Two Ocean Routes

Compare seafloor profiles using distance and depth data.

MAQ.3.1 "Use geospatial data to analyze, explain, and communicate differences among the major geological features of specific aquatic ecosystems (e.g., plate tectonics, continental rise, continental slope, abyssal plain, trenches, sea mounts..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Number the station rows in each region from nearest to farthest shore. Underline passage sentences that connect a seafloor feature to a geologic process.

From Shore to Deep Water

1 Scientists compare two underwater routes, one off the eastern United States in the Atlantic and one off Japan in the Pacific. Each station's distance begins at its own shoreline, so the distances do not place both oceans on one continuous line. Depth is measured below sea level. Read the station data as samples of two different seafloor profiles.

SEAFLOOR STATIONS ON TWO ROUTES

Region	Station	Distance from shore (km)	Depth (m)
Atlantic	A	120	200
Atlantic	B	220	3,200
Atlantic	C	550	4,700
Pacific	D	40	200
Pacific	E	170	7,800

2 The Atlantic margin is far from an active plate boundary. Beyond its shallow shelf, the bottom drops down a continental slope. Sediment collects at the slope's base, forming a continental rise between stations B and C. Farther out, station C lies on a broad abyssal plain where fine particles settle across the deep bottom.

3 Off Japan, one tectonic plate sinks beneath another. This process, called subduction, creates an ocean trench and helps fuel volcanic island formation. The Pacific route therefore reaches a much deeper location closer to shore than the Atlantic route does. A few stations show important contrasts, but they cannot reveal every ridge, seamount, or habitat between stations.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which station is most likely in an ocean trench? Use its depth and the plate process near Japan to explain your choice.

2. Compare the depth change per kilometer from Atlantic A to B and from Pacific D to E. Which sampled segment changes depth faster? Show your calculations.

3. Use the station data and passage to describe the seafloor sequence from Atlantic A through C. Where does the continental rise fit?

4. Why would the station data alone not prove that there are no seamounts between Atlantic B and C?

3 YOUR TURN

Your own words

Write four sentences proposing one new depth-measuring station between two listed stations on either route. Give its region and distance from shore, name a feature you would test for, use at least two table values to explain your choice, and describe a result that would support your idea.

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PART 1 · READ AND MARK

Number the station rows in each region from nearest to farthest shore. Underline passage sentences that connect a seafloor feature to a geologic process. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which station is most likely in an ocean trench? Use its depth and the plate process near Japan to explain your choice.	**Pacific station E is most likely in a trench. It is 7,800 m deep, and subduction near Japan creates ocean trenches.**
2	Compare the depth change per kilometer from Atlantic A to B and from Pacific D to E. Which sampled segment changes depth faster? Show your calculations.	**A to B changes 3,000 m over 100 km, or 30 m/km. D to E changes 7,600 m over 130 km, or about 58.5 m/km. D to E changes depth faster.**
3	Use the station data and passage to describe the seafloor sequence from Atlantic A through C. Where does the continental rise fit?	**A is near the shallow shelf edge, B is on the deeper slope, and C is on the abyssal plain. The sediment-built continental rise lies between B and C.**
4	Why would the station data alone not prove that there are no seamounts between Atlantic B and C?	**The stations are separate samples. A seamount could lie between B and C without appearing in either station's depth reading.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would add an Atlantic station 350 km from shore, between B at 220 km and C at 550 km. I would test whether this stretch includes a continental rise. B is 3,200 m deep and C is 4,700 m deep, so a reading near 4,000 m at my station would show slower deepening than the 3,000 m drop between A and B. That result would support a gentler rise, though one reading could not map its full shape.

Accept reasonable feature interpretations that cite the passage and station data. For the proposal, the new distance must fall between two stations on the same route, and the proposed result must help test the named feature.