Clues Beneath the Sea

Read the evidence, then explain how moving plates change Earth.

6.6 "Construct an evidence-based explanation of how tectonic plate movement impacts Earth's surface over geological time. a. Construct an evidence-based explanation of how Earth's internal energy flows between its surface and its interior. b..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three observations that show plates moved in the past. Circle one sentence that explains how plate movement forms a surface feature or causes an event.

A Ridge in the Atlantic

1. Imagine standing on the Atlantic seafloor, where a long ridge rises above the ocean floor. Earth's solid outer shell, the lithosphere, is broken into moving plates. Some heat inside Earth remains from its formation, and radioactive decay makes more heat. Energy flows toward the surface as hot mantle rock slowly moves and transfers heat to cooler rock. Sinking parts of plates can pull other parts along. Plates travel only a few centimeters each year, but over millions of years their movement changes the shapes of oceans and continents.

2. When plates spread apart at a divergent boundary, hot mantle rock rises and partly melts. Melted rock can reach the surface, cool, and build new seafloor along an ocean ridge. At a convergent boundary, plates collide. If an ocean plate sinks beneath another plate, it can help produce magma that feeds volcanoes. If two continents collide, their edges can crumple into mountains. At a transform boundary, plates slide past each other. Stuck edges may suddenly slip, causing an earthquake. Earthquakes can also happen where plates meet or spread.

3. How can scientists tell that plates moved before anyone could measure them? The east coast of South America and the west coast of Africa fit roughly together. Fossils of the freshwater reptile Mesosaurus occur on both continents, although it could not swim across a wide ocean. Rock layers of matching ages and types also appear on opposite shores. On the Atlantic seafloor, rock near the central ridge is younger than rock farther away. Together, these clues support the idea that the continents were once joined and then moved apart as new seafloor formed.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does energy from inside Earth help change the surface over millions of years?

2. Explain how plates moving apart can form new seafloor.

3. Compare one surface effect of plates colliding with one effect of plates sliding past each other.

4. How do both the Mesosaurus fossils and the ages of Atlantic seafloor rocks support the idea that plates moved?

3 YOUR TURN

Your own words

A seafloor ridge runs between two islands on different plates, and the youngest rocks lie along the ridge. In four or five sentences, identify the likely plate boundary, explain how energy from inside Earth changes the seafloor, predict what will happen to the islands over millions of years, and name one observation that could test your prediction.

ANSWER KEY

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GRADE 6 · 6.6

PART 1 · READ AND MARK

Underline three observations that show plates moved in the past. Circle one sentence that explains how plate movement forms a surface feature or causes an event. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does energy from inside Earth help change the surface over millions of years?	**Heat moves toward the surface as mantle rock slowly moves and transfers energy. This movement helps move plates, which reshape oceans and continents over millions of years.**
2	Explain how plates moving apart can form new seafloor.	**At a divergent boundary, hot mantle rock rises and partly melts. Melted rock reaches the surface, cools, and forms new seafloor.**
3	Compare one surface effect of plates colliding with one effect of plates sliding past each other.	**Colliding continental plates can form mountains. Plates sliding past each other can stick and then slip, causing an earthquake.**
4	How do both the Mesosaurus fossils and the ages of Atlantic seafloor rocks support the idea that plates moved?	**Mesosaurus fossils on both sides of the Atlantic suggest the continents were once joined. Seafloor rock is younger near the ridge and older farther away, which supports the idea that new seafloor formed as the plates moved apart.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The islands lie on plates moving apart at a divergent boundary. Heat from Earth's interior helps mantle rock rise beneath the ridge. Some of that rock melts, and cooled melt builds new seafloor. Over millions of years, the islands should move farther apart. Scientists could measure the distance between the islands over many years to test whether they are moving apart.

Accept answers that connect internal heat, plate motion, and surface changes with accurate cause-and-effect reasoning. For the open task, accept another testable observation, such as checking whether seafloor rocks become older with distance from the ridge.