Rocks on the Move

Weigh evidence for past and present plate movement

E.8.9A.2 "Explore and debate theories of plate tectonics to form conclusions about past and current movements of rocks at Earth's surface throughout history."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two clues to past movement and circle one measurement of present movement. Number the two competing explanations for the matching fossils and rocks so you can compare them.

A Debate Across the Atlantic

1 Imagine finding the same ancient fern fossils in coastal rocks of South America and Africa. In the early 1900s, Alfred Wegener argued that these continents had once joined and later drifted apart. Matching rock layers and mountain belts on both shores strengthened his case. Critics offered another explanation: perhaps land bridges had once connected the continents and later sank. Wegener could not explain what force would move entire continents across the ocean floor. His evidence suggested past movement, but the missing mechanism left room for debate.

2 Decades later, scientists mapped the Atlantic seafloor. They found a long ridge where molten rock rises, cools, and becomes new ocean crust. Bands of rock with matching magnetic patterns lie on opposite sides of the ridge. The bands record changes in Earth's magnetic field as new crust forms and moves away. This evidence supports seafloor spreading, not continents plowing through fixed ocean crust. In the modern theory of plate tectonics, continents ride on moving plates that include both continental and oceanic crust.

3 Today, GPS stations show that parts of South America and Africa move away from each other by a few centimeters per year. The Atlantic grows wider as new crust forms between them. Elsewhere, old ocean crust sinks beneath another plate at a deep trench, so spreading does not make Earth steadily larger. Plate tectonics explains both ancient matches across the Atlantic and movement measured now. It has stronger support than the sunken land bridge idea because several independent clues fit one model, though no single clue proves every detail of Earth's history.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why did Wegener's evidence suggest that South America and Africa had once been joined, and why did critics still question his idea?

2. How do the matching magnetic patterns on both sides of the Atlantic ridge support seafloor spreading?

3. How does the GPS evidence strengthen a conclusion drawn from the ancient rocks and fossils?

4. Someone claims that seafloor spreading must make Earth steadily larger. What evidence from the passage challenges that claim?

3 YOUR TURN

Your own words

On a made-up ocean plate, an active volcano lies east of a line of extinct volcanoes, and the extinct volcanoes get older toward the west. GPS shows the plate moving west. In 4 to 5 sentences, argue how the volcano rocks moved in the past and how they are moving now, use two clues, and name another explanation or an uncertainty you would test.

ANSWER KEY

Rocks on the Move

GRADE 8 · E.8.9A.2

PART 1 · READ AND MARK

Underline two clues to past movement and circle one measurement of present movement. Number the two competing explanations for the matching fossils and rocks so you can compare them. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why did Wegener's evidence suggest that South America and Africa had once been joined, and why did critics still question his idea?	**Matching fossils, rock layers, and mountain belts suggested the continents had been joined. Critics proposed sunken land bridges, and Wegener could not explain what moved the continents.**
2	How do the matching magnetic patterns on both sides of the Atlantic ridge support seafloor spreading?	**They fit the idea that new crust forms at the ridge, records Earth's magnetic field, and then moves away on both sides.**
3	How does the GPS evidence strengthen a conclusion drawn from the ancient rocks and fossils?	**The ancient matches suggest the continents moved apart in the past, while GPS shows that parts of them are moving apart now.**
4	Someone claims that seafloor spreading must make Earth steadily larger. What evidence from the passage challenges that claim?	**Old ocean crust sinks beneath another plate at deep trenches, so crust is removed as new crust forms elsewhere.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The older volcano rocks likely formed farther east and traveled west as the plate moved. Their ages increase toward the west, which fits that history. GPS shows that the plate is still moving west today. The volcanoes might instead have formed at separate places, so I would test whether their rocks have similar chemical patterns.

Accept conclusions that connect the age pattern to past movement and GPS to current movement. Students may propose a different testable explanation or uncertainty, but they should not claim the clues prove exactly where each volcano formed.