Answer Key with Questions

Lesson Check: Development of a Theory

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1) As new seafloor moves away from an ocean ridge, the seafloor cools and becomes less dense than the material beneath it.

- ○ True
- ○ False

Correct Answer

False

2) The youngest rocks on the ocean floor are located _____.

- ○ **A)** near continents
- ○ **B)** at mid-ocean ridges
- ○ **C)** far from mid-ocean ridges
- ○ **D)** near Asia

Correct Answer

B) at mid-ocean ridges

3) Which of the following best explains the age of oceanic crust and ocean-floor features?

- **A)** seafloor spreading
- **B)** continental drift
- **C)** subduction
- **D)** crystallization

Correct Answer

A) seafloor spreading

4) New ocean crust is continually formed at _____.

- **A)** mid-ocean ridges
- **B)** trenches
- **C)** subduction zones
- **D)** ocean basins

Correct Answer

A) mid-ocean ridges

5) The theory of _____ explains how new crust is created at mid-ocean ridges.

Correct Answer

seafloor spreading

6) What new technology was used to map the seafloor beginning in the 1940s and 1950s?

Correct Answer

Answers may vary.

Explanation

sound waves on moving ships

7) How does a mid-ocean ridge form?

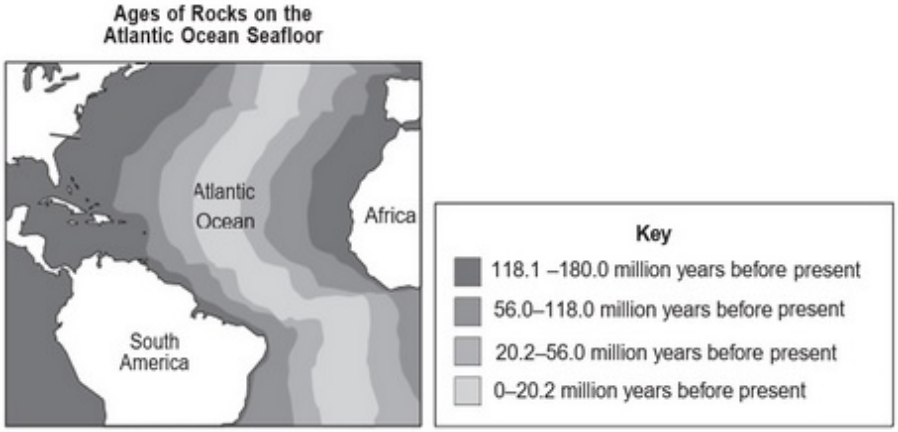
Correct Answer

Answers may vary.

Explanation

As the seafloor spreads apart, magma moves upward and flows from the cracks. It becomes solid as it cools and forms new seafloor. As new seafloor moves away from the ridge, it cools, contracts, and becomes denser than the material below it. This dense, colder seafloor begins to sink, helping to form the mid-ocean ridge.

8) The map shows the ages of rocks found on the Atlantic Ocean seafloor.



a. Identify the process that causes the pattern of rock data shown in the map.

b. Explain how the pattern provides evidence for the process you identified in part (a).

Correct Answer

Answers may vary.

Explanation

a. Plate tectonics or seafloor spreading
b. New ocean crust is made at the rift zone (or mid-ocean ridge). As more crust builds up at the center of the ridge, it pushes away the older crust toward the continents. This process happens slowly over millions of years, creating a pattern of crust that gets older the farther away it is from the ridge.
[Note: Student may also discuss that the pattern records changes in magnetic polarity of the oceanic crust. The different colored pattern is also used to show matching reversals in magnetic polarity of the rocks on either side of the ridge.]

Constructed-Response Rubric

PE: MS-ESS2-3 *Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.*		
	Level of Understanding	**Evidence of Understanding**
3	**Demonstrating Expected Understanding**	Student response provides **clear** evidence of using the dimensions* to make sense of scientific phenomena and/or to design solutions to problems. Student is able to: · identify the process that causes the pattern of rock data shown in the map; **AND** · explain how the pattern provides evidence for the process identified in part (a).
2	**Progressing toward Understanding**	Student response provides **partial** evidence of using the dimensions* to make sense of scientific phenomena and/or to design solutions to problems. The response lacks some critical information and details or contains some errors. Student is able to: ▪ identify the process that causes the pattern of rock data shown in the map **BUT** is unable to explain how the pattern provides evidence for the process identified in part (a).
1	**Beginning to Develop Understanding**	Student response is incomplete or provides minimal evidence of using the dimensions* to make sense of scientific phenomena and/or to design solutions to problems.
0	**Not Showing Understanding**	Student does not respond or student response is inaccurate, irrelevant, or contains insufficient evidence of using the dimensions* to make sense of scientific phenomena and/or to design solutions to problems.
**As outlined in the Performance Expectations (PE) of the NGSS, the three dimensions are the disciplinary core ideas (DCI), science and engineering practices (SEP), and crosscutting concepts (CCC). Note that due to the complexity of the PEs, individual assessment items may not address all three dimensions.*		

Scoring Notes:

Possible answers include:

a. Plate tectonics or seafloor spreading

b. New ocean crust is made at the rift zone (or mid-ocean ridge). As more crust builds up at the center of the ridge, it pushes away the older crust toward the continents. This process happens slowly over millions of years, creating a pattern of crust that gets older the farther away it is from the ridge.

[Note: Student may also discuss that the pattern records changes in magnetic polarity of the oceanic crust. The different colored pattern is also used to show matching reversals in magnetic polarity of the rocks on either side of the ridge.]