Chapter 7

Earth's Structure

North Carolina Essential Standards

6.E.2.1 Summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.

CHAPTER 7
LESSON 1

Earth's Structure

Spherical Earth

Key Concepts

- What are Earth's major systems and how do they interact?
- Why does Earth have a spherical shape?

Before You Read

What do you think? Read the two statements below and decide whether you agree or disagree with them. Place an A in the Before column if you agree with the statement or a D if you disagree. After you've read this lesson, reread the statements to see if you have changed your mind.

Before	Statement	After
	1. People have always known that Earth is round.	
	2. Earth's hydrosphere is made of hydrogen gas.	

Study Coach

Summarize Main Ideas As you read, write one sentence to summarize the main idea in each paragraph. Where bold words appear, use them in your sentences.

Read to Learn

Describing Earth

How did people learn about the shape and size of Earth? Earth is too large to see all of it at one time. People studied the parts of Earth that they could see. Then they used what they learned to figure out what they couldn't see.

People once believed that Earth was a flat disk with land in the center and water at the edges. Later they used clues, such as Earth's shadow on the Moon during an eclipse, to learn Earth's real shape.

The Size and Shape of Earth

Scientists now can get a good view of Earth using satellites. They have found that Earth is a sphere, but not a perfect one. *A* **sphere** *is shaped like a ball, with all points on the surface at an equal distance from the center.* The image to the right shows that Earth has a bulge around the equator and is somewhat flattened at the poles. The distance around Earth is 13,000 km. This measurement is Earth's diameter. Earth is the largest of the four rocky planets closest to the Sun.

Visual Check

1. Describe What shape is Earth?

Earth Systems

Earth is large and complex. It is hard to study all of Earth at once. To make studying Earth easier, scientists describe four Earth systems. They are the atmosphere, the hydrosphere, the geosphere, and the biosphere, as shown in the concept web below. Each system is different, but they interact, or act together. They exchange matter and energy.

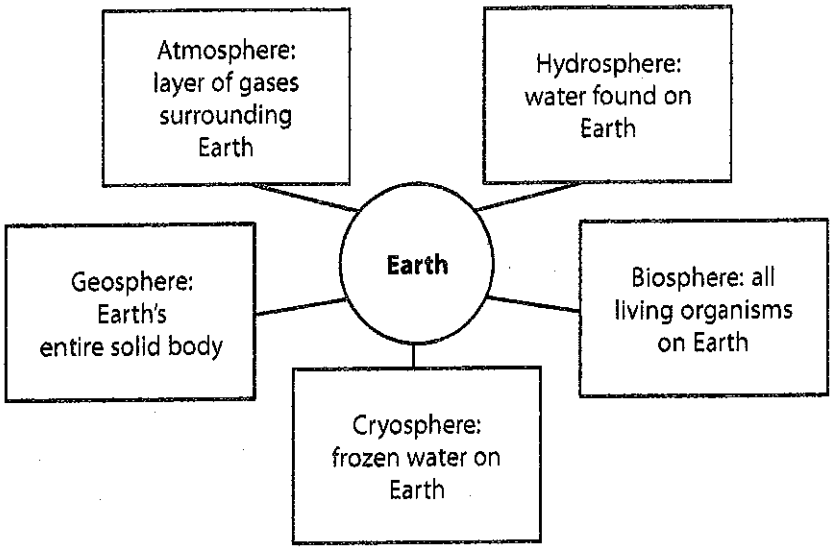
The Atmosphere, the Hydrosphere, and the Cryosphere The atmosphere is Earth's outermost system. It is the layer of gases that surrounds Earth. The atmosphere is a mixture of nitrogen, oxygen, carbon dioxide, and small amounts of other gases. This layer is about 100 km thick.

The hydrosphere is Earth's water. This water is on the surface of Earth, underground, and in the atmosphere. The hydrosphere has three kinds of water: salt water, freshwater, and ice. Most of the water in the hydrosphere is in salty oceans. Freshwater is in rivers, lakes, and underground. Some water is frozen in glaciers and polar ice sheets.

Water is always moving between the atmosphere and the hydrosphere. This movement is an example of how Earth's systems interact. This exchange of matter and energy makes life on Earth possible.

The Geosphere and the Biosphere *The* **geosphere** *is Earth's entire solid body.* It contains a thin layer of soil and sediments that cover a rocky center. The geosphere is the largest Earth system.

The biosphere includes all living organisms on Earth. Organisms in the biosphere live within the atmosphere, the hydrosphere, and the geosphere. They interact with all the systems.



Think it Over

2. Apply Which is part of the hydrosphere? (Circle the correct answer.)

a. a pebble

b. a river

c. carbon dioxide

Key Concept Check

3. Name the Major Earth systems.

_____

_____

_____

_____

_____

Visual Check

4. Identify Circle the system on the concept web that scientists would study to learn how animals interact.

How did Earth form?

Earth formed about 4.6 billion years ago (bya), along with the Sun and the rest of our solar system. Materials from a large cloud of gas and dust came together to form the Sun and all the planets. To understand how this happened, you first need to know how gravity works.

The Influence of Gravity

Gravity *is the force that every object exerts on every other object because of their masses.* The more mass either object has, or the closer together they are, the stronger the gravitational force.

Reading Check

5. Name two factors that affect the strength of the gravitational force between objects.

Gravity is the force that holds you and all other objects here on Earth. All objects that are on or near Earth are pulled toward Earth's center by gravity. When you throw a softball into the air, it comes right back down. It returns to Earth because Earth has more mass than any other object near you. Because it has more mass, Earth has a stronger gravitational force on you and the softball than any other objects do.

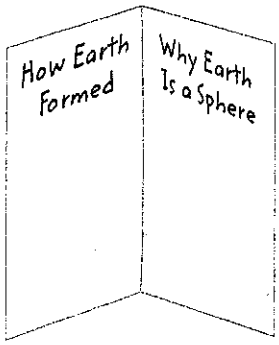
The Solar Nebula

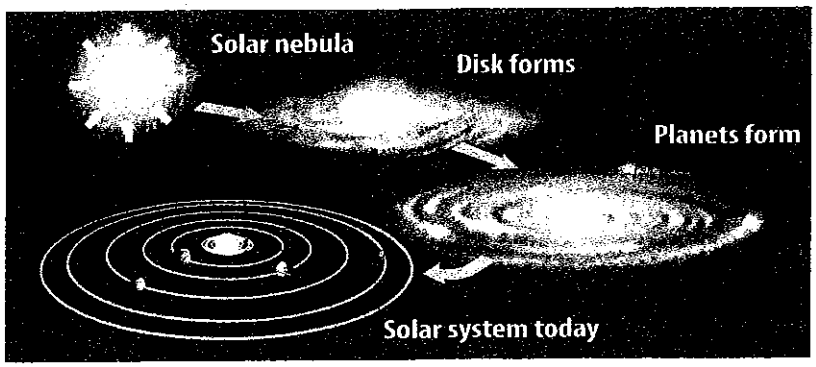
Gravity had a major role in the formation of our solar system. As you can see in the picture below, the solar system formed from a cloud of gas, ice, and dust called a nebula. Gravity pulled the gas, ice, and dust closer together. The nebula got smaller and flattened into a disk. Then the disk began to turn. The materials in the center of the disk became denser, and a star—our Sun—was formed.

After the Sun formed, the rest of the material began to come together into planets. Earth, one of those planets, formed as gravity pulled small particles together. When the particles bumped together, they stuck to each other. They became larger objects with more mass and therefore more gravity. They attracted still more particles. Over time, enough matter collected and formed Earth.

FOLDABLES

Make a half-book, and use it to organize your notes about Earth's formation.





Visual Check

6. Recall Our solar system formed from what type of cloud?

Early Earth

The young planet Earth was uneven, not shaped like a sphere. How did Earth become the sphere we know today? When Earth grew large enough, it began to produce thermal energy, or heat, in its core. The rocks of the planet became hot and soft enough to flow. Gravity pulled in the bumps that stuck out from the planet. The rock flowed and Earth became spherical in shape.

The Formation of Earth's Layers

The thermal energy from Earth's core had another important effect on the planet. The thermal energy caused different materials to separate into layers. Before it became hot, Earth was a mixture of solid particles. The thermal energy melted some of this material. The material flowed into separate layers of different materials. These layers were affected by density and gravity.

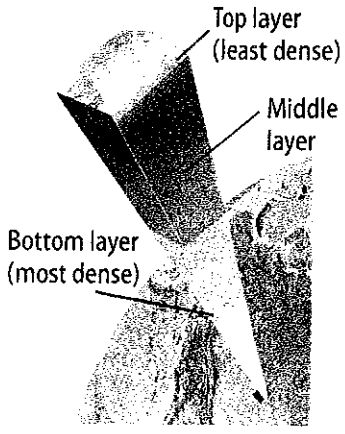
The Role of Density The different materials in young Earth formed layers based on their densities. **Density** *is the amount of mass in a material per unit volume.* The following equation is used to mathematically find density:

$$D = m/V$$

D is the density of the material, m is the mass of the material, and V is the volume of the material. If two materials have the same volume, the denser material will have more mass.

The Role of Gravity Remember that there is a stronger gravitational force between Earth and a denser object than there is between Earth and a less-dense object. Imagine that you drop a piece of wood and a brick that are the same size into a pan of water. The two objects have different densities. The wood will float because it is less dense than water. The brick will sink to the bottom because it is denser than water.

When ancient Earth started melting, the densest materials sank and formed the innermost layer of Earth. The least-dense materials stayed at the surface and formed the outermost layer. The materials with densities in between formed layers. The three major layers of the geosphere are shown here.



Key Concept Check

7. State How did Earth develop its spherical shape?

Math Skills

To calculate density, divide the mass by the volume. The unit for density is a unit of mass, such as g, divided by a unit of volume, such as cm^3. The density of aluminum is 27 g/10 cm^3 = 2.7 g/cm^3.

8. Solve One-Step Equations An iron cube with a volume of 10 cm^3 has a mass of 78 g. What is the density of the iron?

Visual Check

9. Apply Why are the most-dense materials in the bottom layer?

Mini Glossary

density: the amount of mass in a material per unit volume

geosphere: Earth's entire solid body

gravity: the force that every object exerts on every other object because of their masses

sphere: a ball shape with all points on its surface at an equal distance from the center

1. Review the terms and their definitions in the Mini Glossary. Write a sentence that describes one of the effects of gravity on Earth as a young planet.

2. In the table below, write Earth's systems in the left column. In the right column, write what each system is made up of.

Earth Systems	Composition
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

3. How did writing down the main idea of each paragraph help you understand the ideas in the lesson?

What do you think NOW?

Reread the statements at the beginning of the lesson. Fill in the After column with an A if you agree with the statement or a D if you disagree. Did you change your mind?

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Name _____ Date _____

Earth's Structure

How is Earth structured?

Before You Read

Before you read the chapter, think about what you know about the structure of Earth. Record your thoughts in the first column. Pair with a partner and discuss his or her thoughts. Write those thoughts in the second column. Then record what you both would like to share with the class in the third column.

Think	Pair	Share

Chapter Vocabulary

Lesson 1	Lesson 2	Lesson 3
NEW sphere geosphere gravity density	**NEW** crust mantle lithosphere asthenosphere core magnetosphere **REVIEW** observation	**NEW** landform plain plateau mountain **ACADEMIC** feature

LESSON 1

Spherical Earth

Scan *Lesson 1. Read the lesson titles and bold words. Look at the pictures. Identify three facts that you discovered about Earth's systems or formation. Write these facts in your Science Journal.*

Main Idea

Describing Earth

I found this on page _____.

Details

Draw *Earth as seen from space.*

I found this on page _____.

Compare *Earth systems. Then explain how these systems work together.*

Atmosphere	_____	_____	Biosphere
Description: _____ _____ _____ _____	**Description:** _____ _____ _____ _____	**Description:** the solid part of Earth	**Description:** _____ _____ _____ _____

Earth's four systems exchange _____ and _____. The _____ provides oxygen, the _____ provides the water, and the _____ provides the organisms in the biosphere a place to live and elements needed for their survival.

Main Idea

How did Earth form?

I found this on page _____.

Details

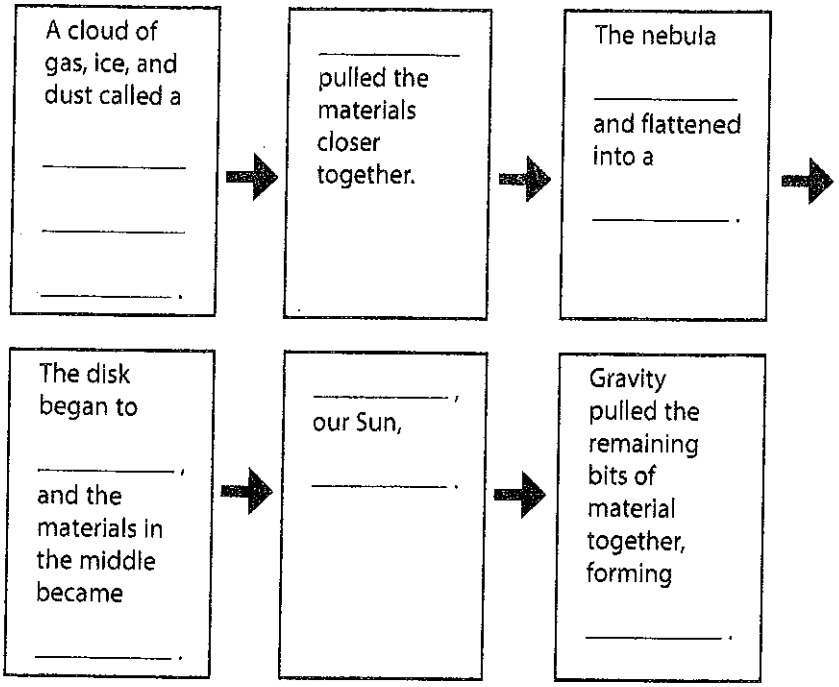
Model *the strength of gravitational force between two objects. Draw arrows of different thicknesses to indicate the strength of the gravitational force exerted by the objects in each pair.*

Object A has a greater mass than Object B.

Objects C and D have the same mass.

I found this on page _____.

Sequence *the early events in the formation of the solar system.*



Main Idea

I found this on page _____.

Details

Sequence *the events that formed early Earth.*

The newly formed Earth grew _____ enough to generate _____ _____.	_____ became soft enough to _____.	Gravity pulled in the irregular bumps, and _____ _____ _____ _____.

The Formation of Earth's Layers

I found this on page _____.

Draw *and label the* geosphere. *Use these terms:*

- least dense
- middle layer
- most dense

I found this on page _____.

Organize *information about how the layers of the* geosphere *formed.*

The densest material _____.

The least dense material _____.

The materials with intermediate densities _____

_____.

Connect It Apply what you have learned about the formation of Earth to describe how gravity influenced the formation of the planet Mars.

_____

_____

_____

_____

_____

Earth's Structure

Earth's Interior

Before You Read

What do you think? Read the two statements below and decide whether you agree or disagree with them. Place an A in the Before column if you agree with the statement or a D if you disagree. After you've read this lesson, reread the statements to see if you have changed your mind.

Before	Statement	After
	3. Earth's interior is made of distinct layers.	
	4. Scientists discovered that Earth's outer core is liquid by drilling deep wells.	

Read to Learn

Clues to Earth's Interior

You cannot see very far inside Earth. The deepest mines and wells do not go much deeper than Earth's surface. How do scientists learn about Earth's interior? They use many methods to discover what is under the surface.

What's below Earth's surface?

Scientists use deep mines and wells to get clues about what is below Earth's surface. The deepest mine ever made is more than 3 km deep. People can use this mine to explore the geosphere.

The deepest well is more than 12 km deep. People cannot go down into this well. Instead, they bring samples to the surface. They also send tools down to make observations.

Temperature and Pressure Increase with Depth

It is hot in deep mines and wells. This is a clue that it is hot inside Earth. It gets hotter as you go deeper. The temperature is about 53°C (127°F) near the bottom of the deepest mine and about 190°C (374°F) near the bottom of the deepest well. There is no way to measure the temperature of Earth's center. Scientists estimate that it is about 6,000°C (10,832°F).

Key Concepts

- What are the interior layers of Earth?
- What evidence indicates that Earth has a solid inner core and an outer liquid core?

Mark the Text

Identify Unknown Words As you read, highlight any word or term that you don't understand. Use a dictionary to look up the meaning of these words and terms, and keep a list of their definitions.

Think it Over

1. Predict What kinds of things might scientists measure in a mine or a well?

Reading Check

2. Describe How does pressure change toward the center of Earth?

Pressure Just as temperature increases, pressure increases toward the center of Earth. The weight of the rocks on the surface pushes on the rocks below. This pressure makes the rocks below more dense than the rocks on the surface.

Deep Wells The high temperatures and pressures inside Earth make it impossible to dig deep wells. Therefore, scientists have sampled only a small part of the geosphere. How can scientists learn about what is below the deepest wells?

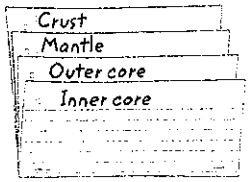
Using Earthquake Waves

Scientists use indirect methods to learn about what is inside Earth. Most of their data comes from studying earthquake waves. How can scientists learn about what is inside Earth by using earthquakes?

Earthquakes release energy in the form of three types of waves. The waves move through Earth. They move in different ways through the different materials. They speed up in more-dense materials and slow down in less-dense materials. Some waves change direction when they reach certain materials. Others cannot travel through some materials. By studying how the waves move, scientists can learn about the density and structure of materials in Earth.

FOLDABLES

Make a layered book to organize information about Earth's four major layers.



Earth's Layers

As you learned, differences in density resulted in the materials within Earth forming layers. Each layer of Earth is made of different materials. The densest materials are at Earth's center.

Crust

Earth's **crust** *is its brittle, rocky outer layer.* The crust is much thinner than the other layers of the geosphere. You might think of the crust as the shell on a hard-cooked egg. The crust is not only the thinnest layer, but it is also the least-dense layer of the geosphere. The crust is made mostly of elements of low mass, such as silicon and oxygen.

Reading Check

3. Contrast Compare the thickness and density of continental and oceanic crusts.

Rocks of the crust are under oceans and on land. The crust under oceans is called oceanic crust. It is formed of dense rocks that contain iron and magnesium. The crust on land is called continental crust. Continental crust is about four times thicker than oceanic crust. Continental crust is thickest under tall mountains. Continental crust is less dense than oceanic crust.

Mantle

Earth's mantle is the layer just below the crust. *The* **mantle** *is the thick middle layer in the solid part of Earth.* The mantle contains more iron and magnesium than the oceanic crust does. This makes the mantle more dense than either the continental crust or the oceanic crust. The mantle is made of rock, just like the crust.

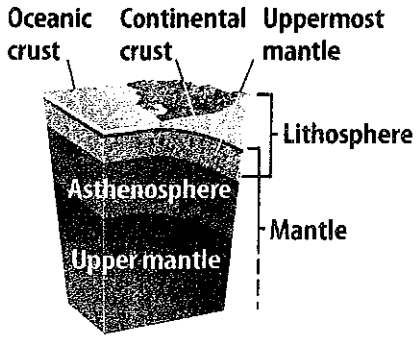
Scientists group the mantle into four layers. In each layer, the rocks react differently when forces push or pull on them.

Uppermost Mantle The uppermost layer of the mantle is made of hard rocks. These brittle, rigid rocks are similar to the rocks in the crust. For this reason, *scientists group together the crust and the uppermost mantle into a rigid, or hard, layer called the* **lithosphere** (LIH thuh sfihr).

Asthenosphere The rocks below the lithosphere are so hot that tiny bits melt. When this happens, the rocks are no longer brittle. They begin to flow. When a material, such as rock, flows, scientists use the word *plastic. The plastic layer within the mantle is called the* **asthenosphere** (as THEN uh sfihr).

The material in the asthenosphere is not like the plastics you use every day. The term *plastic* means the material is soft enough to flow. The asthenosphere flows slowly. Even if you could visit the mantle, you would not be able to see the rock flow because it moves too slowly. Rocks in the asthenosphere move about as slowly as your fingernails grow.

Upper Mantle and Lower Mantle The rock below the asthenosphere, shown below, is solid, even though it is hotter than the rock in the asthenosphere. How can it be solid when the cooler rock in the asthenosphere is plastic? The pressure below the asthenosphere is so high that melting does not occur. High pressure squeezes the hot rock into a solid. This solid rock of the upper mantle and lower mantle forms the largest layer of Earth.



Reading Check

4. Compare How do the rocks in the lithosphere and the asthenosphere differ?

Reading Check

5. Describe What material makes up the largest layer of Earth?

Visual Check

6. Name the layers of the mantle shown in the figure.

Science Use v. Common Use
nickel
Science Use *a specific type of metal*

Common Use a coin worth five cents

Key Concept Check
7. Name What are the interior layers of Earth?

Core

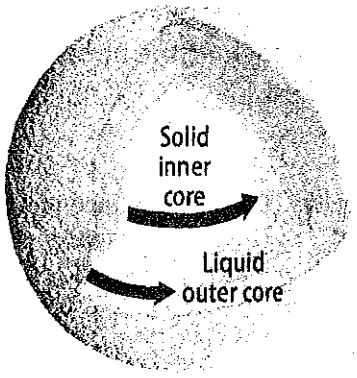
The dense metallic center of Earth is the **core**. Imagine again that Earth is a hard-cooked egg. The yolk of the egg would be Earth's core. Earth's crust and mantle are made of rock. Why do you think the core is made of metal? Remember that early Earth was much hotter than it is now. Earth's materials flowed, just like they do in the asthenosphere today. As you learned earlier in the chapter, early Earth was soft enough for gravity to pull the densest material to the center. That dense material is metal. The core is mostly iron with small amounts of nickel and other elements. It has a liquid outer core and a solid inner core.

Outer Core You learned that pressure in the lower mantle is great enough to keep the rock in a solid state even though it is very hot. How, then, could the outer core—where the pressure is even higher—be liquid? The answer is that the mantle and the core are made of different materials. These materials melt at different temperatures. Just as in the asthenosphere, the effects of temperature outweigh the effects of pressure in the outer core. Scientists learned that the outer core is liquid by studying what happens to earthquake waves when they enter the outer core.

Key Concept Check
8. Explain What evidence shows that Earth's outer core is liquid?

Inner Core Earth's inner core, shown in the figure below, is a dense ball of solid iron crystals. The temperature at the center of Earth is about 6,000°C. Because the pressure is so high, the iron is in a solid state.

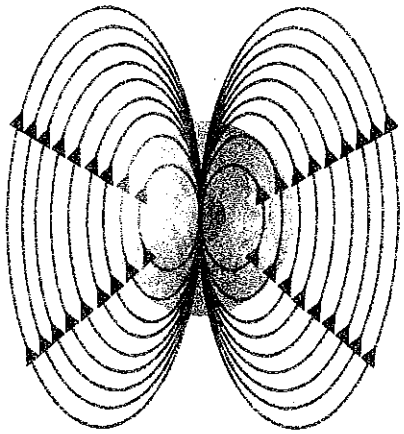
The liquid outer core is not tightly attached to the solid inner core. Therefore, the two layers of the core can spin at different speeds. The inner core spins a little faster than the rest of Earth does.



Visual Check
9. Identify How do the arrows in the figure show that the inner core spins faster than the outer core?

Earth's Core and Geomagnetism

Have you ever used a compass? The needle on a compass points north. The metallic compass needle lines up with a force field around Earth. This force field, which is shown below, is caused by Earth's core.



Earth's Magnetic Field

As you learned, Earth's inner core spins faster than the outer core does. This produces streams of flowing, molten iron in the outer core. The movement of these molten materials produces Earth's magnetic field.

Think of Earth's magnetic field as a bar magnet. It has opposite poles, as shown above.

For centuries, people have used compasses and Earth's magnetic field to navigate. But the magnetic field does not stay the same. Over geologic time, the magnetic field's strength and direction change. The poles have even reversed direction several times in Earth's history.

Magnetosphere

Earth's magnetic field protects Earth from charged particles that flow from the Sun. The magnetic field pushes away some charged particles and traps others. *The outer part of the magnetic field that affects the charged particles is called the* **magnetosphere** (mag NEE tuh sfihr). The flow of these charged particles produces the shape of the magnetosphere.

Visual Check

10. Hypothesize What do the arrows in the picture represent?

_____

_____

Reading Check

11. Explain What creates Earth's magnetic field?

_____

_____

_____

Think it Over

12. Compare Like Earth's magnetic field, a magnet in your hand pushes away some things and draws other things toward it. Name an object that a magnet would draw into its field. Name an object that the magnet would repel.

_____

_____

Mini Glossary

asthenosphere (as THEN uh sfihr): the plastic (flowing) layer within Earth's mantle

core: the dense metallic center of Earth

crust: the brittle, rocky outer layer of Earth

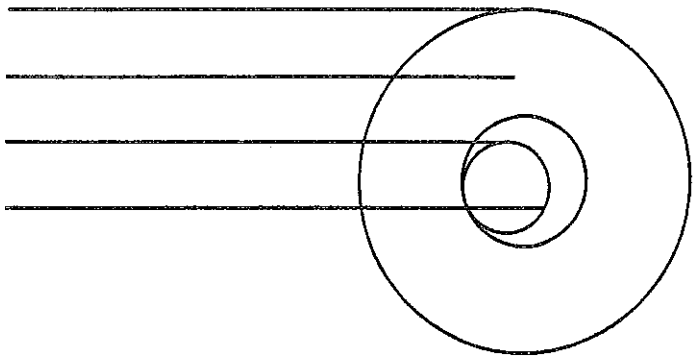
lithosphere (LIH thuh sfihr): the rigid layer of Earth made up of the crust and the uppermost mantel

magnetosphere (mag NEE tuh sfihr): the outer part of Earth's magnetic field that interacts with charged particles from the Sun

mantle: the thick middle layer in the solid part of Earth

1. Review the terms and their definitions in the Mini Glossary. Write a sentence that describes how the crust and the mantle are related.

2. Fill in the diagram below to identify Earth's layers. Use the following terms: *asthenosphere, inner core, lithosphere,* and *outer core*.



3. Write a sentence in which you correctly use at least two words or terms that were unfamiliar to you before you read this lesson.

What do you think NOW?

Reread the statements at the beginning of the lesson. Fill in the After column with an A if you agree with the statement or a D if you disagree. Did you change your mind?

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LESSON 2

Earth's Interior

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Write your predictions in your Science Journal.*

Main Idea

Clues to Earth's Interior

I found this on page _____.

I found this on page _____.

I found this on page _____.

Earth's Layers

I found this on page _____.

Details

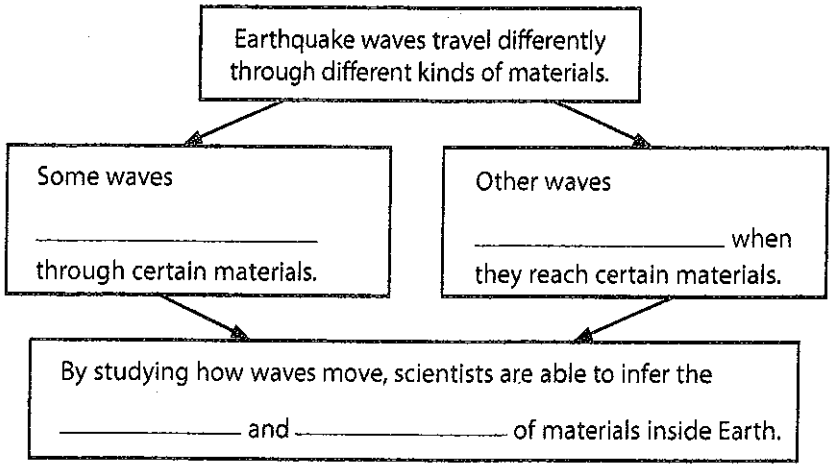
Detail *two methods that scientists use to study Earth's interior.*

1. _____ **2.** _____

Identify *the changes in temperature and pressure that occur as depth increases in the geosphere.*

Temperature		Pressure	
increases	decreases	increases	decreases

Summarize *how scientists use earthquake wave data to learn about Earth's interior.*



Relate *three facts about the outermost layer of Earth.*

Name of this layer: _____

Density relative to other layers: _____

Earthquake waves travel _____ in this layer than in the layer below.

Describe *the 2 types of* crust.

Continental	Oceanic

Main Idea

I found this on page _____.

Details

Organize *information about the* mantle *in the table below.*

Mantle	
Density	
Layers	• Uppermost Mantle: with the crust forms a rigid layer called the _____ • Asthenosphere: _____ that can slowly flow • Upper Mantle and Lower Mantle: solid rock; the _____ layer; _____ keeps this layer from _____

I found this on page _____.

Explain *how scientists know that the* core *has both a liquid and a solid part.*

Scientists learned that the outer core is liquid and the inner core is solid by studying _____.

Earth's Core and Geomagnetism

I found this on page _____.

Identify *the source of Earth's magnetic field, and describe how this field protects Earth from cosmic rays and charged particles from the Sun.*

_____

_____

_____

_____

_____

_____

Connect It Explain why a peach is both a good and a poor model of Earth's layers.

_____

_____

_____

_____

_____

Earth's Structure

Earth's Surface

Before You Read

What do you think? Read the two statements below and decide whether you agree or disagree with them. Place an A in the Before column if you agree with the statement or a D if you disagree. After you've read this lesson, reread the statements to see if you have changed your mind.

Before	Statement	After
	5. All ocean floors are flat.	
	6. Most of Earth's surface is covered by water.	

Read to Learn

Oceans and Continents

Earth's surface is made up of oceans and continents. Continents are landmasses. More of Earth is covered by oceans than by continents. Over 70 percent of Earth's surface is ocean.

The surface of Earth's land has different features, such as mountains and valleys. The surface of the oceans is quite smooth. Many of the features found on land, however, also appear on the ocean floor. The longest mountain ranges on Earth are near the centers of the oceans. One canyon on the ocean floor is the same size as the Grand Canyon, which is on land.

Landforms

Mountains, plains, plateaus, canyons, and other features are examples of landforms. **Landforms** *are topographic features formed by processes that shape Earth's surface.* The word *topographic* refers to the shape of a given area. Landforms can be as big as mountains or as small as anthills. Landforms can be described by their elevation, relief, size, shape, slope, and by how they relate to the landscape around them. A landform is usually identified by its surface form and location.

Key Concepts

- What are Earth's major landforms and how do they compare?
- What are the major landform regions of the United States?

Study Coach

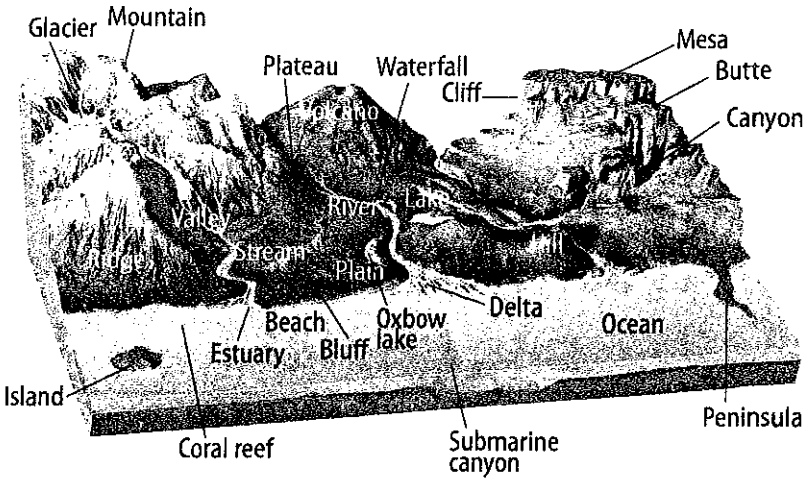
Use an Outline As you read, make an outline to summarize the information in the lesson. Use the main headings in the lesson as the main headings in the outline. Complete the outline with the information under each heading.

Key Concept Check

1. Define What are landforms?

Visual Check

2. Identify Circle a landform that is familiar to you. Be prepared to describe it.



Landforms, such as those shown above, change over time. Erosion and the uplift of Earth's surface can create and affect landforms.

Elevation

Elevation is the height above sea level of a feature. Scientists use this characteristic to describe features on Earth's surface. For example, a plain and a plateau have different elevations.

Relief

Relief is the difference in elevation in a given area. A plain is a landform with low relief. This means that there is a small difference between the lowest elevation and the highest elevation in an area. The Grand Canyon has high relief. There is a large difference between the lowest elevation and the highest elevation of the canyon.

Reading Check

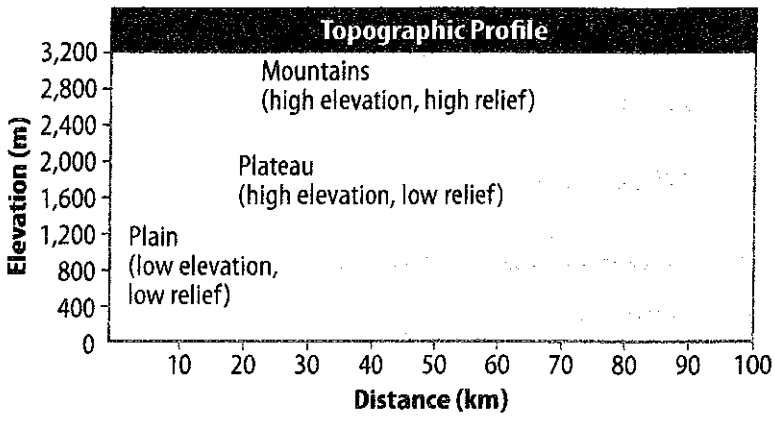
3. Describe How is elevation used to compare landforms?

Topography

The term *topography* describes the shape of a geographic area. Relief and topography can be used to describe features on continents and on the ocean floor. The topography of a plain, a plateau, and mountains are compared below.

Visual Check

4. Explain Which features have high elevation and high relief?



Plains

The features that cover most of Earth are plains. **Plains** *are landforms with low relief and low elevation.* The broad, flat area in the center of North America is called the interior plains.

Plains can form from sediments that are deposited by water or wind. Plains often have rich soil. For this reason, many plains are used for growing crops or grazing animals.

Plateaus

Plateaus, like plains, are flat, but plateaus are high. **Plateaus** *are areas with low relief and high elevation.* Plateaus are much higher than the land that surrounds them. Their sides are often steep and rugged. Plateaus are found on every continent, but they are not as common as plains.

Plateaus can form when forces within Earth uplift rock layers. They can also form when sections of Earth's crust are forced into each other. Some plateaus are caused by volcanic activity. Layers of lava build up over time to form plateaus.

Mountains

Mountains *are landforms with high relief and high elevation.* They are the tallest landforms on Earth.

Mountains can form in several ways. Sometimes lava builds up on the ocean floor. Over time, this mound of lava grows tall enough to rise above the ocean's surface. The Hawaiian Islands are mountains that formed in this way.

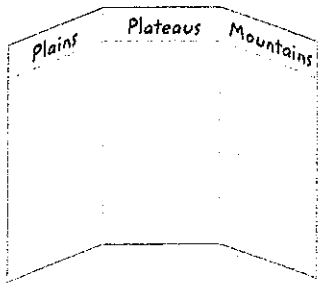
Other mountains form when forces inside Earth push, fold, or uplift huge blocks of rock. Mountains that formed in this way are the Rocky Mountains, the Appalachian Mountains, and the Himalayas.

Major Landform Regions in the United States

The United States has many kinds of landforms. Plains, plateaus, and mountains form some of the major landform regions in the United States.

FOLDABLES

Make a tri-fold book from a sheet of paper. Label it as shown. Use it to organize your notes about Earth's major landforms.



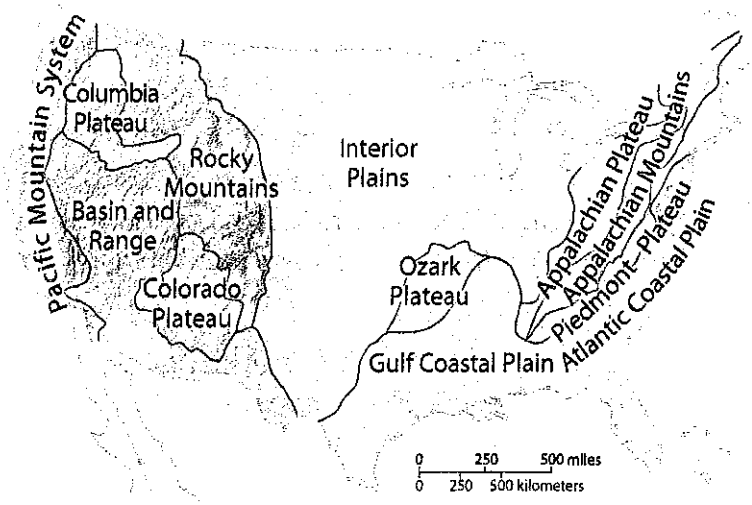
Reading Check

5. Describe a plateau.

Think it Over

6. Draw Conclusions

Why do you think the Hawaiian Islands are sometimes called volcanic islands?



The map above shows the major landform regions in the United States. Locate each landform region on the map as you read about it.

Coastal plains run along much of the East Coast and the Gulf Coast. These plains formed millions of years ago when sediments were deposited on the ocean floor.

Interior plains make up much of the central part of the United States. They are flat and grassy. They have thick soils that are good for growing crops and grazing animals.

The Appalachian Mountains are in the Eastern United States. They began to form about 480 million years ago (mya). At one time these mountains were much taller than they are today. They have eroded, or worn away, over time.

The Rocky Mountains are in the western United States and western Canada. These mountains are younger, taller, and more rugged than the Appalachian Mountains.

The Colorado Plateau is also a rugged region. It formed when forces within Earth lifted up huge pieces of crust. Over time, the Colorado River cut through the plateau, forming the Grand Canyon.

Visual Check

7. Locate What landform region do you live in?

_____

Reading Check

8. Conclude Name one way that mountains can change over time.

_____

_____

Key Concept Check

9. Describe three major landform regions in the United States.

_____

_____

Mini Glossary

landform: a topographic feature formed by processes that shape Earth's surface

mountain: a landform with high relief and high elevation

plain: a landform with low relief and low elevation

plateau: an area with low relief and high elevation

1. Review the terms and their definitions in the Mini Glossary. Write a sentence that uses all four terms correctly.

2. Fill in the table below to identify the characteristics of each landform. The first characteristic has been filled in for you.

Landform	Elevation	Relief
Plateau	high	
Mountain		
Plain		

3. List some facts from your outline that summarize your understanding of Earth's major landforms.

What do you think NOW?

Reread the statements at the beginning of the lesson. Fill in the After column with an A if you agree with the statement or a D if you disagree. Did you change your mind?

Connect ED

Log on to ConnectED.mcgraw-hill.com and access your textbook to find this lesson's resources.

Lesson 3 Earth's Surface

Skim *Lesson 3 in your book. Read the headings and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Write your ideas in your Science Journal.*

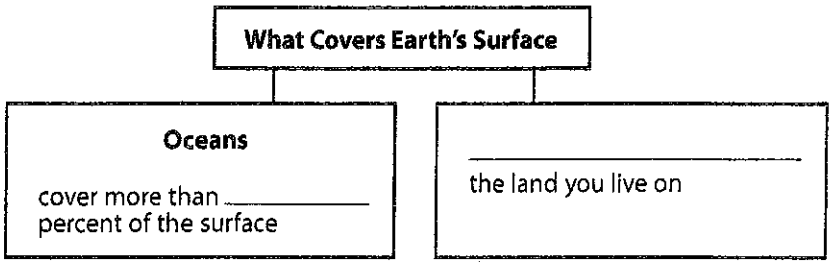
Main Idea

Oceans and Continents

I found this on page _____.

Details

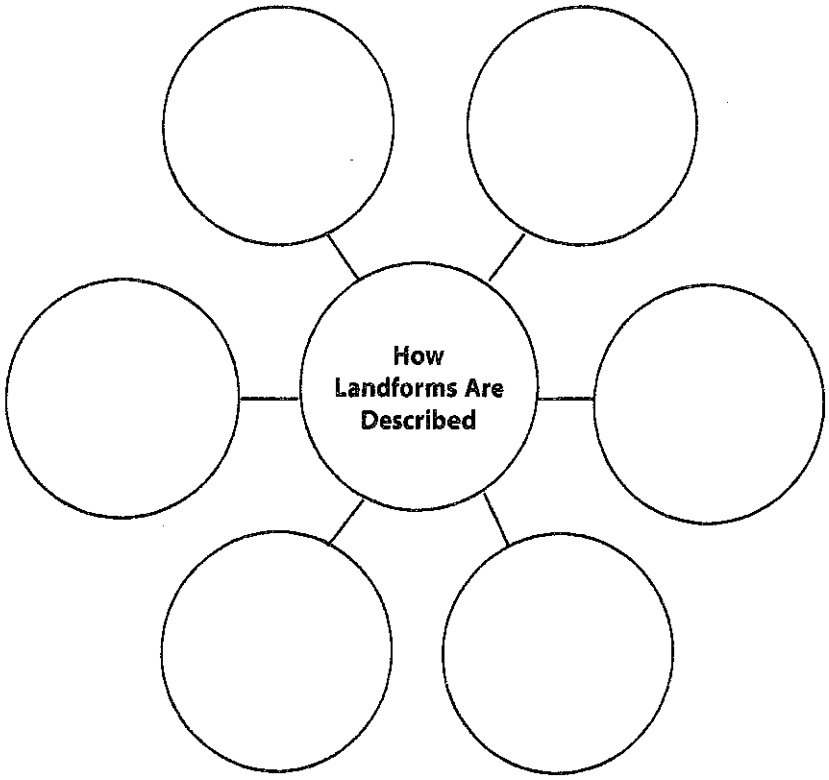
Classify *information about the features of Earth's surface.*



Landforms

I found this on page _____.

Organize *information about Earth's* landforms. *List 6 factors used to describe landforms.*



I found this on page _____.

Identify *two factors that change landforms over time.*

1. _____

2. _____

Main Idea

I found this on page _____.

I found this on page _____.

I found this on page _____.

Details

Determine *whether each example describes elevation, relief, or topography.*

The height of Mt. Everest: _____

The difference in elevation between the tops and bottoms of hills in a given area: _____

The shape of a river and its valley: _____

Compare *Earth's* landforms *in terms of relief and elevation.*

Landform	Relief	Elevation
Plains		
Plateaus		
Mountains		

Create *a concept map about* plains, plateaus, *and* mountains. *Include at least three facts about each* landform.

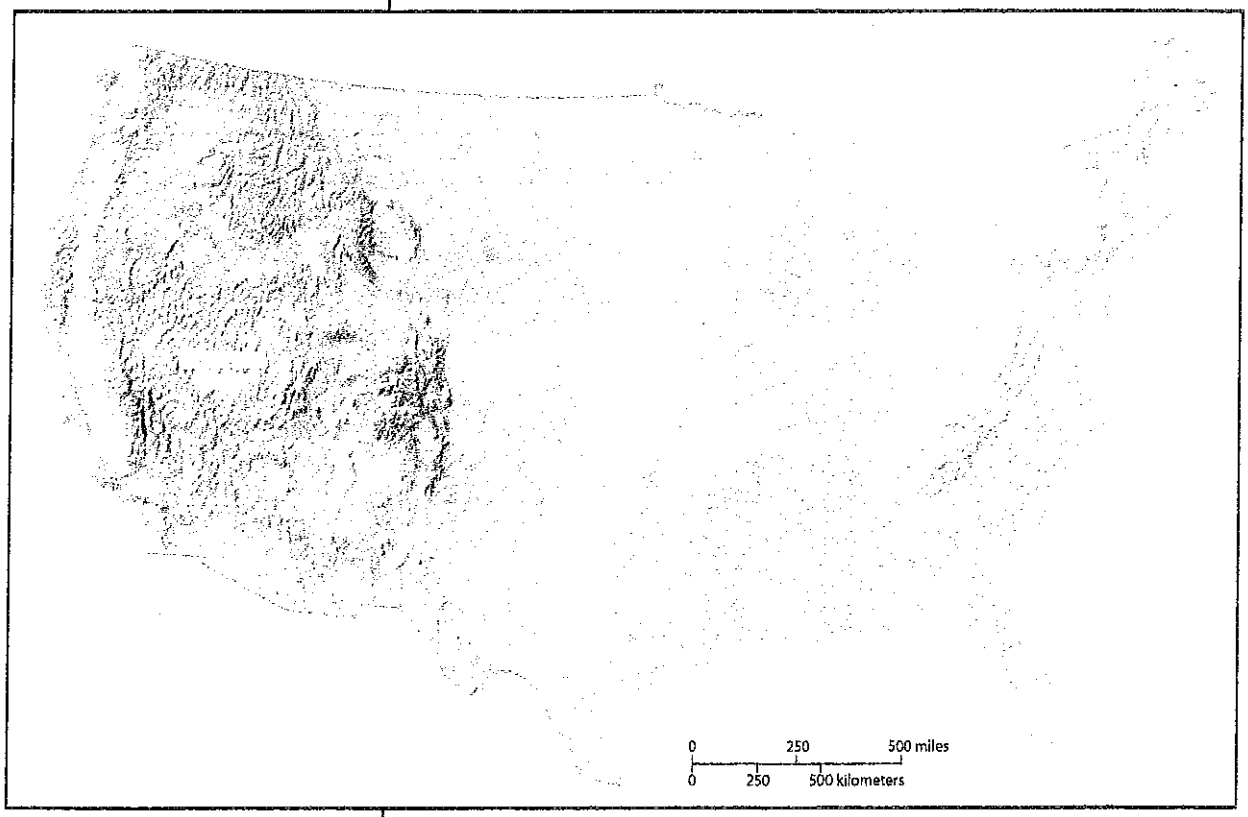
Main Idea

I found this on page _____.

Details

Identify *the major* landform *regions of the United States. Label the features listed below. Color the* plains *green, the* plateaus *orange, and the* mountains *brown.*

Plateaus	Plains	Mountains
Ozark Plateau	Interior Plains	Pacific Mountain System
Colorado Plateau	Gulf Coast Plain	Rocky Mountains
Columbia Plateau	Atlantic Coastal Plain	Appalachian Mountains
Appalachian Plateau		Basin and Range
Piedmont Plateau		



Synthesize It Study the map above. What patterns do you see? How would you describe the major landform regions of the United States to a friend?

Review Earth's Structure

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned.

Use this checklist to help you study.

- ❑ Complete your Foldables® Chapter Project.
- ❑ Study your *Science Notebook* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

Summarize It Review the chapter Big Idea and the lesson Key Concepts. Imagine that you have landed on another planet. You decide to make drawings in order to describe Earth's structure to the people you meet there. Make three drawings. Include a drawing of Earth's shape, its internal structure, and at least one of its landforms. Write a caption that describes each of your drawings.

Challenge *Suppose that you were asked to design a house for each topographic region. What feature or features might be necessary in a house in one region that might not be needed in another?*