

Chapter 10 Lesson 1

I can discuss evidence that explains how lithospheric plates move at centimeters per year.

SPI 0707.7.5 Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year.

What Mastery Looks Like

12 Scientists theorize that the Atlantic Ocean is slowly increasing in width. Which is the best approximation of the rate at which lithospheric plates beneath the Atlantic Ocean are moving?

- F** 2 millimeters per year
- G** 2 centimeters per year
- H** 2 meters per year
- J** 2 kilometers per year

48 Which geological feature most likely forms when two continental tectonic plates collide?

- F** desert
- G** beach
- H** mountain range
- J** deep trench

Essential Questions

- What is continental drift?
- What evidence supports continental drift?
- At what speed does continental drift occur?

Continental Drift

- When you hear the term, *continental drift*, what do you think?
 - Discuss with your group.
 - Be ready to share.
- [Video](#)
- Continental Drift: the gradual movement of the continents across the earth's surface through geological time.

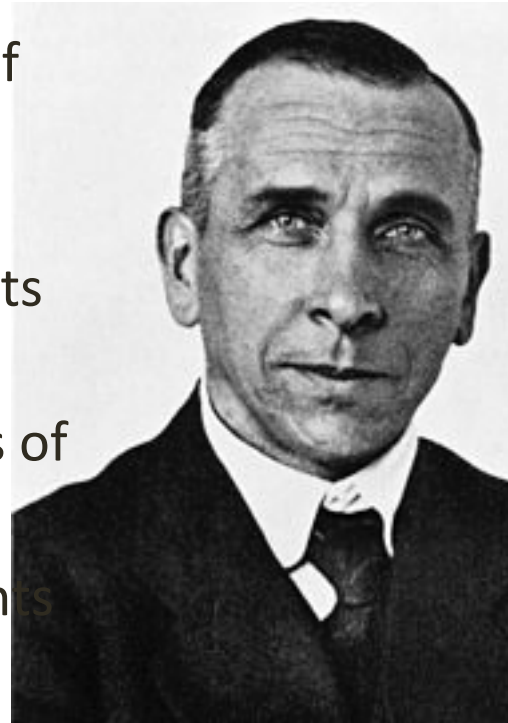
Evidence

- 400 years ago Abraham Ortelius noted the fit between the coastlines of South America and Africa.
- Do you notice any other continents that seem like they could fit together?



Pangaea

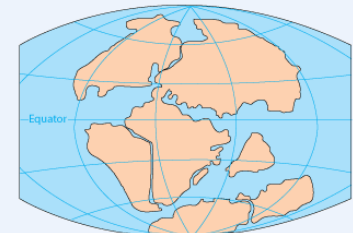
- Alfred Wegener, a German meteorologist, thought that the fit of the continents was more than just a coincidence.
- He theorized that all of the continents fit together at some point.
- In 1912, he proposed the hypothesis of continental drift.
- Wegener suggested that all continents once were connected as one large landmass called Pangaea. He said they broke apart about 200 million years ago.
- Pangaea means “all land.”



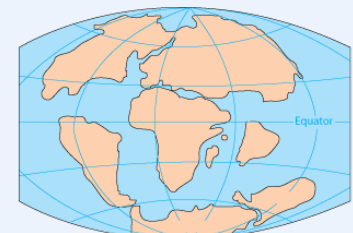
PERMIAN
250 million years ago



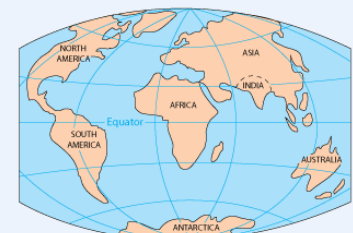
TRIASSIC
200 million years ago



JURASSIC
145 million years ago



CRETACEOUS
65 million years ago



PRESENT DAY

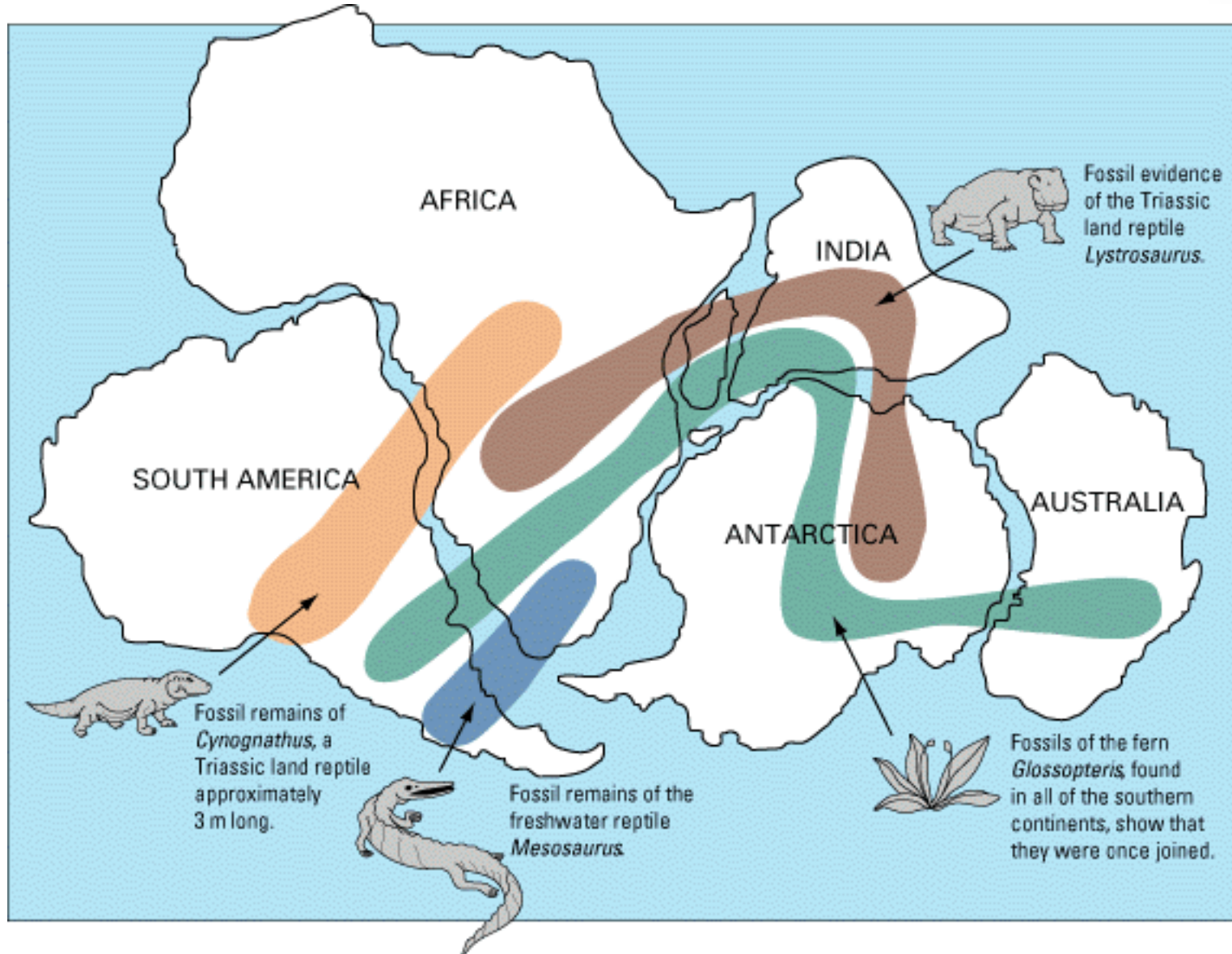
Controversy

- Wegener's ideas were not accepted until after his death.
- Why do you think his theory was so controversial?
 - He couldn't explain how the continents drifted apart.
- He suggested that the continents plowed through the ocean floor, driven by the spin of Earth.
- Other experts strongly disagreed with his explanation.
- Eventually, other observations supported Wegener's theory.
- So, what would you need to prove this theory? What would it take to get you to believe Wegener? Discuss with your group.

Fossil Evidence

- We have the puzzlelike fit of the continents, but other evidence also supports continental drift.
- Fossils!
- Fossils of the reptile Mesosaurus have been found in South America and Africa.
- Why is this significant?
- How could the reptile have been on two different continents separated by an ocean?
- Wegener hypothesized that this reptile lived on both continents when they were joined

Fossil Map



Fossil Evidence

- Glossopteris, a plant fossil, has been found in Africa, Australia, India, South America, and Antarctica.
- This also supports Wegener's theory.



Climate Clues

- Wegener also used continental drift to explain evidence of changing climates.
- Fossils of warm weather plants were found on an island in the Arctic Ocean.
 - Wegener believes this island drifted from tropical regions to the arctic.
- Wegener also used continental drift to explain evidence of glaciers found in temperate and tropical areas.
 - Glacial deposits are found in South America, Africa, India, and Australia. This shows that parts of these continents were once covered by glaciers.
 - Wegener thought that these continents were connected and partly covered with ice near Earth's south pole.

Rock Clues

- If the continents were connected, then rocks that make up the continents should be the same in locations where they were joined.
- Parts of the Appalachian Mountains are similar to those found in Greenland and Western Europe.
- Eastern South America and western Africa also have similar rocks.



How did it happen?

- Wegener couldn't explain how, why, or when.
- The idea suggested that lower-density, continental material somehow had to plow through higher-density, ocean floor material.
- The force behind this was thought to be the spin of Earth on its axis. This was quickly rejected.
- We will talk about seafloor spreading...next.

Exit Ticket

- <http://www.brainpop.com/science/earthsystem/platetectonics/>
- Take out your white boards!