Name _____

Daily Science
Big Idea 4
WEEK 2

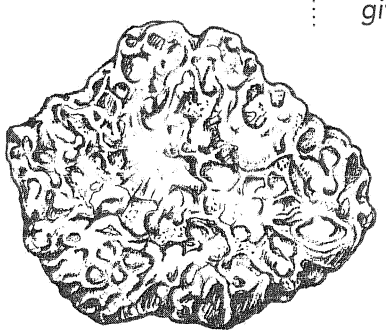
Day 1

Weekly Question

How do scientists know what is inside Earth?

For thousands of years, people have wondered what is inside Earth. At one time, there were people who claimed Earth was hollow. Some thought the interior of Earth looked like Swiss cheese, full of cavernous holes. Still others believed it was the "underworld," where spirits of the dead went! But scientists eventually discovered that rather than being open on the inside, the interior of Earth had a higher **density** than the surface. That means a rock from inside Earth could weigh more than three times as much as one of the same size on the surface.

Iron-rich volcanic rocks that have made their way to the surface from deep within Earth provided scientists with direct evidence of the **composition** of Earth's interior. As Earth was formed, the heavier elements, such as iron and nickel, sank to the center of the planet. The less dense elements, such as oxygen and silicon (SIL-ih-kahn), remained near the surface. Further proof of Earth's composition comes in the form of meteorites from space. These rocks of iron and nickel are remnants of the cores of planets and asteroids that were formed at the same time as our planet, by the same processes, and from the same materials.



meteorite

Vocabulary

composition
kom-puh-ZIH-shun
the type of material that an object is made of

density
DEN-sih-tee
the amount of matter within a given space

A. Answer the questions.

1. Which has a higher density, iron or silicon? _____
2. What two types of rock provided evidence of the composition of Earth's interior? _____ and _____

B. When you pour a cup of water and a cup of oil into the same container, the oil stays on top, while the water sinks to the bottom. Which liquid do you think is denser? Explain your answer.

_____

Name _____

Daily Science Big Idea 4 WEEK 2

Day 2

Weekly Question

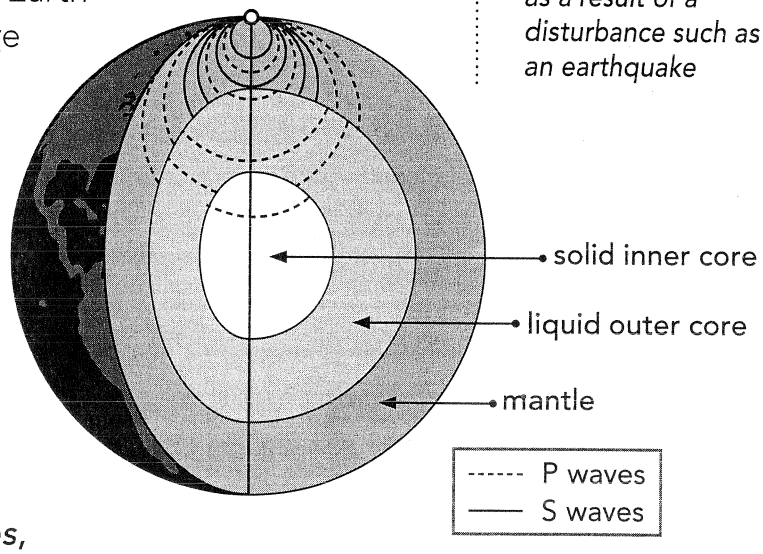
How do scientists know what is inside Earth?

While volcanic rocks offer evidence of Earth's composition, earthquakes provide information about Earth's structure. Earthquakes produce two types of **seismic waves** that travel through Earth: *primary* (P) waves and *secondary* (S) waves. P waves travel faster than S waves. And both types of waves travel faster through dense material. However, while P waves can travel through liquid, S waves cannot.

How did scientists figure this out? Following an earthquake, geologists would measure how long it took the waves to be felt at different locations around the world. Based on the time it took for the waves to arrive, they concluded that Earth consisted of different layers—some more dense than others. And because the S waves never arrived at all at some places, the scientists realized that part of Earth's interior must be liquid.

Vocabulary

seismic waves
SIZE-mik WAYVZ
vibrations that travel through Earth as a result of a disturbance such as an earthquake



The composition and density of Earth's different layers affect the speed of seismic waves.

For each clue, write whether *P waves*, *S waves*, or *both* are being described.

1. The denser the material is, the faster these seismic waves travel. _____
2. These waves can travel through liquid. _____
3. Sometimes these waves don't arrive on the other side of Earth. _____
4. These are the faster seismic waves. _____
5. These waves are produced by earthquakes. _____

Name _____

Daily Science Big Idea 4 WEEK 2

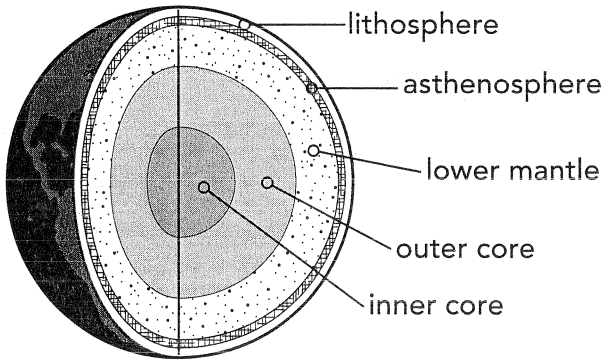
Day 3

Weekly Question

How do scientists know what is inside Earth?

Earth is divided into three main parts—the core, the **mantle**, and the crust—which vary in composition, as well as in temperature and pressure. As you move deeper and deeper into Earth, both temperature and pressure increase. The core makes up the center of Earth, where temperature and pressure are at their highest. The inner core is a solid composed almost entirely of iron, while the outer core is a liquid mixture of iron and nickel.

Directly above the core is the solid lower layer of the mantle. Above that is the **asthenosphere**. Although also a solid, this layer of the mantle can flow like taffy. On top of the asthenosphere lies the **lithosphere**. Pressure and temperature are the lowest in this layer. The lithosphere, which forms the tectonic plates of Earth's surface, includes the thin top portion of the mantle as well as the crust.



Vocabulary

asthenosphere
as-THEN-uh-sfeer
the solid middle layer of mantle that is able to move and change form

lithosphere
LIH-thoh-sfeer
the outer layer of Earth, consisting of the crust and the topmost part of the mantle

mantle
MAN-tul
the section of Earth between the crust and the core

A. Use the diagram and information from the passage to answer the questions.

1. How many layers are there in the mantle? _____
2. Which layer is made of liquid? _____
3. Which layer has the lowest temperature? _____

B. Even though it is a solid, the asthenosphere can flow like taffy. What other solids can you think of that flow? Name at least two.

_____

Name _____

Daily Science
Big Idea 4
WEEK 2

Day 4

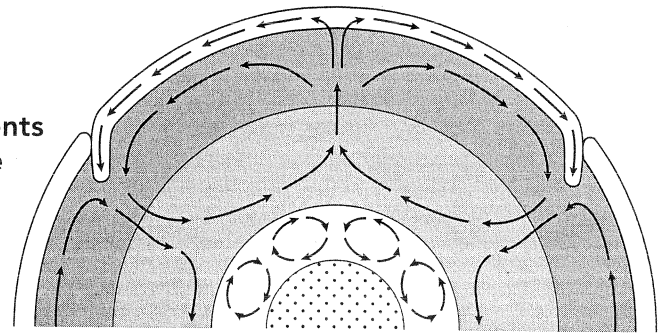
Weekly Question

How do scientists know what is inside Earth?

As scientists researched Earth's interior, they learned about the processes that go on under our planet's surface. They discovered that both the molten outer core and the mantle move in circular currents. In the outer core, these convection currents are driven by heat from the inner core. In the mantle, they are powered by the movements of the tectonic plates.

Heated rock from deep in the mantle rises because it is less dense. This creates an upward current. Near the surface, pressure is relieved and the rising rock turns to liquid magma. Once it reaches the surface through a rift, the liquid rock cools and solidifies. Over time, it becomes denser and eventually sinks into a trench and back into the mantle, pulling the surrounding rock along with it. This creates a downward current. In this way, convection currents continually recycle rocks between the crust and the mantle.

Convection Currents in the Outer Core and Mantle



Number the events in the correct order to show how convection currents work in Earth's interior. The first step in the cycle has been labeled.

____ Rising rock becomes liquid magma.

____ Dense rock sinks back into the mantle and creates a downward current.

____ Heated rock from the mantle becomes less dense and rises.

1 High temperatures from the inner core heat rock deep in the mantle.

____ Rock on the surface continues to cool and becomes denser.

____ Liquid rock cools on the surface and solidifies.

Name _____

Daily Science
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Day 5

Weekly Question

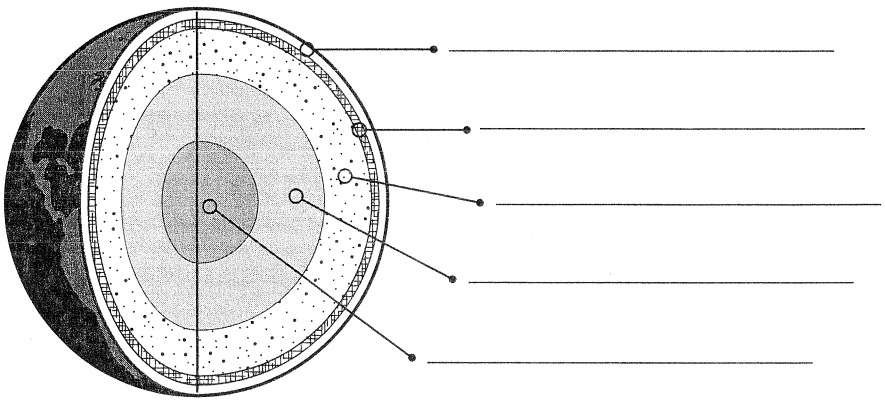
How do scientists know what is inside Earth?

A. Use the words in the box to complete the sentences.

density	seismic waves	mantle	composition

1. Volcanic rocks from deep within Earth provide evidence of the _____ and _____ of Earth's interior.
2. By studying the pattern of _____ that followed an earthquake, geologists determined that Earth's outer core was liquid.
3. The outer layer of Earth, or the lithosphere, includes the crust and the topmost layer of the _____.

B. Use the words in the box to label the layers of Earth.



lower mantle
outer core
asthenosphere
inner core
lithosphere

C. Which of these is true about Earth's core? Check the correct box.

- ❒ It has the highest temperature and pressure of any of Earth's layers.
- ❒ It has the lowest temperature and pressure of any of Earth's layers.
- ❒ The pressure is highest, but the temperature is lowest.
- ❒ The temperature is highest, but the pressure is lowest.