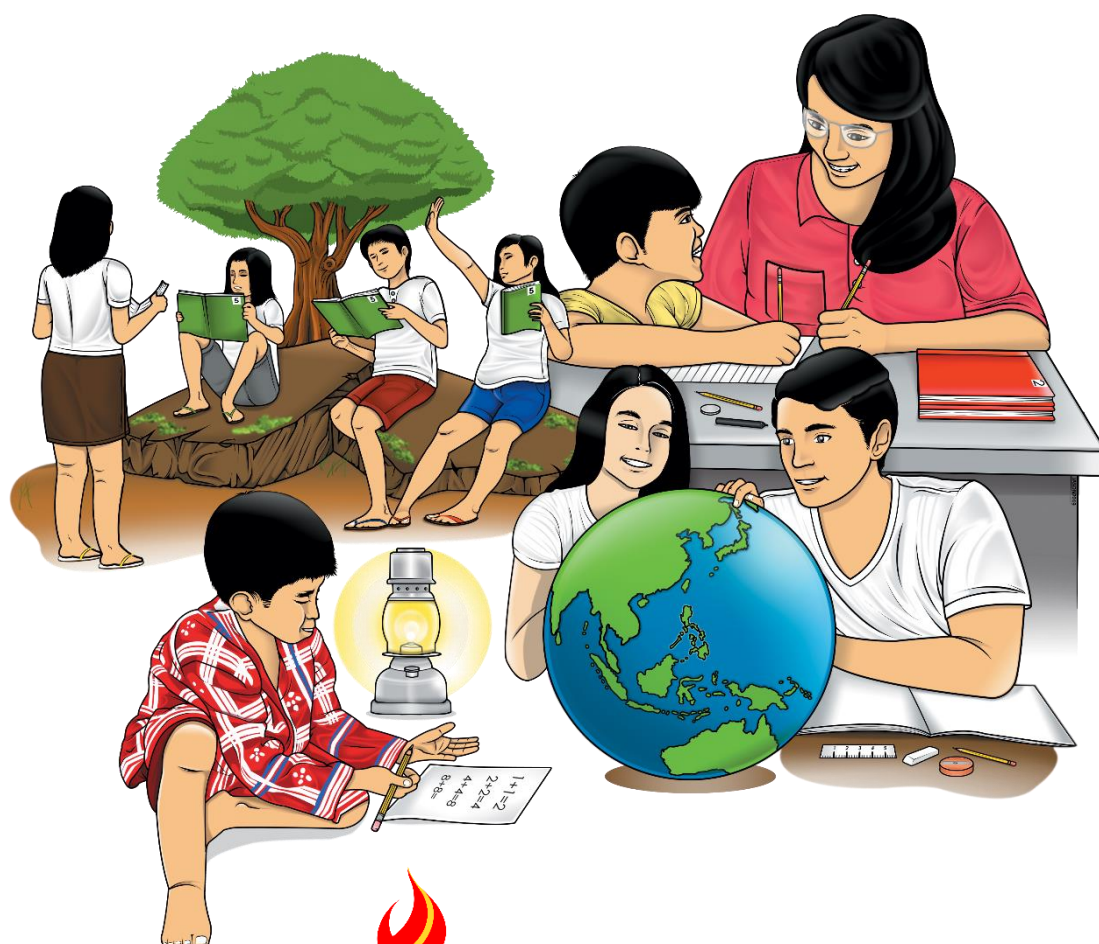


# Earth Science for STEM

## Quarter 2 – Module 8: Movement of Plates



**Earth Science for STEM**  
**Alternative Delivery Mode**  
**Quarter 2 – Module 8: Movement of Plates**  
**First Edition, 2021**

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# **Earth Science for STEM**

## **Quarter 2 – Module 8:**

### **Movement of Plates**

# **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.

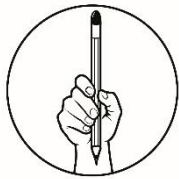


## ***What I Need to Know***

This lesson pertains to the learning competency that would engage the students to know how the movement of the earth's plates leads to the formation of folds, faults, trenches, volcanoes, rift valleys and mountain ranges. The activities would enable the students to differentiate the patterns of the movements of the plates and the land formations that resulted in such movement. This would also help them realize the effect of the movements of the plates to both the biotic and abiotic components of the Earth.

After going through this module, you are expected to:

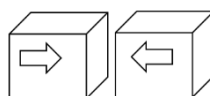
1. describe the patterns of the movements of the plates;
2. explain how plate movements resulted in the formation of folds, faults, trenches, volcanoes, rift valleys and mountain ranges; and
3. identify the plate boundary in which the land formations had existed.



## What I Know

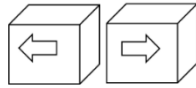
Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

- Which of the following statements is **INCORRECT** about plate movements?
  - The movement of plates is not a source of earthquakes.
  - Tectonic Plates are responsible for shaping the earth's crust.
  - Every continent formed rises above the sea due to plate tectonics.
  - The movement of plates elicit the formation of landforms such as rifts, valleys, mountains and trenches.
- Earth's surface is dramatically reshaping itself in an endless, slow-motion movement. Which of the following choices will best describe the thought of the given sentence?
  - It connotes correct information regarding the deformation of landforms.
  - Forming components
  - Reconstructing
  - It connotes correct information on how the surface of the earth may change over time.
- How do magma intrusions occur?
  - Through drifting of continents
  - When two continental plates collide
  - When two oceanic plates move apart
  - When sea floor spreads
- What will occur when there is movement in narrow zones along plate boundaries?
  - Magma intrusion
  - Formation of crust
  - Solidification of liquid materials
  - Earthquake in the location and nearby areas
- Why is the rim of the Pacific Ocean called as the Ring of Fire?
  - It is composed of fault-block mountains.
  - It is comprised of folded mountains.
  - It is an area where normal fault mountains are situated.
  - It is composed of several volcanoes both in land and water.
- If the figure is a movement of two continental plates, what land formation can be formed?



- |             |           |
|-------------|-----------|
| A. Mountain | C. Trench |
| B. Ridge    | D. Valley |

7. What plate boundary can be formed based on the illustration below?



- A. Convergent plate boundary
  - B. Divergent plate boundary
  - C. Subduction plate boundary
  - D. Transform plate boundary
8. What type of plate movement is shown in the illustration in number seven?
- A. Collision
  - B. Intrusion
  - C. Spreading
  - D. Transform
9. Convergent plate boundary may exist between continental and oceanic plates. How do plates move in these locations forming land masses with distinct features?
- A. The plates will collide.
  - B. The plates will make intrusions.
  - C. The plates move away from each other and spread out.
  - D. The plates will slide past each other.
10. How Mid-oceanic ridges were formed at divergent plate boundary?
- A. As the plates collide, molten rock moves to the seafloor, producing volcanic eruptions of sedimentary materials.
  - B. As the plates move away from each other, molten rock moves to the seafloor, producing volcanic eruptions of basalt.
  - C. As the plates subduct, molten rock moves to the seafloor, producing volcanic eruptions of Sedimentary materials.
  - D. As the plates slide past each other, molten rock moves to the seafloor, producing volcanic eruptions of basalt.
11. The Great Rift Valley in Africa and the Gulf of Aden all formed because of divergent plate motion. How did these landforms were created from the movement of divergent plates in these locations?
- A. One plate overlaps the other.
  - B. One plate subsides the other.
  - C. Two plates move away from each other.
  - D. Two plates move toward each other.
12. West Valley Fault may move and can cause high intensity and magnitude earthquake in Metro Manila and nearby provinces. Which of the following caused its formation?
- A. Two plates moving above each other.
  - B. Two plates moving away from each other.
  - C. Two plates moving toward each other.
  - D. Two plates that are moving past each other.
13. How do you think Mariana Trench was formed?
- A. It is a result of the breakage of a part of Pacific plate.
  - B. It is formed when the Pacific plate collide with Philippine plate.
  - C. It is formed when the Pacific plate subducts the Philippine plate
  - D. It is an outcome of the rising of magma in the shoreline.

- # Lesson 8

## Movement of Plates

Analyze the given figures below and answer the questions comprehensively. Write your answers on a separate sheet of paper.

1. In what continent do you live in?
2. If the earth is composed of one big continent at around 225 billion years ago, what might have caused the continents to move to its present position?





### ***Notes to the Teacher***

This module is intended for STEM students. It envisioned to facilitate learning even in alternative delivery mode. In case that some parts of the module are not clear enough, kindly ask for the teacher's assistance.



### ***What's New***

Determine the famous land formations which can be found on Earth by re-arranging the scrambled words. Write your answer in a separate sheet of paper.

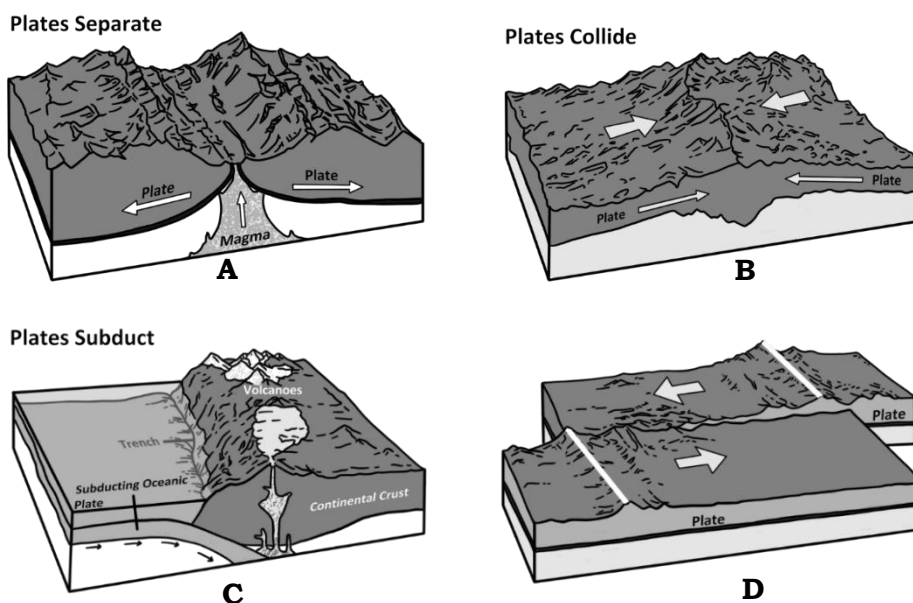
- |                               |  |
|-------------------------------|--|
| <b>1. DMI-ANOCE GERID</b>     | It is known as the Earth's longest chain of mountains.   |
| <b>2. MUTON ERSTVEE</b>       | It is the highest mountain of the world.   |
| <b>3. UNGKANHENGACJ</b>       | It is considered as the third highest mountain of the world which is a part of the Himalayan mountain range. |
| <b>4. MONTU UDANLG-DANGUL</b> | It is the second highest mountain the Philippines.   |
| <b>5. UNMOT PALUG</b>         | It is considered as Luzon's highest peak   |
| <b>6. YAHAMSIAL</b>           | It is considered as the highest mountain range in the world.   |
| <b>7. RIMAANA RCENHT</b>      | It is considered to be the deepest part of the Earth's surface.  |
| <b>8. ILPIPHINPE TNEHCR</b>   | This trench was formed due to a collision between the Eurasian plate and the smaller Philippine plate.       |
| <b>9. ALTA LOVOCAN</b>        | It is known as the world's smallest volcano.   |
| <b>10. UNMAA OLA</b>          | It is a massive shield volcano in Hawaii constructed by countless lava flows.                                |



## What is It

The plates make up Earth's outermost shell have its own characteristics. This can be substantiated from the feature of the deepest ocean trench to the highest mountain and mountain ranges. A tectonic plate is a massive, irregularly shaped slab of solid rock. It can be divided into continental and oceanic plate. Thus, plate tectonics explain the features and movement of Earth's surface in the present and the past.

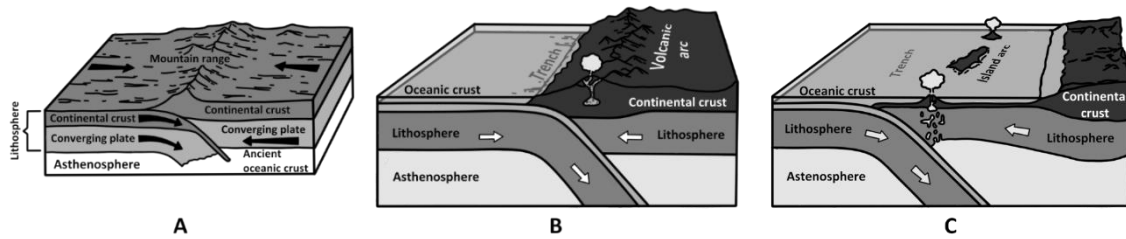
The tectonic movement of the Earth's plates has rose in the folding and faulting of the crust. This is due to the Earth's plates transversing, diverging or converging against one another. This causes the crust of the Earth to clasp and be stressed, which can generate huge amounts of pressure that build up as time progresses. Most geologic motion stems from the interaction where the plates meet or divide. Each tectonic plate can move independently and freely floating. The plates move at a rate of one to two inches per year. This is due to the convection currents in the mantle of the Earth.



**Figure 2.** Movement of plates.

(A) Away from each other      (B) Collide      (C) Subduct      (D) Slide past each other

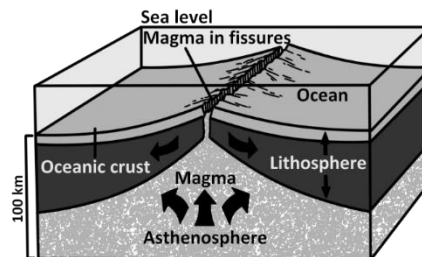
The motion of plates can be described in four patterns. This includes collision wherein two continental plates are moved toward each other. Subduction when one plate subsides beneath the other plate. Another movement is spreading which occurs when two plates are move away from each other. Transform faulting occur when two plates slide past each other. These movements of the plates create three types of tectonic boundaries which also explain the formation of folds, faults, trenches, volcanoes, rift valleys, and mountain ranges.



**Figure 3.** Land formations due to the movement of plates  
 (A) Mountain Range      (B) Trench and Volcanic Arc      (C) Trench Island Arc

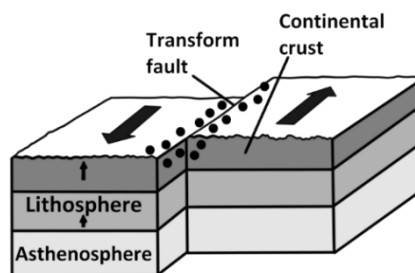
Convergent plate boundary occurs when two plates collide. Subduction zones occur when one or both of the tectonic plates are composed of oceanic crust. The denser plate is subducted underneath the less dense plate.

The plate being forced under is eventually melted and destroyed. When oceanic crust meets ocean crust Island arcs and oceanic trenches occur. Areas of active seafloor spreading can also occur behind the island arc known as back-arc basins. These are often related with submarine volcanoes. When oceanic crust meets continental crust, the denser oceanic plate is subducted, often forming a mountain range on the continent. The Andes is an example of this type of collision. When a continental crust collides with another continental crust, both continental crusts are too light to subduct. This creates large mountain ranges. The most spectacular example of this is the Himalayas.



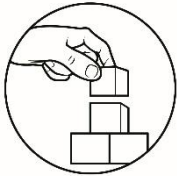
**Figure 4.** Movement of Divergent Plate Boundary

Divergent plate boundaries occur when two plates move away from each other. The space created will be filled with new material from molten magma that forms below the surface of the earth. Divergent boundaries can form within continents but may eventually open and become ocean basins. Within continents, this plate boundary initially produces rifts or rift valleys. The most active divergent plate boundaries are between oceanic plates which is called mid-oceanic ridges. This is also known as underwater mountain range.



**Figure 5.** Transform Fault

Transform plate boundaries are where plates slide past each other. The relative motion is horizontal. It can occur underwater or on land. In the process, the crust is neither destroyed nor created. Due to this friction, the plates cannot simply glide past each other. As a result, stress builds up in both plates. When it surpasses the threshold of the rocks, energy is released which can cause earthquakes.



## What's More

Analyze the given illustration. In a sheet of paper, write the type of boundary, movement of plates and land formation that can be formed.

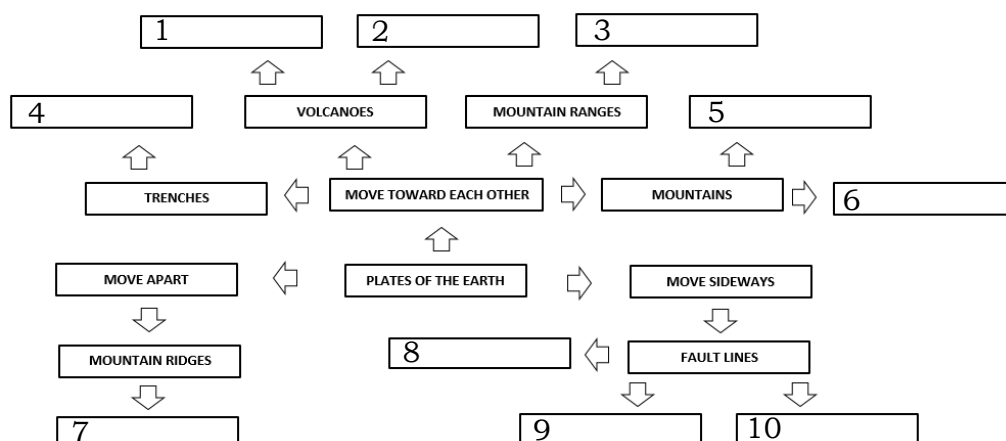
Illustration	Movement	Type of Boundary	Land Formation

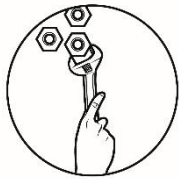


## What I Have Learned

Complete the thought of the given concept map. Give examples for each landform that can only be found in the Philippines.

### Complete Me: Plate Movements and Land Formations





## ***What I Can Do***

Read and analyze the situation. Answer the questions comprehensively.

Have you heard of the most feared ***“The Big One”***? This will be the worst-case scenario of a 7.2-magnitude earthquake which can occur due to the movement of the West Valley Fault. This 100-kilometer fault runs through six cities in Metro Manila and some nearby provinces.

How do this movement of the fault may affect Philippines geologically? How would this affect the lives of people?

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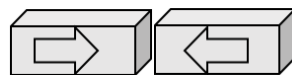


## ***Assessment***

Multiple Choice. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. How will you describe the plate movement that resulted in the formation of Cordillera Central Mountain Ranges?
  - A. The plates move in the same direction.
  - B. The plates collide.
  - C. The plates subduct.
  - D. The plates move away from each other
  
2. Hawaiian Islands are born from rising volcanic hotspot from the sea floor of the Pacific Ocean. Which set off arrows best represents the plate movement that resulted in the formation of these great islands?
  - A.  
  - B.  
  - C.  
  - D.  

3. What type of plate boundary resulted to the formation of new material from molten magma?
  - A. Convergent plate boundary
  - B. Divergent plate boundary
  - C. Strike-slip fault boundary
  - D. Transform plate boundary
4. Which of the following statements about transform plate boundary and transform movement is **INCORRECT**?
  - A. The relative motion of plates is horizontal.
  - B. It can occur both underwater and on land.
  - C. In the process, the crust is destroyed nor created.
  - D. Transform plate boundaries are where plates slide past each other.
5. How does Mariana Trench was formed?
  - A. It is a result of the breakage of a part of Pacific plate.
  - B. It is formed when the Pacific plate collide with Philippine plate.
  - C. It is formed when the Pacific plate subducts the Philippine plate.
  - D. It is an outcome of the rising of magma in the shoreline.
6. How do the oceanic and continental plate along the western coast of South America resulted in the formation of Atacama Trench?
  - A. Due to the heating of the plates of the Earth
  - B. Movement of convection currents flowing in the mantle
  - C. Due to the stress from continental plate sliding past the oceanic plate
  - D. Due subduction of the oceanic plate under the continental plate
7. Why do plates of the Earth is slowly moving in an unnoticeable manner?
  - A. Because of the energy from the Sun
  - B. Due to movement of faults in Mountain Ranges
  - C. Light form the natural satellite
  - D. Due to convection currents in the mantle
8. Based on the given illustration below about the movement of plates, which would likely **NOT** be formed?

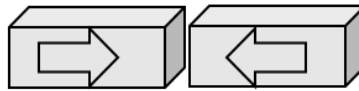


- A. Caraballo Mountains
  - B. Marikina Fault System
  - C. Mount Kanlaon
  - D. Sierra Madre
9. Movement of plates may result to the formation of faults. Which set of arrows represent this movement?
  - A.
  - B.
  - C.
  - D.

10. What will be formed when there is a build-up of rocks in a convergent plate boundary composed of two continental crusts?
- A. Faults
  - B. Mountain
  - C. Trench
  - D. Valleys

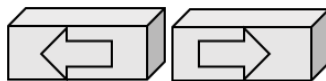
11. Lubang fault line is underwater and estimated to start off the tip of the Calatagan Peninsula and runs across Balayan and Batangas Bays. How does this fault line was formed?
- A. Two plates moving above each other
  - B. Two plates moving away from each other
  - C. Two plates moving toward each other
  - D. Two plates that are moving past each other



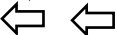
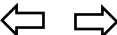
12. What plate boundary will exist in the given illustration?



- A. Convergent plate boundary
  - B. Divergent plate boundary
  - C. Subduction plate boundary
  - D. Transform plate boundary
13. How does the movement of plates affect the surface of the Earth?
- A. When the plates move slide past each other mountain ranges were formed.
  - B. It may result to the formation and deformation of landforms.
  - C. It may create earthquakes along fault lines far from the origin of movement.
  - D. Rising and falling movement of plates may result to the formation of mountains and volcanoes.

14. What plate boundary will exist in the given illustration?



- A. Convergent plate boundary
  - B. Divergent plate boundary
  - C. Subduction plate boundary
  - D. Transform plate boundary
15. How did the plates move which resulted in the formation of mount Pulag?
- A. 
  - B. 
  - C. 
  - D. 



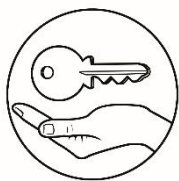
## Additional Activities

Upon knowing that the plates of the earth are continuously but slowly moving, what you do you think is the possible position of the different continents 500 years from now? Draw your answer inside the box below. Refer to the rubrics below as your guide in illustrating your ideas.

**Table 2. Rubrics**

Category	5	4	3	2	1
Content	The illustration covers topic in-depth with details and examples. Subject knowledge is excellent.	The illustration includes vivid and essential knowledge about the topic. Subject knowledge appears to be good.	The illustration includes some essential information about the topic but there are 1 to 2 factual errors.	The illustration includes few essential information about the topic but there are 3 to 5 factual errors.	Content of the illustration is minimal and there are several factual errors.
Originality	All of the graphics used on the illustration reflect an exceptional degree of student creativity.	Several of the graphics used on the illustration reflect an exceptional degree of student creativity.	One or two of the graphics used on the illustration reflect students' creativity.	The illustration is made by the student but is based on the designs or ideas of others.	The work is not authentic and original.
Relevance to the topic	All graphics are related to the topic and content of the lesson that make the drawing easier to understand.	Some graphics are related to the topic and content of the lesson that make the drawing easier to understand.	Few graphics are related to the topic and content of the lesson that make the drawing easier to understand.	The graphics used were somehow relevant to the lesson but do not make the drawing easy to understand.	The graphics used were irrelevant to the lesson.
Total Score:					





## Answer Key

<p><b>Assessment</b></p> <p>1. B 2. D 3. B 4. C 5. C 6. D 7. D 8. B 9. D 10. B 11. D 12. A 13. B 14. B 15. B</p>	<p><b>What's More</b></p> <p>1. Convergent Plate Boundary 2. Divergent Plate Boundary 3. Continental – Boundary 4. Collision 5. Subduction 6. Moving apart 7. Slide past each other 8. ← 9. → 10. ↑ 11. Mountain ranges 12. Hydrothermal Vents 13. Himalayas 14. Pacific Basins 15. San Andreas Fault</p>	<p><b>What's New</b></p> <p>1. MID-OCEAN RIDGE 2. MOUNT EVEREST 3. KANGCHENJUNGA 4. MOUNT DULANG- DULANG 5. MOUNT PULAG 6. HIMALAYAS 7. MARIANA TRENCH 8. PHILIPPINE TRENCH 9. TAAL VOLCANO 10. MAUNA LOA</p>
<p><b>What I Know</b></p> <p>1. A 2. D 3. C 4. D 5. D 6. A 7. B 8. C 9. A 10. B 11. C 12. D 13. A 14. A 15. B</p>		

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