Cracking Up

Splitting Up

A new ocean will one day separate Africa.

A group of nomads got a shock several years ago in a desert in Ethiopia. A series of earthquakes rattled the ground one night, making a deafening noise. The next morning, the nomads discovered that a 3-foot cliff had risen from the ground behind them.

The event wasn’t just any earthquake. It was one step in a geological process that is slowly building a new ocean in eastern Africa.

Spreading Apart

Earth’s shell is made up of enormous pieces that fit together like those in a jigsaw puzzle. Called tectonic plates, the pieces are moving very slowly. Some plates are crashing together. Some are pulling apart. In the long course of Earth’s history, the movements of plates have created mountains, oceans, and continents.
In eastern Africa, two large tectonic plates—the African Plate and the Arabian Plate—are pulling away from each other. “There’s true plate spreading going on there,” Cindy Ebinger, an earth scientist at the University of Rochester in New York, told ScienceSpin.

That’s not all. As the two plates pull apart, the African Plate is splitting into two pieces. One tectonic plate is becoming two plates.

Joe Lemonnier
An ocean will one day fill the Great Rift Valley, where Africa is pulling apart.

Recently, that tectonic activity has gotten dramatic. In 2005, the cracking of the African Plate triggered a volcanic eruption in Ethiopia. That was followed by a series of earthquakes—the same ones the nomads felt. The earthquakes occurred as magma (liquid rock) rose from deep within Earth, splitting the ground wide open. A series of crevices, some as wide as 10 feet, opened along a 35-mile stretch of desert in Ethiopia. Since then, the cracks have continued to grow.

A Natural Lab

Africa’s tectonic activity has been going on for 30 million years. The spreading and cracking is what formed the Red Sea, as well as a deep depression known as the Great Rift Valley. The rift runs south from the bottom of the Red Sea through eastern Africa.

As the two sides of the rift valley pull even farther apart, the entire area will someday fall below sea level. Eventually, water from the Red Sea will rush in to fill the rift, spawning a new body of water. A million years from now—possibly sooner—the Great Rift Valley will lie at the bottom of an ocean that divides Africa in two.
1. Based on the passage, which of the following is NOT created by tectonic plate movement?

   A countries  
   B oceans  
   C mountains  
   D continents

2. Based on the sequence of the geological process described in the passage, when will the Great Rift Valley fill with water?

   A never  
   B after the area is flooded by rain  
   C after the area falls below sea level  
   D after 30 million years

3. Based on the passage, how often are new oceans created?

   A not often, because it takes millions of years  
   B very often, because tectonic plates move fast  
   C every year  
   D whenever an earthquake happens

4. Read the following sentence: “A series of crevices, some as wide as 10 feet, opened along a 35-mile stretch of desert in Ethiopia.”

   As used in the sentence, what are crevices?

   A open spaces in the desert  
   B large cracks in the ground  
   C shaking during earthquakes  
   D liquid magma from volcanic eruptions

5. This passage is mainly about

   A how tectonic plates move under the ocean  
   B continents and how they are created  
   C how nomads live in Ethiopia  
   D tectonic plates creating a new African ocean
6. According to the passage, what are two ways tectonic plates move?

__________________________________________________________________________________________________________

__________________________________________________________________________________________________________

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7. Based on the passage, why don’t we usually feel it when tectonic plates are crashing together and pulling apart?

__________________________________________________________________________________________________________

__________________________________________________________________________________________________________

__________________________________________________________________________________________________________

8. The question below is an incomplete sentence. Choose the word that best completes the sentence.

One day the Great Rift Valley will become an ocean, ____________ it falls below sea level.

A  before  
B  although  
C  finally  
D  after

9. Answer the questions based on the sentence below.

In 2005, a volcanic eruption triggered a series of earthquakes in Ethiopia.

What? a volcanic eruption

(did) What? _____________________________________________________________

When? _________________________________________________________________

Where? __________________________________________________________________
10. Read the vocabulary word and definition below and complete questions 10a, 10b, and 11.

**Vocabulary Word:** trigger (trig·ger): to cause something to begin or to happen.

**10a.** Read the five sentences below and underline the word trigger in each sentence.

1. The movement of the tectonic plates triggered an earthquake when they pulled the ground apart.

2. The stronger safety laws triggered a growth of the town’s economy as more people felt confident enough to build new businesses.

3. The other person’s mean words triggered Sue’s tears because they made her feel sad.

4. Knocking one book off of the shelf triggered a chain reaction that knocked down all of the books.

5. Being outside during the spring triggered her sneezing, because she was allergic to flowers.

**10b.** Which image shows an event triggered by some change?

![Image 1](Image 1.png) ![Image 2](Image 2.png)

**11.** What might trigger the fire department to hurry to an apartment building?

______________________________________________________________________________________________  
______________________________________________________________________________________________  
______________________________________________________________________________________________  
______________________________________________________________________________________________  
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Teacher Guide & Answers

Passage Reading Level: Lexile 980

Featured Text Structure: Sequence – the writer provides an order of events or steps in a process

Passage Summary: This passage discusses the sequence of events leading to the creation of a new ocean that will one day divide Africa. The process involves the movement of tectonic plates.

1. Based on the passage, which of the following is NOT created by tectonic plate movement?

A countries  
B oceans  
C mountains  
D continents

2. Based on the sequence of the geological process described in the passage, when will the Great Rift Valley fill with water?

A never  
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4. Read the following sentence: “A series of crevices, some as wide as 10 feet, opened along a 35-mile stretch of desert in Ethiopia.”

As used in the sentence, what are crevices?

A open spaces in the desert  
B large cracks in the ground  
C shaking during earthquakes  
D liquid magma from volcanic eruptions

5. What is this passage mostly about?

A how tectonic plates move under the ocean  
B continents and how they are created  
C how nomads live in Ethiopia  
D tectonic plates creating a new African ocean

6. According to the passage, what are two ways tectonic plates move?

Suggested answer: Some tectonic plates crash together, and others pull apart. [see paragraph 4]
7. Based on the passage, why don’t we usually feel it when tectonic plates are crashing together and pulling apart?

**Suggested answer:** We are usually unable to feel tectonic plates moving because they are moving very slowly. [see paragraph 3]

8. The question below is an incomplete sentence. Choose the word that best completes the sentence.

One day the Great Rift Valley will become an ocean, ______________ it falls below sea level.

A before  
B although  
C finally  
D after

9. Answer the following questions based on the sentence below.

In 2005, a volcanic eruption triggered a series of earthquakes in Ethiopia.

What? a volcanic eruption

(did) What? **triggered a series of earthquakes**

When? in **2005**

Where? in **Ethiopia**

10. ReadWorks recommends that you teach this vocabulary word to the whole class out loud using the four steps listed below.

**Vocabulary Word:** trigger

**Step 1:** Introduce the word

a. Teacher writes the word on the board and divides it into syllables: (trig · ger)

b. Teacher says: “This word is trigger. What is the word?” [All students reply together out loud: “trigger.”]

**Step 2:** Provide a child-friendly definition

a. Teacher says: “Trigger means to cause something to begin or to happen.”

b. Teacher says: “The passage states that the cracking of the African plate triggered, or caused, a volcanic eruption in Ethiopia. If you have asthma, dust can trigger, or cause, a coughing fit.”

c. Teacher says: “What is the word?” [All students reply together out loud: “trigger.”]

**Step 3:** Practice the word

Teacher provides examples and additional opportunities to repeat the word. Read the first sentence out loud to your students. Begin reading it again and when you come to the vocabulary word, prompt students to say the vocabulary word out loud. Then, finish reading the sentence out loud to your students.
10a. 1. The movement of the tectonic plates triggered an earthquake when they pulled the ground apart.

2. The stronger safety laws triggered a growth of the town’s economy as more people felt confident enough to build new businesses.

3. The other person’s mean words triggered Sue’s tears because they made her feel sad.

4. Knocking one book off of the shelf triggered a chain reaction that knocked down all of the books.

5. Being outside during the spring triggered her sneezing, because she was allergic to flowers.

Step 4: Check for student understanding

This step can be completed as a whole class activity or as an independent practice.

10b. Which image shows an event triggered by some change?

11. What might trigger the fire department to hurry to an apartment building?

Suggested answer: There could be a fire, smoke, an injury, or some type of emergency at the apartment building.

Suggested Additional Vocabulary: deafening, crevices, rift, spawning, dramatic