



Science Objectives

- Students will relate continental drift to seafloor spreading.
- Students will understand the role of mid-ocean ridges in seafloor spreading.

Vocabulary

- ridge
- trench
- seafloor spreading
- seismic
- tectonic plate
- continent

About the Lesson

- In this lesson students will:
 - Measure the distance between South America and Africa over a 120 million year time span.
 - Understand how the age of the ocean floor relates to its distance from a mid-ocean ridge.



TI-Nspire™ Navigator™

- Send out the *Sea_Floor_Spreading.tns* file.

Activity Materials

- Compatible TI Technologies:  TI-Nspire™ CX Handhelds,  TI-Nspire™ Apps for iPad®,  TI-Nspire™ Software



Tech Tips:

- This activity includes screen captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at <http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials>

Lesson Files:

Student Activity

- Sea_Floor_Spreading_Student.doc
- Sea_Floor_Spreading_Student.pdf

TI-Nspire document

- Sea_Floor_Spreading.tns



Discussion Points and Possible Answers

Have students read the background information on the student activity sheet or on page 1.2 of the .tns file.

Move to page 1.3.

Have students answer question 1 in the .tns file, activity sheet, or both.

Q1. Which of the following would you most expect to occur at a mid-ocean ridge?

Answer: A. volcanic activity

Move to page 1.4

1. Students should select the South American point and then select the African point in the simulation. Doing this will collect a distance measurement.
2. Have students select the up and down arrows (▼ and ▲) to advance 10 million years towards present time and repeat the distance measurement.
3. Students should continue to collect distance measurements every 10 million years to present day.



Tech Tip: To access the Directions again, select  > **Sea Floor Spreading > Directions**



Tech Tip: To access the Directions again, select or **Document Tools** () > **Sea Floor Spreading > Directions.**

Move to pages 1.5 - 1.11

4. Students should observe the spreadsheet on page 1.5 containing the distance measurements collected, Then, they should analyze the scatterplot on page 1.6. Students use this data to answer the following questions.



- Q2. According to the graph, as the age of the earth increases, the distance between South American and Africa _____ . (Remember: Present day is 0 years).

Answer: A. increases.

- Q3. According to this simulation, each plate is moving at a rate of

Answer: C. 67 km every million years



Tech Tip: Students may need help using the calculator app that is embedded on page 1.8 for Question #3.

- Q4. If you were to compare a sample of ocean crust next to a mid-ocean ridge with a sample very far from the ridge, what would you notice

Answer: A. The sample near the ridge is much younger.

- Q5. What evidence from the graph supports the idea that new sea floor is being created?

Sample Answer: Student answers will vary; The age of the sea floor is youngest at the mid-ocean ridge. The distance between the continents increased over time.

- Q6. If new ocean floor is created at the Mid-Atlantic Ridge, propose an explanation for why the earth's total crust is not increasing. How could this explain why the age of Earth is 4 billion years old while the oldest region of crust is only 200 million years old?

Sample Answer: Student answers will vary; While new crust is created at the mid-ocean ridges, old crust is being destroyed somewhere else. The crust is continuously recycled at the trenches. If old crust is being destroyed constantly, it would explain why the oldest region of crust is only 200 million years old and not 4 billion years old.



Wrap Up

When students are finished with the activity, retrieve the .tns file using TI-Nspire Navigator. Save grades to Portfolio. Discuss activity questions using Slide Show.

Assessment

- Formative assessment will consist of questions embedded in the .tns file. The questions will be graded when the .tns file is retrieved. The Slide Show will be utilized to give students immediate feedback on their assessment.
- Summative assessment could consist of questions/problems on the chapter test or a performance assessment. For example, students could diagram the motions of the earth's plates, including labels to show the relative age of the ocean floor near trenches and ridges.