Handout 1 (blue) Plate Tectonics

Standard 2.3

1. What did people notice when they studied new world maps 400 years ago?

- Similarity of the continental shorelines on either side of the Atlantic ocean.

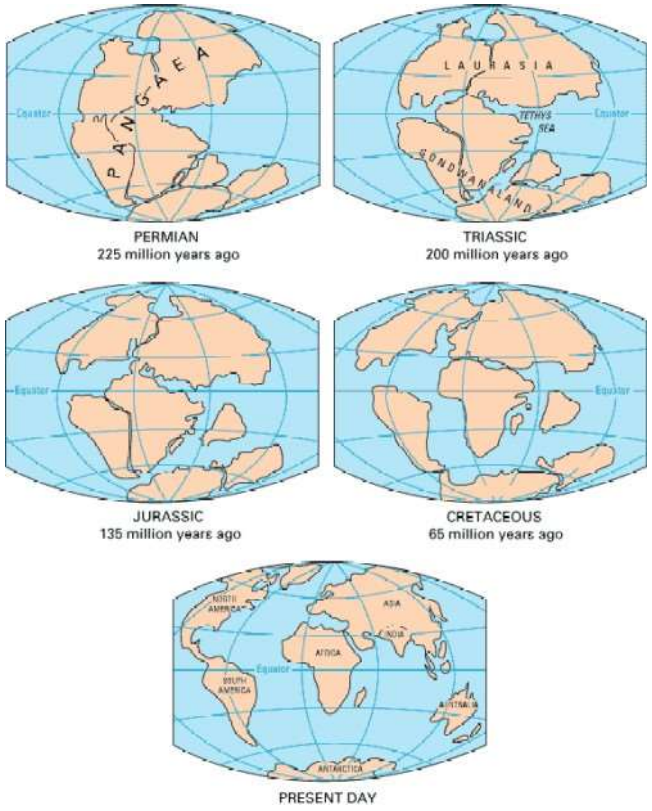
2. The German scientist Alfred Wegener proposed a hypothesis now called __Continental Drift__.

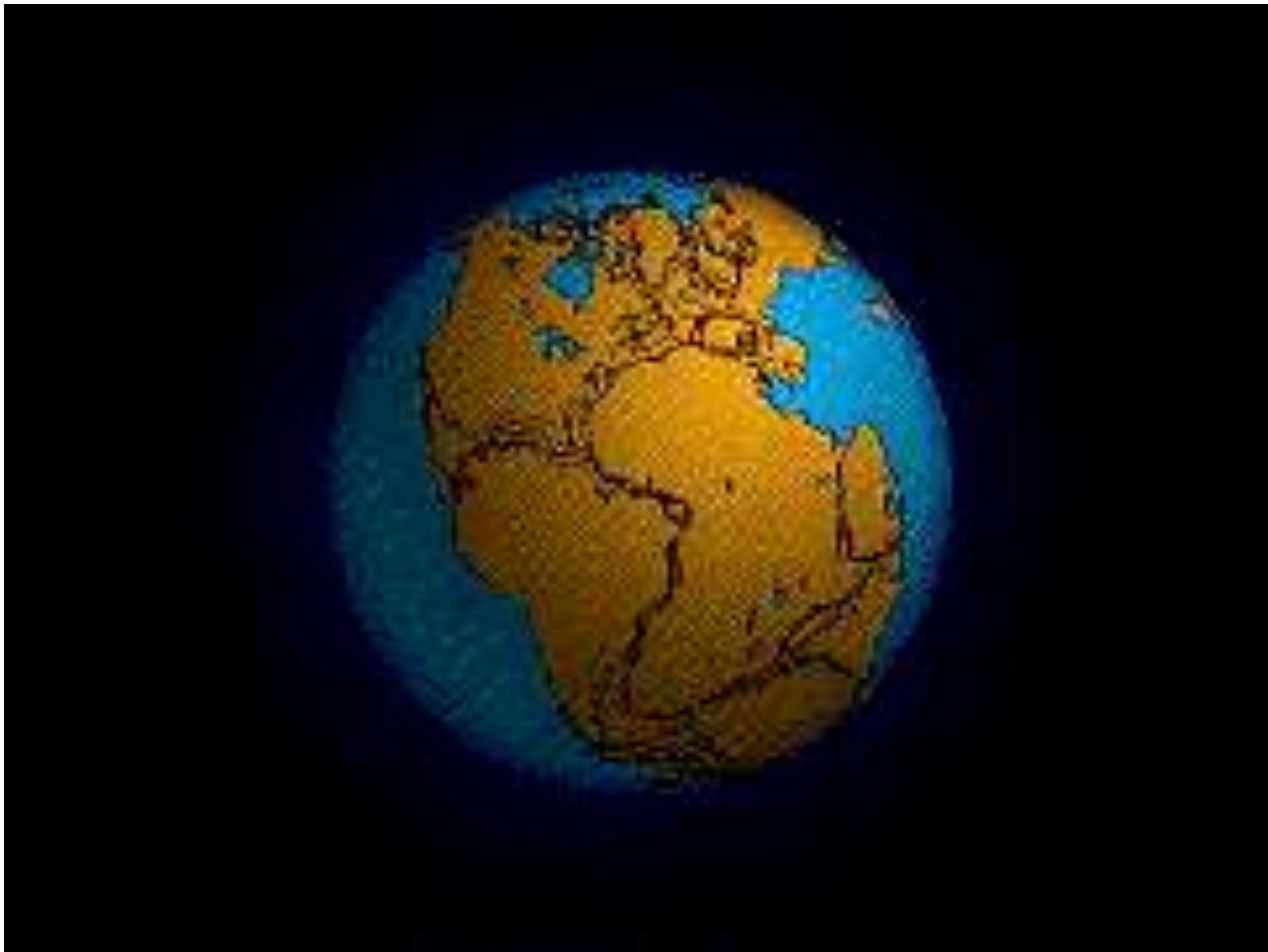
3. Wegener hypothesized that the continents formed part of a single land mass, or __supercontinent__.

4. When did Wegener think that small continents began forming

__250 million years ago__.

5. Wegener speculated that over millions of years these small continents drifted to their present locations .



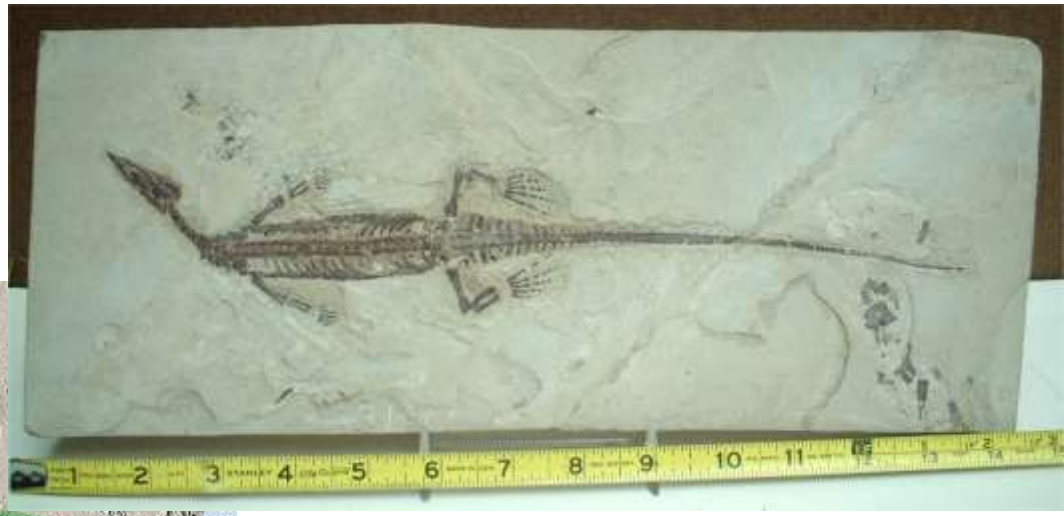


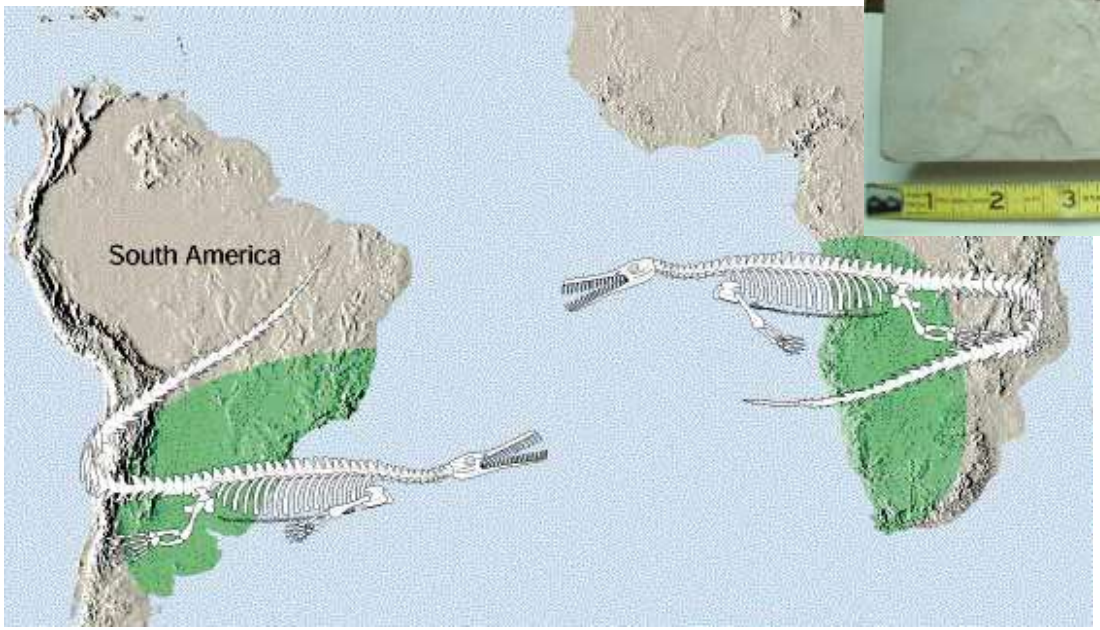
6. Why was Wegener interested in finding fossils of the same plants and animals on two different continents?

- If the continents had once been joined, fossils of the same plants and animals should be found in areas that had once been connected.

7. Where were the fossils from the extinct land reptile called *Mesosaurus* found?

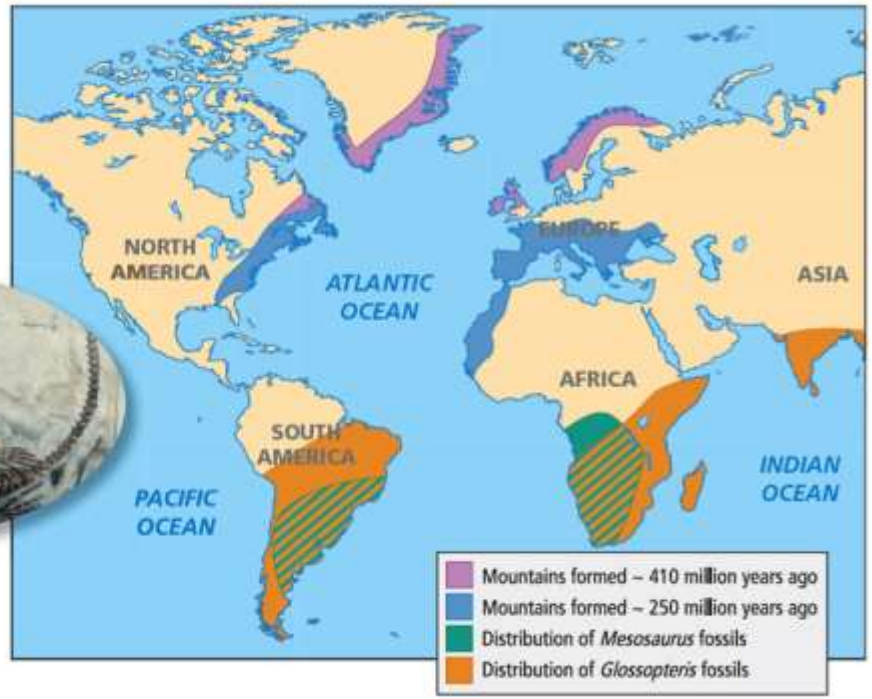
- They were found in both South America and western Africa





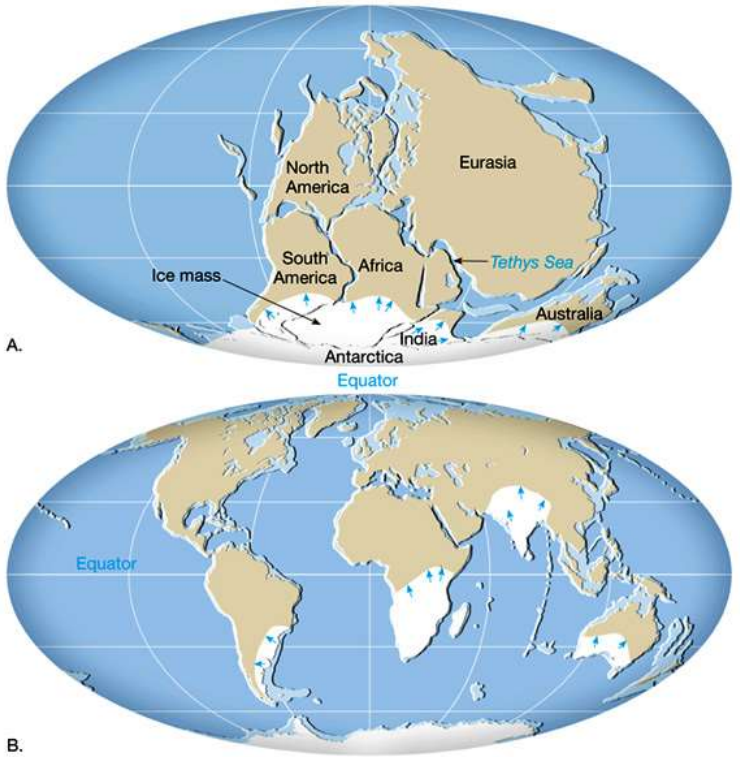
8. Give an example of a mountain chain that seems to continue from one continent to other continents across the ocean.

- **The Appalachian Mountains** extend northward along the eastern coast of North America and are of similar age and structure of mountains in Greenland, Scotland, and northern Europe.



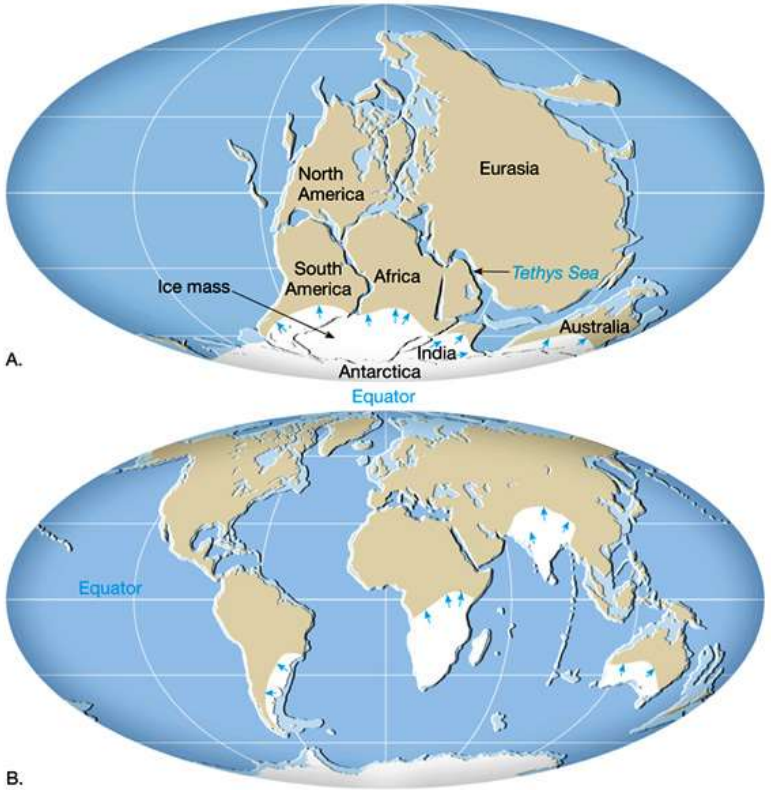
9. What do layers of debris from ancient glaciers in South Africa and South America indicate to geologists?

- Today, those areas have climates that are too warm for glaciers to form.



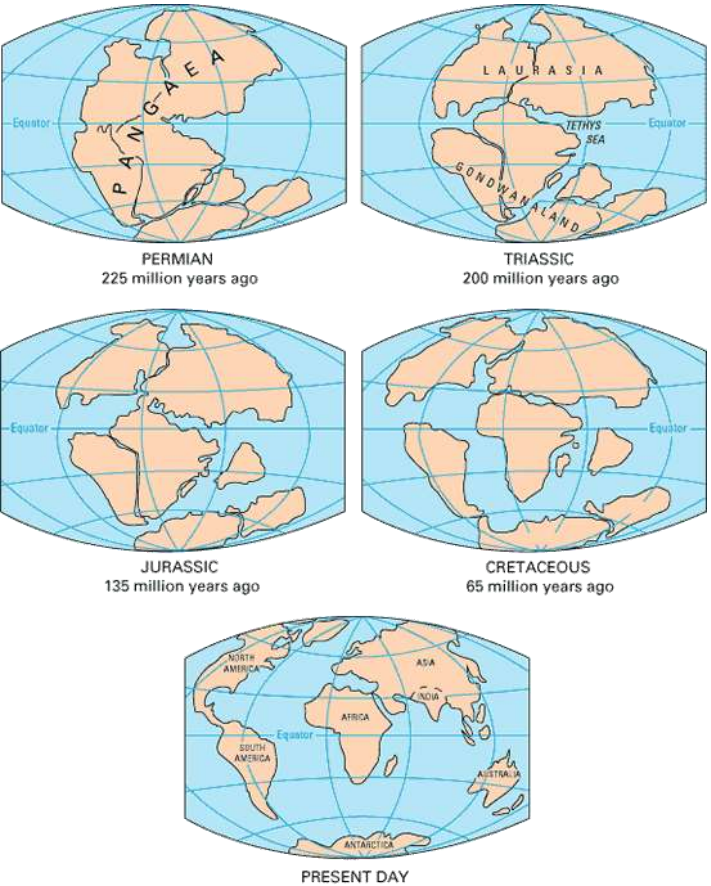
10. How did Wegener account for differences in climate between the past and today?

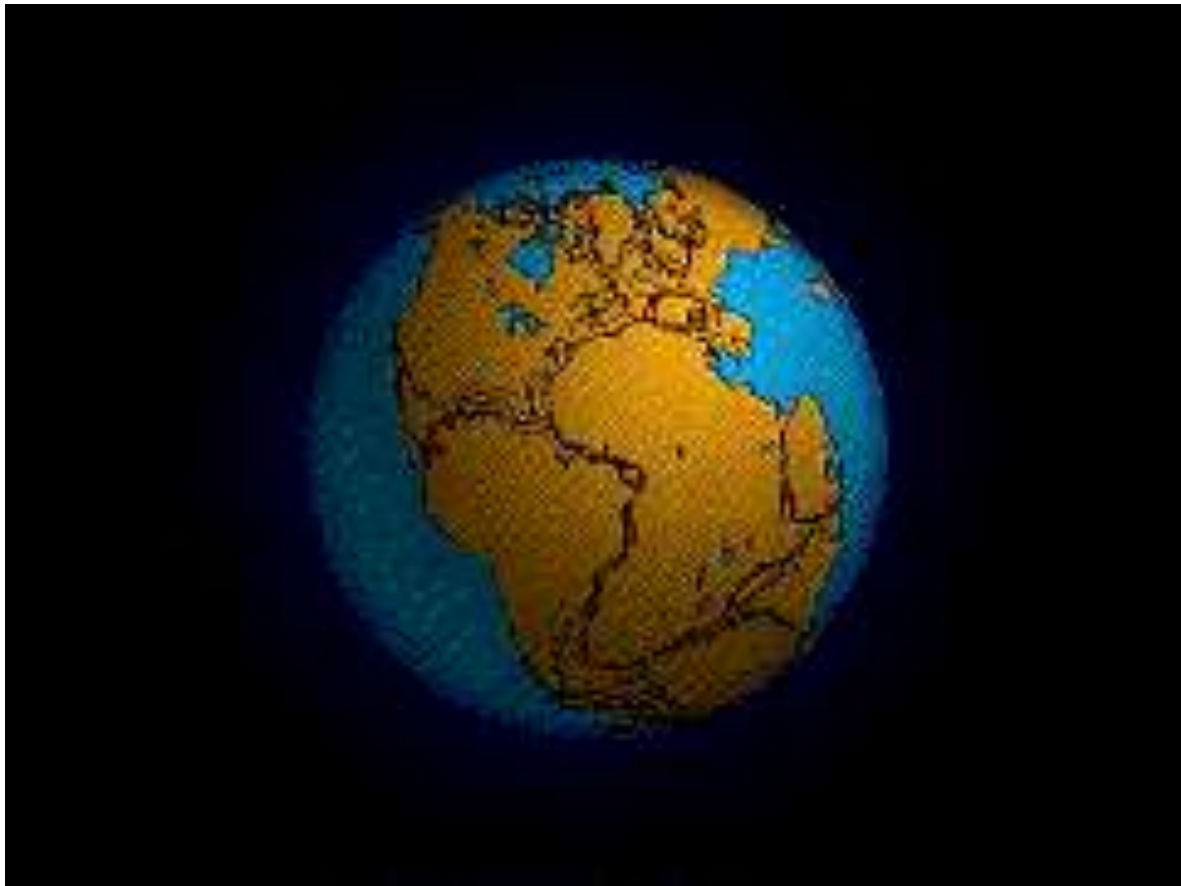
- The continents were once joined and positioned differently.



11. According to Wegener, how did the continents move?

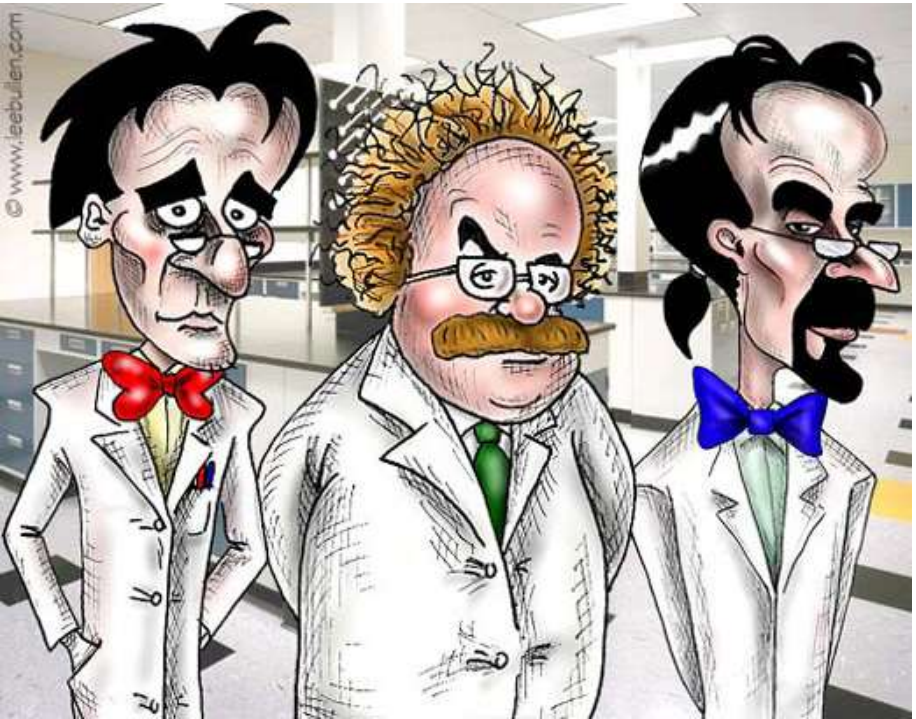
- Wegener suggested that the continents plowed through the rock of the ocean floor.

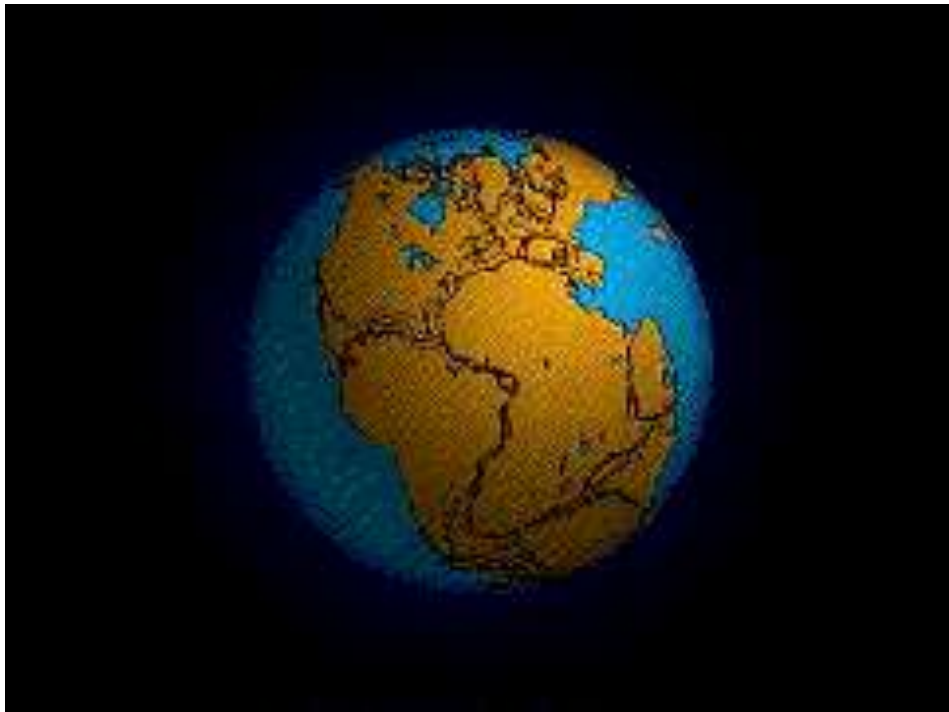




12. Why did scientists disagree with Wegener's theory of how the continents moved?

- Other scientists of the time rejected the mechanism by which Wegener proposed that the continents moved.

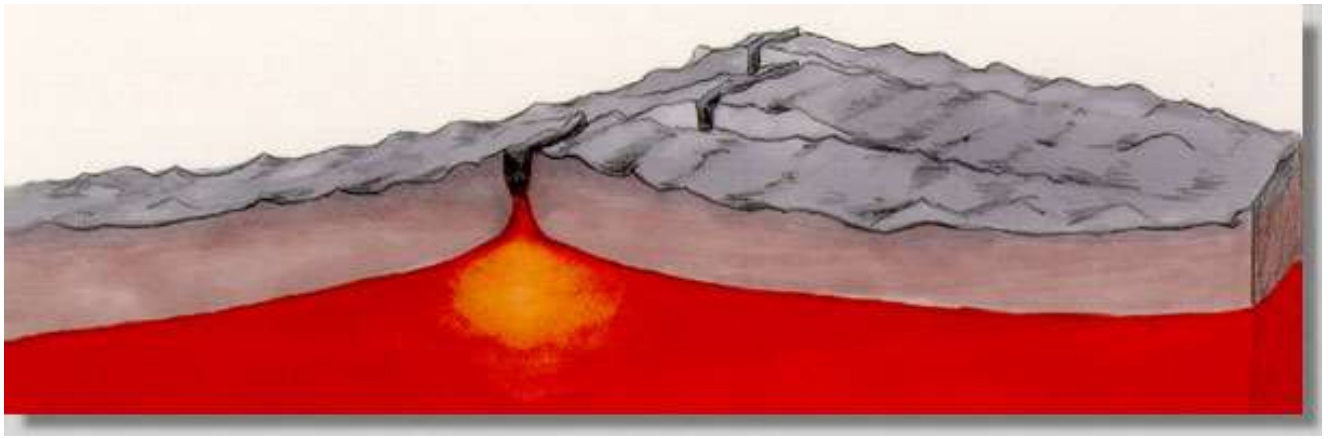




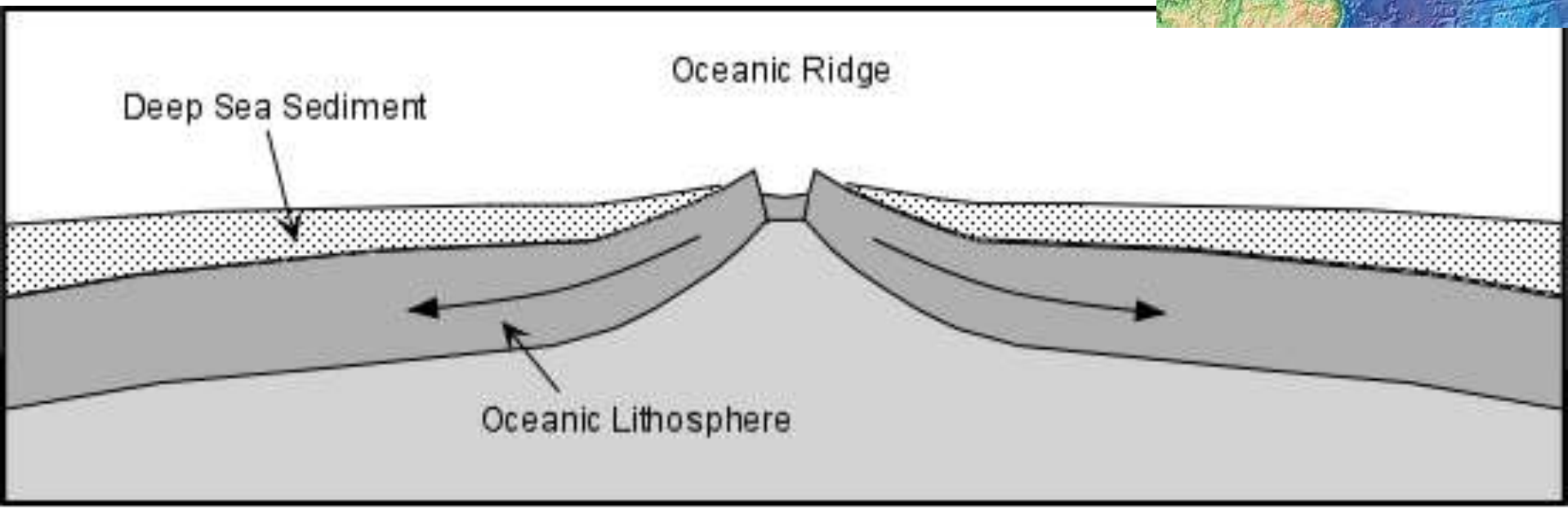
13. Why was Wegener's theory not proven in his lifetime?

- There was no geologic evidence supporting Wegener's idea that the continents plowing through the ocean floor. Wegener died in 1930 never finding an acceptable mechanism.

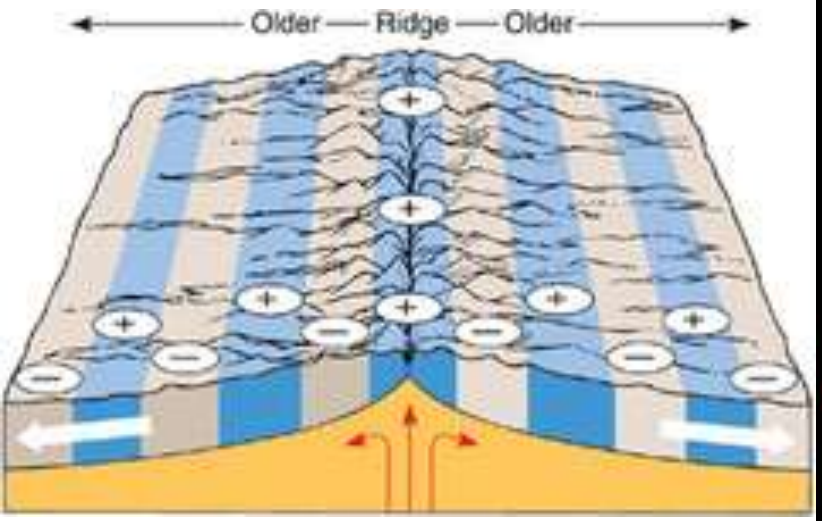
14. Undersea mountain ranges with steep, narrow valleys in the center are called mid-ocean ridges.

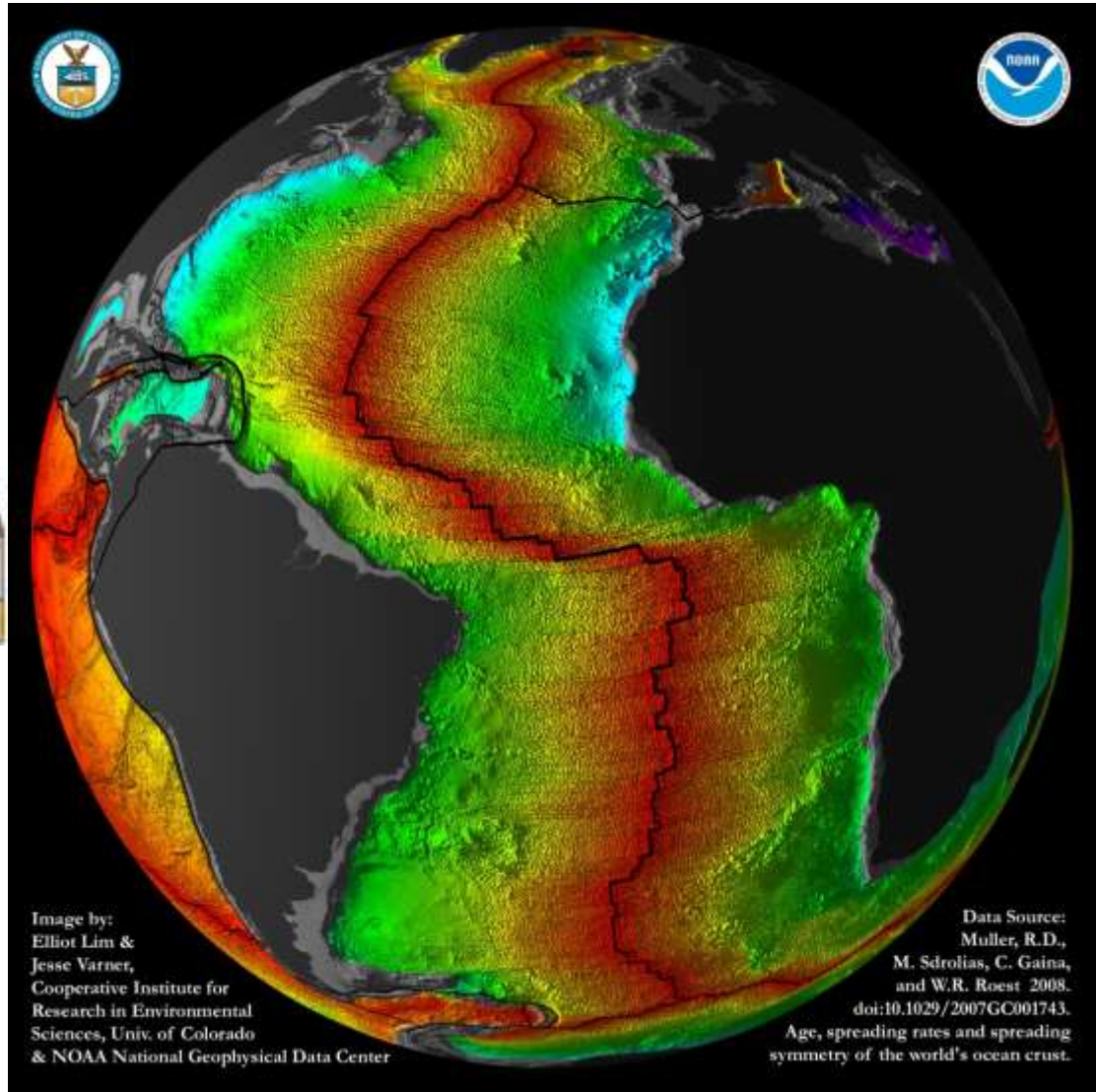


15. Compared to sediment found farther from a ridge, sea-floor sediment closer to a ridge is _____thinner_____.

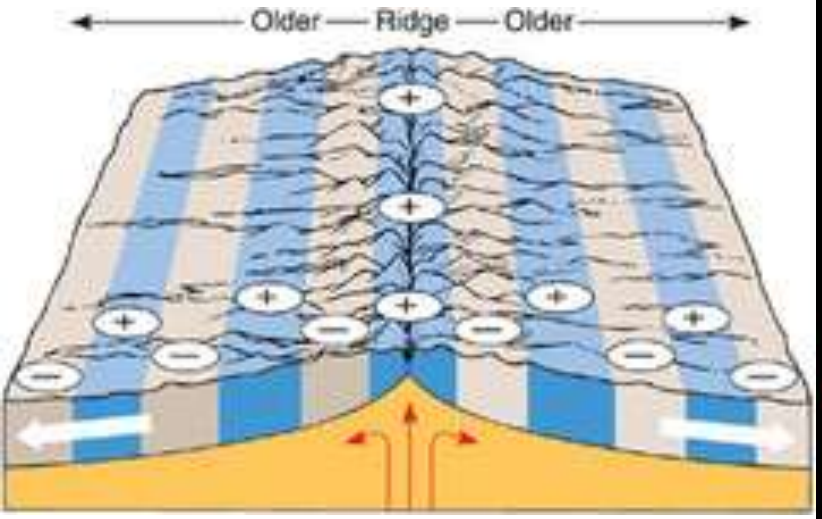


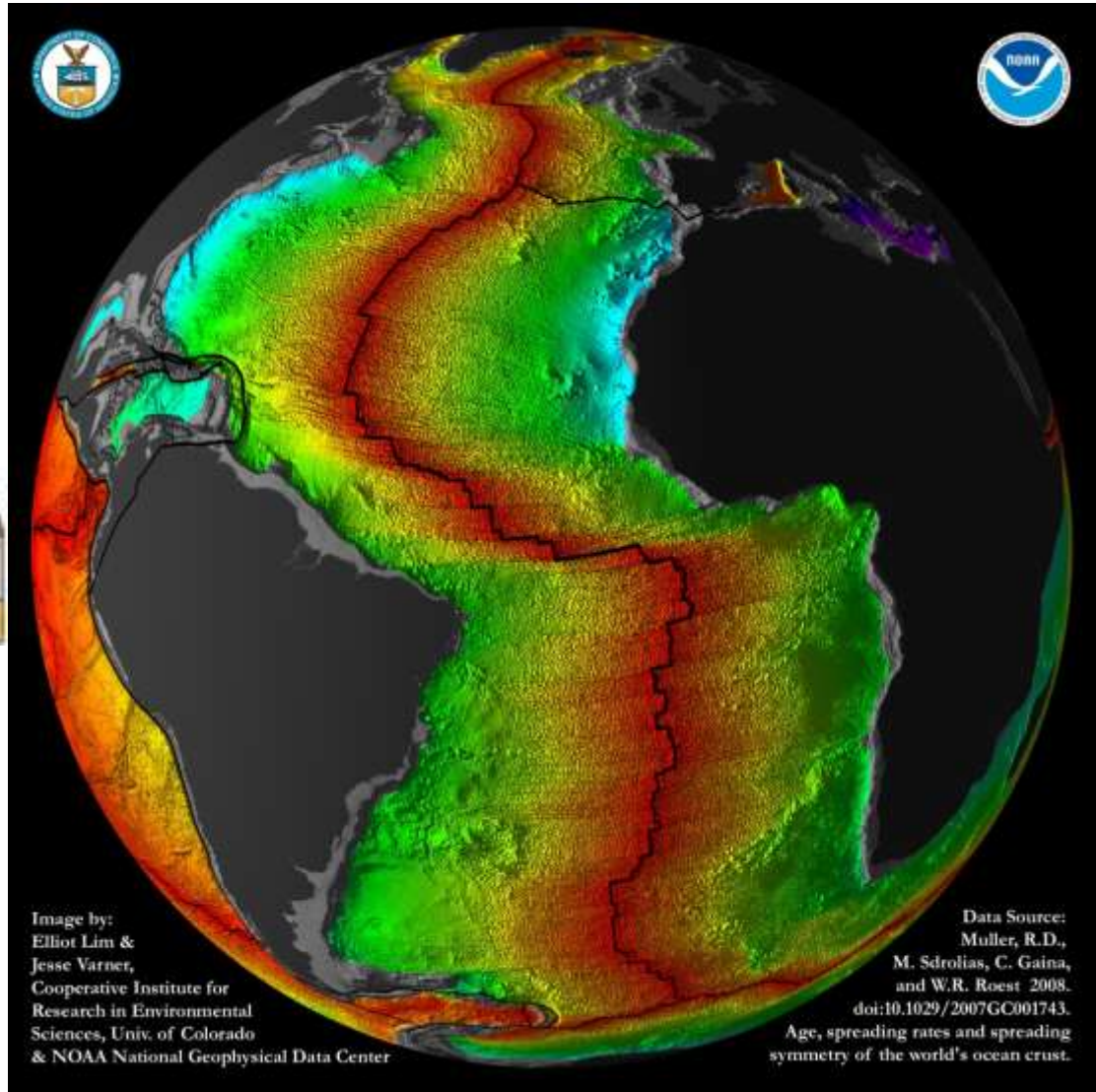
16. Compared to rocks farther from a ridge, rocks closer to a ridge are younger.





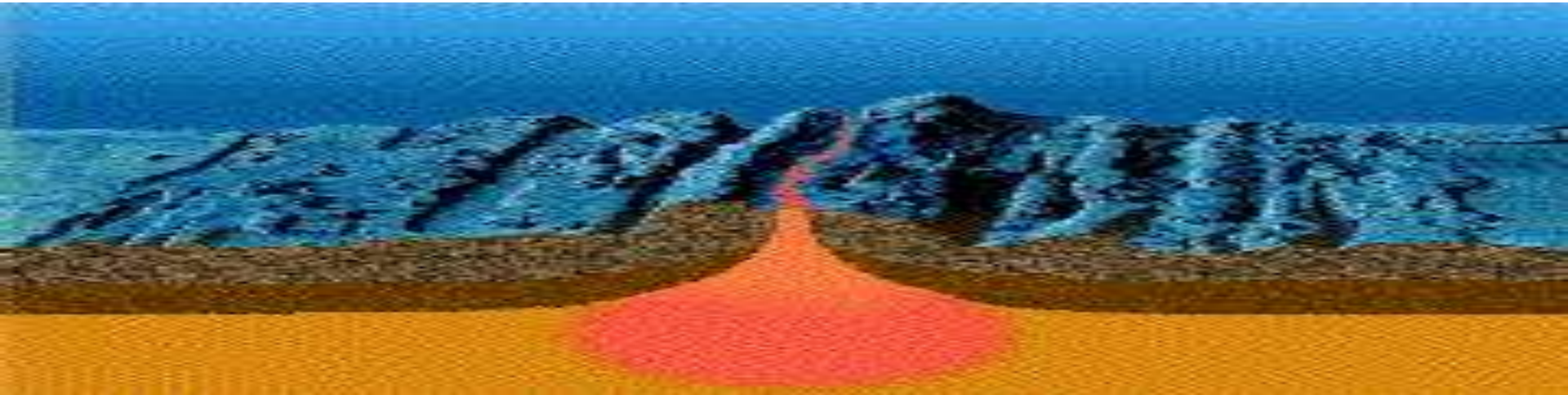
17. The oldest ocean rocks are 175 million years old.





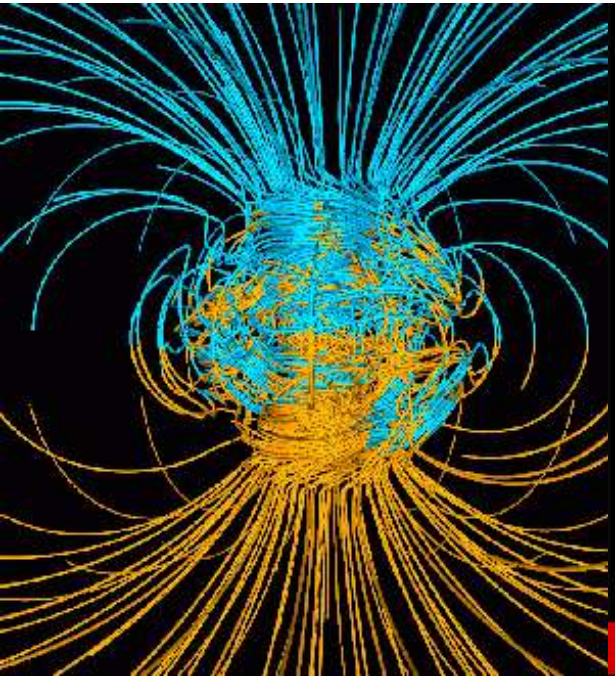
18. Describe the process of sea-floor spreading.

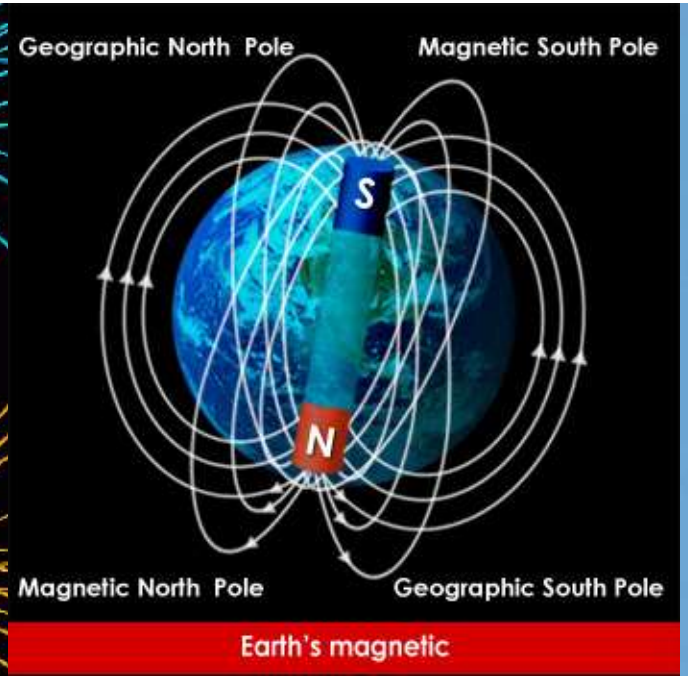
- The process by which new oceanic lithosphere (sea floor) forms as magma rises to Earth's surface and solidifies at a mid-ocean ridge.



19. In what way is Earth like a giant magnet?

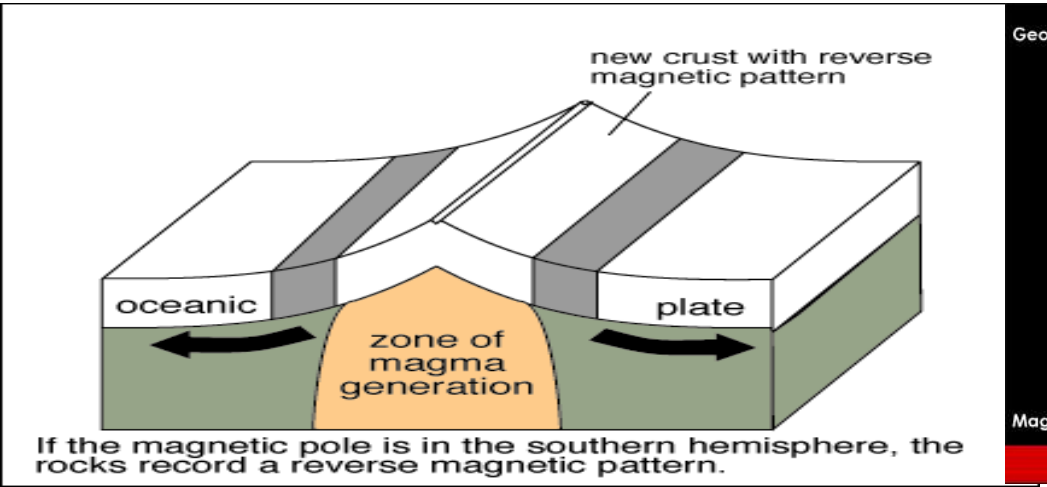
- Earth has north and south geomagnetic poles. A compass needle aligns with the field of magnetic force that extends from one pole to the other.

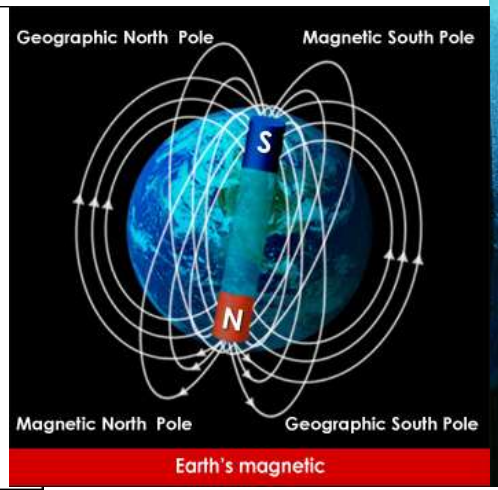




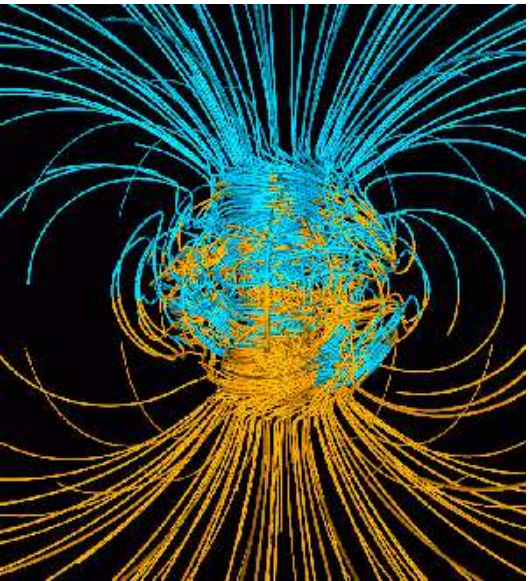
20. Explain how solidified magma comes to be magnetic.

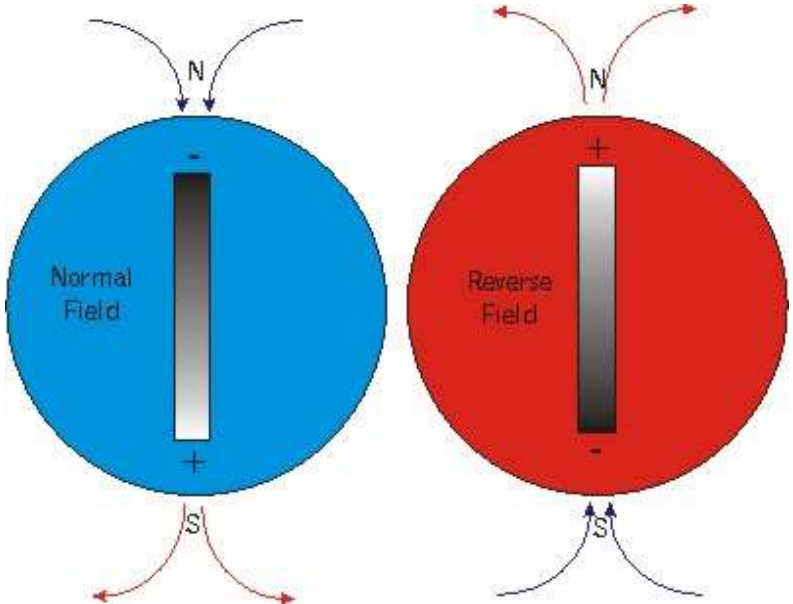
- As magma solidifies to form rock, iron-rich minerals in the magma align with Earth's magnetic field in the same way that a compass needle does. When the rock hardens, the magnetic orientation of the minerals becomes permanent.

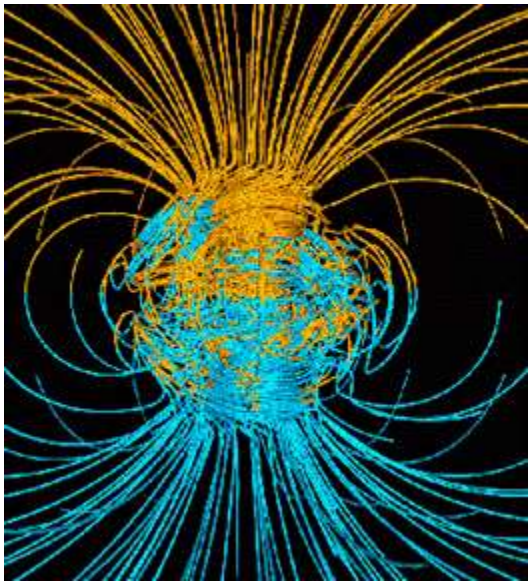




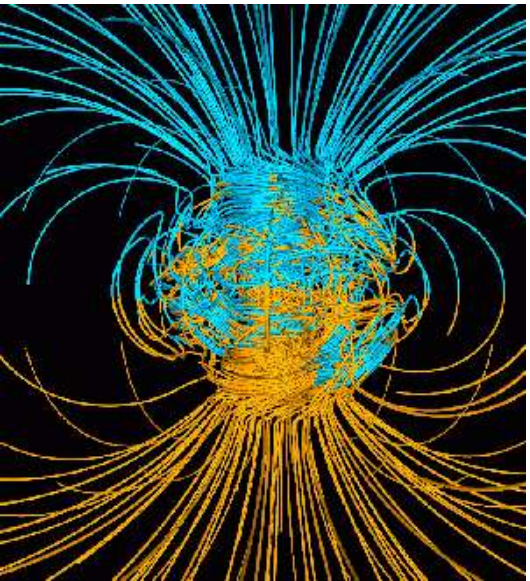
21. Rocks with magnetic fields that point north have _normal polarity_.

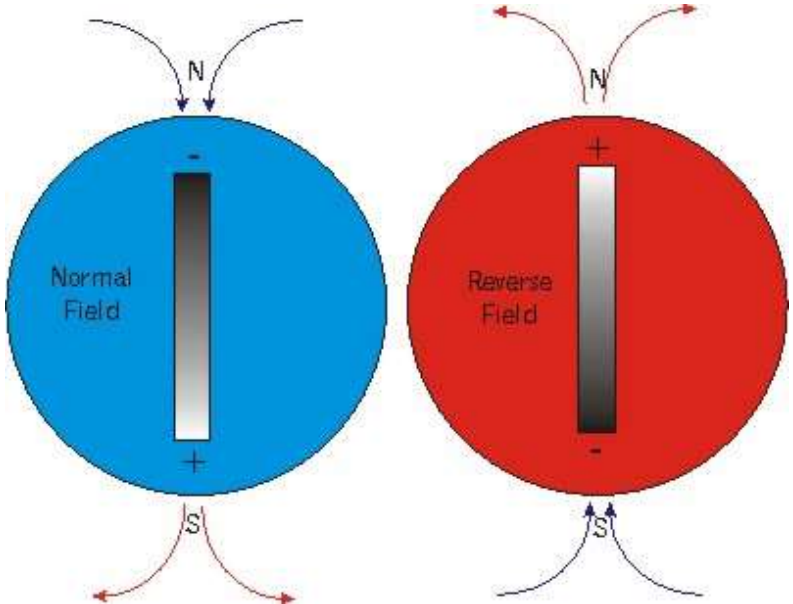


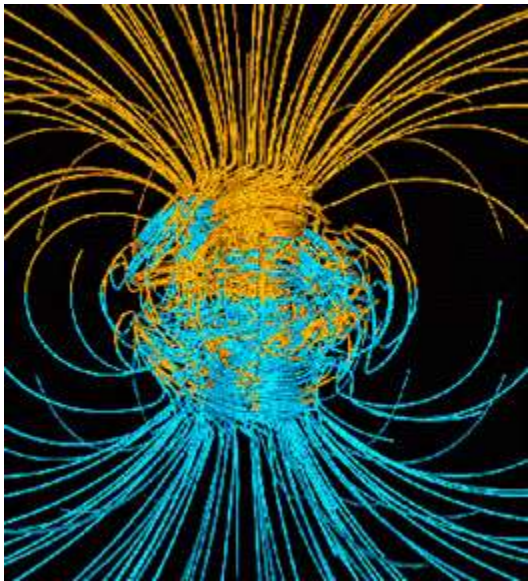




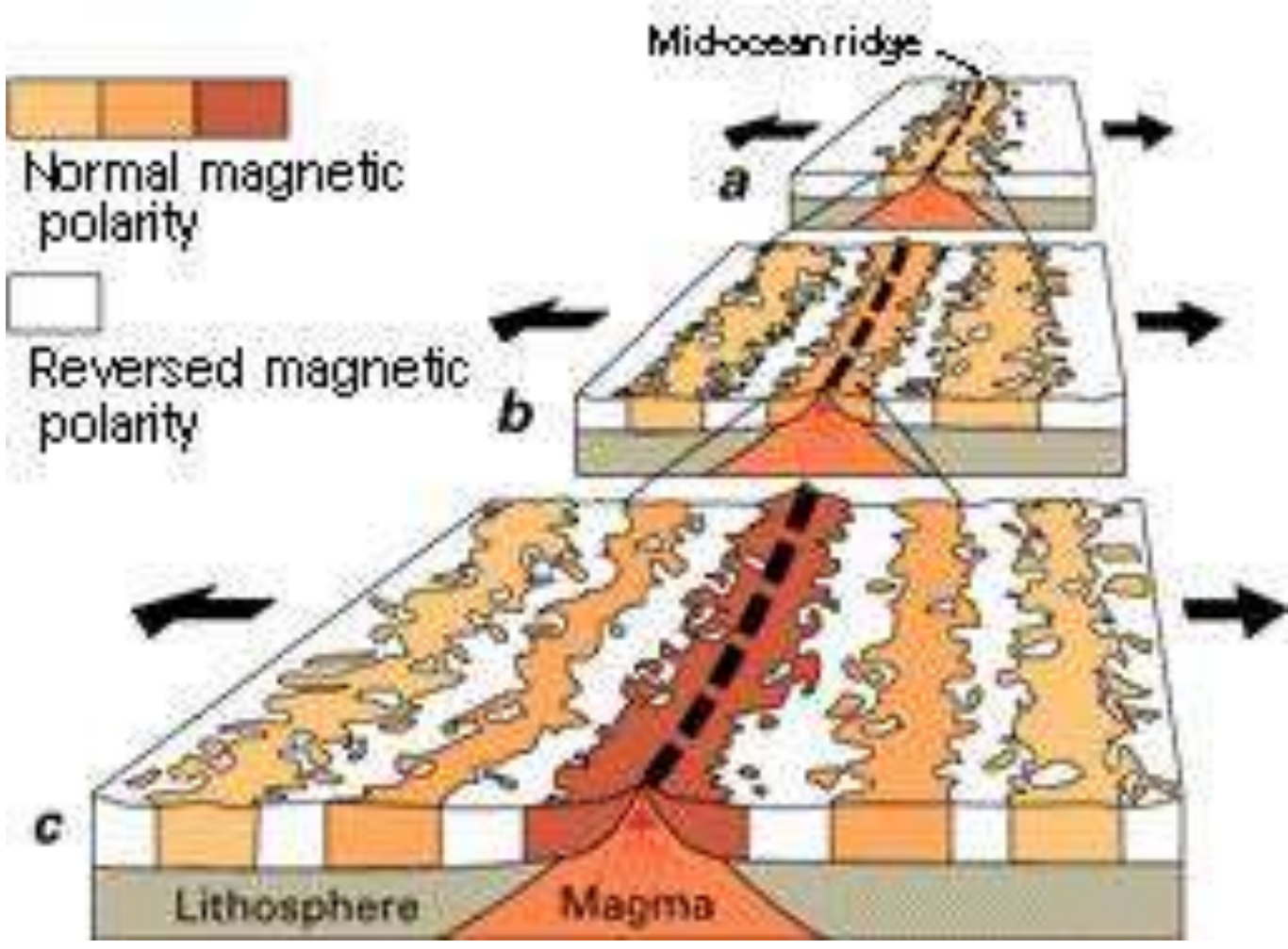
22. Rocks with magnetic fields that point south have _reversed polarity_.





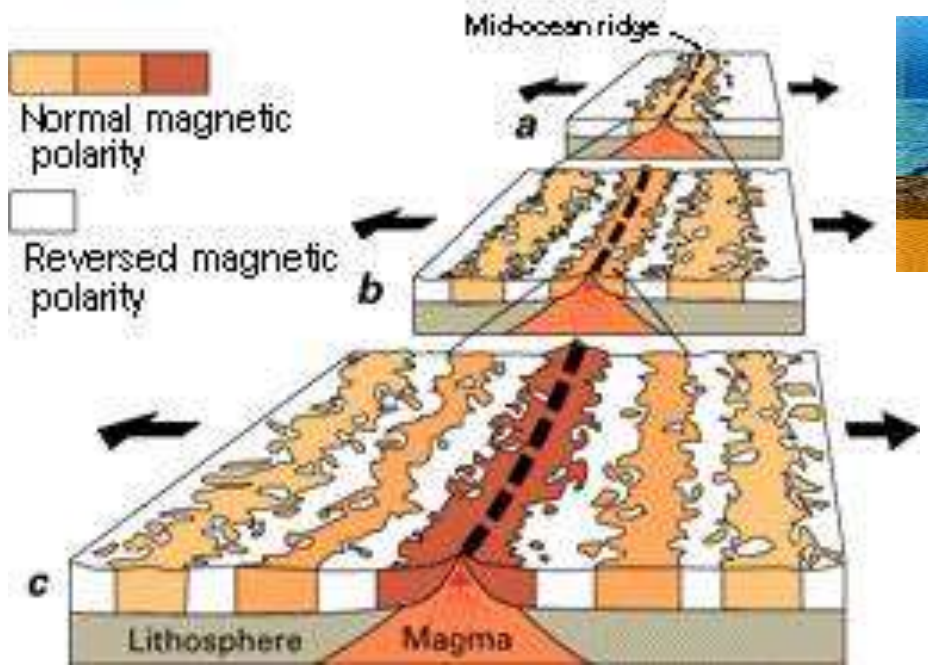


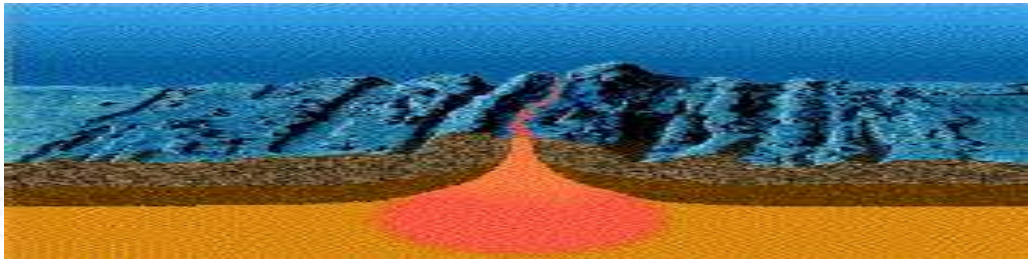
23. The pattern of normal and reverse polarity in rocks enabled scientists to create the geomagnetic reversal time scale.



24. What did scientists think happened to cause the magnetic patterns they found?

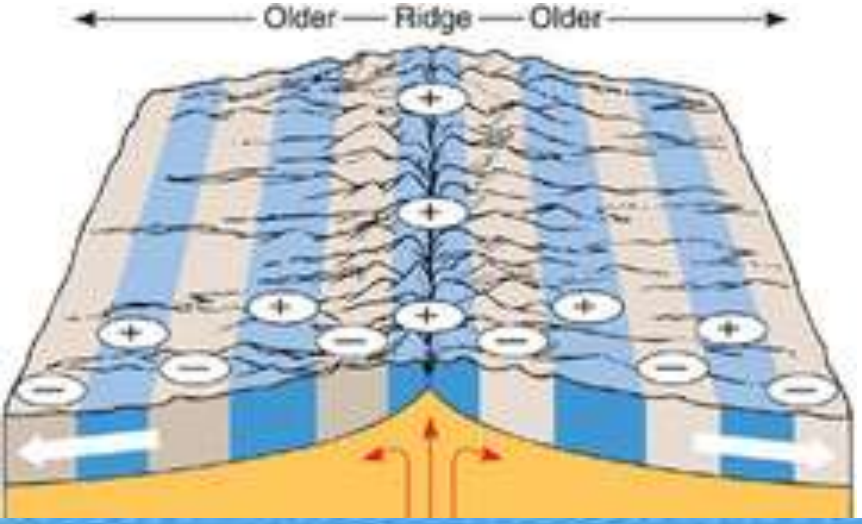
- Scientists suggested that as new sea floor forms at a mid-ocean ridge, the new sea floor records reversals in Earth's magnetic field.

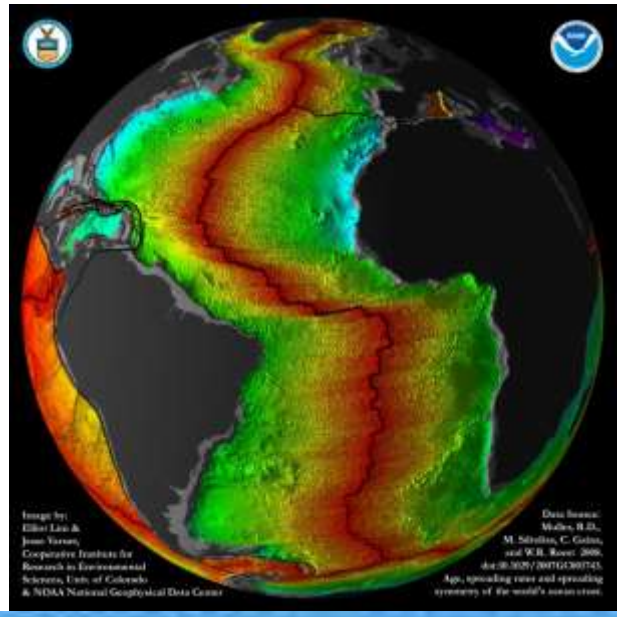




25. Where were the youngest rocks on the sea floor?

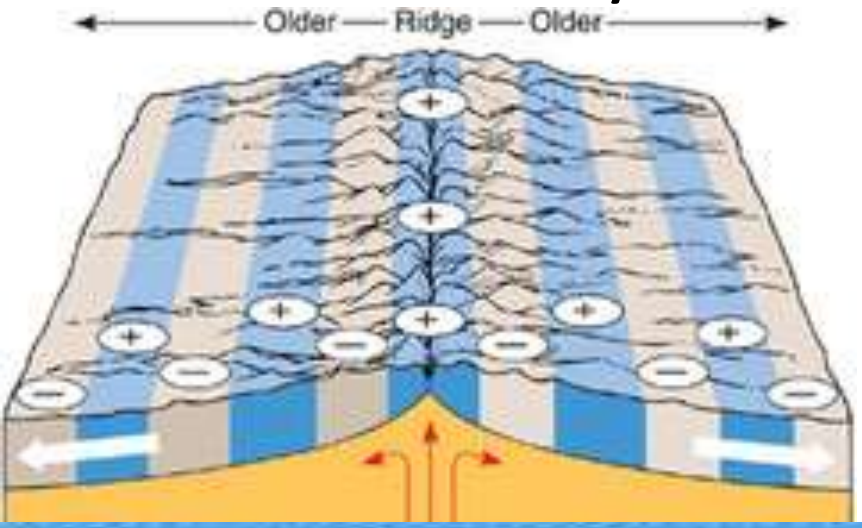
- At the center of the ridge

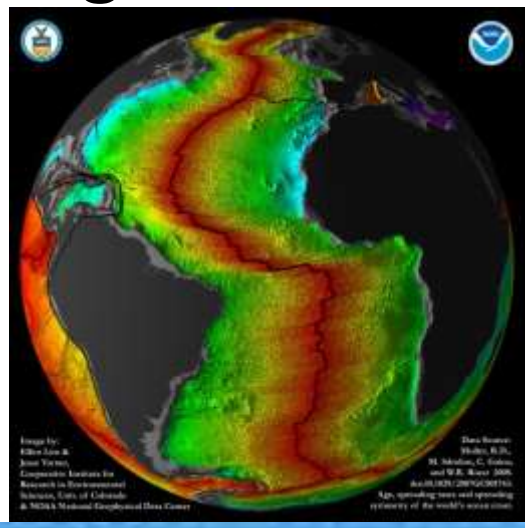




26. Where were the older rocks on the sea floor?

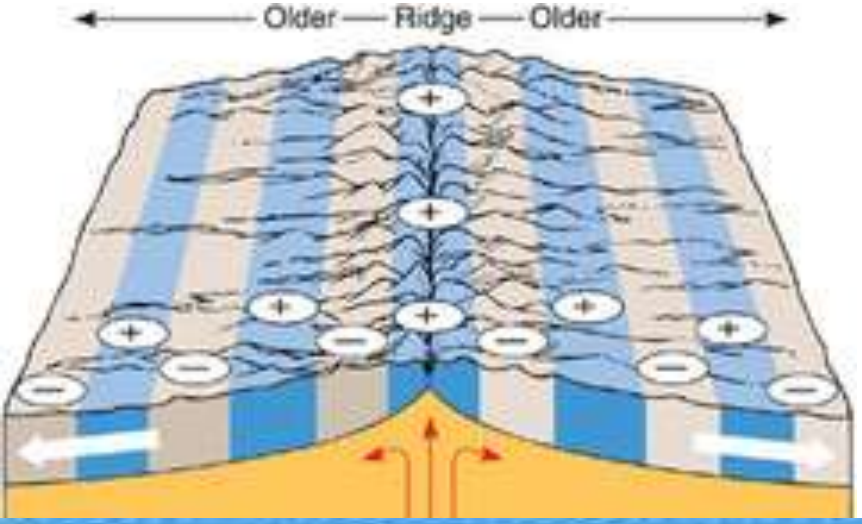
- Farther away on either side of the ridge.

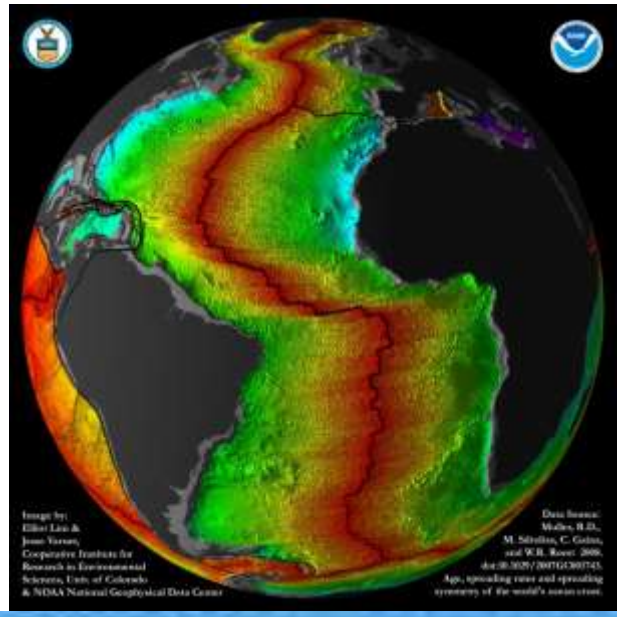




27. Where does new rock form on the sea floor?

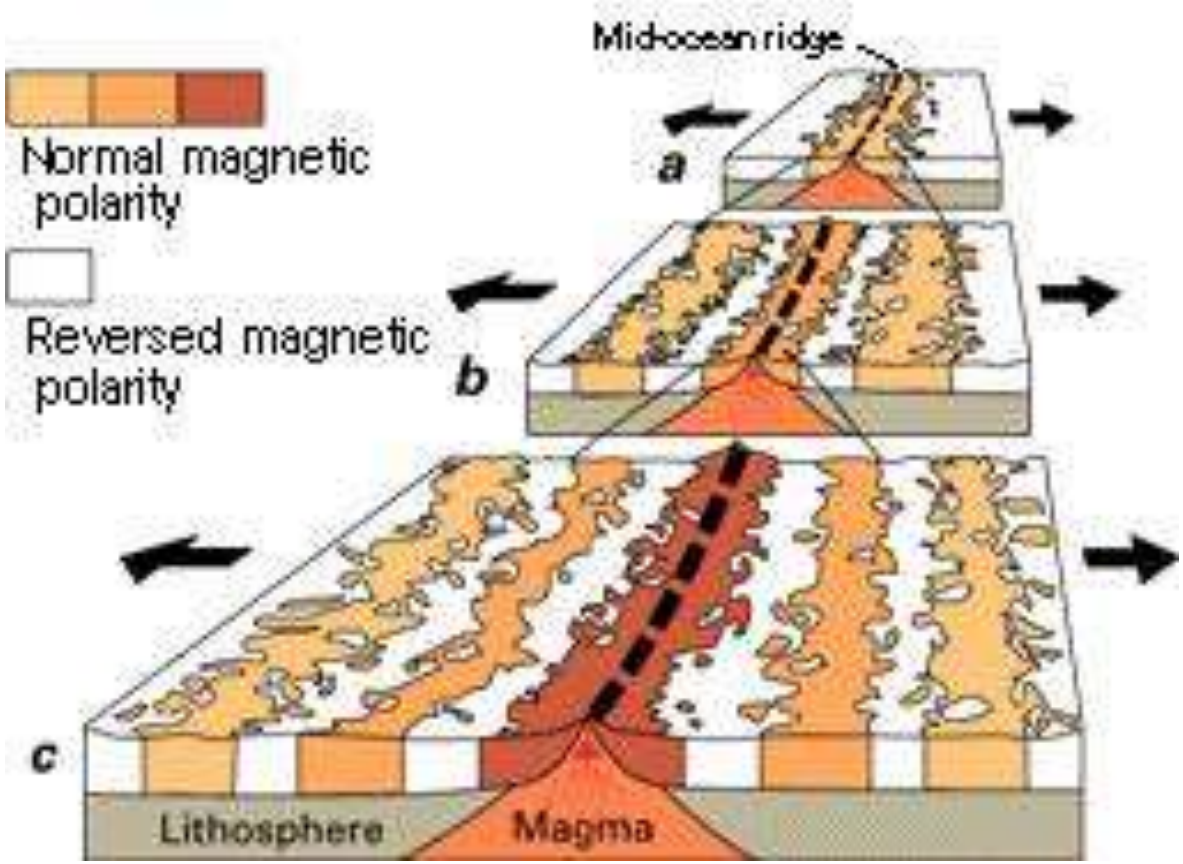
- At the rift in a mid-ocean ridge.





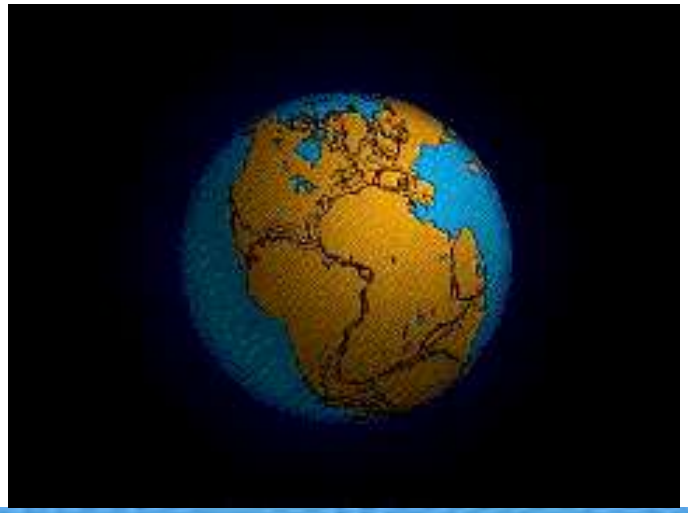
28. What supports Hess's theory of sea-floor spreading?

- The symmetry of magnetic patterns and the symmetry of ages of sea-floor rocks.



29. Continents move over Earth's surface

- By the widening sea floor, which acts as a conveyor belt.



30. The mechanism that verifies Wegener's hypothesis of continental drift is Sea-floor spreading.