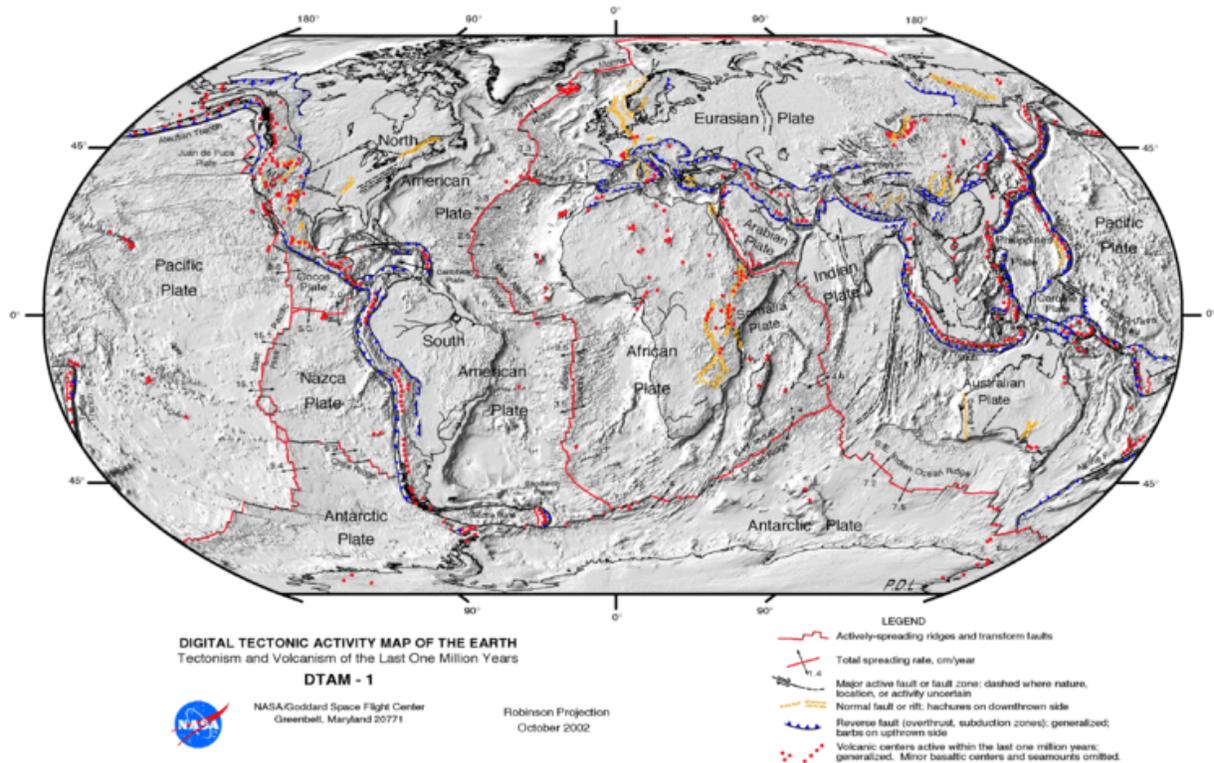


# Our Changing Earth: Plate Tectonics and Large-Scale System Interactions

By Gabrielle Sierra



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David and Charlie were setting off on a hiking trip with their uncle Max.

They had packed all of the essential items they would need for their day of hiking. Inside their backpacks were sandwiches, water, sunscreen, bug spray, a long sleeve shirt for the cold, and sunglasses for the sun.

Before they started on their trip, they gathered around a picnic table with their uncle. He showed them what was inside his own backpack. His bag was heavier. He had all the same things David and Charlie had in their bags except he also had a first aid kit, extra water bottles, a flashlight and a bunch of folded papers.

“What is with all the papers, Uncle Max?” asked David. “Are you going to be doing some homework at the top of the mountain?”

Uncle Max and the boys laughed.

“No,” said Uncle Max, spreading out the folded papers. “These are all maps. They will show us where we are headed.”

“Why don’t you just look up the map on your phone?” asked Charlie.

“Well, we can do that too,” said Uncle Max. “But just in case the phone battery dies or we lose service, we will have these maps on paper. Plus a few of these maps show specific trails for the park that may not be listed on your phone.” Uncle Max opened one of the maps even wider and pointed to a spot with his finger. “This is where we are,” he said. “See all of the trees around us? And this is the trail we are going to take up the mountain and then back.” Uncle Max pointed at a mountain to the right. Sure enough it was on the map in the same spot.

The boys adjusted their bags, tied their shoes tight, and started off down the trail following behind Uncle Max.

“How do the people who make the maps know where everything is?” asked Charlie.

“Well, there is something called Cartography,” said Uncle Max. “Cartography is the study and making of maps. Cartographers use science and exploration to establish where certain parts of the Earth are.”

Uncle Max and the boys hiked around a bunch of trees and followed a path over a small river.

“Do maps tell you about what is under the water too?” asked David.

“Some of them do,” said Uncle Max. “Not all maps show all bodies of water. But bigger bodies of water like oceans and lakes are often mapped out. If you are exploring in the ocean and you want to find some coral reef or a sunken ship, then that would be included on a map.”

The three walked for another hour. As they went, they looked at all the trees and plants. They also saw a deer and a few frogs.

After a few more minutes, the boys stopped and had some water, while Uncle Max showed them where they were on the map. They were almost at the bottom of the mountain—they could see it right up in front of them.

“In school we learned that the Earth’s surface moves,” said David, as they started walking again. “Because the Earth is made up of plates.”

“Plates?” asked Charlie. “Like the plates we use to eat lunch?”

Uncle Max laughed. “Sort of,” he said. “More like puzzle pieces that fit together. And yes, they do move, but usually they move very slowly. If you look at maps that scientists have created of what the Earth looked like many, many years ago, you can see that countries and islands on the Earth were in different places. Land masses broke apart and floated.”

“So then maps change,” said Charlie.

“Yes, they have to be updated to reflect any changes,” said Uncle Max. “Not that those changes happen very fast.”

“Earthquakes happen fast, though,” said David.

“Definitely,” said Uncle Max. “Very fast. An earthquake is the result of a sudden release of energy in the Earth’s crust that creates something called seismic waves. That is why the machine used to measure an earthquake is called a seismometer. This machine helps scientists figure out what is going on in the Earth and helps predict any future earthquakes, since they sometimes come in patterns.”

“That’s scary,” said Charlie.

“It is. But that shows you how powerful the Earth’s movements can be,” said Uncle Max.

The three hikers reached the mountain.

David looked up. “We are going all the way up there?” he asked. He was tired from his first hike and was not looking forward to heading up the mountain.

Uncle Max laughed. “How about we have our sandwiches down here instead,” he suggested. “Then we can go back and swim in the lake.”

The boys agreed. So Uncle Max laid a blanket on a big flat rock, and the three had their sandwiches in the sun. Then they took a photo in front of the mountain, so they could show their mom. Maybe next time they came back, they could use the map to climb the mountain.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What is the name of the study and creation of maps?

- A circumnavigation
- B tectonics
- C cartography
- D exploration

2. In the passage, Uncle Max describes a number of things to the boys. How does he describe earthquakes?

- A a sudden release of energy in the Earth's crust that creates seismic waves
- B a slow event that occurs over many years
- C a gradual release in pressure that rarely causes problems
- D an unexpected natural disaster that could happen at any time

3. The movement of the Earth's plates has changed the way that the Earth looks over many years. What evidence from the text supports this conclusion?

- A Science and exploration is used to establish where certain parts of the Earth are.
- B Some maps show where a coral reef is located or where a sunken ship can be found.
- C Maps of the Earth many years ago show countries and islands in different places.
- D Earthquakes sometimes come in patterns.

4. Based on the information Uncle Max explains, what can be concluded about the impact of the movement of the Earth's plates?

- A The movement of the Earth's plates does not affect the location of lands and oceans.
- B The movement of the Earth's plates affects the location of lands and oceans.
- C The movement of the Earth's plates only affects the location of the oceans.
- D The movement of the Earth's plates only affects the location of islands.

5. What is the main idea of this story?

- A Maps can help predict the movement of Earth's plates.
- B Maps can help show you where you are and where you are headed.
- C Maps can replace your cell phone if it runs out of battery.
- D Maps can make hiking easier.

6. Uncle Max compares the Earth’s plates to puzzle pieces. Why does Mr. Max compare the Earth’s plates to puzzle pieces?

- A to show that the Earth’s plates are as confusing as puzzle pieces
- B to show that the Earth’s plates fit together like puzzle pieces
- C to show that the Earth’s plates need to be put together by humans just like puzzle pieces
- D to show that the Earth’s plates are made of the same material as puzzle pieces

7. While the Earth’s plates move very slowly, some changes in the Earth happen very quickly, \_\_\_\_\_ earthquakes.

Choose the answer that best completes the sentence below.

- A consequently
- B notably
- C finally
- D initially

8. According to Uncle Max, what do maps show?

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**9.** Describe the Earth’s plates based on the information Uncle Max gives to David and Charlie.

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**10.** Explain the reason that maps must change over time. Use information from the text.

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**Teacher Guide & Answers**

**Passage Reading Level:** Lexile 610

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8. According to Uncle Max, what do maps show?

**Suggested answer:** Answers may include any of the following: the trail which he and the boys are on, bodies of water like lakes and oceans, and the location of land masses.

9. Describe the Earth's plates based on the information Uncle Max gives to David and Charlie.

**Suggested answer:** Students should explain that the Earth's surface is made up of plates. These plates fit together like puzzle pieces and they usually move very slowly.

10. Explain the reason that maps must change over time. Use information from the text.

**Suggested answer:** Answers may vary and should be supported by the text. Students should explain that many, many years ago, continents and islands were in different places. Land masses broke apart and floated. Thus, these maps must be updated to reflect where the masses are located at a specific time.

More advanced answers may explain that the movement of the Earth's plates slowly changed the locations of land masses, so that maps representing the Earth a long time ago must be different from the ones we use today.