Dear Parents and students,

The following are your assignments for the next three weeks for 6th Grade Science. A total of six written assignments will be Due April 14. Each student received a Science Textbook at the beginning of the year all reading pages will come from that book.

- **Week of March 23-March 27** – Chapter 8, Lesson 3 -The Theory of Plate Tectonics
  - Monday - Read pages 318-323
  - Tuesday – Answer worksheet titled **Chapter 8.3 -The Theory of Plate Tectonics**
  - Wednesday- Re-read pages 318-323 for reinforcement and understanding
  - Thursday – Go over your answers for **Chapter 8.3 -The Theory of Plate Tectonics Worksheet**
  - Friday – Complete **Chapter 8.3 -The Theory of Plate Tectonics Lesson Quiz** (This will be taken as a test grade.)

- **Week of March 30-April 3** – Chapter 8, Lesson 5 – Earthquakes and Plate Tectonics
  - Monday – Read pages 332-337
  - Tuesday- Answer worksheet titled **Chapter 8.5 Earthquakes and Plate Tectonics**
  - Wednesday- Re-read pages 332-337 for reinforcement and understanding
  - Thursday – Go over your answers for **Chapter 8.5 Earthquakes and Plate Tectonics Worksheet**
  - Friday – Complete **Chapter 8.5 Earthquakes and Plate Tectonics Lesson Quiz** (This will be taken as a test grade.)

- **Week of April 6- April 10** – Chapter 8, Lesson 6 – Volcanoes and Plate Tectonics
  - Monday – Read pages 338-341
  - Tuesday – Answer worksheet titled **Chapter 8.6 Volcanoes and Plate Tectonics**
  - Wednesday- Re-read pages 338-341 for reinforcement and understanding
  - Thursday – Go over your answers for **Chapter 8.6 Volcanoes and Plate Tectonics Worksheet**
  - Friday- Complete **Chapter 8.6 Volcanoes and Plate Tectonics Lesson Quiz** (This will be taken as a test grade.)

Thank you for all that you do and for your support,

6th Grade Science Department
Chapter 8.3 – The Theory of Plate Tectonics (Pgs. 318-323)

Understanding Main Ideas

Label each diagram by writing the type of plate boundary it shows. (Pg319)

![Diagram 1]
![Diagram 2]
![Diagram 3]

1. _______________  
2. _______________  
3. _______________

4. Identify the six major plates. (pg.318)

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Building Vocabulary

Fill in the blank to complete each statement.

5. At a(n) _______________________ plates come together. (Pg319)

6. Breaks in Earth’s crust where rocks have slipped past each other are called _____________________. (Pg321)

7. A(n) ______________________ is a deep valley on land that forms along a divergent boundary. (Pg321)

8. The geological theory that states that pieces of Earth’s crust are in constant, slow motion is called _______________________. (Pg319)

9. At a(n) __________________________ plates slip past each other. (Pg319)

10. Plates move apart along a(n) _______________________________. (Pg319)
Chapter 8.3 – The Theory of Plate Tectonics - Lesson Quiz

If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

1. _________________ Earth’s plates meet at boundaries. (pg319)
2. _________________ Breaks in the crust called faults form where plates meet. (Pg321)
3. _________________ Plates slide past each other at convergent boundaries. (Pg319)
4. _________________ A(n) rift valley forms where plates diverge on land. (Pg321)
5. _________________ Ocean currents drive Earth’s plates. (pg319)
6. _________________ Most transform boundaries where plates move apart occur along the mid-ocean ridges. (pg321)

Circle the letter of the correct answer on the line to the left.

7. Which theory describes the motion of and force driving Earth’s plates? (pg319)
   A. First Law of Motion
   B. Third Law of Motion
   C. Continental drift
   D. Plate Tectonics

8. What is the motion of Earth’s plates like? (Pg319)
   A. Fast and in stages
   B. Slow and in stages
   C. Fast and constant
   D. Slow and constant

9. The San Andreas Fault is an example of which kind of boundary? (Pg323)
   A. Transform
   B. Divergent
   C. Oceanic
   D. Convergent

10. Which feature forms at convergent boundaries? (Pg322)
    A. Mountain ranges
    B. Trench
    C. Rift Valley
    D. Mid-ocean Ridge
Chapter 8.5 – Earthquakes and Plate Tectonics (Pg332-337)

Understanding Main Ideas

Answer the following questions.

1. How does a seismogram show earthquake waves? (Pg333)

________________________________________________________________
________________________________________________________________
________________________________________________________________

2. What data do geologists use to see where earthquakes are most common? (Pg335)

________________________________________________________________
________________________________________________________________
________________________________________________________________

3. Why do earthquakes occur more often in some places than in others? (Pg335)

________________________________________________________________
________________________________________________________________
________________________________________________________________

4. What is the Ring of Fire? (Pg336)

________________________________________________________________
________________________________________________________________
________________________________________________________________

5. Explain why earthquakes do not happen everywhere on Earth. (Pg336)

________________________________________________________________
________________________________________________________________
________________________________________________________________
Chapter 8.5 – Earthquakes and Plate Tectonics - Lesson Quiz

If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

1. In a seismograph, seismic waves cause the pen to vibrate, which produces a pattern of zig-zag lines. (Pg333)

2. On a seismogram, higher lines drawn in the paper indicate weaker seismic waves. (Pg334)

3. The first waves shown on a seismogram are the P waves. (Pg334)

4. The highest risk of earthquakes in the United States is along the west coast. (Pg335)

5. The Ring of Fire is an area of seismic activity around the Atlantic Ocean. (Pg336)

6. Places far from plate boundaries are less likely to experience earthquakes. (Pg335)

Fill in the blank to complete each statement.

7. Earthquakes occur most often along boundaries. (Pg335)

8. On a seismogram, smaller waves that occur after the earthquake indicate a(n) _________________. (Pg334 CHALLENGE)

9. The weight and pen of a seismograph resist ________________ during an earthquake. (Pg333)

10. Geologists cannot yet predict ________________ and where an earthquake will occur. (Pg335)
Chapter 8.6 – Volcanoes and Plate Tectonics (Pgs. 338-341)

Understanding Main Ideas

**Answer the following questions.**

1. How do volcanoes change Earth’s surface? (Pg339)

   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________

2. Why do so many of Earth’s volcanoes occur along plate boundaries? (Pg339)

   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________

**Building Vocabulary**

**Answer the following questions.**

3. What is the difference between magma and lava? (Pg338)

   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________

4. Define each of these terms in your own words.
   a. Volcano (Pg338) ____________________________________________
      ___________________________________________________________
   b. Ring of Fire (Pg339) _________________________________________
      ___________________________________________________________
   c. Island arc (Pg340) __________________________________________
      ___________________________________________________________
   d. Hot spot (Pg341) ____________________________________________
      ___________________________________________________________
Chapter 8.6 – Volcanoes and Plate Tectonics - Lesson Quiz

If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

1. _________________ Some volcanoes form along the mid-ocean ridges, where two plates move together. (Pg340)

2. _________________ Not all volcanoes form along plate boundaries. (Pg341)

3. _________________ Magma is molten material from the mantle that has reached Earth’s surface. (Pg338)

4. _________________ Yellowstone National Park marks the location of a huge island arc. (Pg340)

Fill in the blank to complete the statement.

5. An area where material from deep within Earth’s mantle rises through the crust and melts to form magma is called a(n) _________________. (Pg341)

6. _________________ is an underground molten mixture of rock-forming substances, gases, and water from the mantle. (Pg338)

7. Volcanic belts form along the boundaries of Earth’s _________________. (Pg339)

8. Japan and New Zealand are examples of strings of volcanic islands known as _________________. (Pg340)

9. A volcano is a(n) _________________ that forms in Earth’s crust when molten material reaches the surface. (Pg338)

10. The Ring of Fire is a major belt of _________________. (Pg339)
**The Theory of Plate Tectonics**

**What Is the Theory of Plate Tectonics?**

Earth's lithosphere is like the eggshell of a dropped hard-boiled egg. It is broken into uneven pieces called plates that are separated by cracks. Earth has six major tectonic plates: the Eurasian, the African, the Indo-Australian, the Pacific, the North American, and the South American plates.

**Slip-Sliding Away**

In 30 million years, this airplane might take one hour longer to fly from New York to London than it takes today. That's because these two cities are moving slowly apart as they ride on pieces of Earth's crust.

**Recall the name of your state capital. Then, answer the question below.**

**Will your state capital be farther from London in 30 million years? Explain.**

**Fun Fact**

This trip seems to get a little longer each time!
Earth’s plates meet at boundaries, as shown in Figure 1. Along each boundary, plates move in one of three ways. Plates move apart, or diverge, at a **divergent boundary** (dy vur junt). Plates come together, or converge, at a **convergent boundary** (kun vur junt). Plates slip past each other in opposite directions along a **transform boundary**.

In the mid-1960s, geologists combined what they knew about sea-floor spreading, Earth’s plates, and plate motions into a single theory called **plate tectonics**. The theory of plate tectonics states that Earth’s plates are in slow, constant motion, driven by convection currents in the mantle. Plate tectonics explains the formation, movement, and subduction of Earth’s plates.

**Mantle Convection and Plate Motions**

What force is great enough to move the continents? Earth’s plates move because they are the top part of the large convection currents in Earth’s mantle. During subduction, gravity pulls denser plate edges downward into the mantle. The rest of the plate also moves. The motion of the plates is like the motion of liquid in a pot of soup heating on a stove.

**Figure 1**

**Earth’s Plates**

Earth’s six major plates are the Eurasian plate, the African plate, the Indo-Australian plate, the Pacific plate, the North American plate, and the South American plate.

**Interpret Maps** Draw arrows at all the boundaries of the Pacific plate, showing the directions in which plates move. (Hint: First, study the map key.)
Plate Motions Over Time

Scientists use satellites to measure plate motion precisely. The plates move very slowly—from about 1 to 12 centimeters per year. The North American and Eurasian plates move apart at a rate of 2.5 centimeters per year. That’s about as fast as your fingernails grow. Because the plates have been moving for tens to hundreds of millions of years, they have moved great distances.

Over time, the movement of Earth’s plates has greatly changed the location of the continents and the size and shape of the oceans. As plates move, they change Earth’s surface, producing earthquakes, volcanoes, mountain ranges, and deep-ocean trenches. Geologists have evidence that over the last billion years, supercontinents have formed and split apart several times. The most recent supercontinent, called Pangaea (pan jee uh), formed when Earth’s landmasses moved together about 350 to 250 million years ago. Then, about 200 million years ago, Pangaea began to break apart, as shown in Figure 2.

Figure 2
Plate Motion

Since the breakup of Pangaea, the continents have taken about 200 million years to move to their present locations.

Use the maps to answer the questions.

1. **Interpret Maps** List three examples of continents that have drifted apart from each other.

   [Blank lines for student response]

2. **Challenge** Which two landmasses that were not connected to each other in Pangaea have collided on Earth today?

   [Blank lines for student response]
Plate Boundaries  Recall that the edges of Earth’s plates meet at plate boundaries. **Fauls**—breaks in Earth’s crust where rocks have slipped past each other—form along these boundaries. Convection currents in Earth’s mantle cause the plates to move. As the plates move, they collide, pull apart, or grind past each other. These movements produce great changes in Earth’s surface and on the ocean floor. These changes include the formation of volcanoes, mountain ranges, ocean basins, and deep-ocean trenches.

Divergent Boundaries  Can a crack in Earth’s crust be so wide that people can walk through it? In Iceland it can! There, two plates move slowly away from each other. **Figure 3** shows part of the crack that has formed as these two plates have moved apart over time.

Recall that plates move away from each other at a divergent boundary. Most divergent boundaries occur along the mid-ocean ridges, where new crust is added during sea-floor spreading. But in a few places, the mid-ocean ridge rises above sea level. Volcanic activity of the mid-Atlantic ridge is also seen in Iceland.

Where pieces of Earth’s crust diverge on land, a deep valley called a rift valley forms. Several rift valleys make up the East African rift system. There, the crust is slowly pulling apart over a wide area.

**FIGURE 3**  
**Breaking Up Is Hard to Do**
Two plates separate to form a great crack in Iceland, marking a divergent boundary.

*Interpret Diagrams*  Draw arrows on the diagram to show how plates move at a divergent boundary. Then describe how the plates move.

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**Vocabulary**  **Prefixes**  Read the text about the three types of plate boundaries. Circle the correct meaning of each prefix given here.

- Dia- = (away/together/along)
- Con- = (away/together/along)
- Trans- = (away/together/along)

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**do the math!**

Plates move at very slow rates. These rates are from about 1 to 12 cm per year. To calculate rates of motion, geologists use the following formula.

\[ \text{Rate} = \frac{\text{Distance}}{\text{Time}} \]

**Calculate**  The Pacific plate is sliding past the North American plate. In 10 million years, the plate will move 500 km. What is the Pacific plate’s rate of motion? Express your answer in centimeters per year.
Convergent Boundaries  The Andes Mountains run for 8,900 kilometers along the west coast of South America. Here, two plates collide. Recall that a boundary where two plates come together, or collide, is called a convergent boundary.

What happens when two plates collide? The density of the plates determines which one comes out on top. Oceanic crust becomes cooler and denser as it spreads away from the mid-ocean ridge. Where two plates carrying oceanic crust meet at a trench, the plate that is more dense sinks under the less dense plate.

A plate carrying oceanic crust can also collide with a plate carrying continental crust. Oceanic crust is more dense than continental crust. The more dense oceanic crust can push up the less dense continental crust. This process has formed the Andes, as shown in Figure 4. Meanwhile, the more dense oceanic crust also sinks as subduction occurs. Water eventually leaves the sinking crust and rises into the wedge of the mantle above it. This water lowers the melting point of the mantle in the wedge. As a result, the mantle partially melts and rises up as magma to form volcanoes.

Two plates carrying continental crust can also collide. Then neither piece of crust is dense enough to sink far into the mantle. Instead, the collision squeezes the crust into high mountain ranges.

Earth’s Changing Crust
As plates move, they produce mountains, volcanoes, and valleys as well as mid-ocean ridges and deep-ocean trenches.

Identify  Fill in the blanks with the correct terms from the list on the next page. (Hint: Some points use more than one term.)
Transform Boundaries  Recall that a transform boundary is a place where two plates slip past each other, moving in opposite directions. Beneath the surface of a transform boundary, the sides of the plates are rocky and jagged. So the two plates can grab hold of each other and “lock” in place. Forces inside the crust can later cause the two plates to unlock. Earthquakes often occur when the plates suddenly slip along the boundary that they form. However, crust is neither created nor destroyed at transform boundaries. The San Andreas fault, shown in Figure 5, is one example of a transform boundary.

**Figure 5**  
Fault Line  
The San Andreas fault in California marks a transform boundary.

**Interpret Diagrams** Draw arrows on the diagram to show how plates move at a transform boundary. Then describe how the plates move.

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**Assess Your Understanding**

1a. **Review** Moving plates form convergent, divergent, or boundaries.

1b. **Summarize** How do moving plates change Earth’s crust?

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**got it?**

- I get it! Now I know that the three types of plate boundaries are

- I need extra help with
Earthquakes and Plate Tectonics

How Do Seismographs Work?

Where Do Earthquakes Occur?

my planet diary for Texas
Whole Lot of Shaking Going On

Is the ground moving under your school? In 2004, scientists in the USArray project placed 400 seismographs across the western United States to monitor the shaking underneath Earth's surface. Every month, 18 seismographs are moved east, "leapfrogging" the other 382. By 2014, the project will have a complete profile of the nation's seismic activity. The map below shows one arrangement of the array during an early stage of the project. It was Texas's turn to be monitored between 2008 and 2010. Scientists hope to learn more about our active Earth from the data they have collected.

Fun Fact

Communicate: Discuss this question with a group of classmates. Write your answer below.
What information might the array have provided while it was in Texas?
How Do Seismographs Work?

Today, seismographs are complex electronic devices. Some laptop computers and car air bags contain similar devices that detect shaking. But a simple seismograph, like the one in Figure 1, can consist of a heavy weight attached to a frame by a spring or wire. A pen connected to the weight rests its point on a drum that can rotate. As the drum rotates, the pen in effect draws a straight line on paper wrapped tightly around the drum. Seismic waves cause a simple seismograph’s drum to vibrate, which in turn causes the pen to record the drum’s vibrations. The suspended weight with the pen attached moves very little. This allows the pen to stay in place and record the drum’s vibrations.

Measuring Seismic Waves When you write a sentence, the paper stays in one place while your hand moves the pen. But in a seismograph, it’s the pen that remains stationary while the paper moves. Why is this? All seismographs make use of a basic principle of physics: Whether it is moving or at rest, every object resists any change to its motion. A seismograph’s heavy weight resists motion during an earthquake. But the rest of the seismograph is anchored to the ground and vibrates when seismic waves arrive.

FIGURE 1

Recording Seismic Waves

In a simple seismograph, a pen attached to a suspended weight records an earthquake’s seismic waves. Make Models To mimic the action of a seismograph, hold the tip of a pencil on the right edge of the seismograph paper below. Have a classmate pull the right edge of the book away from your pencil while the classmate also “vibrates” the book side to side.
Seismograms

When an earthquake’s seismic waves reach a simple seismograph, the seismograph’s drum vibrates. The vibrations are recorded by the seismograph’s pen, producing a seismogram, as shown in the top diagram.

P waves travel fastest and arrive first. 
S waves arrive shortly after P waves.
Surface waves produce the largest disturbance on the seismogram.

Challenge
An aftershock is a smaller earthquake that occurs after a larger earthquake. Draw the seismogram that might be produced by a seismograph during an earthquake and its aftershock. Label the earthquake and the aftershock.

Reading a Seismogram
You have probably seen the zigzagging lines used to represent an earthquake. The pattern of lines, called a seismogram, is the record of an earthquake’s seismic waves produced by a seismograph. Study the seismogram in Figure 2. Notice when the P waves, S waves, and surface waves arrive. The height of the lines drawn by the seismograph is greater for a more severe earthquake or an earthquake closer to the seismograph.

Assess Your Understanding

1a. Review The height of the lines on a seismogram is (greater/less) for a stronger earthquake.

1b. Interpret Diagrams What do the relatively straight, flat portions of the seismogram at the top of Figure 2 represent?

334 Earth’s Structure
Where Do Earthquakes Occur?

Geologists use seismographs to monitor earthquakes. Other devices that geologists use detect slight motions along faults. Yet even with data from many different devices, geologists cannot yet predict when and where an earthquake might strike. **But from past seismographic data, geologists have created maps of where earthquakes occur around the world. The maps show that earthquakes often occur along plate boundaries.** Recall that where plates meet, plate movement stores energy in rock that makes up the crust. This energy is eventually released in an earthquake.

**Earthquake Risk in North America** Earthquake risk largely depends on how close a given location is to a plate boundary. In the United States, two plates meet along the Pacific coast in California, Washington state, and Alaska, causing many faults. Frequent earthquakes occur in California, where the Pacific plate and the North American plate meet along the San Andreas fault. In Washington, earthquakes result from the subduction of the Juan de Fuca plate beneath the North American plate. Recall that during subduction, one plate is forced down under another plate.

**apply it!**

The map shows areas where serious earthquakes are likely to occur, based on the location of past earthquakes across the United States.

1. **Interpret Maps** The map indicates that serious earthquakes are most likely to occur (on the east coast/in the midsection/on the west coast) of the United States.

2. **Predict** Based on the evidence shown in the map, predict where you think plate boundaries lie. Explain your reasoning.
Earthquake Risk Around the World  Many of the world’s earthquakes occur in a vast area of geologic activity called the Ring of Fire, as shown in the Pacific section of Figure 3. In this area, plate boundaries form a ring around the Pacific Ocean. Volcanoes as well as earthquakes are common along these boundaries. The Ring of Fire includes the west coast of Central America and the west coast of South America. Strong earthquakes have occurred in countries along these coasts, where plates converge. Across the Pacific Ocean, the Pacific Plate collides with several other plates. Here, Japan, Indonesia, New Zealand, and New Guinea are seismically very active. One of the most powerful earthquakes ever recorded occurred off the coast of Japan on March 11, 2011.

India, China, and Pakistan also have been struck by large earthquakes. In this area of the world, the Indo-Australian Plate collides with the Eurasian Plate. Earthquakes are also common where the Eurasian Plate meets the Arabian and African plates.

**FIGURE 3** ..........................................................  
Earthquakes are closely linked to plate tectonics. The map shows where past earthquakes have occurred in relation to plate boundaries.

Make Judgments  Draw an outline tracing the plate boundaries that make up the Ring of Fire. Then look at North America. Draw a star where buildings should be built to withstand earthquakes. Put an X where there is less need to design buildings to withstand strong shaking. Do the same for another continent (not Antarctica). Explain your answers.
Earthquakes in Alaska
Look at the map of Alaska. Earthquakes here are the result of subduction. Infer Draw the plate boundary. Then draw arrows on either side of the boundary to show the direction in which the plates move relative to each other.

Assess Your Understanding
TEKS 10D
2a Review The stored in rocks as a result of plate movement can be released in an earthquake.

b. Describe Why do earthquakes occur more often in some places than in others?

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I get it! Now I know that seismographic data reveal that

I need extra help with

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Chapter 8.6 – Pgs. 338-341

Volcanoes and Plate Tectonics

Where Are Volcanoes Found on Earth’s Surface?

my planet diary

Mountain of Fire, Mountain of Ice

Climbers who struggle up the snow-packed slopes of Mount Erebus on Antarctica may be in for an unpleasant surprise. Balls of scorching molten rock three meters across might come hurtling out of the air and land just steps from climbers’ feet! Why? Because Mount Erebus is one of Earth’s southernmost volcanoes.

Scientists believe that Mount Erebus lies over an area where material from Earth’s mantle rises and then melts. The melted material reaches the surface at Mount Erebus.

Lab Zone: Do the Inquiry Warm-Up Moving Volcanoes. Student Lab Manual, p. 126

Where Are Volcanoes Found on Earth’s Surface?

A volcanic eruption can be awe-inspiring. Molten material can be spewed high into the atmosphere. Entire villages can be buried in volcanic ash. A volcano is a mountain that forms in Earth’s crust when molten material, or magma, reaches the surface. Magma is a molten mixture of rock-forming substances, gases, and water from the mantle. When magma reaches the surface, it is called lava. After magma and lava cool, they form solid rock.
Vocabulary
- volcano
- magma
- lava
- Ring of Fire
- island arc
- hot spot

Skills
- Reading: Relate Text and Visuals
- Inquiry: Develop Hypotheses

Volcanoes and Plate Boundaries
Are volcanoes found randomly across Earth? No, in general, volcanoes form a regular pattern on Earth. To understand why, look at the map in Figure 1. Notice how volcanoes occur in many great, long belts.

Volcanic belts form along the boundaries of Earth’s plates.

Volcanic eruptions can occur where two plates pull apart, or diverge. Here, plate movements cause the crust to fracture. The fractures in the crust create a vent through which the magma can flow. Eventually, this magma reaches the surface. Volcanoes can also occur where two plates push together, or converge. As the plates push together, one plate can sink beneath the other plate. Water that is brought down with the sinking plate eventually helps to form magma, which rises to the surface.

The Ring of Fire, shown in Figure 1, is one major belt of volcanoes. It includes the many volcanoes that rim the Pacific Ocean. The Ring of Fire includes the volcanoes along the coasts of North and South America and those in Japan and the Philippines.

Figure 1
The Ring of Fire
The Ring of Fire is a belt of volcanoes that circles the Pacific Ocean. As with most of Earth’s volcanoes, these volcanoes form along boundaries of tectonic plates.

Develop Hypotheses
Circle a volcano on the map that does not fall along a plate boundary. Why did this volcano form here? Write your answer below. Revise your answer after finishing the lesson.

Original Hypothesis:


Revised Hypothesis:
**Diverging Boundaries** Volcanoes form along the mid-ocean ridges, where two plates move apart. Mid-ocean ridges form long, underwater mountain ranges that sometimes have a rift valley down their center. Along the rift valley, lava pours out of cracks in the ocean floor. This process gradually builds new mountains. Volcanoes also form along diverging plate boundaries on land. For example, large volcanoes are found along the Great Rift Valley in East Africa.

**Converging Boundaries** Many volcanoes form near converging plate boundaries, where two oceanic plates collide. Through subduction, the older, denser plate sinks into the mantle and creates a deep-ocean trench. Water in the sinking plate eventually leaves the crust and rises into the wedge of the mantle above it. As a result, the melting point of the mantle in the wedge is lowered. So the mantle partially melts. The magma that forms as a result rises up. This magma can break through the ocean floor, creating volcanoes.

The resulting volcanoes sometimes create a string of islands called an **island arc**. Look at Figure 2. The curve of an island arc echoes the curve of its deep-ocean trench. Major island arcs include Japan, New Zealand, the Aleutians, and the Caribbean islands.

Volcanoes also occur where an oceanic plate is subducted beneath a continental plate. Collisions of this type produced the volcanoes of the Andes Mountains in South America. In the United States, plate collisions also produced the volcanoes of the Pacific Northwest, including Mount St. Helens and Mount Rainier.
**Hot Spots** Not all volcanoes form along plate boundaries. Some volcanoes are the result of “hot spots” in Earth’s mantle. A **hot spot** is an area where material from deep within Earth’s mantle rises through the crust and melts to form magma.

**A volcano forms above a hot spot when magma erupts through the crust and reaches the surface.** Hot spots stay in one place for many millions of years while the plate moves over them. Some hot spot volcanoes lie close to plate boundaries. Others lie in the middle of plates. Yellowstone National Park in Wyoming marks a huge hot spot under the North American plate.

**apply it!**

The Hawaiian Islands have formed one by one as the Pacific plate drifts slowly over a hot spot. This process has taken millions of years.

1. The hot spot is currently forming volcanic mountains on the island of (Oahu/Maui/Hawaii).

2. Do you think Maui will erupt again? Why or why not?

3. **Challenge** Which island is older—Kauai or Maui? Why?

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**Assess Your Understanding**

**TEKS 10D**

1a. **Define** A volcano is a mountain that forms in Earth’s crust when ___ reaches the surface.

b. **Explain** Describe one way in which plate tectonics causes volcanic eruptions.

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**got it?**

- I get it! Now I know that volcanoes are found in the following two general locations: ___

- I need extra help with ___