Lesson 3 The Theory of Plate Tectonics

Predict *three ideas that will be discussed in Lesson 3 after reading the headings. Write your predictions in your Science Journal.*

Main Idea

The Plate Tectonics Theory

I found this on page 233.

Details

State *the problem that scientists had with seafloor spreading.*

Sample answer: When new oceanic crust is made, it spreads out, taking up space. Scientists did not understand how new crust was not increasing the size of Earth.

I found this on page 233.

Define plate tectonics. *Explain what the word* tectonic *means as part of your definition.*

Sample answer: Plate tectonics is a theory which states that Earth's surface is made of plates that move with respect to one another. The word tectonic means "builder" and refers to the forces that shape Earth's crust.

I found this on page 234.

Identify *the layers of Earth involved in plate movements. Describe how these layers interact.*

Layer	Description
Lithosphere	consists of the crust and the solid, uppermost mantle
Asthenosphere	layer that flows beneath the rigid lithosphere

Plate Boundaries

I found this on page 235.

Organize *information about* divergent plate boundaries. *Use arrows to show how plates move relative to one another at this type of boundary.*

Type of Boundary	Description	Movement
Divergent	forms where two plates separate; can exist in the middle of a continent or on the ocean floor	← →

Main Idea

Details

Model transform plate boundaries. *Either write a description or illustrate this type of plate interaction. Include arrows to show the direction of movement. Label the plates and the structures that result from the collisions.*

I found this on page 236 .

Drawings should show two plates that slide horizontally past each other.

Transform Plate Boundaries

I found this on page 236 .

Drawings should show the two plates folding and deforming to form mountains. Neither plate should be moving under the other.

Continent-to-Continent Collision

Main Idea

Details

Evidence for Plate Tectonics

I found this on page 237 .

Identify *evidence for plate motion provided by* plate tectonics.

1. Satellites can measure how fast continents move.
2. location of earthquake activity explained
3. location of volcanic activity explained
4. location of mountains explained

Plate Motion

I found this on page 238 .

Define convection, *and give an example of* convection *you have experienced in your everyday life.*

Definition: Convection is the circulation of material caused by differences in temperature and density.

Example: Accept all reasonable responses. Sample answers: air circulating in a heated room; water circulating in a pot on a stove; air currents in the atmosphere causing thunderstorms

I found this on page 238 .

Explain *how* convection *occurs in the mantle by completing the sequence diagram.*

Radioactive elements heat the inside of Earth.

↓

The heat is transferred from the core to the mantle. Convection currents form.

↓

These currents in the asthenosphere move the lithosphere above it.

↓

In this way, tectonic plates move in response to the heating and cooling of mantle material.

Main Idea

I found this on page 239 .

Details

Describe *the forces that cause plate motion.*

Force	Description
Basal drag	Convection currents drag the plates along as though on a conveyor belt.
Ridge push	Hot magma rises and solidifies at elevated ridges. Gravity pulls the rocks down and out of the way so that new seafloor can form.
Slab pull	The sinking plate, or slab, pulls on the rest of the plate as it descends into the mantle.

A Theory in Progress

I found this on page 240 .

Identify *four questions scientists have about* plate tectonics.

1. Why did the plates separate to begin with?
2. Why do some earthquakes and volcanoes occur far away from plate boundaries?
3. What forces dominate plate motion?
4. What will scientists investigate next?

Synthesize It What explanation can you offer for several volcanoes located in a line on the seafloor erupting over time to form islands?

Accept all reasonable responses. Sample answer: The volcanoes are probably located near where two oceanic plates meet. As the older plate was subducted, it melted. This melted material rose and formed the line of volcanoes. Over time, lava built up to form islands.