Name: _____ Date: _____

The Layers of the Earth

Circle group

Earth looks solid and still. But under your feet, it is made of layers, like an onion. Scientists cannot dig to the center. So they learn about the layers from earthquakes. When an earthquake shakes the ground, waves move through the planet. The waves bend, speed up, and slow down. That tells scientists what the inside is made of.

The outside layer is the crust. It is a thin shell of solid rock. Next to the whole Earth, the crust is about as thin as the skin of an apple. It is thickest under the continents. It is thinnest under the oceans.

Under the crust is the mantle. It is the thickest layer. The mantle is made of hot rock. It is solid, but over a very long time it flows slowly, like thick putty. Slow moves in the mantle are one reason the plates in the crust move.

At the center is the core. It has two parts. The outer core is mostly iron and nickel. It is so hot that the metal is liquid. The inner core is iron and nickel too, but it is solid. The pressure at the center is so great that the metal cannot melt.

The liquid outer core moves. That motion makes Earth's magnetic field. The field is why a compass needle points north.

Questions

1. How do scientists learn about Earth's layers?

_____

_____

2. What is the crust?

_____

_____

3. Where is the crust thinnest?

_____

_____

4. What is the mantle like?

_____

_____

5. How are the outer core and the inner core different?

_____

_____

6. Why is the inner core solid when the outer core is liquid?

_____

_____

7. Why does the author say Earth is like an onion?

_____

_____

Words to know

crust: the thin, hard outer layer of the Earth
mantle: the thick layer of hot rock between the crust and the core
core: the center of the Earth, made mostly of iron and nickel
pressure: a strong force pushing on something from all sides
magnetic field: the area around a magnet or planet where a magnetic force can be felt

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Layers of the Earth

Triangle group

Earth looks solid and still, but under your feet it is made of layers, like an onion. Scientists cannot dig to the center, so they learn about the layers by studying earthquakes. When an earthquake shakes the ground, waves travel through the planet. The way the waves bend, speed up, and slow down tells scientists what the inside is made of.

The outer layer is the crust, a thin shell of solid rock. In proportion, the crust is about as thin as the skin of an apple. It is thickest under the continents and thinnest under the oceans.

Below the crust is the mantle, the thickest layer. The mantle is made of hot rock. It is solid, but over a very long time it flows slowly, like thick putty. Slow movements in the mantle are one reason the plates in the crust move.

At the center is the core, which has two parts. The outer core is made mostly of iron and nickel, and it is so hot that the metal is liquid. The inner core is also iron and nickel, but it is solid, because the pressure at the center of the Earth is so great that the metal cannot melt.

The motion of the liquid outer core also produces Earth's magnetic field. That field is the reason a compass needle points north.

Questions

1. How do scientists learn about the layers inside the Earth?

_____

_____

2. What is the crust?

_____

_____

3. Where is the crust thinnest?

_____

_____

4. What is the mantle like?

_____

_____

5. How is the outer core different from the inner core?

_____

_____

6. Why is the inner core solid when the outer core around it is liquid?

_____

_____

7. What does comparing Earth to an onion help you picture?

_____

_____

Words to know

crust: the thin, hard outer layer of the Earth
mantle: the thick layer of hot rock between the crust and the core
core: the center of the Earth, made mostly of iron and nickel
pressure: a strong force pushing on something from all sides
magnetic field: the area around a magnet or planet where a magnetic force can be felt

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Layers of the Earth

Square group

Although Earth appears solid and motionless, the planet beneath your feet is actually composed of distinct layers, somewhat like an onion. Because scientists cannot possibly drill to the center, they investigate these layers indirectly by studying earthquakes. When an earthquake shakes the ground, waves travel through the planet, and the way those waves bend, accelerate, and decelerate reveals what the interior is made of.

The outermost layer is the crust, a comparatively thin shell of solid rock. In proportion to the entire planet, the crust is roughly as thin as the skin of an apple; it is thickest beneath the continents and thinnest beneath the oceans.

Beneath the crust lies the mantle, the thickest layer of all. The mantle consists of hot rock that is solid, yet over extraordinarily long periods it flows gradually, behaving somewhat like thick putty. These slow movements within the mantle are one reason the plates of the crust shift position.

At the center lies the core, which is divided into two regions. The outer core is composed primarily of iron and nickel, and its temperature is so intense that the metal is liquid. The inner core is likewise iron and nickel, but it remains solid, because the pressure at the center of the Earth is so tremendous that the metal cannot melt.

The circulation of the liquid outer core also generates Earth's magnetic field, which is the reason a compass needle points north.

Questions

1. Since no one can drill to the center, what evidence do scientists use to investigate Earth's interior?

_____

_____

2. How does the passage describe the crust?

_____

_____

3. Where is the crust at its thinnest?

_____

_____

4. Characterize the mantle's composition and behavior.

_____

_____

5. Contrast the outer core with the inner core.

_____

_____

6. Explain why the inner core remains solid even though the surrounding outer core is liquid.

_____

_____

7. What does the author's comparison of Earth to an onion help a reader visualize?

_____

_____

Words to know

crust: the thin, hard outer layer of the Earth
mantle: the thick layer of hot rock between the crust and the core
core: the center of the Earth, made mostly of iron and nickel
pressure: a strong force pushing on something from all sides
magnetic field: the area around a magnet or planet where a magnetic force can be felt

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: The Layers of the Earth

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: The Layers of the Earth

Easier · 221 words · Flesch-Kincaid grade 2.7

1. They study the waves from earthquakes that move through the planet.
2. The thin outside layer of solid rock.
3. Under the oceans.
4. It is the thickest layer. It is hot, solid rock that flows slowly over a long time, like thick putty.
5. The outer core is liquid metal. The inner core is solid metal. Both are mostly iron and nickel.
6. The pressure at the center is so great that the metal cannot melt.
7. Earth has layers, one inside another, the way an onion does.

Triangle: The Layers of the Earth

This passage · 224 words · Flesch-Kincaid grade 5.4

1. They study earthquake waves that travel through the planet.
2. The thin outer layer of solid rock.
3. Under the oceans.
4. It is the thickest layer. It is hot, solid rock that flows slowly over a very long time, like thick putty.
5. The outer core is liquid metal, and the inner core is solid metal. Both are mostly iron and nickel.
6. The pressure at the center of the Earth is so great that the metal cannot melt.
7. That Earth is made of layers, one inside another.

Square: The Layers of the Earth

Harder · 238 words · Flesch-Kincaid grade 10.9

1. Earthquake waves. The way they bend, speed up, and slow down as they travel through the planet reveals what the interior is made of.
2. As the outermost layer, a comparatively thin shell of solid rock.
3. Beneath the oceans.
4. It is the thickest layer, made of hot rock that is solid but flows gradually over extremely long periods, like thick putty.
5. Both are primarily iron and nickel, but the outer core is liquid and the inner core is solid.
6. The pressure at the center of the Earth is so tremendous that the metal cannot melt.
7. That Earth is built of layers nested one inside another.