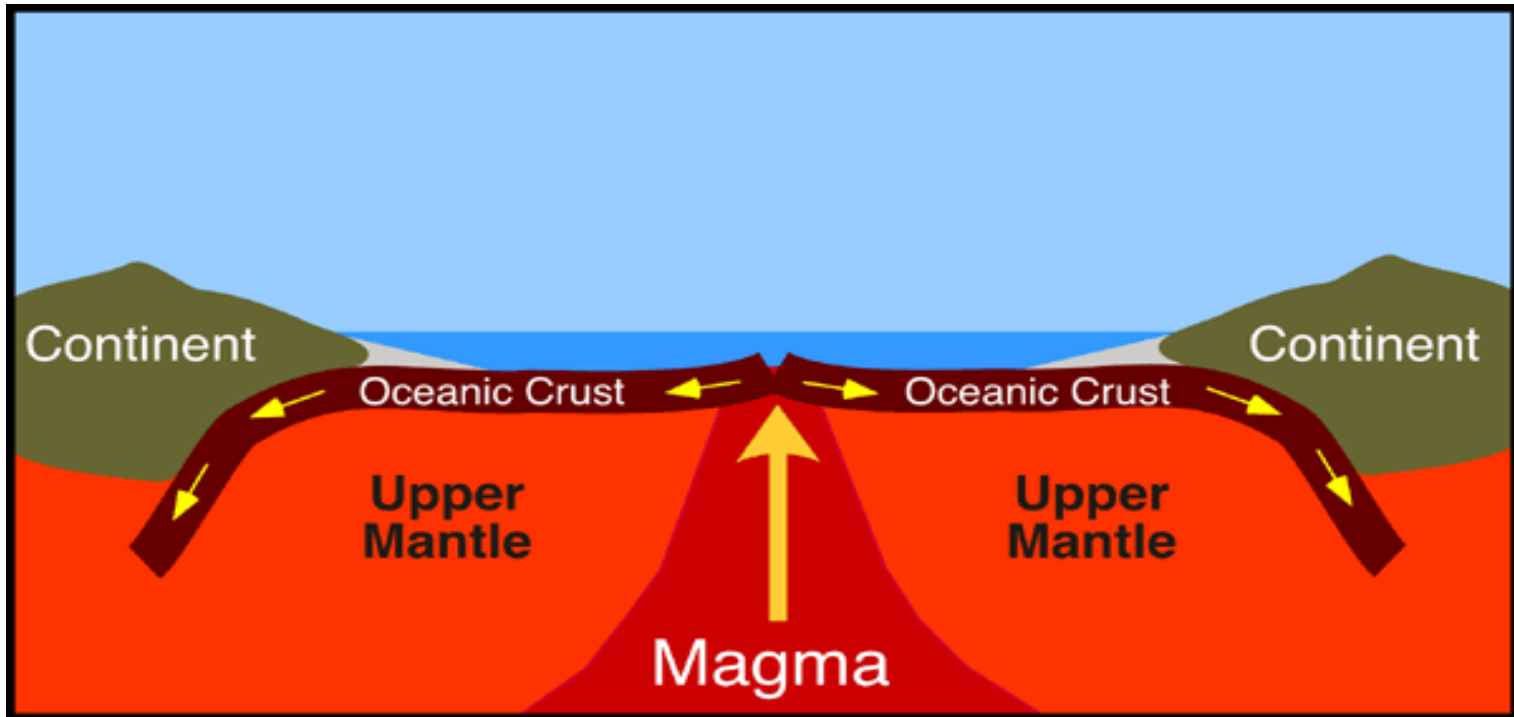


# Sea Floor Spreading

Ch. 10 Lesson 2 TB 304-306

I can explain how sea floor spreading is associated with movements of the Earth's major plates.  
(0707.7.6)



# Essential Questions

- What is sea floor spreading?
- How do age and magnetic clues support sea floor spreading?

# What Master looks like!

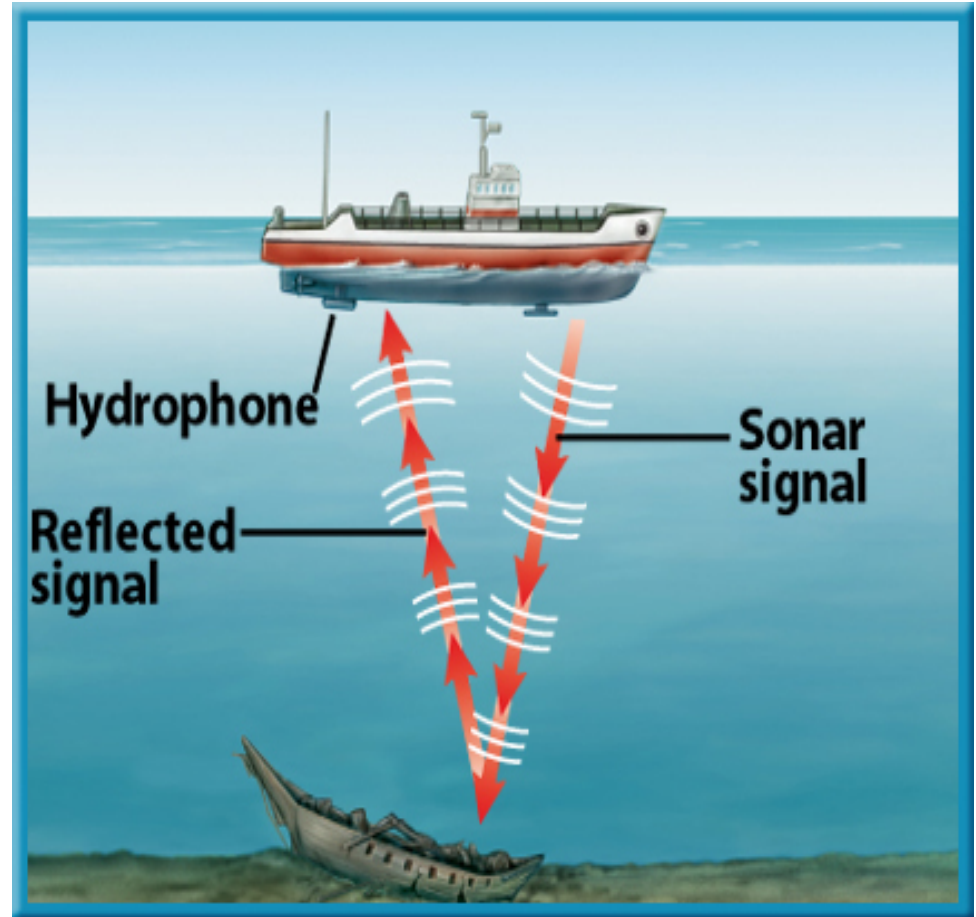
Why was the discovery of no rocks older than 2 billion years old on the ocean floor so important?

[Need a Hint?](#)

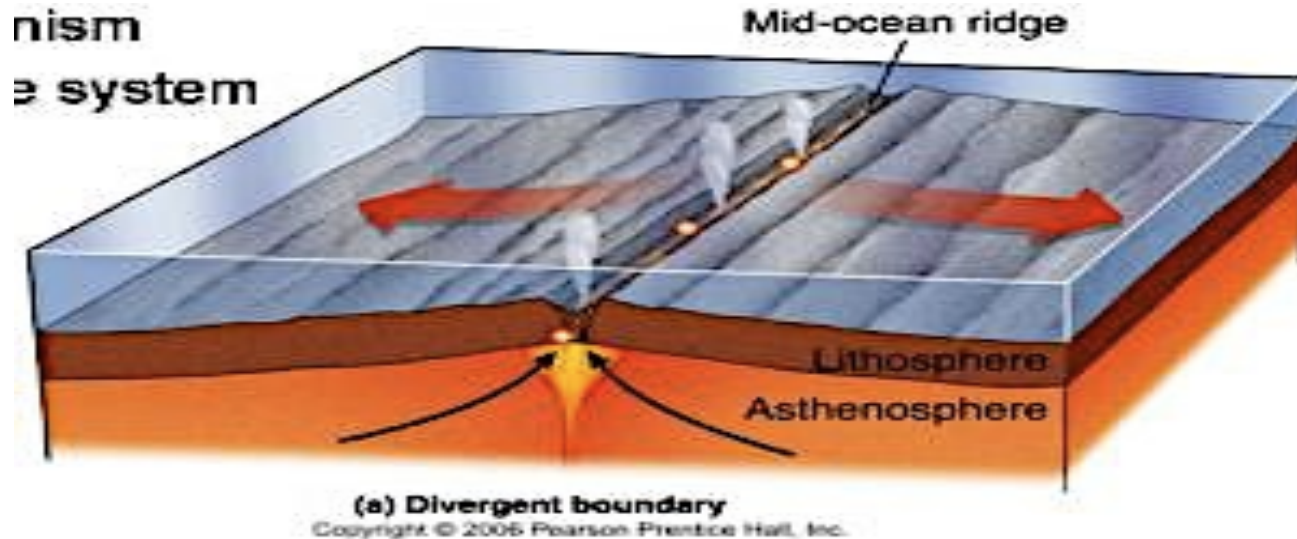
- A)** This evidence proved that new seafloor features are constantly being added due to reversals of Earth's magnetic field.
- B)** This evidence proved that new seafloor features are constantly being added due to seafloor spreading.
- C)** This evidence proved that new seafloor features are constantly being added due to continental drift.
- D)** This evidence proved that the rocks on the seafloor were older than rocks on continents.

# Mapping the Ocean Floor

- Before WWI, Map the ocean floor by lowering a rope from a boat and record the depth
- 1940s-1950s- Sound waves used to map ocean floor
- Sound waves echo off ocean bottom- longer they took to return, the deeper the water is.



# Mapping the Ocean Floor



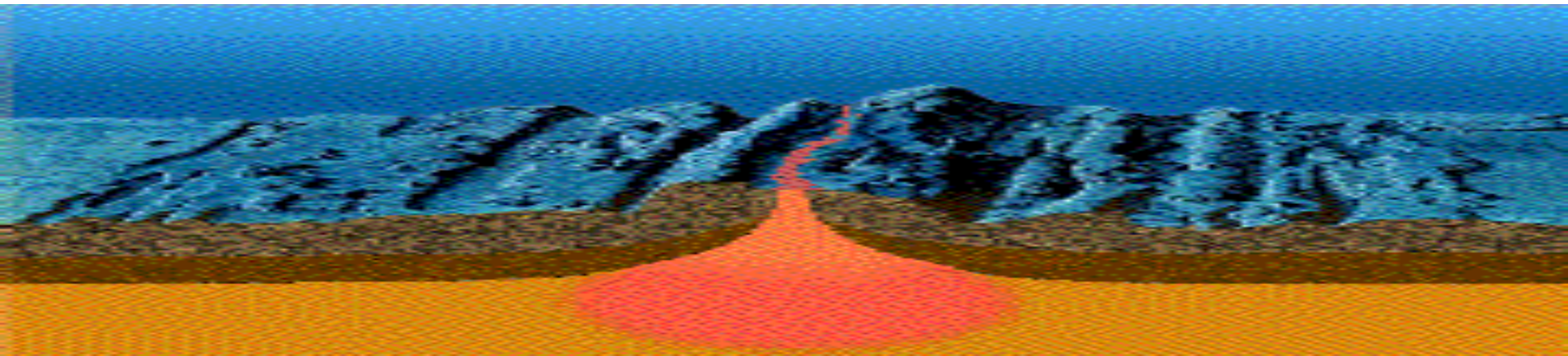
- Using sound waves, discovery of underwater ridges, or mountains, and valleys.
- Rift Valleys- volcanic activity and earthquakes
- Mid-Ocean Ridges- Underwater mountain ranges

# The Seafloor Moves

- 1960s Harry Hess- theory of Seafloor Spreading
  - <https://www.youtube.com/watch?v=GyMLLxbfa4>
- Hot, less dense material below Earth's crust rises toward surface (Mid-Ocean Ridges)
- It then flows sideways, carrying floor from the ridge in opposite directions
- Seafloor parts, magma is forced up
- Magma becomes solid as it cools=new seafloor
- Cools, Contracts, becomes denser
- Denser seafloor sinks to form the ridge

**Turn to a neighbor, and explain.**

How does new sea floor form at mid-ocean ridges?





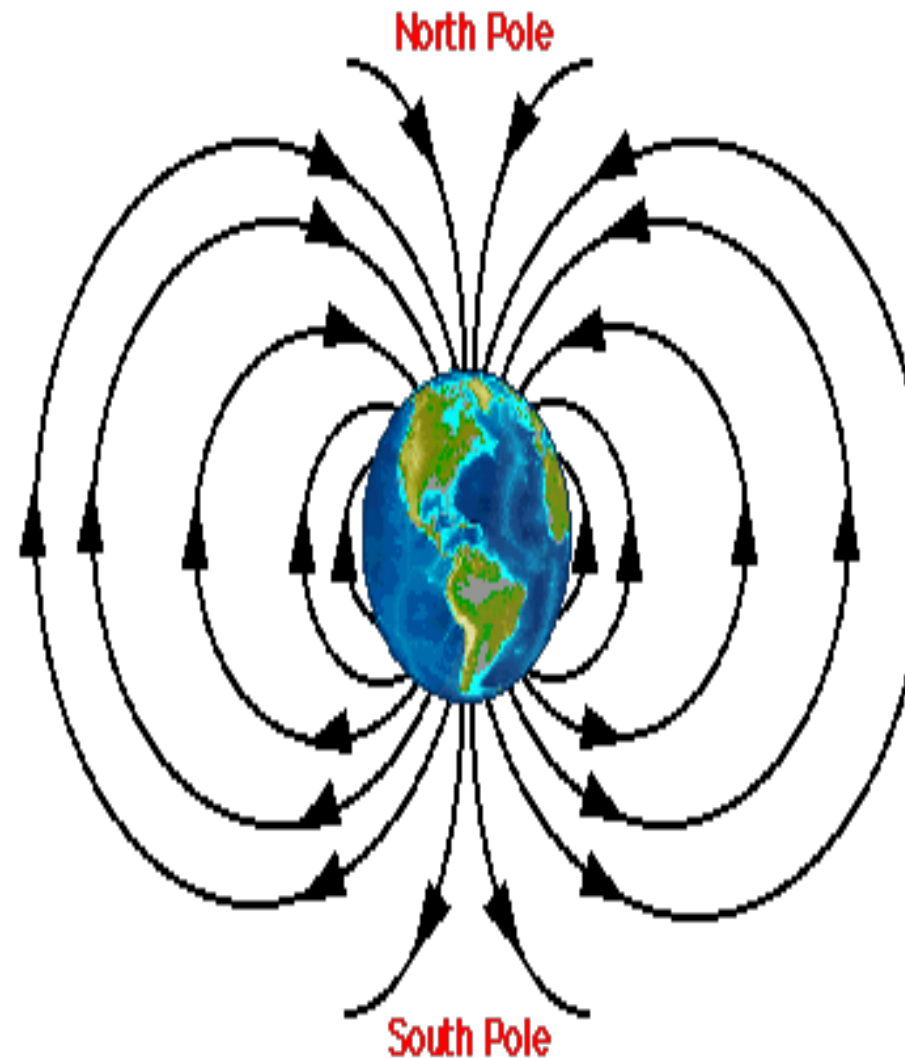
# Evidence of Spreading

- 1968-*Glomar Challenger*
  - Drilled into rock on ocean floor for samples
  - Youngest rocks found at mid-ocean ridges
  - Age of rocks become older as they moved farther from the ridges.
- Using submersibles-discovered new ocean features and life forms
  - Molten material forced upward, brings heat and chemicals – Supports exotic life-forms
  - EX: Giant Clams, Mussels, Tube worms



# Evidence: Magnetic Clues

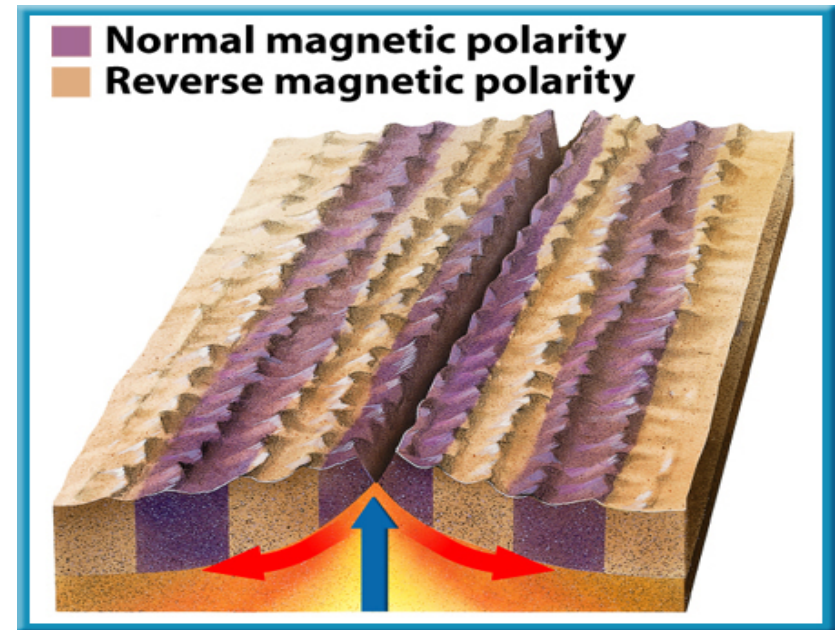
- Earth's Magnetic field- North and South Poles
  - <https://www.youtube.com/watch?v=BCzCmldiaWQ>
- Magnetic lines or directions – leave Earth near South Pole, enter Earth North Pole
- Magnetic Reversal=lines run opposite way
- Recorded in rocks forming along mid-ocean ridges





# Evidence: Magnetic Time Scale

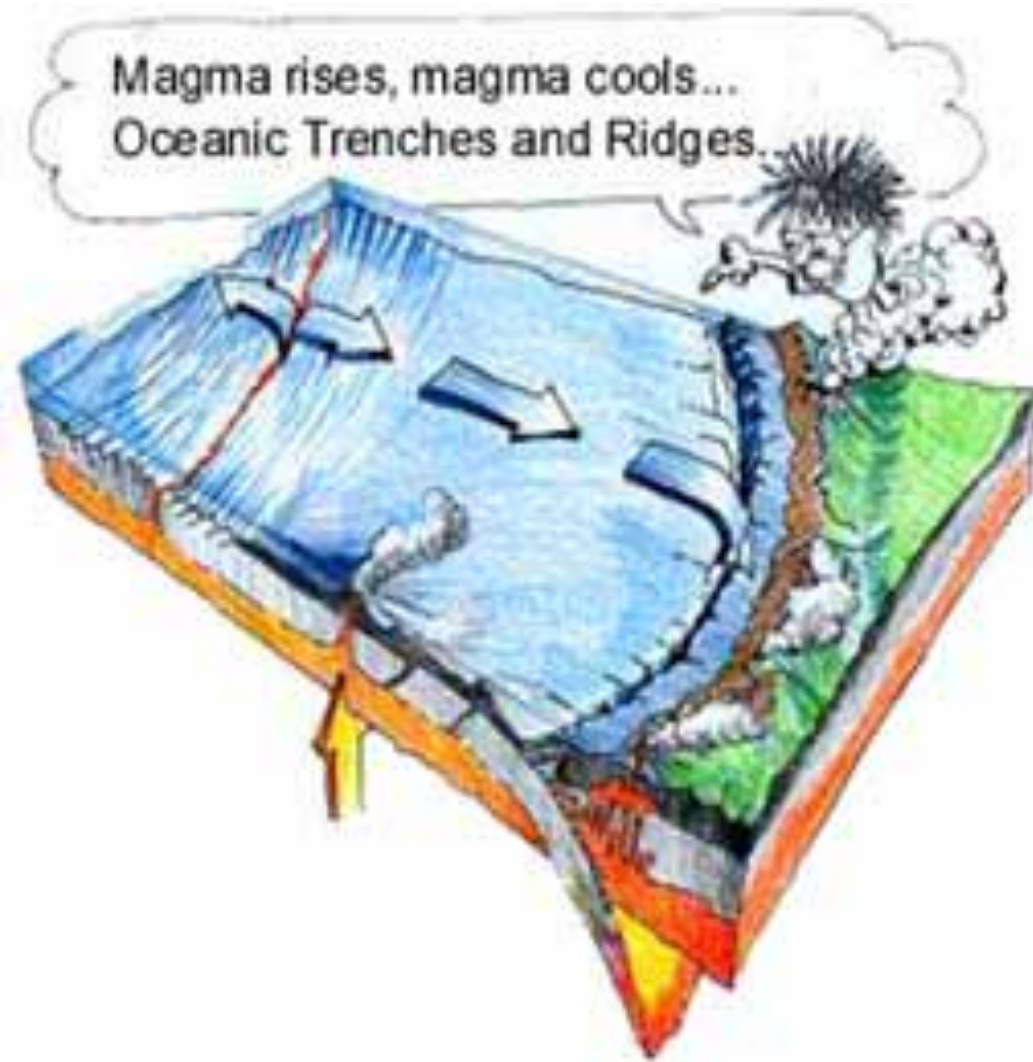
- Magnetite: Iron-bearing mineral
  - Record Earth's magnetic field direction
  - Magnetic field reverses, newly forming iron minerals record the magnetic reversal
- Magnetometer (mag nuh TAH muh tur)
  - Detects magnetic fields
  - Magnetic Alignment in rocks reverses back and forth over time in strips parallel to mid-ocean ridges
  - Strong magnetic reading is recorded when polarity of rock=polarity of Earth today
  - Normal polarity in rocks show up as high peaks
  - Magnetic reversals show new rock being formed at mid-ocean ridges



**Explain why this is considered to be evidence of seafloor spreading?**

# Subduction in Deep-Ocean Trenches

Magma rises, magma cools...  
Oceanic Trenches and Ridges.



As the ocean spreads apart, it also plunges into deep water canyons called deep-ocean trenches.

Subduction is the process by which the ocean floor sinks beneath a deep-ocean trench and back into the mantle

# Independent time

- Complete section review questions 1 - 5

# Exit Ticket

Why was the discovery of no rocks older than 2 billion years old on the ocean floor so important?

[Need a Hint?](#)

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