Name: _____ Date: _____

Lesson 1.4: Analyzing Patterns at Plate Boundaries

How are earthquakes related to plate boundaries? Can the huge, rocky plates of Earth's outer layer actually move? Today, you will use the Sim to create some earthquakes and answer these questions!

Unit Question

- Why are fossils of species that once lived together found in different locations on Earth now?

Chapter 1 Question

- What is the land like where *Mesosaurus* fossils are found?

Key Concepts

- Earth's outer layer is made of hard, solid rock.
- Earth's outer layer is divided into sections called plates.
- Geologists look for patterns in landforms and in geologic events in order to better understand Earth.
- The plates of Earth's outer layer move.

Vocabulary

- claim
- cross section
- earthquake
- evidence
- outer layer
- pattern
- plate
- plate boundary

Digital Tools

- *Plate Motion* Simulation

Name: _____ Date: _____

Warm-Up

What happens to Earth's plates during an earthquake? (check one)

- ☐ **Claim 1:** Plates move, which can cause earthquakes.
- ☐ **Claim 2:** Earthquakes cause the plates to move.

Why did you choose this claim? Explain why you think this claim best describes what happens to Earth's plates during an earthquake.

_____

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Name: _____ Date: _____

Simulating Earthquakes

Part 1: Earthquakes and Plate Motion

Do earthquakes cause plate motion? Or does plate motion cause earthquakes?

You and a partner will use the *Plate Motion* Sim to create earthquakes and collect evidence. Your evidence will help you to decide which of the claims is best supported:

Claim 1: Plates move, which can cause earthquakes.

Claim 2: Earthquakes cause the plates to move.

1. Open the *Plate Motion* Sim.
2. Select Region 2 of the Sim.
3. Use the Add Rock tool to create continents, and press SET BOUNDARY to select a boundary type.
4. Press RUN, and toggle on earthquakes. Make observations about when earthquakes happen.
5. Press BUILD and then press REBUILD to try a different combination of continent shapes and plate boundary types. After selecting the plate boundary type, press RUN and repeat your observations.
6. While using the Sim, refer to the information about each claim that is on the board. Discuss with your partner which claim is best supported.

Part 2: Reconsidering the Claims

Now that you've gathered evidence from the Sim, choose a claim again.

What happens to Earth's plates during an earthquake? (check one)

- ☐ **Claim 1:** Plates move, which can cause earthquakes.
- ☐ **Claim 2:** Earthquakes cause the plates to move.

Name: _____ Date: _____

Modeling a Plate Boundary

You have been investigating the question: *What is the land like where* Mesosaurus *fossils are found?* Use the Modeling Tool activity: Modeling a Plate Boundary on the next two pages to show your thinking about this question. Follow the instructions below.

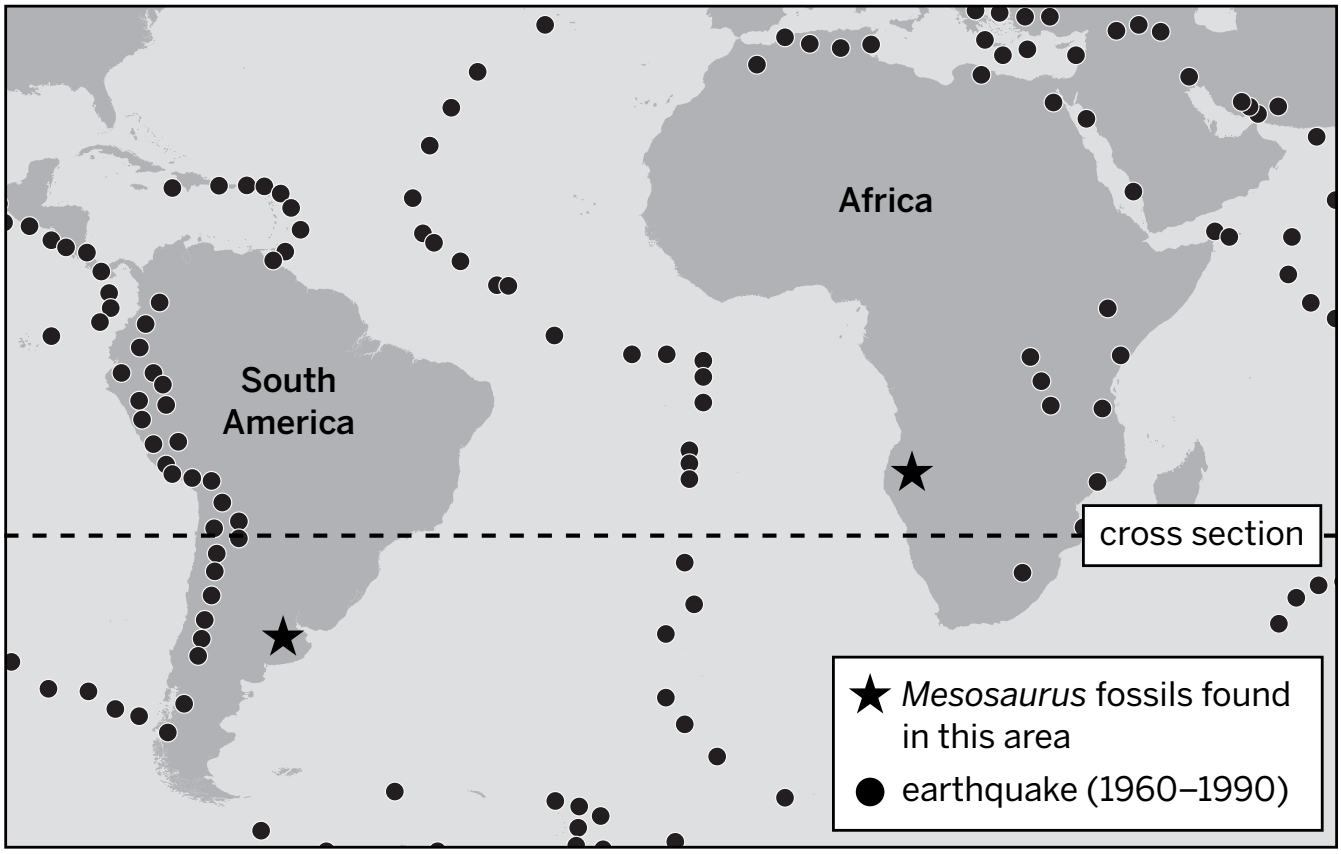
Goal: Show what the land is like where *Mesosaurus* fossils are found.

Do:

- The map below shows a pattern of earthquakes that occurred between South America and Africa. Using that pattern of earthquakes to help you, draw the most likely plate boundary between South America and Africa.
- Choose the cross section on the next page that best shows what the land is like where *Mesosaurus* fossils are found.
- Cut out the cross section you chose and glue it in the box below the map.
- In the cross section that you added below the map, draw in a line to mark the location of the plate boundary.

Name: _____ Date: _____

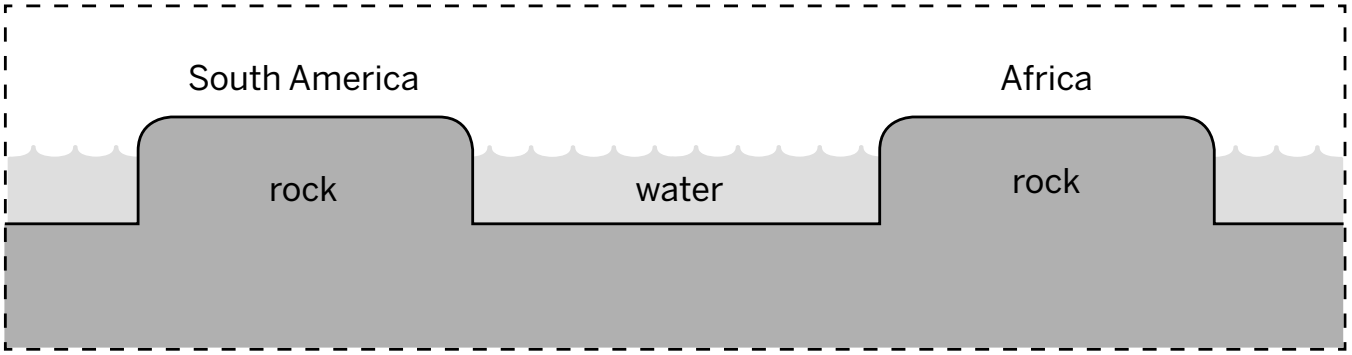
Modeling a Plate Boundary (continued)

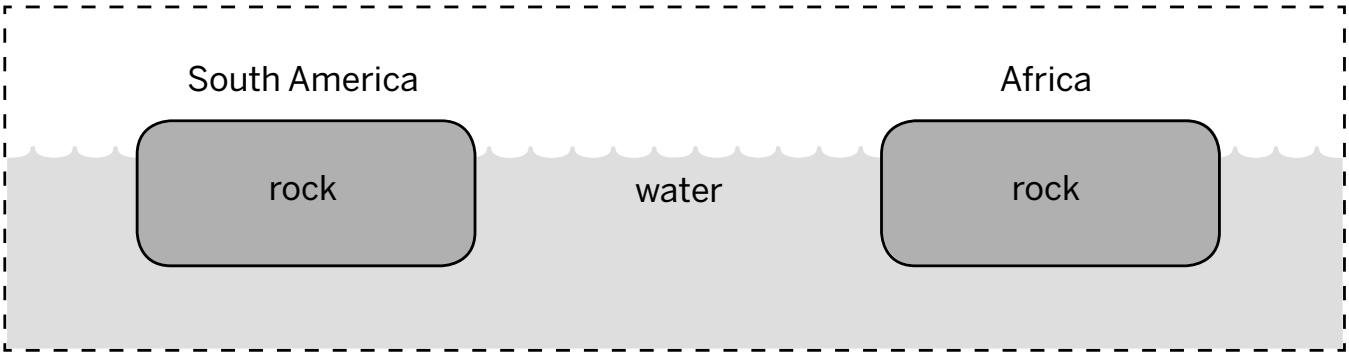


Name: _____ Date: _____

Modeling a Plate Boundary (continued)

Cross Section Options





Name: _____ Date: _____

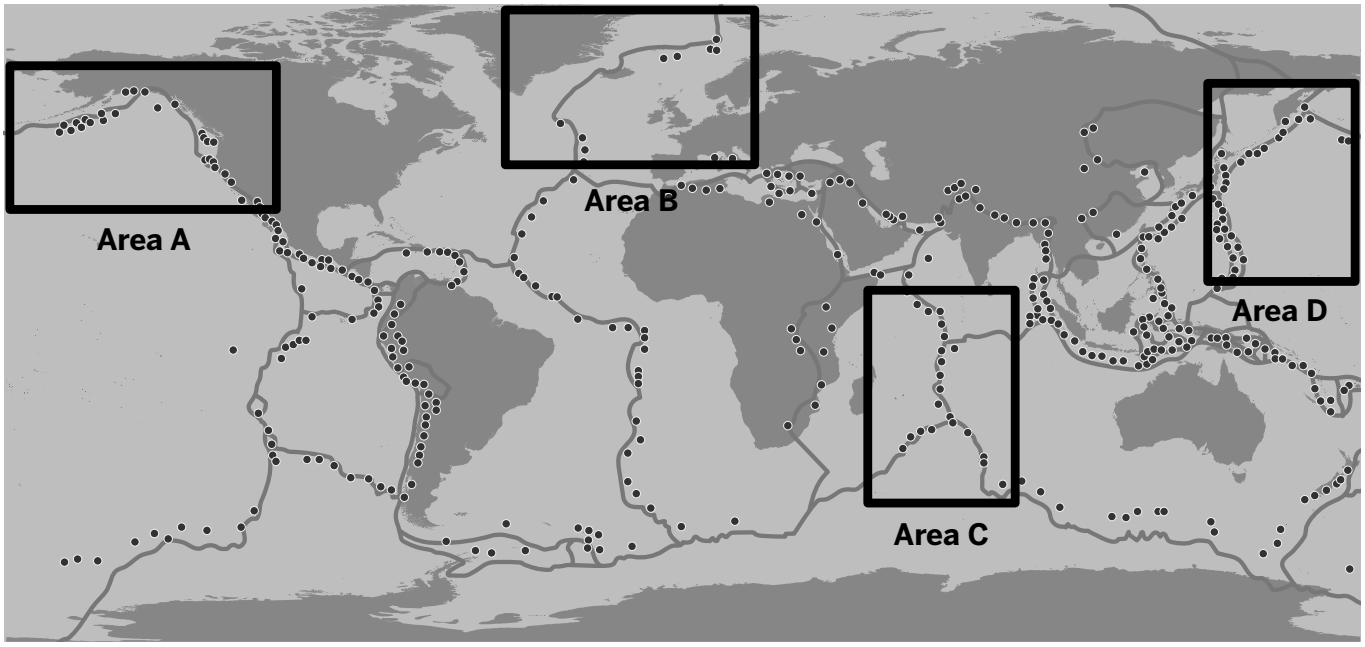
Considering the *Mesosaurus* Exhibit

Plate Motion Claims

- **Claim 1:** The South American Plate and African Plate moved apart **suddenly.**
- **Claim 2:** The South American Plate and African Plate moved apart **gradually.**

Plate Boundary and Earthquake Map

Earth's outer layer is made of hard, solid rock and is divided into plates.



Name: _____ Date: _____

Homework: Answering the Chapter 1 Question

Answer the Chapter 1 Question using the evidence you have collected in this unit so far. Use the words in the Word Bank below if they help you complete your response.

Word Bank

apart	continent	earthquake	fossil	*Mesosaurus*
ocean	outer layer	plate	plate boundary	movement

What is the land like where *Mesosaurus* fossils are found?

_____

_____

_____

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_____

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_____

Name: _____ Date: _____

Homework: Check Your Understanding

This is a chance to reflect on your learning so far. This is not a test. Be open and truthful when you respond to the questions below.

Scientists investigate in order to figure things out. Are you getting closer to figuring out why the fossils of *Mesosaurus* that once lived together are found in different locations on Earth now?

1. I understand what Earth's outer layer is made of underneath the water and soil on the surface. (check one)

   ☐ yes

   ☐ not yet

Explain your answer choice.

_____

_____

2. I understand what happened with the plates and the mantle between South America and Africa. (check one)

   ☐ yes

   ☐ not yet

Explain your answer choice.

_____

_____

3. I understand what happens with the plates and the mantle when two plates move toward each other. (check one)

   ☐ yes

   ☐ not yet

Explain your answer choice.

_____

_____

Name: _____ Date: _____

Homework: Check Your Understanding (continued)

4. I understand how long it took for South America and Africa to move far away from each other. (check one)

   ☐ yes

   ☐ not yet

Explain your answer choice.

_____

_____

5. What do you still wonder about why the fossils of *Mesosaurus* that once lived together are found in different locations on Earth now?

_____

_____

_____

_____