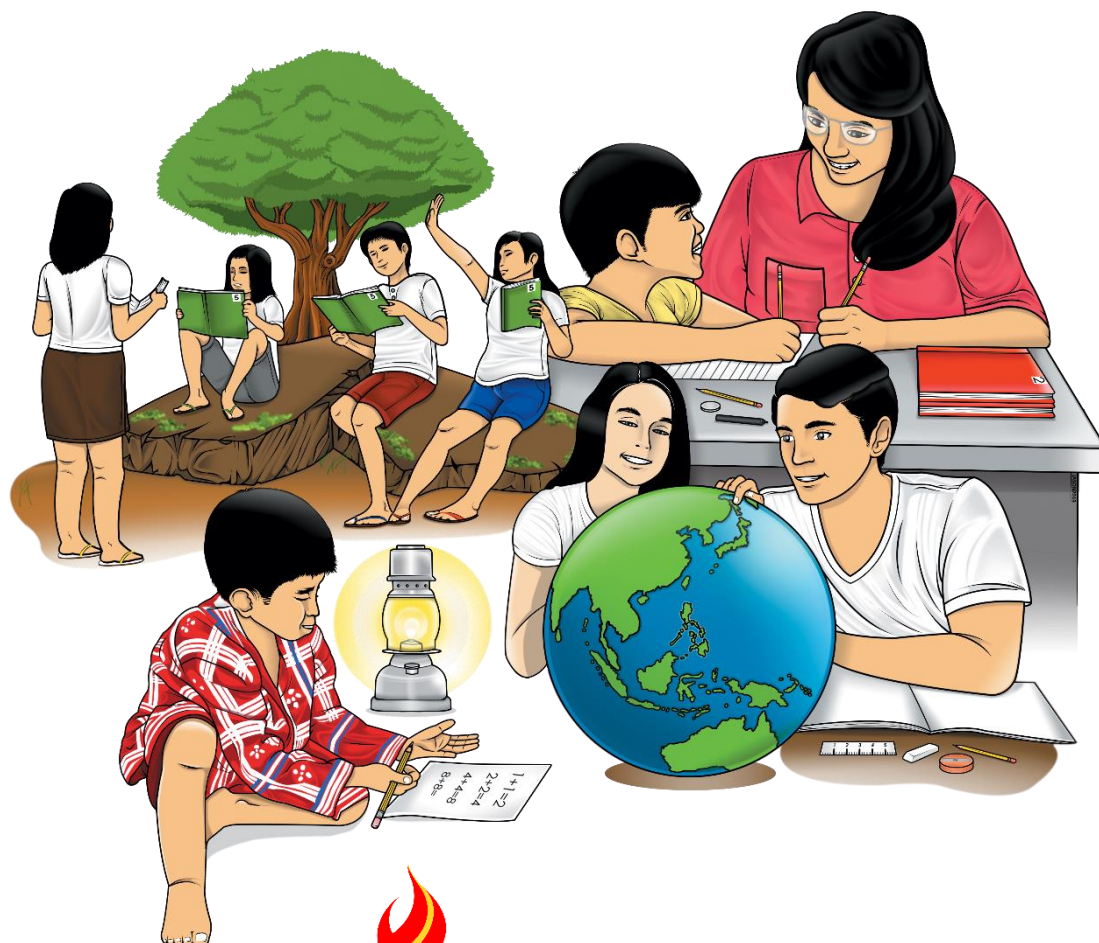


Science

Quarter 2 – Module 1: Earthquakes and Faults



Science – Grade 8
Alternative Delivery Mode
Quarter 2 – Module 1: Earthquakes and Faults
First Edition, 2019

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Science

Quarter 2 – Module 1:

Earthquakes and Faults

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

Lesson

1

How Do Movements Along Faults Generate Earthquakes

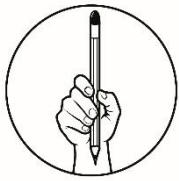


What I Need to Know

This module was designed and written with you in mind. It is here to help you master about earthquakes and faults. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

After going through this module, you are expected to:

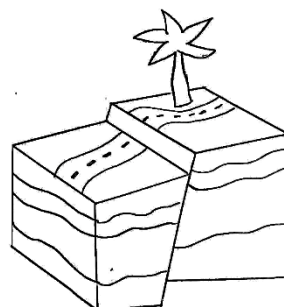
Explain how movements along faults generate earthquakes. S8ES-IIa-14



What I Know

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

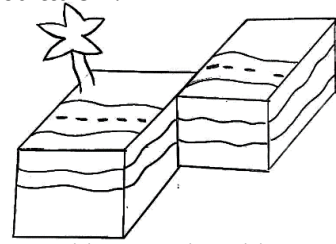
1. What is a crack or break in the lithosphere that can shift and cause an earthquake?
 - A. Epicenter
 - B. Eruption
 - C. Fault
 - D. Focus
2. What do you call a fault where two blocks of crust pull apart and create space?
 - A. Normal fault
 - B. Reverse fault
 - C. Strike-slip fault
 - D. Transform fault
3. How will you describe the movement of the walls in a strike-slip fault?
 - A. moving sideways
 - B. pulling the side apart
 - C. pushing the side together
 - D. pushing and pulling the sides
4. How does a reverse fault form?
 - A. The blocks slide past each other.
 - B. The blocks pull apart from each other.
 - C. The hanging wall moves upward relative to the footwall.
 - D. The hanging wall moves downward relative to the footwall.
5. What do you call the amount of ground displacement in an earthquake?
 - A. Crack
 - B. Dip
 - C. Fold
 - D. Slip
6. What type of fault is illustrated in the picture?
 - A. Normal
 - B. Reverse
 - C. Strike-slip
 - D. Transform



Illustrated by: Angelo Zaldy C. Francia

7. How will you describe the movement of fault in this illustration?

- A. moving sideways
- B. pulling the sides apart
- C. pushing the sides together
- D. moving in vertical direction



Illustrated by: Angelo Zaldy C. Francia

8. Which of the following geologic features is an example of a reverse fault?

- A. Anatolian fault
- B. San Andreas fault
- C. Himalayas mountain
- D. East African rift zone

9. What refers to a vibration of the Earth due to the rapid release of energy?

- A. Earthquake
- B. Fault
- C. Friction
- D. Stress

10. Earthquakes happen along a fault line. Which of the following is NOT true about fault?

- A. It can be found on land.
- B. It is where fault cyclone starts.
- C. It can be found under the sea.
- D. It is a break in the Earth's crust.

11. In which type of fault can earthquake occur?

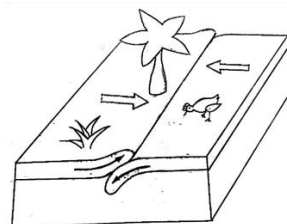
- A. Normal
- B. Reverse
- C. Transform
- D. All of these

12. Which type of fault would be least likely to occur along the valley?

- A. Normal
- B. Reverse
- C. Thrust
- D. Transform

13. What type of fault is illustrated in the picture?

- A. Normal
- B. Reverse
- C. Strike-slip
- D. Transform



Illustrated by: Angelo Zaldy C. Francia

14. The Alpine Fault cuts through New Zealand. At this location, two plates are sliding past each other slowly over time. What type of fault exists at Alpine Fault?
- A. Divergent
 - B. Normal
 - C. Reverse
 - D. Transform
15. What is the movement of a strike-slip fault?
- A. Backwards
 - B. Downward
 - C. Sideways
 - D. Upward



What's In

If you can recall in Science 7, it was mentioned that the Philippines is situated along the Pacific Ring of Fire. How does this affect us? People who live along the Ring of Fire must anticipate the occurrence of earthquakes and volcanic eruptions.

Can you locate the Philippines on the globe? There are two ways by which you can describe the location of a certain place on the globe. One is by determining its latitude and longitude. The other is by identifying the landmasses and bodies of water in the surrounding area.

In this module, you will understand how the movements of faults generate earthquakes. Strong earthquakes have caused countless deaths all over the world, even before people have started recording these events. These are unpredictable forces of nature. They happen in no specific time and place. Up to this day, seismologists are still figuring out how to detect seismic tremors accurately.

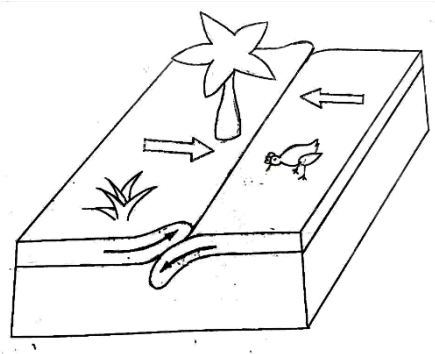
No one can stop earthquakes from happening. But there are things that people can do to avoid or decrease the loss of life and damage to property. The first step is to have a clear understanding of the occurrence of earthquakes.



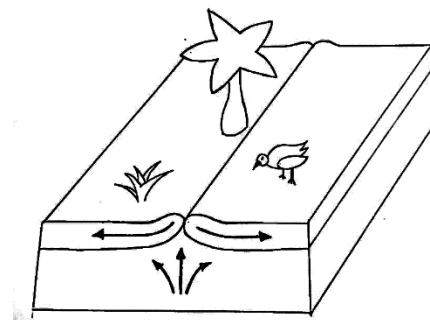
What's New

Activity 1. It's Your Fault

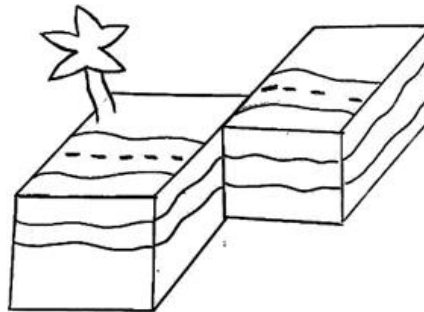
Directions: Identify each of the figures below whether it represents *strike-slip fault*, *normal fault*, or *reverse fault* based on the given descriptions below. Write your answers on a separate sheet of paper.



1. _____



2. _____



3. _____

Figure 1: Types of Fault

Illustrated by: Angelo Zaldy C. Francia

Strike-slip fault - rocks are sliding past each other horizontally.

Normal fault - two blocks of crust pull apart create space, stretching the crust into a valley. In a normal fault, the hanging wall drops down.

Reverse fault - also known as thrust fault, sliding one block of crust on top of another. This fault is commonly found in collisions zones.



What is It

An earthquake is brought about by an abrupt slip on a fault, much like what happens when you snap your fingers. Going before the snap, you push your fingers together and sideways. Since you are pushing them together, friction keeps them from moving to the side. At the point when you push sideways hard enough to overcome this friction, your fingers move unexpectedly, discharging energy in a form of sound waves that set the air vibrating and travel from your hand to your ear, where you hear the snap.

The same process goes on in an earthquake. Stress in the outer layer of the Earth pushes the sides of the fault together. The grinding over the surface of the fault holds the rocks together so they do not slip promptly when pushed sideways. In the long run, enough pressure develops, and the rocks slip suddenly releasing energy in waves that make a travel through the rocks to cause the shaking that we feel during an earthquake.

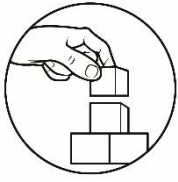
Earthquake is the shaking of the surface of the Earth resulting from the sudden release of energy in the Earth's lithosphere. The energy will eventually be released once the fault overcomes the friction movement.

Faults are thin zones of crushed blocks of rocks. These are often in centimeters to thousands of kilometers long. Their surfaces can be vertical or horizontal. These can expand into the earth and might possibly reach out up to the earth's surface. These are also breaking in the Earth's crust where rocks on either side of the crack have slid past each other. There are three kinds of faults: strike-slip, normal, and thrust (reverse) faults. Each type is the outcome of different forces pushing or pulling on the crust, causing rocks to slide up, down or past each other. The amount of ground displacement in an earthquake is called the slip.

Strike-slip faults are rocks sliding past one another on a horizontal plane, with little to no vertical movement. Examples to these are the San Andreas Fault and the Anatolian Fault.

Normal faults are two blocks of crust layer pulling apart, extending the crust into a valley thus, creating a space. A normal fault has the upper side or hanging wall appears to have moved downward with respect to the footwall. The Basin and Range Province in North America and the East African Rift Zone are two notable districts where normal fault is spreading apart Earth's crust.

Reverse faults are also known as thrust faults, the slide one block of crust on top of another. These faults are normally found in collision zones where tectonic plates push up mountain ranges, for example, the Himalayas and Rocky Mountains.



What's More

When rocks slip past each other in faulting, the upper or overlying block along the fault plane is known as the hanging wall, or headwall and the lower block is known as the footwall. To learn more about this, let us answer Activity 2.

Activity 2. Describe Me

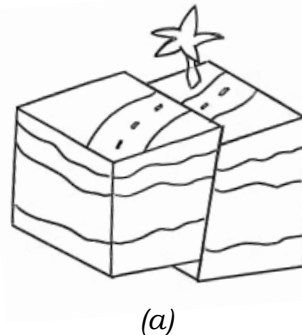
Directions: Choose the statements in column A that best describe each of the types of faults in Column B. Write the letter of your answer on a separate sheet of paper.

Column A

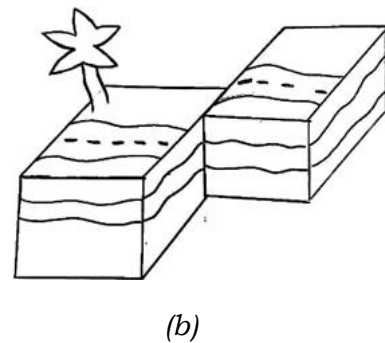
1. Faults are pulling the sides apart.
2. Faults are compressional, pushing the sides together.
3. Faults have walls that move sideways, not up or down.

Column B

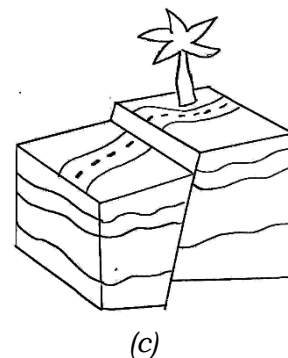
A.



B.



C.



All illustrations by: Angelo Zaldy C. Francia

Activity 3. Trace It

Directions: Study the figure and refer to the legend below. Answer the questions that follow. Write your answers on a separate sheet of paper.

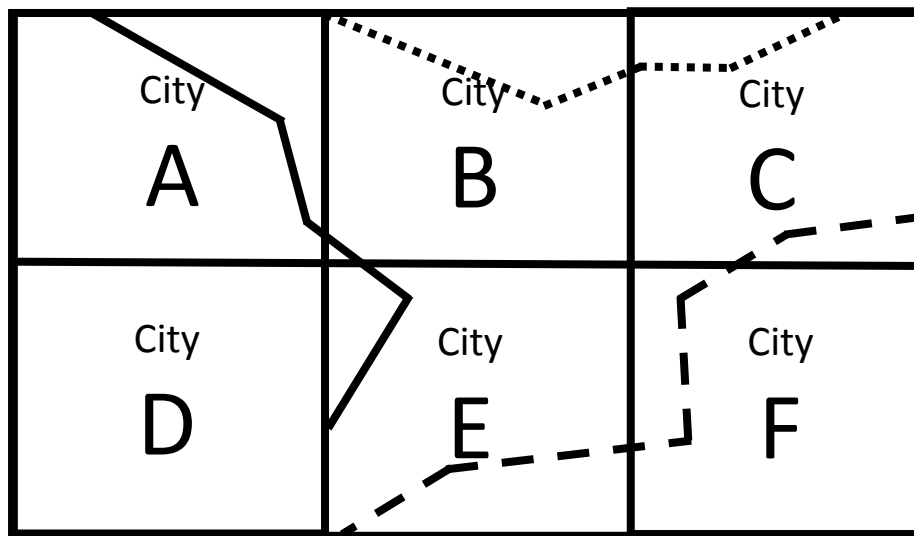





Figure 3: Fault Map

Illustrated by: Bryan S. Samonte

Legend:

	Normal fault
	Reverse fault
	Transform fault

- Which cities have valleys? _____
- Which cities have mountains? _____
- Which among the cities has the least probability of having an earthquake?

- How do movements along faults generate earthquakes?

Rubric

Advance (4 points)	Proficient (3 points)	Nearly Proficient (2 points)	Emerging (1 point)
Answer is well-organized and completely explained the details.	Answer is organized and some details are explained.	Answer is not organized and details are unclear.	Answer does not make sense and shows no details.

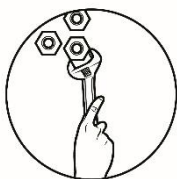


What I Have Learned

Directions: Fill in the blanks with the correct term to complete the statements.

Write your answers on a separate sheet of paper.

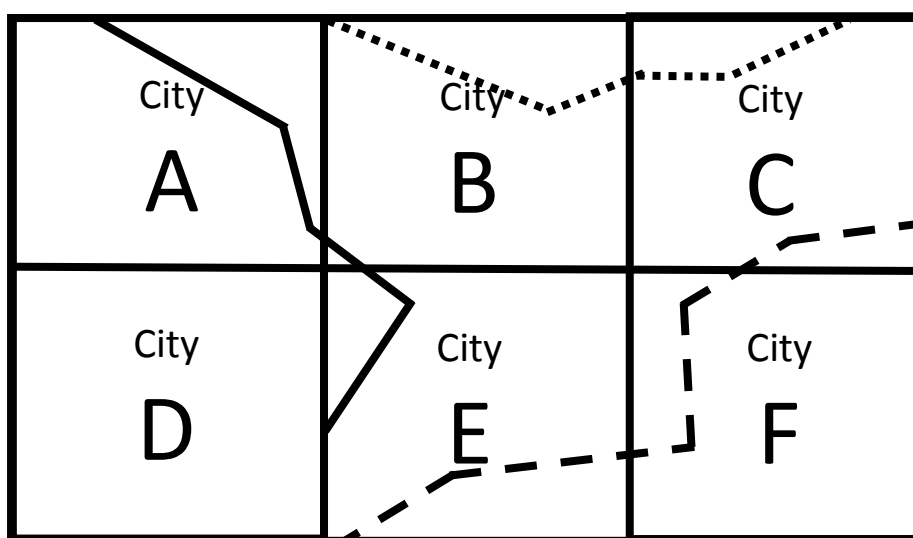
- _____ faults form when the hanging wall drops down.
- _____ faults form when the hanging wall moves up.
- _____ faults have walls that move sideways, not up or down.
- _____ is the shaking of the surface of the Earth resulting from the sudden release of energy in the lithosphere.
- _____ are thin zones of crushed blocks of rocks. These are often in centimeters to thousands of kilometers long.



What I Can Do

Activity 5. Where Will I Live?

Directions: Analyze Figure 3 below to help you decide on the safest city you want to reside. Write your answers on a separate sheet of paper.



Legend: ——— Normal fault
 - - - Reverse
 Transform

Figure 3: Fault Map

Illustrated by: Bryan S. Samonte

Questions:

1. Which cities are along the normal fault? _____
2. In which city is the safest place to build a house? _____
3. Why did you choose that city? _____

Rubric

Advance (4 points)	Proficient (3 points)	Nearly Proficient (2 points)	Emerging (1 point)
Answer is well-organized and completely explained the details.	Answer is organized and some details are explained.	Answer is not organized and details are unclear.	Answer does not make sense and shows no details.

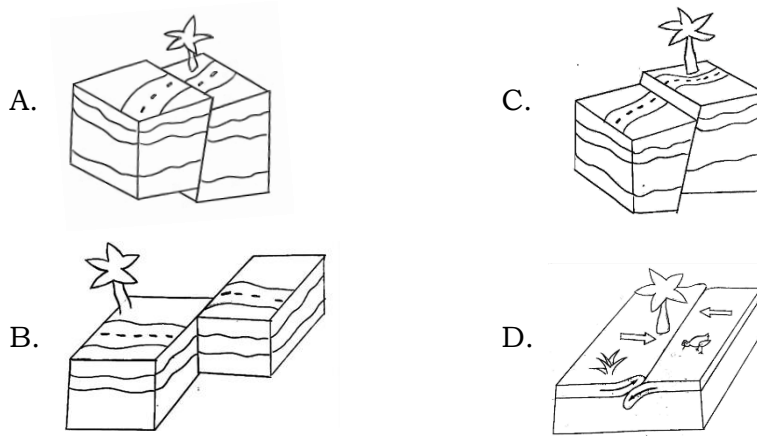


Assessment

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

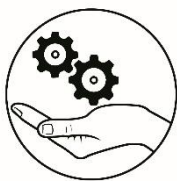
1. The stress along the outer layer of the Earth causes the build-up of energy. What prevent the rocks from releasing this energy?
 - A. bending of rocks
 - B. vibration of the rocks
 - C. friction between rocks
 - D. energy released by rocks
2. Why do earthquakes occur frequently in Japan, Indonesia, and Philippines?
 - A. They are surrounded by seas.
 - B. They are located near the equator.
 - C. They are considered archipelagic countries.
 - D. They are found within the Pacific Ring of Fire.
3. Which factor keeps the rocks from slipping past each other?
 - A. Arrangement
 - B. Bending
 - C. Depth
 - D. Roughness

4. What type of fault formed the Rocky Mountains?
 - A. Normal
 - B. Reverse
 - C. Strike-slip
 - D. Transform
5. What happens to the rocks in a fault slip?
 - A. They stick together.
 - B. They slide past each other.
 - C. There is no movement at all.
 - D. They suddenly slip and generate earthquake.
6. What is referred to as a fracture between two blocks of rocks?
 - A. Earthquake
 - B. Fault
 - C. Stress
 - D. Volcano
7. What type of fault is the San Andreas fault?
 - A. Normal
 - B. Reverse
 - C. Strike-slip
 - D. Thrust
8. Which type of fault is described by two blocks of crust pushing together?
 - A. Normal
 - B. Reverse
 - C. Strike-slip
 - D. Thrust
9. Which of the following figures illustrates normal fault?



All illustrations by: Angelo Zaldy C. Francia

10. How do faults produce earthquakes?
- A. Once friction is overcome, a fault slip produces earthquake.
 - B. Molten rock materials accumulate and go out along a fault.
 - C. Tectonic plates collide forming a volcano and causing earthquake.
 - D. Magma and lava cause the ground to move producing earthquake.
11. Which type of fault is described by a hanging wall slipping down the footwall?
- A. Normal
 - B. Reverse
 - C. Strike-slip
 - D. Transform
12. What type of fault is described by rocks moving sideways past each other?
- A. Converge
 - B. Normal
 - C. Reverse
 - D. Transform
13. What is referred to as the shaking of the Earth's surface resulting from the sudden release of energy in the lithosphere?
- A. Earthquake
 - B. Fault
 - C. Friction
 - D. Stress
14. What type of fault shows two plates moving apart from each other?
- A. Normal
 - B. Reverse
 - C. Strike-slip
 - D. Transform
15. How does a reverse fault form?
- A. The blocks slide past each other.
 - B. The blocks pull apart from each other.
 - C. The hanging wall moves upward relative to the footwall.
 - D. The hanging wall moves downward relative to the footwall.



Additional Activities

Activity 6. It's Not Your Fault

Directions: Complete the crossword puzzle below. Write your answer inside the box.

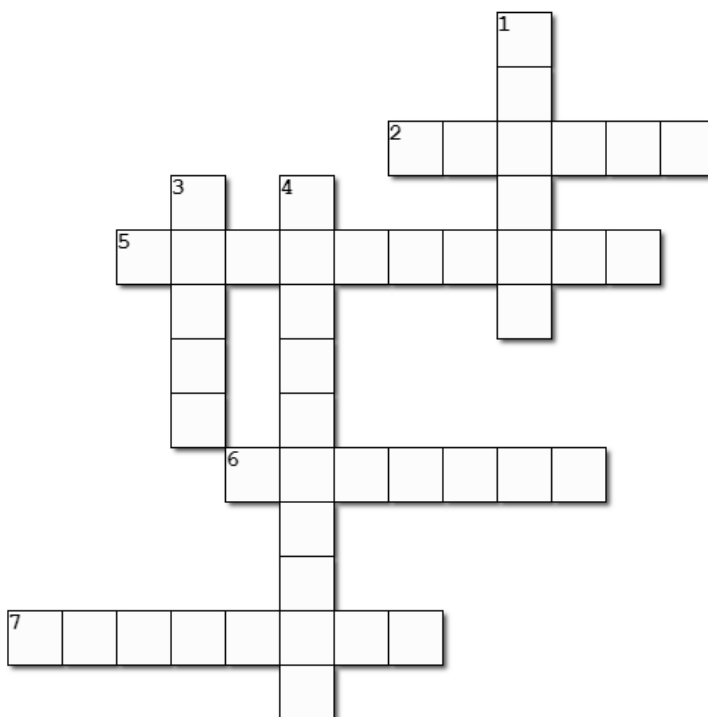


Figure 4: Crossword Puzzle

Across

2. Other term for reverse fault
5. A vibration of the Earth due to the rapid release of energy
6. A type of fault that slides one block of crust on top of another
7. A force that holds the rocks together, so they do not slip promptly when pushed sideways

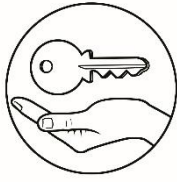
Down

1. Two blocks of crust layer pull apart
3. A crack or break in the lithosphere that can shift and create an earthquake.
4. Show rocks on either side of the fault plane moves horizontally in the nearly opposite directions.



Notes to the Teacher

Provide extra copies of this activity for students' use.



Answer Key

Assessment 1. C 6. B 11. A 2. D 7. A 12. D 3. D 8. B 13. A 4. B 9. C 14. A 5. D 10. A 15. C	What can I Do? Activity 5 1. Cities A, B, and E 2. City D 3. Because City D is far from any fault. There is no hazard of ground fissure which could damage the foundation of the house.	What I have Learned 1. a. normal b. reverse c. strike slip 2. Earthquake 3. Fault
What's More Activity 4 1. Active 2. Inactive 3. Inactive 4. Active	What's More Activity 3 1. Cities A, B, and E 2. Cities C, E, and F 3. City D 4. The friction across the surface of the fault holds the rocks together in order that they don't slip immediately when pushed sideways. Eventually enough stress builds up and thus sudden slip of the rocks, releasing energy in waves that travel through the rock to cause the shaking that we feel during earthquake.	
Additional Activity 1. normal 2. thrust 3. fault 4. strike slip 5. earthquake 6. reverse 7. friction	What's More Activity 2 1. B 2. C 3. A	What's New Activity 1 1. Reverse Fault 2. Normal Fault 3. Strike-slip Fault
		What I know 1. C 6. A 11. D 2. B 7. A 12. B 3. A 8. C 13. B 4. C 9. A 14. D 5. D 10. B 15. C

Reference

Department of Education, Science 8 Learner's Module, First Edition 2013, Page 155.

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