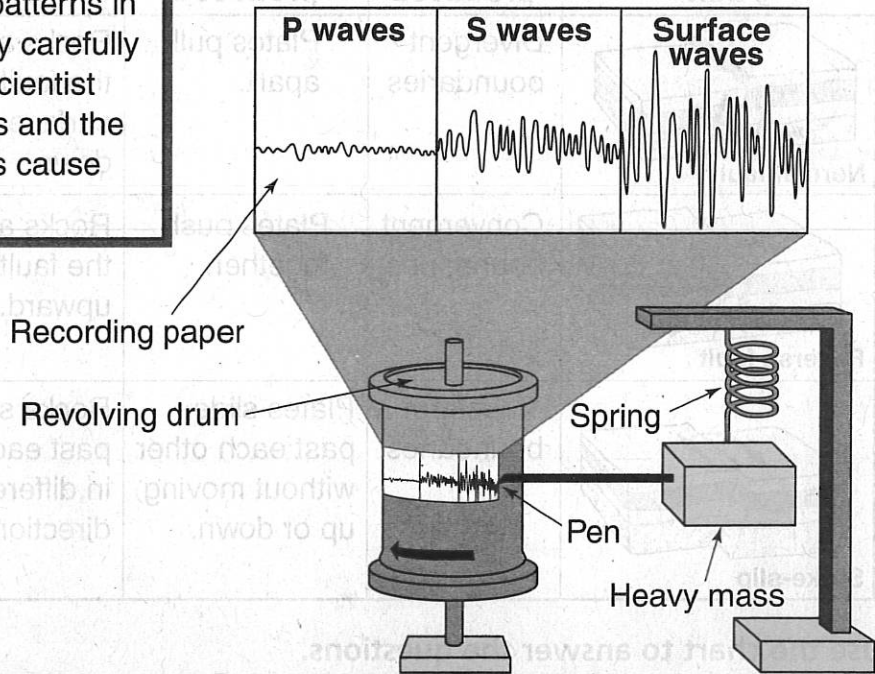
1. What is being compared in the chart? \_\_\_\_\_
2. Which type of fault is produced when plates push together?  
\_\_\_\_\_
3. At which type of fault do rocks above the fault surface move down?  
\_\_\_\_\_
4. What is an example of a strike-slip fault? \_\_\_\_\_
5. At which type of fault do rocks above the fault move upward?  
\_\_\_\_\_
6. What type of fault is the Sierra Nevada in California?  
\_\_\_\_\_
7. How is a strike-slip fault produced?  
\_\_\_\_\_



# How Can We Learn from Seismic Waves?

This diagram shows the parts of a seismograph and what a seismograph is used for. Read the caption. Study the diagram.

A seismograph shows patterns in the waves that arrive. By carefully studying the waves, a scientist can identify the P waves and the S waves. Surface waves cause the most damage.



Use the diagram to answer the questions.

1. What kind of data does a seismograph show?  
\_\_\_\_\_
2. What are the parts that make up a seismograph?  
\_\_\_\_\_
3. How are data recorded on a seismograph?  
\_\_\_\_\_
4. How does the appearance of S waves differ from that of P waves?  
\_\_\_\_\_
5. Which type of waves causes the greatest damage? \_\_\_\_\_



# Earthquakes

Match the correct letter with the description.

- \_\_\_\_\_ 1. additional shaking after the earthquake
- \_\_\_\_\_ 2. the point where an earthquake begins
- \_\_\_\_\_ 3. earthquake vibrations that travel through Earth's crust
- \_\_\_\_\_ 4. a huge crack in Earth's crust
- \_\_\_\_\_ 5. a huge ocean wave caused by an earthquake
- \_\_\_\_\_ 6. an instrument that measures the shaking of Earth's crust
- \_\_\_\_\_ 7. the amount of energy released by an earthquake
- \_\_\_\_\_ 8. the point directly above the focus where the earthquake is first felt
- \_\_\_\_\_ 9. the measure of the energy of earthquakes from 1 to 10

## Vocabulary

- a. fault
- b. seismograph
- c. magnitude
- d. seismic waves
- e. Richter scale
- f. focus
- g. epicenter
- h. aftershocks
- i. tsunami

Answer each question.

10. What are the fastest seismic waves called?

\_\_\_\_\_

11. What is the Mercalli scale?

\_\_\_\_\_  
\_\_\_\_\_

12. Why are earthquakes less likely to happen at the centers of Earth's plates?

\_\_\_\_\_  
\_\_\_\_\_

# Earthquakes

## Vocabulary

divergent

break

push together

surface

motion

sudden

crust

energy

faults

earthquake

transform

### Fill in the blanks.

As plates move, they bend and stretch the rocks of the

\_\_\_\_\_. When the rocks reach their limit, they

\_\_\_\_\_. As a result huge cracks in the crust called

\_\_\_\_\_ form at and below the \_\_\_\_\_.

Different faults are produced by different kinds of plate

\_\_\_\_\_. Along \_\_\_\_\_ boundaries, plates

pull apart. At \_\_\_\_\_ boundaries, plates move past each

other. At convergent boundaries, plates \_\_\_\_\_.

The broken faults scrape against each other, moving gradually. Sometimes these

movements are \_\_\_\_\_. The \_\_\_\_\_

released shakes the crust. This sets a(n) \_\_\_\_\_ in motion.

# Volcanoes

Fill in the blanks.



Reading Skills: Cause and Effect - questions 4, 9, 10, 12, 16, 17, 18, 19

## How Do Volcanoes Form?

1. A volcano is a place where molten rock, \_\_\_\_\_, and solid rock erupt through an opening in the crust.
2. The magma that erupts through a central opening, or \_\_\_\_\_, is called \_\_\_\_\_.
3. A cuplike hollow around the vent located at the top of a volcano is called a(n) \_\_\_\_\_.
4. When a volcano collapses, a very wide crater called a(n) \_\_\_\_\_ forms.
5. The Pacific Ring of Fire is a belt of \_\_\_\_\_ that circles the Pacific Ocean.
6. Many of Earth's volcanoes are at the ocean floor lining the \_\_\_\_\_.
7. Most volcanoes occur along \_\_\_\_\_ boundaries.
8. Where plates are moving apart, \_\_\_\_\_ form.
9. As a plate moves over a(n) \_\_\_\_\_, magma melts up through the crust and forms volcanoes.

## What Are the Types of Volcanoes?

10. As gases and lava explode out, hot rocks fall to the ground and build up a steep-sided cone called a(n) \_\_\_\_\_ volcano.
11. Magma that simply flows out of a vent forms a \_\_\_\_\_ as the lava hardens into a wide, flat mound.
12. Explosive eruptions of hot rocks followed by a flow of lava over and over causes a(n) \_\_\_\_\_ volcano to form.



**Why Are Only Some Volcanoes Active?**

13. A volcano that is erupting now or has erupted recently is said to be \_\_\_\_\_.
14. A volcano that has not been active for a long period of time but has erupted in recorded history is said to be \_\_\_\_\_.
15. A volcano that has not erupted in recorded history is said to be \_\_\_\_\_.

**How Does Magma Affect Land Features?**

16. When magma hardens in vertical cracks, a(n) \_\_\_\_\_ is formed.
17. If the magma hardens between horizontal layers of rock, a(n) \_\_\_\_\_ is formed.
18. A dome-shaped \_\_\_\_\_ occurs when magma in a sill pushes upward.
19. As magma pushes upward, it may raise overlying rock layers into \_\_\_\_\_.
20. The largest and deepest of all underground formations are \_\_\_\_\_.

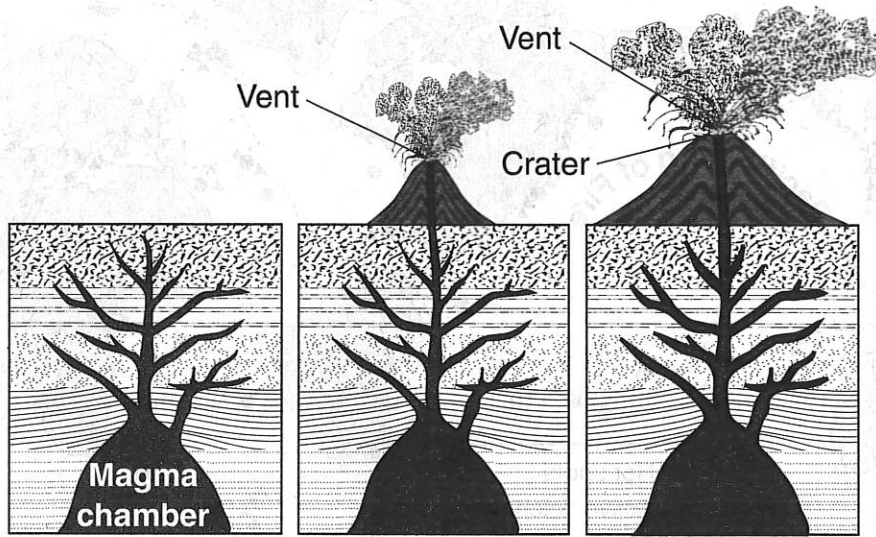
**How Can Magma Heat Underground Water?**

21. An opening in the ground through which hot water and steam erupt periodically is called a(n) \_\_\_\_\_.
22. An opening in the ground where hot water and gases escape is called a(n) \_\_\_\_\_.
23. Heat from below Earth's surface is called \_\_\_\_\_.
24. The first geothermal power plant in the United States produced steam that was used to produce \_\_\_\_\_.



# How Do Volcanoes Form?

A diagram can show the steps in a process. Look at the series of illustrations below. The order in which they are shown matches the order in which they actually occur.



Use the diagram to answer the questions.

1. What process is shown in the diagram?

\_\_\_\_\_

2. What does the first illustration show?

\_\_\_\_\_

3. What is occurring in the middle illustration?

\_\_\_\_\_

\_\_\_\_\_

4. What is the central opening called? \_\_\_\_\_

5. Why does the third diagram show a large hill around the vent?

\_\_\_\_\_

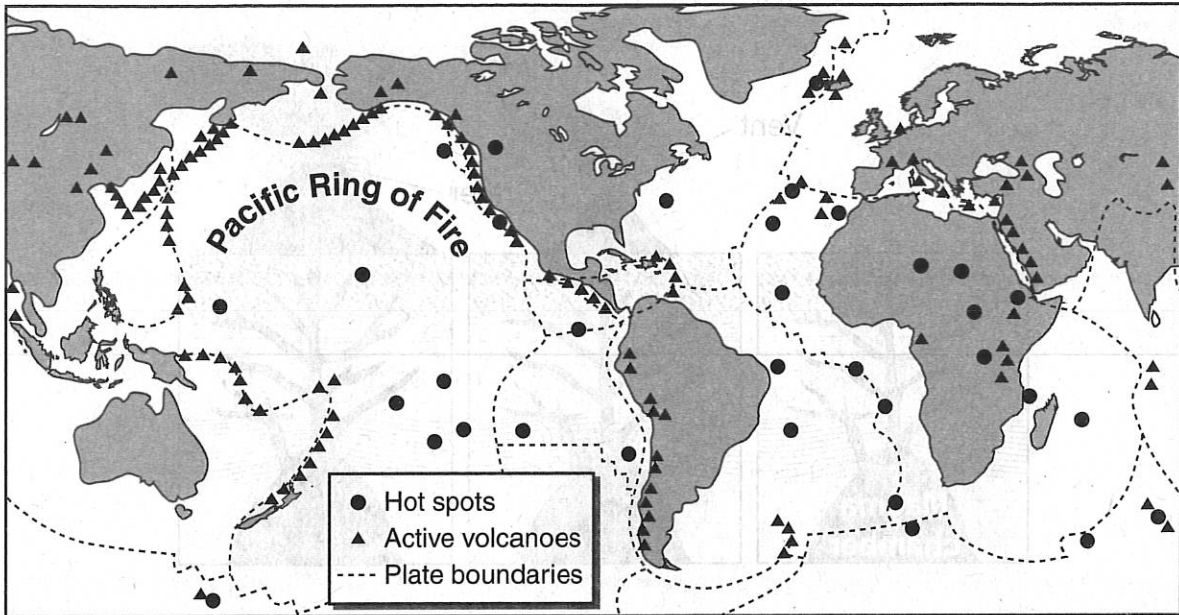
6. Why does the first diagram lack this hill?

\_\_\_\_\_

\_\_\_\_\_

# Where Are Volcanoes Located?

This map presents a variety of information. Observe the map key. Note the type of information presented in the map.



Use the map to answer the questions.

1. What three kinds of information are shown in the map?

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2. What does the circular belt on the left side of the diagram represent?

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3. What relationship is shown between the location of active volcanoes and plate boundaries?

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4. What relationship is shown between the location of hot spots and plate boundaries?

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5. This map lacks a title. Think about the information it presents. Then write a title. Remember, a good title notes what the map shows.

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# Volcanoes

Match the correct letter with the description.

- \_\_\_\_\_ 1. a steep-sided shape formed by hot rocks
- \_\_\_\_\_ 2. a central opening in a volcano where the magma rises to the surface and erupts
- \_\_\_\_\_ 3. what magma is called outside the volcano
- \_\_\_\_\_ 4. a cuplike hollow at the top of a volcano around the opening
- \_\_\_\_\_ 5. a wide, flat mound which forms from lava flows
- \_\_\_\_\_ 6. the deepest and largest of all underground formations
- \_\_\_\_\_ 7. a very hot part of the mantle
- \_\_\_\_\_ 8. lava alternating from explosive to quiet periods can form this
- \_\_\_\_\_ 9. heat from below Earth's surface

## Vocabulary

- a. lava
- b. batholith
- c. geothermal energy
- d. composite volcano
- e. vent
- f. cinder-cone volcano
- g. hot spot
- h. crater
- i. shield volcano

Answer each question.

10. Why do volcanos erupt?

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11. What is the difference between a dormant volcano and an extinct volcano?

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12. How does a geyser work?

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## Volcanoes

### Vocabulary

beneath

Mediterranean Sea

hot spot

belts

magma

melts

middle

Ring of Fire

colliding

#### Fill in the blanks.

Volcanoes occur in long lines called \_\_\_\_\_. One that circles the Pacific Ocean is the Pacific \_\_\_\_\_. Another can be found running along the \_\_\_\_\_ through Iran.

Volcanoes also form along the edges of slowly \_\_\_\_\_ plates. One plate plunges \_\_\_\_\_ another, and the downward-moving plate \_\_\_\_\_ forms and moves upward through the rocks to form volcanoes. The Hawaiian Islands are a chain of volcanoes in the \_\_\_\_\_ of a plate. Geologists believe the plate is moving over a part of the mantle called a(n) \_\_\_\_\_.

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# Earth's Moving Crust

Test

Circle the letter of the best answer.

- The idea that a supercontinent split into pieces that traveled in time to their present locations is known as
  - continental drift.
  - original horizontality.
  - subduction.
  - sea-floor spreading.
- Hot, molten rock below Earth's surface is called
  - crust.
  - magma.
  - mantle.
  - ridge.
- At divergent boundaries, plates pull apart; at convergent boundaries, plates
  - push together.
  - move side to side.
  - harden.
  - slide past each other.
- Plates slide on the lower portion of the
  - mantle.
  - magma.
  - rift.
  - fault.
- The point where an earthquake originates is called the
  - aftershock.
  - plate.
  - focus.
  - magnitude.
- Scientists can detect the shaking of Earth's crust using
  - faults.
  - primary waves.
  - secondary waves
  - seismographs.
- The Richter scale rates earthquakes from
  - 1 to 8.
  - 1 to 10.
  - 2 to 12.
  - 2 to 30.

Circle the letter of the best answer.

8. Seismic waves can produce tsunamis, which are  
a. amounts of energy released.    b. cracks in the crust.  
c. huge ocean waves.    d. vibrations in the ground.
9. The movement of Earth's crust can be explained by the movement of plates in  
a. batholiths.    b. convection currents.  
c. plate tectonics.    d. hot springs.
10. One of the two belts where more than 80 percent of land volcanoes are found is the  
a. Galapagos Islands.    b. Hawaiian Islands.  
c. Great Rift Valley.    d. Pacific Ring of Fire.
11. A cuplike hollow around the central opening of a volcano is called a  
a. crater.    b. hot spot.  
c. lava.    d. vent.
12. When a volcano becomes dormant, it is  
a. erupting.    b. extinct.  
c. inactive.    d. underwater.
13. The largest and deepest of all underground formations are  
a. batholiths.    b. dikes.  
c. laccoliths.    d. sills.
14. An opening in the ground where hot water and gases escape without erupting is called a  
a. crater.    b. hot spring.  
c. mantle.    d. shield volcano.