

Continental Drift Alfred Wegener

- Learn who Alfred Wegener was and state the theory of continental drift.
- Describe the crust as broken into pieces called tectonic plates.
- Evaluate the evidence for continental drift and explain why it was not accepted at the time.
- Explain that convection currents within the Earth's mantle driven by heat released by natural radioactive processes cause the plates to move at relative speeds of a few centimetres per year.

Lesson 2

Continental Drift

Starter: Think Pair Share

Were all scientists successful?

Can you think of any scientists who were famous but unsuccessful?

- Mendeleev's early life.
- Nikolai Tesla
- Alfred Wegener's sad later life

The Earth's surface isn't smooth — it's covered in mountains and valleys. In the olden days, scientists thought that these structures were formed due to the surface of the Earth shrinking as the Earth cooled down after it was formed.

But scientists now think that the Earth's surface is split up into big chunks called tectonic plates and that mountains are formed when these tectonic plates collide.

The idea that the Earth's surface is not stable and is made up of parts that move was first put forward by Alfred Wegener.

He proposed a theory known as the theory of continental drift.

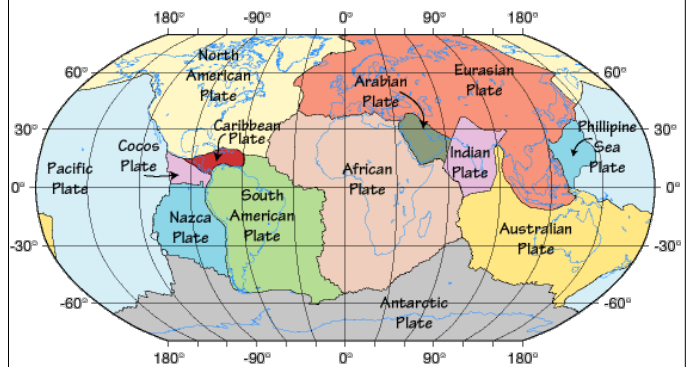
Wegener said that about 300 million years ago, there had been just one 'supercontinent'.

This landmass, called Pangaea, broke into smaller chunks which moved apart. He claimed that these chunks (our modern-day continents) were still slowly 'drifting' apart.



Tectonic Plates

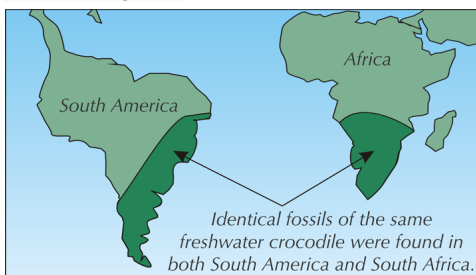
These are the tectonic plates.



Evidence

Alfred Wegener came across some work listing the fossils of very similar plants and animals which had been found on opposite sides of the Atlantic Ocean.

This discovery suggested to Wegener that South America and Africa were once close together.



He investigated further, and found other cases of very similar fossils on opposite sides of oceans.

Evidence

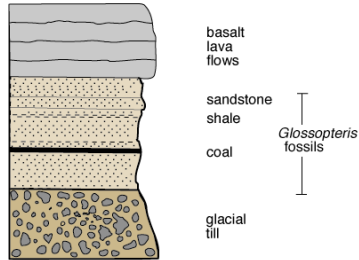
Wegener had also noticed that the coastlines of Africa and South America seemed to 'match' like the pieces of a jigsaw.

He wondered if these two continents had previously been one continent which then split. He started to look for more evidence, and found it.



Evidence

There were matching layers in the rocks in different continents and fossils had been found in the 'wrong' places. Fossils of tropical plants had been discovered on Arctic islands, where the present climate would clearly have killed them off.



In 1915, Wegener felt he had enough evidence and he published his theory of "continental drift".

Reaction to Wegeners theory

The reaction from other scientists to Wegener's theory was mostly very hostile. A few scientists supported Wegener, but most of them didn't see any reason to believe such a strange theory. There were two main reasons why other scientists thought that Wegener's theory was wrong.

1. Wegener couldn't explain how the continents moved

The main problem was that Wegener's explanation of how the 'drifting' happened wasn't very convincing. At the time, other scientists thought that the continents were fixed and couldn't move and Wegener didn't have any evidence that the continents were moving.

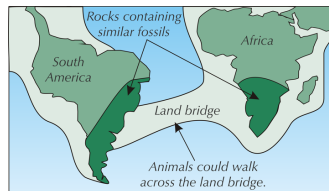
Reaction to Wegeners theory

2. Land bridges could explain a lot of Wegener's evidence

Lots of Wegener's evidence for continental drift was based on things like similar fossils being found on the opposite sides of oceans and matching layers of rock on different continents.

Other people had noticed this too and in 1920, scientists came up with an alternative theory to explain Wegener's evidence.

They thought that there had once been land bridges linking the continents — so animals had been able to cross. The bridges had 'sunk' or been covered over since then.



Reaction to Wegeners theory

2. Wegener wasn't a proper 'scientist'

If Wegener's evidence could be explained by a different, more believable theory, why should they believe Wegener's theory of continental drift?

It probably didn't help that Wegener wasn't a 'proper' geologist — he'd studied astronomy and worked as a meteorologist (a weatherman).



Great Minds Alfred Wegener

Task

What is the Alfred Wegener's theory of continental drift. And what evidence did he have for it? (4)

Alfred Wegener's theory of continental drift was not accepted by the scientists at the time. Why? (2)

<https://www.youtube.com/watch?v=nbU809Cyrao>

On SciShow they talk fast so make sure the subtitles are on and you pause the video often

Plate Tectonics

In the 1950s, scientists were able to investigate the ocean floor and found new evidence to support Wegener's theory. He wasn't right about everything, but his main idea was correct.

By the 1960s, geologists were convinced. We now think the Earth's crust is made of several chunks called tectonic plates which move about, and that colliding chunks push the land up to create mountains.

1. Natural radioactive processes produce heat in the mantle.
2. Heat produces convection currents in the mantle.
3. Convection currents drag large pieces of the crust called tectonic plates apart.