

Plate Tectonics ▪ *Guided Reading and Study*

Earth's Interior

This section explains how scientists learn about Earth's interior. The section also describes the layers that make up Earth and explains why Earth acts like a giant magnet.

Use Target Reading Skills

Before you read the passage for each heading, fill in the top box with what you know. After you have read the passage, fill in the bottom box with what you have learned.

| What You Know |
|-----------------------------------|
| 1. Earth's crust is made of rock. |
| 2. |
| 3. |
| 4. |
| 5. |

| What You Learned |
|------------------|
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |

Exploring Inside Earth

1. What prevents geologists from directly exploring Earth's interior?

2. Geologists use direct evidence from _____ to learn about Earth's interior.

3. Geologists learn about Earth's interior using indirect evidence from _____.

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Earth's Interior *(continued)*

4. Is the following sentence true or false? Earth looks the same today as it did millions of years ago. _____
5. Seismic waves reveal the structure of Earth through their _____ and _____.
6. Circle the letter of each sentence that is true about Earth.
 - a. Indirect evidence of Earth's interior comes from studying rock samples.
 - b. Geologists cannot observe Earth's interior directly.
 - c. It is over 6,000 kilometers from the surface to the center of Earth.
 - d. Geologists learn about Earth's interior by drilling holes.
7. _____ waves are produced by earthquakes.

A Journey to the Center of Earth

8. How does the temperature change as you go from the surface toward the center of Earth? _____

9. How does pressure change as you go from the surface toward the center of Earth? _____
10. The three main layers that make up Earth are the _____,
_____, and _____.

The Crust

11. The _____ is a layer of rock that forms Earth's outer skin.
12. Is the following sentence true or false? The crust is thinnest under high mountains. _____
13. The dark-colored rock that makes up most of the oceanic crust is _____.
14. The light-colored rock that makes up most of the continental crust is _____.

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The Mantle

Match the name of each layer of the mantle with its description.

- | Layer | Description |
|-------------------------|-------------------------------------------------------------------------|
| _____ 15. lower mantle | a. Rigid layer that includes the upper part of the mantle and the crust |
| _____ 16. lithosphere | b. Solid material beneath the asthenosphere |
| _____ 17. asthenosphere | c. Soft layer just below the lithosphere |
18. Is the following sentence true or false? The asthenosphere is not considered solid because it can bend like plastic. _____
19. Is the following sentence true or false? The mantle is nearly 3,000 kilometers thick. _____

The Core

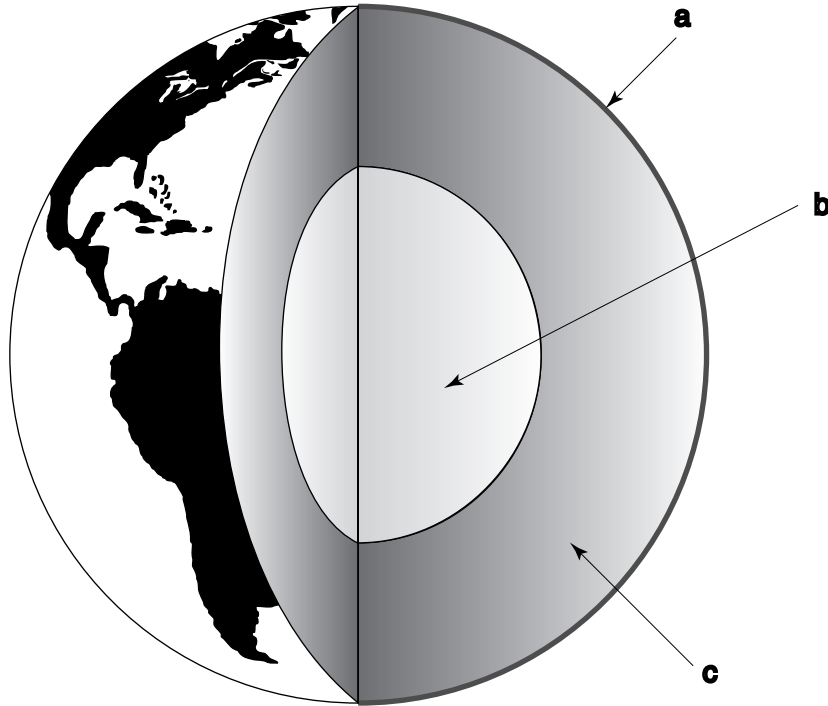
20. Circle the letter of each sentence that is true about Earth's outer core.
- a. It is under low pressure.
 - b. It is made of solid metal.
 - c. It contains iron and nickel.
 - d. It is a solid.
21. Circle the letter of each sentence that is true about Earth's inner core.
- a. It consists of molten metal.
 - b. It is a thick liquid.
 - c. It is not very dense.
 - d. It is under extreme pressure.



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Earth's Interior *(continued)*

22. In the drawing, label the three main layers of Earth.



23. Describe how a compass needle aligns itself. _____

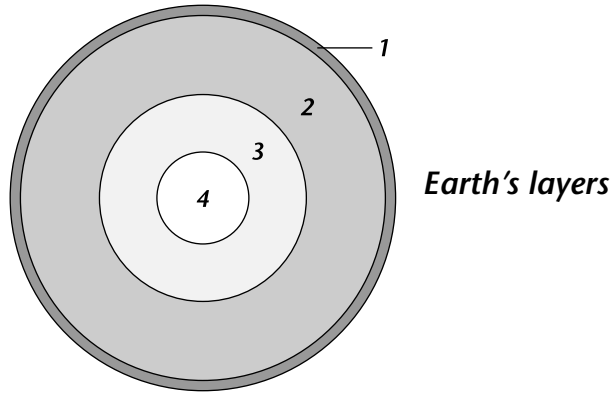
24. What creates Earth's magnetic field? _____

Earth's Interior

Understanding Main Ideas

Label the layers of Earth by writing the name of the layer in the blank.

1. _____
2. _____
3. _____
4. _____



Answer the following questions on a separate sheet of paper.

5. What are two types of evidence geologists use to learn about Earth's interior?
6. Compare and contrast the asthenosphere with the lithosphere.

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.

- | | |
|------------------------|----------------------------------------------------|
| _____ 7. basalt | a. a rock that makes up much of the ocean floor |
| _____ 8. asthenosphere | b. the force pushing on a surface or area |
| _____ 9. crust | c. the layer made up of liquid iron and nickel |
| _____ 10. outer core | d. the uppermost part of the mantle |
| _____ 11. lithosphere | e. a rock that makes up the core of the continents |
| _____ 12. granite | f. outer rind of rock |
| _____ 13. pressure | g. a wave produced by an earthquake |
| _____ 14. seismic wave | h. soft layer of rock in the mantle |

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Convection and the Mantle

This section describes how heat is transferred from Earth's hot core through the mantle.

Use Target Reading Skills

As you read about heat transfer, complete the outline to show the relationships among the headings.

| Convection and the Mantle | |
|---------------------------|---------------------|
| I. | _____ |
| A. | _____ |
| B. | Conduction |
| C. | _____ |
| II. | Convection Currents |
| III. | _____ |
| | _____ |
| | _____ |

Types of Heat Transfer

1. The movement of energy from a warmer object to a cooler object is called _____.
2. List the three types of heat transfer.
a. _____ b. _____ c. _____
3. What is radiation? _____

4. What are two forms of radiation? _____

5. What is conduction? _____

6. What is an example of conduction? _____

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Convection and the Mantle *(continued)*

7. What is convection? _____

8. Heat transfer by convection is caused by differences of _____
and density within a fluid.
9. A measure of how much mass there is in a volume of a substance is
_____.
10. Circle the letter of the sentence that describes what happens to a fluid
when its temperature increases.
- a. Its particles occupy less space.
 - b. Its density decreases.
 - c. Its particles move more slowly.
 - d. Its particles settle together more closely.

Convection Currents

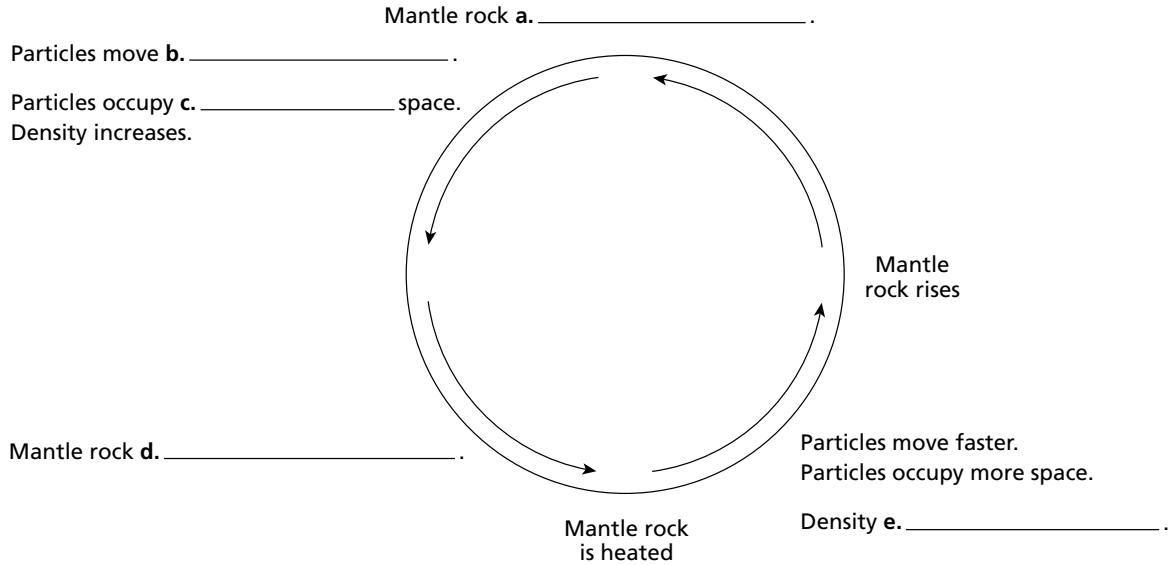
11. What three factors set convection currents in motion? _____

12. What happens to convection currents when the liquid or gas is no longer
heated? _____

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Convection Currents in Earth

13. Complete the graphic organizer to show the relationships among heat, movement, and density in mantle rock.



f. Why is this relationship shown as a cycle? _____

g. In the cycle shown, where would mantle rock be the densest? _____

14. Is the following sentence true or false? The heat source for the convection currents in the mantle is the sun. _____

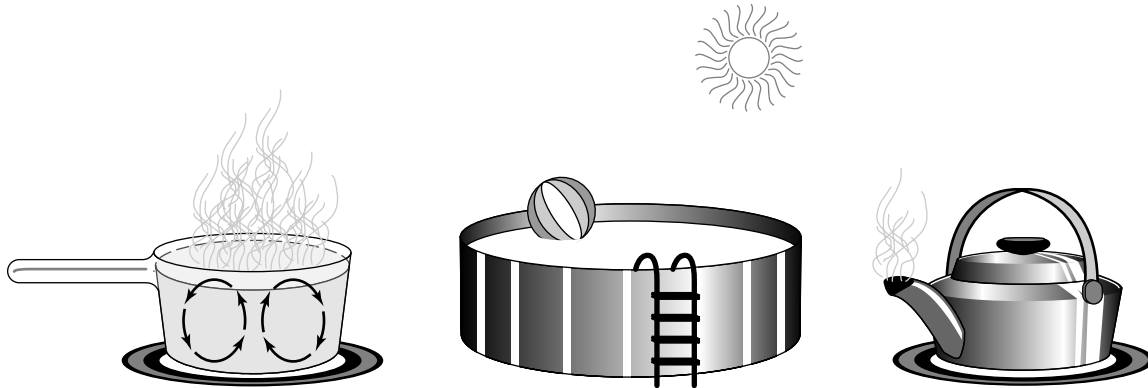


Plate Tectonics ▪ *Review and Reinforce*

Convection and the Mantle

Understanding Main Ideas

Label each figure by writing the type of heat transfer it shows.



1. _____

2. _____

3. _____

Answer the following questions in the spaces provided.

4. What are convection currents and what causes them?

5. What causes convection currents in Earth's mantle?

Building Vocabulary

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

- ___ 6. The transfer of energy through empty space is called convection.
- ___ 7. The movement of energy from a warmer object to a cooler object is called heat transfer.
- ___ 8. Conduction is heat transfer by direct contact of particles of matter.
- ___ 9. Radiation is the transfer of heat by the movement of a heated fluid.
- ___ 10. Density is a measure of how much heat there is in a volume of a substance.

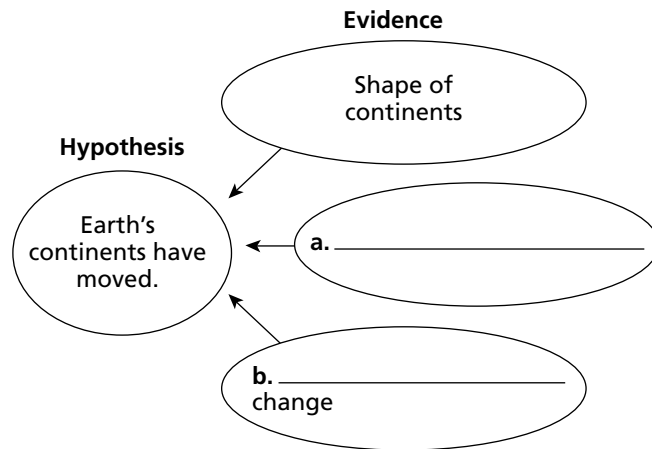
Plate Tectonics ▪ *Guided Reading and Study*

Drifting Continents

This section describes a theory of how the continents came to be located where they are today. The section also gives evidence for the theory and explains why the theory was not accepted for many years.

Use Target Reading Skills

As you read about the evidence that supports the theory of continental drift, complete the graphic organizer.



Continental Drift

1. State Alfred Wegener's hypothesis about how Earth's continents have moved.

2. Wegener named his supercontinent _____.

3. What did Wegener think had happened to this supercontinent?

4. Wegener's idea that the continents slowly moved over Earth's surface became known as _____.

Plate Tectonics ▪ *Guided Reading and Study*

5. Circle the letter of each sentence that supports Wegener's hypothesis.
 - a. Some continents match up like jigsaw puzzle pieces.
 - b. Different rock structures are found on different continents.
 - c. Fossils of tropical plants are found near the equator.
 - d. Continental glaciers once covered South Africa.
6. Give an example of evidence from land features that supported Wegener's idea of continental drift. _____

7. Any trace of an ancient organism preserved in rock is called a(n) _____.
8. How did Wegener explain similar fossils on different continents?

9. Is the following sentence true or false? Wegener believed that continental drift explained fossils of tropical plants found in places that today have a polar climate. _____

Wegener's Hypothesis Rejected

10. How did Wegener think that mountains formed? _____

11. How do the locations of mountains support Wegener's idea about how mountains form? _____



Plate Tectonics ▪ *Review and Reinforce*

Drifting Continents

Understanding Main Ideas

Fill in the blanks in the table below.

| Types of Evidence | Example of Evidence |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Evidence from 1. _____ | a. Mountain ranges in South America and 2. _____ line up b. European coal fields match with similar coal fields in North America |
| Evidence from Fossils | a. Fossils of the plant 3. _____ found in rocks on widely separated landmasses |
| Evidence from 4. _____ | a. Fossils of tropical plants found near Arctic Ocean b. Scratches in rocks made by 5. _____ found in South Africa |

Answer the following questions on a separate sheet of paper.

6. State the hypothesis of continental drift.
7. Why did most scientists reject Wegener’s theory for nearly a half century?

Building Vocabulary

Fill in the blank to complete each statement.

8. All the continents were once joined together in a supercontinent called _____, meaning “all lands.”
9. A(n) _____ is any trace of an ancient organism preserved in rock.
10. Wegener’s theory that the continents slowly moved over Earth’s surface became known as _____.

Plate Tectonics ▪ *Guided Reading and Study*

The Theory of Plate Tectonics

This section explains how the lithosphere is broken into separate sections that move.

Use Target Reading Skills

Before reading the section, write simple definitions for the words *diverge*, *converge*, and *transform*. You may use a dictionary. After reading the passages that contain the key terms *divergent boundary*, *convergent boundary*, and *transform boundary*, explain how your definitions relate to these terms.

Write a definition of each Key Term in your own words below:

plate: _____

scientific theory: _____

plate tectonics: _____

fault: _____

divergent boundary: _____

rift valley: _____

convergent boundary: _____

transform boundary: _____



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The Theory of Plate Tectonics *(continued)*

Introduction

1. The lithosphere is broken into separate sections called _____.
2. Is the following sentence true or false? Plates can carry continents or parts of the ocean floor but not both. _____

How Plates Move

3. What is a scientific theory? _____

4. State the theory of plate tectonics. _____

5. Is the following sentence true or false? The theory of plate tectonics explains the formation, movement, and subduction of Earth’s plates.

Plate Boundaries

Match the term with its definition.

Layer

- _____ 6. plate boundary
- _____ 7. fault
- _____ 8. rift valley

Description

- a. Deep valley that forms where two plates pull apart
- b. Line where the edges of Earth’s plates meet
- c. Break in Earth’s crust where rocks have slipped past each other

9. Complete the compare/contrast table to show how plates move at the different types of plate boundaries.

| Plate Movement | |
|-------------------------------|------------------------|
| Type of Plate Boundary | How Plates Move |
| Divergent boundary | a. |
| Convergent boundary | b. |
| Transform boundary | c. |

Plate Tectonics ▪ *Guided Reading and Study*

d. How are the movement of plates at divergent boundaries and at transform boundaries similar?

10. Is the following sentence true or false? Crust is neither created nor destroyed along a transform boundary. _____

11. Most divergent boundaries occur along _____.

12. When two plates converge, the result is called a(n) _____.

13. When two plates collide, what determines which plate comes out on top? _____

14. Circle the letter of each sentence that is true about convergent boundaries.

a. Where two plates carrying oceanic crust meet, subduction does not take place.

b. An oceanic plate sinks beneath a continental plate when the two plates collide.

c. Where two plates meet, the one that is more dense sinks under the other.

d. Mountain ranges form where two plates carrying continental crust collide.

15. Was Pangaea the only supercontinent to have existed? Explain your answer.

16. Is the following sentence true or false? The pieces of the supercontinent Pangaea began to drift apart about 225 million years ago.

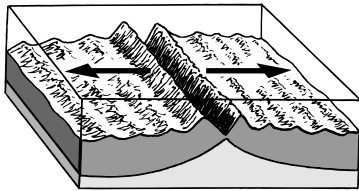


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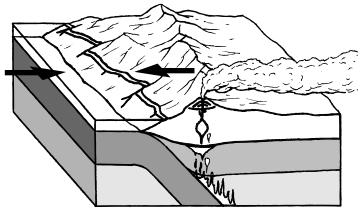
The Theory of Plate Tectonics

Understanding Main Ideas

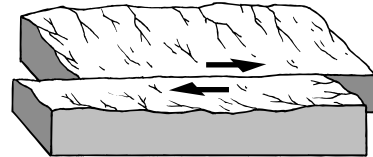
Label each figure by writing the type of plate boundary it shows.



1. _____



2. _____



3. _____

Answer the following questions on a separate sheet of paper.

- Describe what happens when a. two plates carrying oceanic crust collide, b. two plates carrying continental crust collide, and c. a plate carrying oceanic crust collides with a plate carrying continental crust.
- Explain what force caused the movement of the continents from one supercontinent to their present positions.

Building Vocabulary

Fill in the blank to complete each statement.

- A scientific _____ is a well-tested concept that explains a wide range of observations.
- Breaks in Earth's crust where rocks have slipped past each other are called _____.
- The lithosphere is broken into separate sections called _____.
- A(n) _____ is a deep valley on land that forms along a divergent boundary.
- The geological theory that states that pieces of Earth's crust are in constant, slow motion is called _____.