

Grade 7 Science

Unit 4: The Earth's Crust



PLATE TECTONIC THEORY

Alfred Wegener



- 1880 – 1930
- German meteorologist
- He noticed that the continents fit together like a puzzle.



- He said that at one time all continents were joined together in one large land mass, he called **Pangaea**.
- He proposed that this super-continent broke apart 200 million years ago.



- Wegener proposed the **Theory of Continental Drift** which suggests that the continents change position slowly by a few cm a year.
- He could not explain how.

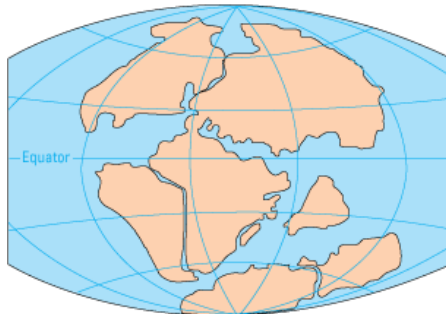
Theory of Continental Drift



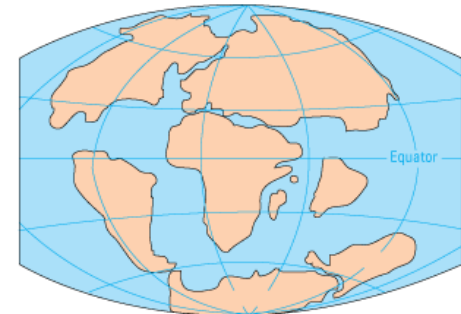
PERMIAN
225 million years ago



TRIASSIC
200 million years ago



JURASSIC
150 million years ago



CRETACEOUS
65 million years ago



PRESENT DAY

Supporting Evidence...

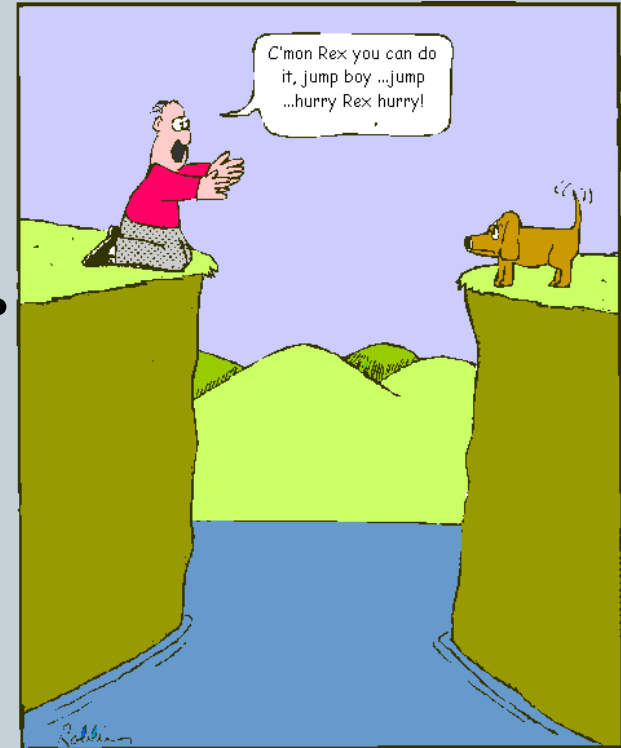


Biological Evidence – Fossils

- Similar fossils found on one continent have been found on others. Ex. NL and Wales

Refer to page 361

- Wegener believed that at one time there had been a land bridge that has now disappeared to join continents together.





Geological Evidence – Rocks and Rock Layers

- Geologists found rocks that were similar on both sides of the Atlantic Ocean. The ages of these rocks are also the same.



- These rocks look as though they had been pushed up into mountains together before they were separated.



Meteorological Evidence – Climate Change

- Location of coal beds. These should be found in tropical, swampy area BUT have been found in cold and moderate climates.



- Glacial evidence. There are warm areas that show evidence that they were once covered in glaciers.

Accepted or Rejected?



Because he was unable to explain HOW the continents move, his theory was rejected by the scientific community.

Plate Tectonics



- Developed from the earlier Continental Drift Theory due to new evidence.
- New technological advances include the following...



1. Sonar: provides a more detailed picture of the sea floor. (*pg. 364*)
2. Magnetometers: provide evidence for sea floor spreading. (*pg. 365*)



3. Deep sea drilling: provides evidence for the internal structure of the crust.

(pg. 366)

Evidence Collected...



- Discoveries on the sea floor showed that magma produces new crust which pushes the plates of the Earth's crust.
- The plates can be pushed in three ways.



1. Divergent boundaries:
plates moves away from
each other.
2. Convergent boundaries:
plates move towards each
other



3. Transform Boundaries:
plates slide past each other.

*This idea was developed by
J. Tuzo Wilson (Canadian
Scientist) during the 1960s.

New Theory...



- Wilson's ideas form a new theory in the 1970s.
- Because it was discovered that the sea floor as well as the continents were moving, the plate tectonic theory was born.



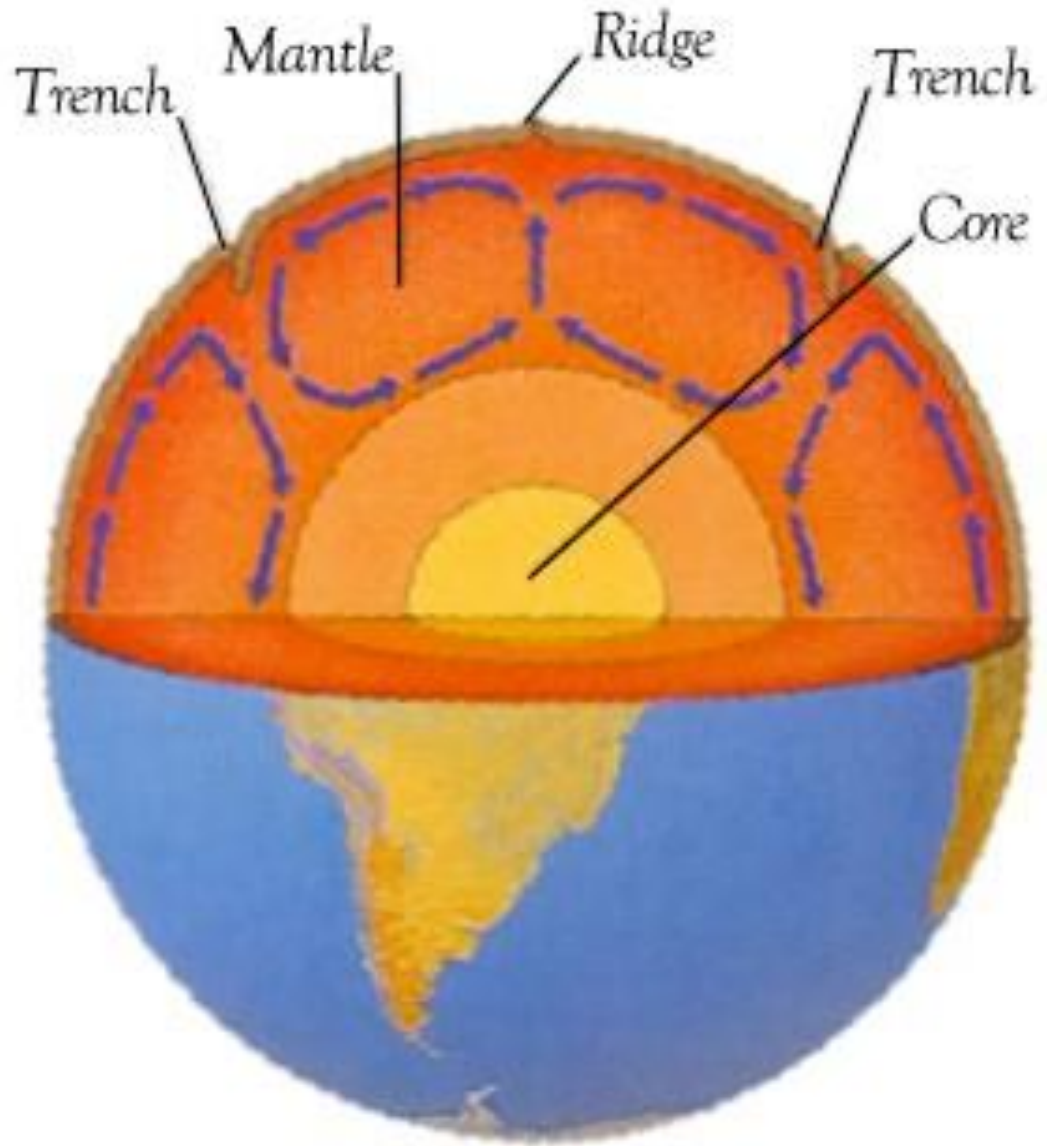
- This theory states that Earth's crust is broken up into pieces, called plates that are always moving on Earth's mantle.
- Satellites are helping to measure plate movements.

Convection Currents



- One explanation to the HOW.
- These convection currents, that move the plates, are in the mantle.

Convection Currents



Canadian Contributions...



J. Tuzo Wilson



- He mapped out where earthquakes and volcanoes had occurred over the Earth's surface, thereby defining the Earth's plates.



Joseph Tyrell



- Discovered dinosaur fossils in Alberta, which proved that the local climate was warmer at an earlier time.



Harold Williams



- Highlighted plate tectonic activity that occurred regionally along the eastern edge of the North American continent.

Plate Tectonics Theory



CORE STSE