

Chapter: Plate Tectonics

Read each question thoroughly. The Science Coach boxes will help you apply the skills and concepts you need to answer the questions.

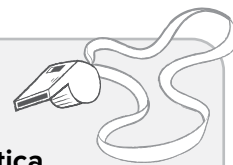
1. *Lystrosaurus* is a type of land reptile that lived around 250 million years ago. These large reptiles were herbivores that used their tusks to dig up the roots of desert plants. Fossil remains of *Lystrosaurus* have been found in Antarctica, India, and Africa.

How does the fossil evidence support the idea that Earth has changed over time?

- (A) It shows that some land animals survived extinction.
- (B) It shows that desert plants grew at the South Pole in Earth's past.
- (C) It shows that Antarctica has not always been in its current location.
- (D) It shows that the fossil record reveals little about a large percentage of animals.

Science Coach

Think about the **climate of Antarctica** today. How could Antarctica have once supported the growth of **desert plants**?



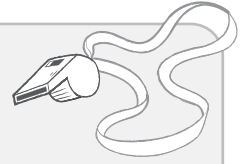
2. There are many active volcanoes in Hawaii. Kilauea, for example, has been erupting since 1983. These islands are unique because they are located in the middle of the Pacific Ocean, far away from any plate boundaries.

Which statement **best** explains how the Hawaiian Islands formed?

- (F) The plate under the Pacific Ocean was subjected to the pressure of the surrounding plates.
- (G) The Hawaiian Islands are the result of the Pacific Plate moving over a stationary hot spot.
- (H) Warm temperatures on the island, combined with atmospheric pressure, caused rock to melt, resulting in the formation of volcanic islands.
- (I) The Hawaiian Islands used to be located near a plate boundary but have been pushed by ocean currents to the center of the Pacific Ocean.

Science Coach

Consider the **different ways volcanoes form**. Are the Hawaiian Islands a result of **tectonic plate** collisions? How do you know? What other processes can form volcanoes?



3. An oceanographer collected rock samples from the ocean floor. The table shows the distance between the mid-ocean ridge and the sampling site.

**Table 1: Distance Between
Mid-Ocean Ridge and Sampling Site**

Sample	Distance from Mid-Ocean Ridge (km)
A	0.1
B	0.5
C	1.0
D	1.5

Which statement **best** relates the age of the rock sample to its sampling location?

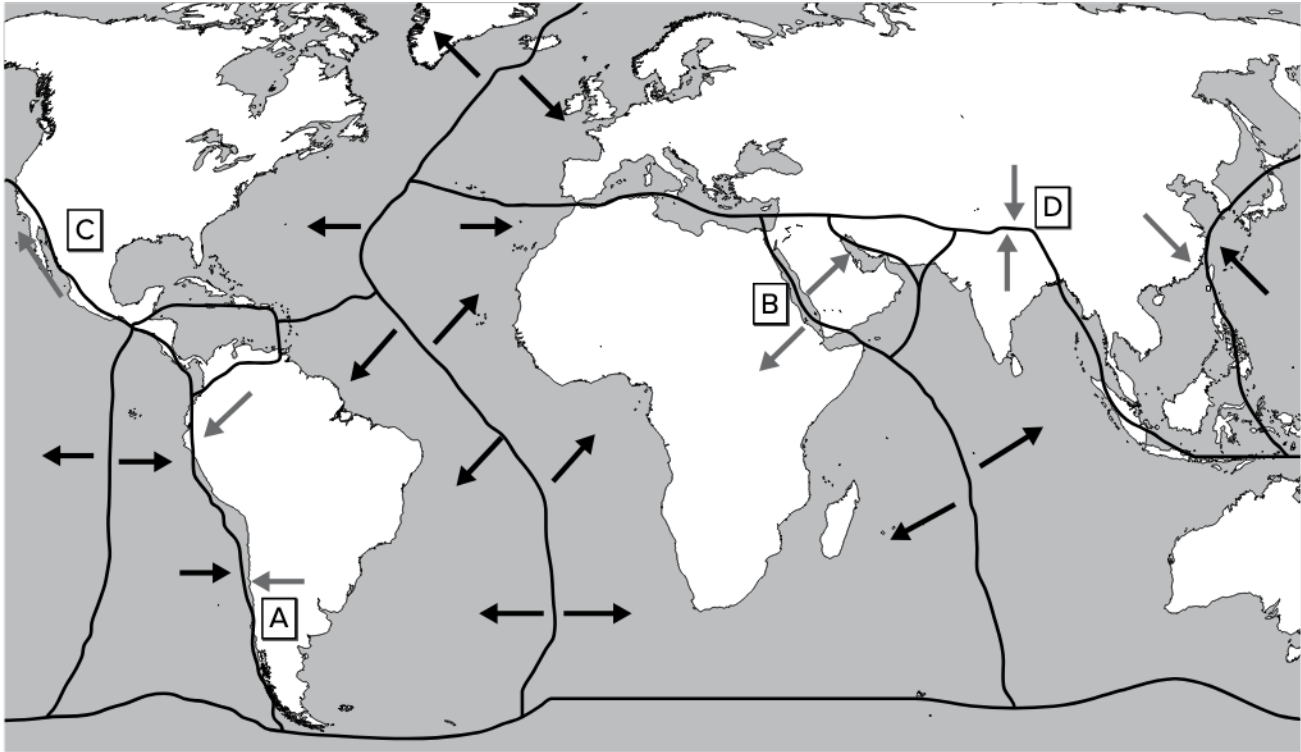
- (A) Sample A has the youngest rocks because new oceanic crust forms at mid-ocean ridges.
- (B) Sample D has the youngest rocks because new oceanic crust forms at mid-ocean ridges.
- (C) Sample A has the oldest rocks because subduction destroys oceanic crust at mid-ocean ridges.
- (D) Sample D has the oldest rocks because subduction destroys oceanic crust at mid-ocean ridges.

Science Coach

Consider the geologic processes that occur at **mid-ocean ridges**. How do **tectonic plates move** at a mid-ocean ridge? What is the result of this movement?



4. Ms. Jackson's class is studying plate tectonics. The students created a model to show how Earth's tectonic plates move. The arrows in the model show the direction of movement.

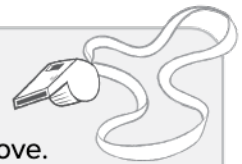


Which location would non-volcanic mountain building **most likely** occur?

- (F) Location A
- (G) Location B
- (H) Location C
- (I) Location D

Science Coach

Think about how **tectonic plates** move. What is the difference between the types of plate boundaries that form non-volcanic **mountains** and those that result in **volcanoes**?

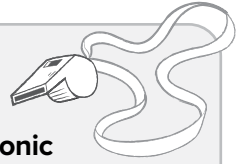


5. How can earthquakes be explained by the theory of plate tectonics?

- (A) Stress builds up and is released as parts of Earth's crust slide past each other.
- (B) Stress builds up and is released as parts of Earth's crust slip below other parts.
- (C) Stress builds up and is released as parts of Earth's crust crash into each other.
- (D) Stress builds up and is released as parts of Earth's crust move away from each other.

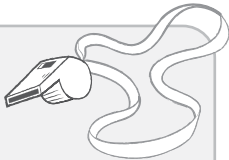
Science Coach

Think about the three types of **tectonic plate** boundaries. What is the difference between them? Which type of boundary is involved in **earthquakes**? What happens at those boundaries?



6. How did the Yellowstone supervolcano **most likely** form?

- (F) The North American plate moved over a stationary hot spot.
- (G) The North American plate slipped past the Pacific Ocean plate.
- (H) The North American plate collided with the Pacific Ocean plate.
- (I) The North American plate separated from the Pacific Ocean plate.

Science Coach

Think about the **plate tectonic processes** required for the **formation** of a **volcano**. What type of **tectonic plates** are involved? Consider the location of Yellowstone National Park. What would explain the presence of a volcano in this location?

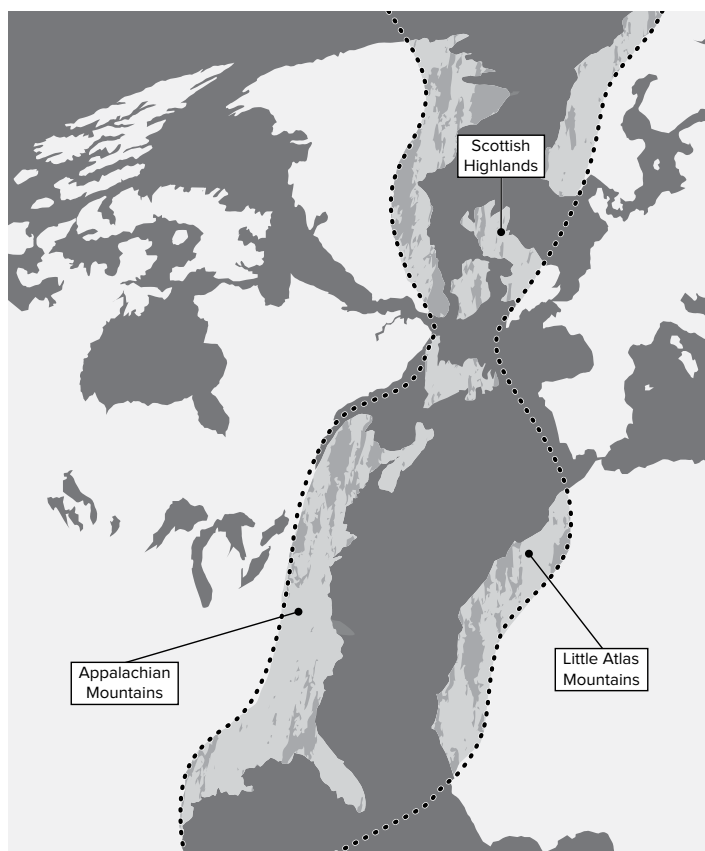
For questions 7, 8, and 9, refer to the following passage and illustration.

In this group of questions, you will use your knowledge about plate tectonics to answer three questions.

Wegener's Wild Idea

Ms. Dixon's science class visited the Florida Museum of Natural History. An exhibit explained the ideas of Alfred Wegener. In 1912, Wegener first proposed that Earth's continents are in constant motion. He based this idea on several pieces of evidence. This included similarities in rocks found in North America, Scotland, and Africa. The map shows the areas where the same types of rocks of about the same age have been found. The shaded areas are the remains of an extensive mountain chain once located on Pangaea.

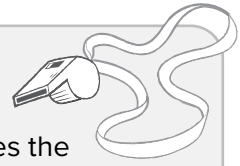
Wegener was not able to explain how the continents could move. For this reason, most geologists rejected his idea. Wegener died in 1930. In the late 1940s, scientists measured the depths of the oceans. Marie Tharp used the data to create maps of the ocean floor. Her detailed maps revealed the presence of mid-ocean ridges. Finally, more than thirty years after his death, the scientific community recognized the validity of Wegener's argument.



7. How does the information in the text and image provide evidence for the continental drift hypothesis?
- (A) It indicates the formation of similar mountain ranges on different continents.
 - (B) It indicates the formation of mountain ranges on separate tectonic plates that drifted together over time.
 - (C) It indicates the formation of a single mountain range that separated when the continents drifted apart.
 - (D) It indicates the formation of mountain ranges on opposite sides of the ocean that have eroded over time.

Science Coach

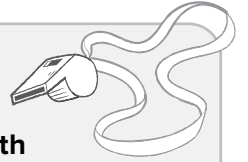
Read the passage carefully. How does the information in the text and the illustration support Wegener's **continental drift** hypothesis?



8. How did Marie Tharp's maps support the continental drift hypothesis?

- Ⓕ They helped show that tectonic plates could move.
- Ⓖ They helped show that fossils formed in Earth's oceans.
- Ⓗ They helped show that rocks could form on the ocean floor.
- Ⓘ They helped show that the principle of superposition was correct.

Science Coach



Think about how the **surface of Earth** has changed over time.

What process did Marie Tharp's maps reveal for the first time? What evidence supports the conclusion that the **continents** we know today have not always been in the same locations?

9. Which process did scientists finally determine to be the drive behind continental motion?

- (A) superposition
- (B) mountain building
- (C) convection currents
- (D) magnetic reversals

Science Coach

Consider the initial skepticism of Wegener's **continental drift hypothesis**. What arguments did the scientific community propose to counter his ideas? How were those **arguments resolved over time**?

