

CONTINENTAL DRIFT

INTRODUCTION

The continental drift hypothesis was developed in the early part of the 20th century, mostly by Alfred Wegener. Wegener said that continents move around on Earth's surface and that they were once joined together as a single supercontinent. While Wegener was alive, scientists did not believe that the continents could move.

THE CONTINENTAL DRIFT IDEA

Find a map of the continents and cut each one out. Better yet, use a map where the edges of the continents show the continental shelf. That's the true size and shape of a continent. Can you fit the pieces together? The easiest link is between the eastern Americas and western Africa and Europe, but the rest can fit together too.



1. The continents fit together like pieces of a puzzle. This is how they looked 250 million years ago.

Alfred Wegener proposed that the continents were once united into a single supercontinent named **Pangaea**, meaning **all earth** in ancient Greek. He suggested that Pangaea broke up long ago to **Lawrasia** (includes the present day North America, Greenland, Europe and Asia or Eurasia) & **Gondwanaland** (includes the present day South America, Africa, Madagascar, India, Australia and Antarctica) and that the continents then moved to their current positions. He called his hypothesis **continental drift**.

EVIDENCE FOR CONTINENTAL DRIFT

Besides the way the continents fit together, Wegener and his supporters collected a great deal of evidence for the continental drift hypothesis.

- **Identical rocks**, of the same type and age, are found on both sides of the Atlantic Ocean. Wegener said the rocks had formed side-by-side and that the land had since moved apart.
- **Mountain ranges** with the same rock types, structures, and ages are now on opposite sides of the Atlantic Ocean. The Appalachians of the eastern United States and Canada, for example, are just like mountain ranges in eastern Greenland, Ireland, Great Britain, and Norway. Wegener concluded that they formed as a single mountain range that was separated as the continents drifted.

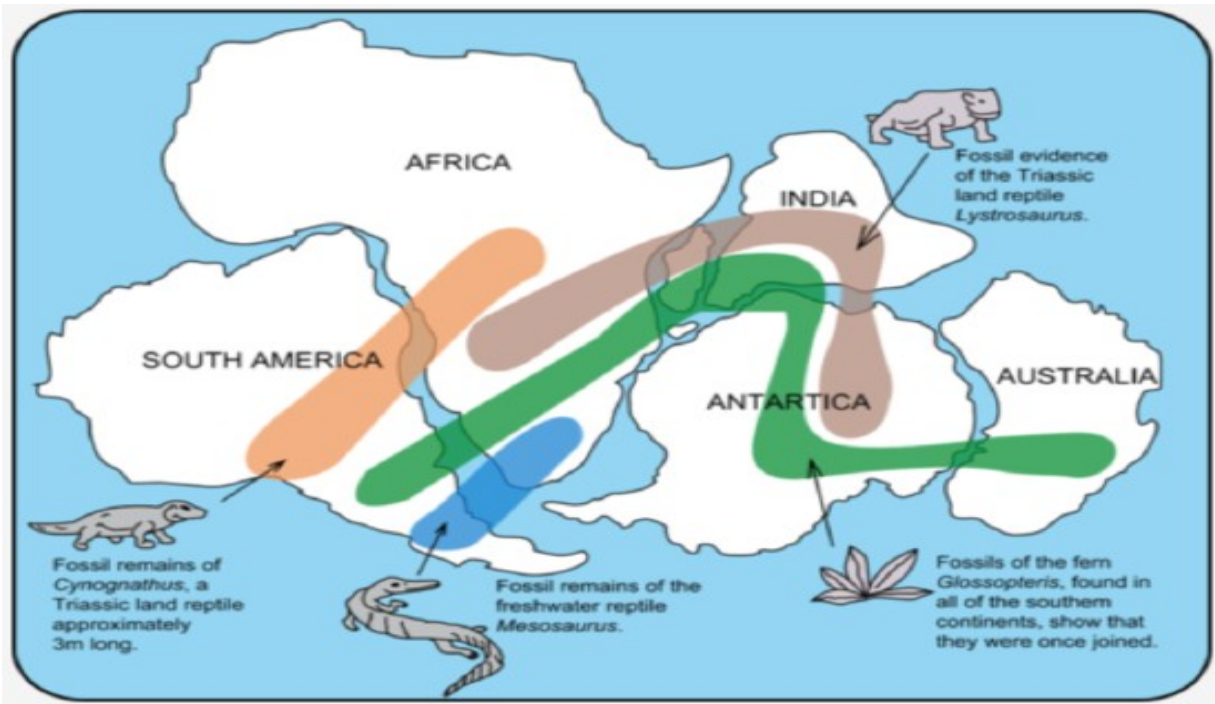


2. The similarities between the Appalachian and the eastern Greenland mountain ranges are evidences for the continental drift hypothesis.

- **Ancient fossils** of the same species of extinct plants and animals are found in rocks of the same age but are on continents that are now widely separated. Wegener proposed that the organisms had lived side by side, but that

the lands had moved apart after they were dead and fossilized. He suggested that the organisms would not have been able to travel across the oceans.

- Fossils of the seed fern *Glossopteris* were too heavy to be carried so far by wind.
- *Mesosaurus* was a swimming reptile but could only swim in fresh water.
- *Cynognathus* and *Lystrosaurus* were land reptiles and were unable to swim



3. Wegener used fossil evidence to support his continental drift hypothesis. The fossils of these organisms are found on lands that are now far apart.

- **Grooves and rock deposits left by ancient glaciers** are found today on different continents very close to the equator. This would indicate that the glaciers either formed in the middle of the ocean and/or covered most of the Earth. Today glaciers only form on land and nearer the poles. Wegener thought that the glaciers were centered over the southern land mass close to the South Pole and the continents moved to their present positions later on.
- **Coral reefs and coal-forming swamps** are found in tropical and subtropical environments, but ancient coal seams and coral reefs are found in locations where it is much too cold today. Wegener suggested that these creatures were alive in warm climate zones and that the

fossils and coal later had drifted to new locations on the continents.

Although Wegener's evidence was sound, most geologists at the time rejected his hypothesis of continental drift.

Why do you think scientists did not accept continental drift?

- Scientists argued that there was no way to explain how solid continents could plow through solid oceanic crust. Wegener's idea was nearly forgotten until technological advances presented even more evidence that the continents moved and gave scientists the tools to develop a mechanism for Wegener's drifting continents.
- Most evidences of the theory were from the southern hemisphere while most geologists are located in the northern hemisphere.
- Geological processes like movement of land masses cannot occur within short geological time. But Wegener assumed that the drifting of Pangaea to existing continents took only one era (Mesozoic).
- Geological research and investigation requires critical knowledge and skill in the study area. Wegener is not a geologist but meteorologist.