Clues Across an Ocean

Use patterns in rocks, fossils, and seafloor ages to investigate plate motion.

MS-ESS2-3 "Analyze and interpret data on the age of the Earth, distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (SEP: 4; DCI: ESS2.B, ESS1.C; CCC: Patterns)"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two clues on land that could show past plate motion, and circle ages in the table that match on opposite sides of the ridge.

What Split the Continents?

1. The coastlines of eastern South America and western Africa look as if they could fit together, though waves have changed their edges. Scientists also find fossils of Mesosaurus, a freshwater reptile, in rocks on both continents. Rock layers of similar age and type line up across the Atlantic. What could connect places now separated by an ocean?

2. Ocean crust adds another clue. Along the Mid-Atlantic Ridge, hot rock rises and forms new crust as plates move apart. Scientists can date samples collected at different distances from the ridge. The table gives simplified measurements from opposite sides of one stretch of the ridge. Look for how crust age changes with distance.

OCEAN CRUST NEAR THE MID-ATLANTIC RIDGE

Sample location	Distance from ridge (km)	Crust age (million years)
Ridge	0	About 0
West side	200	10
East side	200	10
West side	400	20
East side	400	20

3. Compare clues from land with ocean-floor ages instead of relying on one clue. Earth formed about 4.6 billion years ago, far earlier than the crust in this table. Ocean crust forms at ridges and can sink into the mantle at other plate boundaries. That cycle helps explain why ocean crust can be much younger than Earth itself.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does the age of the ocean crust change from the ridge to 400 km away on either side? Use numbers from the table.

2. What pattern do the samples 200 km from the ridge show, and how does it support seafloor spreading?

3. How do the fossil and rock clues support the idea that South America and Africa were once connected?

4. Someone claims that ocean crust must be as old as Earth. Use the passage and table to evaluate that claim.

3 YOUR TURN

Your own words

Imagine two other continents that may once have touched. In four or five sentences, propose two kinds of evidence you would gather, predict a pattern for each, and explain how the patterns together would test whether the plates moved.

ANSWER KEY

Clues Across an Ocean

GRADES 6-8 · MS-ESS2-3

PART 1 · READ AND MARK

Underline two clues on land that could show past plate motion, and circle ages in the table that match on opposite sides of the ridge. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does the age of the ocean crust change from the ridge to 400 km away on either side? Use numbers from the table.	**Crust is about 0 million years old at the ridge and 20 million years old 400 km away on either side.**
2	What pattern do the samples 200 km from the ridge show, and how does it support seafloor spreading?	**Crust on both sides is 10 million years old at 200 km. Matching ages at equal distances fit a pattern of new crust forming at the ridge and moving outward.**
3	How do the fossil and rock clues support the idea that South America and Africa were once connected?	**Both continents have Mesosaurus fossils, and rock layers of similar age and type line up across the Atlantic. Those matches suggest the lands were once joined.**
4	Someone claims that ocean crust must be as old as Earth. Use the passage and table to evaluate that claim.	**The claim is incorrect. Earth is about 4.6 billion years old, but the table shows crust no older than 20 million years. Ocean crust forms at ridges and can sink into the mantle elsewhere.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would look for the same land animal fossil in rock layers of the same age on both continents. Finding that pattern would suggest the lands were once joined, since the animal could not cross a wide ocean. I would also measure the age of ocean crust at matching distances on either side of the ridge between them. If the youngest crust lay at the ridge and older crust lay farther away on both sides, the two patterns together would support plate movement.

Accept other valid pairs of evidence, such as matching rock layers and coastline shapes, if the response predicts a specific pattern for each and explains how both support past plate motion. Treat the table ages as simplified measurements.