

Earth Science Test

8.ESS2.2) Evaluate data collected from seismographs to create a model of Earth's structure.

8.ESS2.5) Construct a scientific explanation using data that explains the gradual process of plate tectonics accounting for A) the distribution of fossils on different continents, B) the occurrence of earthquakes, and C) continental and ocean floor features (including mountains, volcanoes, faults, and trenches).

8.ESS2.4) Gather and evaluate evidence that energy from the earth's interior drives convection cycles within the asthenosphere which creates changes within the lithosphere including plate movements, plate boundaries, and sea-floor spreading.

ESS3.2 Collect data, map, and describe patterns in the locations of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hotspots.

Remember to write two facts from each slide

OR

Answer the questions on the slide

Once you are finished, watch the video on Ms. Bullock webpage titled

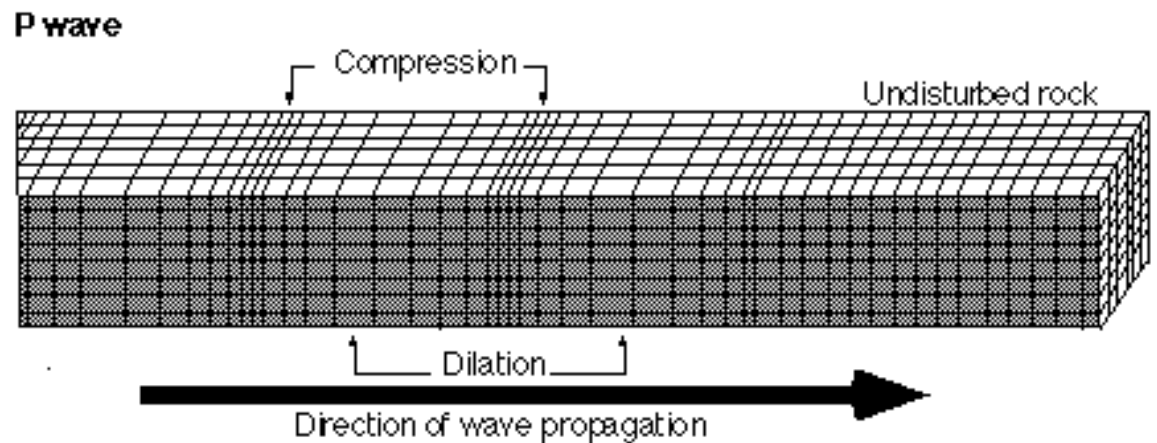
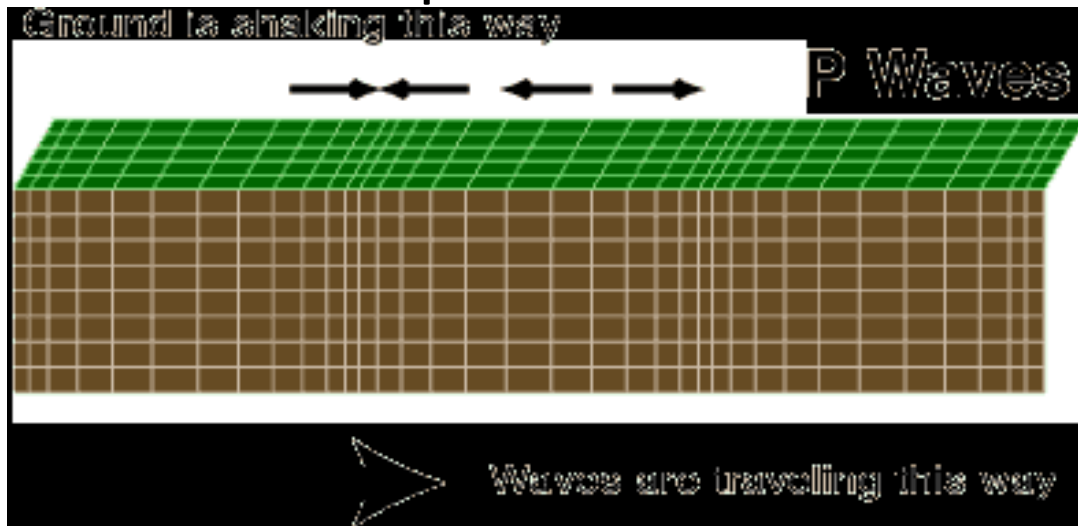
Rocks and Seismic Waves video

Seismic Waves

- Produced from earthquakes
- Two types of seismic waves:
 - P-waves
 - S-waves
- Each wave travels through Earth's layer differently

Seismic Waves: P-waves

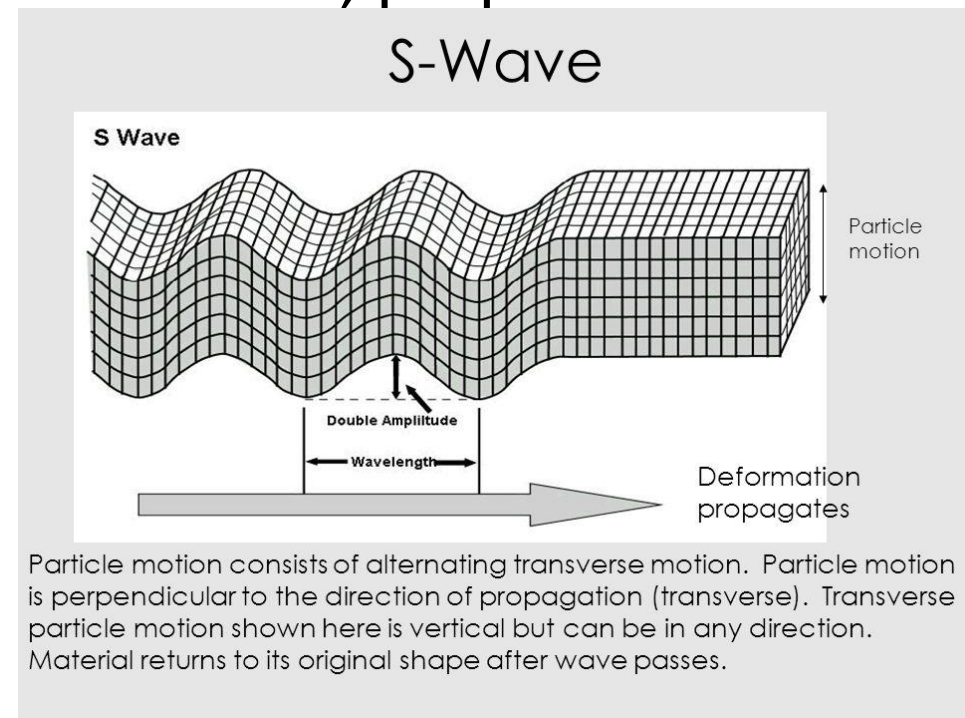
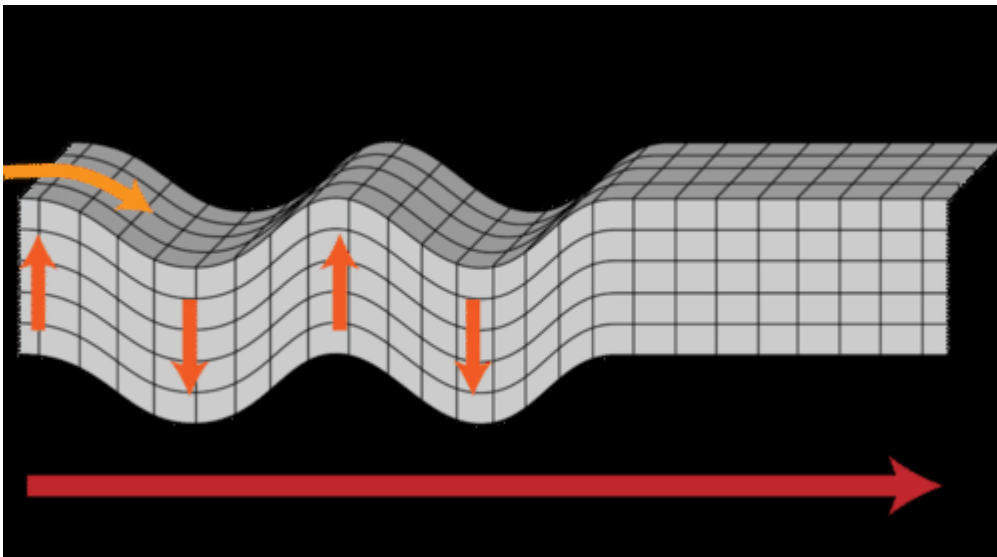
- P-waves (primary waves) travel faster through the Earth's layers
- The first wave to be recorded after an earthquake
- Travel through solid and liquid material
- Also known as pressure waves because they compress and release material parallel to the direction the wave travels



(Modified from Bruce A. Bolt, *Earthquakes: A Primer*. W.H. Freeman & Company, 1978.)

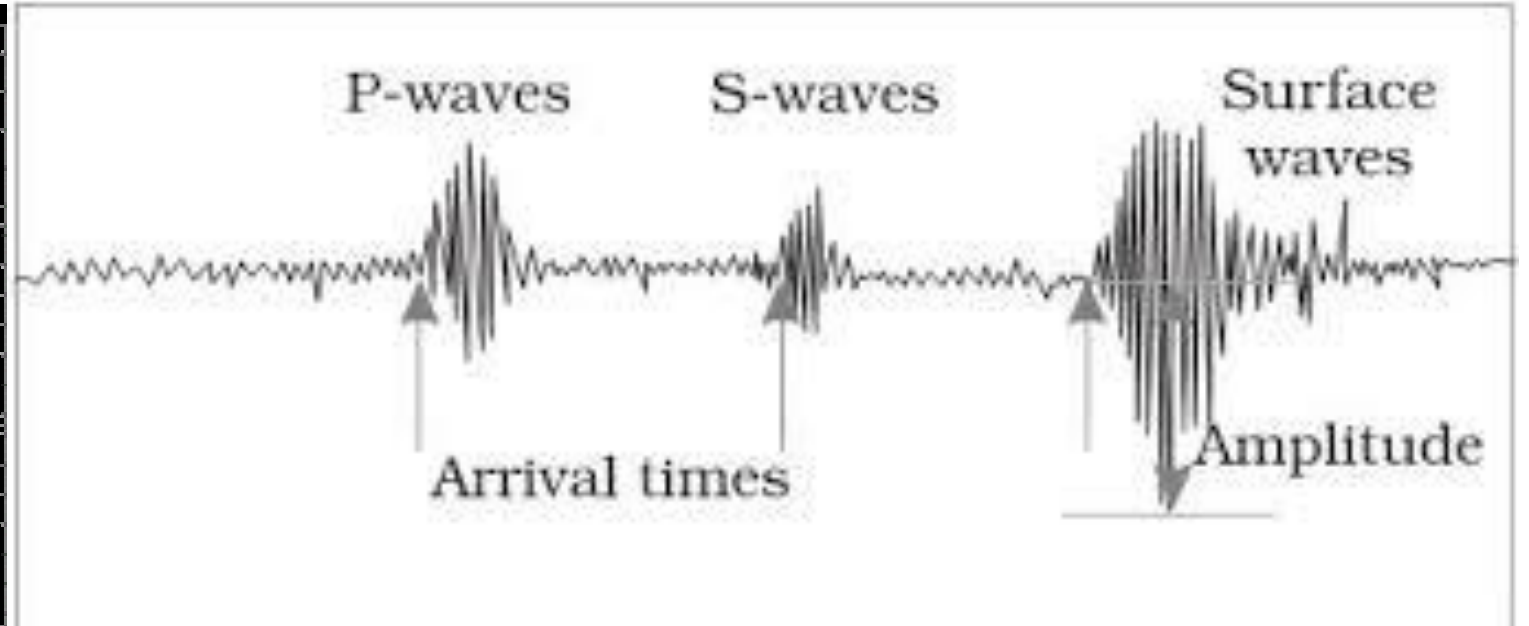
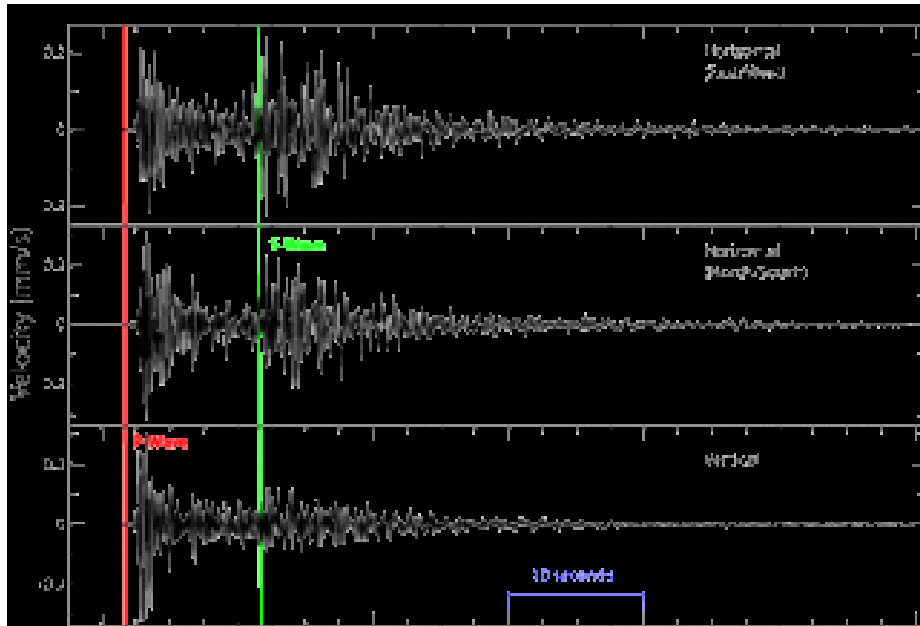
Seismic Waves: S-waves

- S-waves (secondary waves) travel slower through Earth's layers
- The second wave to be recorded after an earthquake
- Only travel through solid medium
- S-waves cause material to move up and down, perpendicular to the direction the wave travels



Seismic Waves

- The arrival of P-waves and S-waves vary because they travel at different speeds and through different mediums

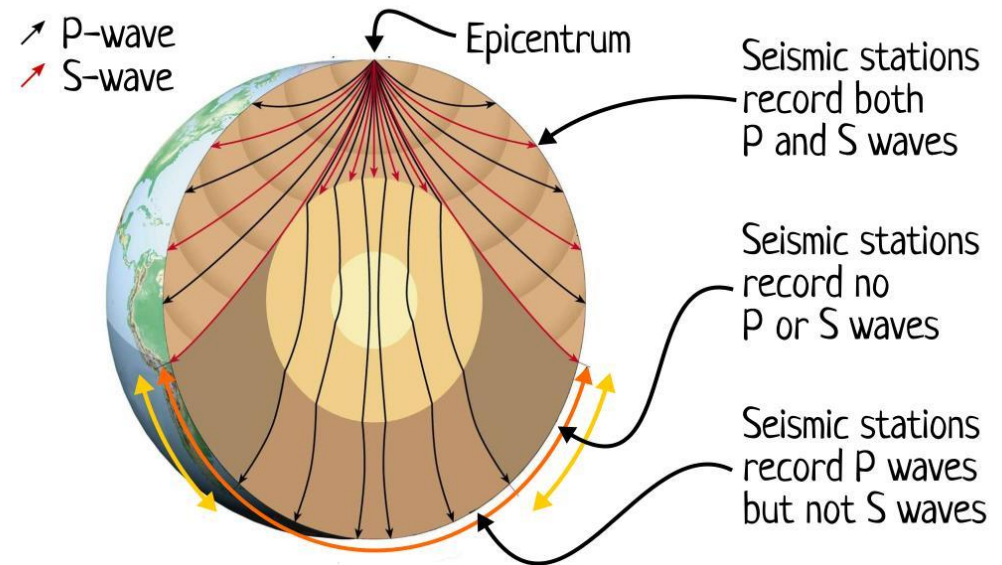


Seismic Waves Earth's Layers

1. What do the red arrows represent

2. Why are there no red arrows inside the inner or outer core?

An **earthquake** generates **seismic waves** that propagate throughout the Earth's interior. Earth's core is mapped by observing the characteristic of the **seismic waves** that reach the surface of the Earth.



Flat-Earthers think it is impossible to determine Earth's interior as nobody has gone to the core before. They are wrong. **Seismology** provide a way for us to determine the **Earth's interior** without having to travel there physically.



FlatEarth.ws/seismic-wave
Debunking Flat Earth Misconceptions

Plate Tectonics

- Lithosphere is broken into plates
- Continents and oceans are on top of these plates
- The plates move on top of the asthenosphere because of convection currents
- Continents will drift and oceans will change sizes as the plates move.

Plate Tectonics

- Evidence to support Theory of plate tectonics
 1. Fossils from one species found on separate land masses (millions of years old)
 2. Shape of continents fit together like a puzzle
 3. Location of Earthquakes show boundary lines between plates
 4. Sea floor spreading (new crust is being formed each year at the Mid Atlantic Ridge, causing North America and Europe to move farther apart)

Plate Tectonics

- Why do plates move?

Convection currents in mantle cause the plates to move

- 3 boundary types:
 - Convergent
 - Divergent
 - Transform

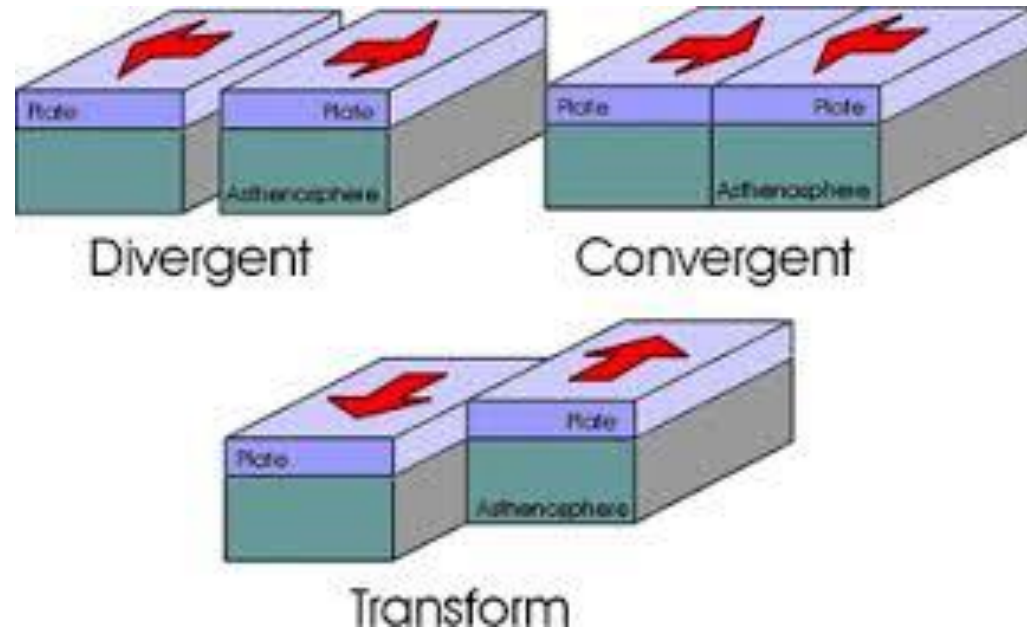


Plate Tectonics

Convergent Boundary

- Continental – Continental

Forms- Mountains (Himalayan Mountains)

- Continental – Oceanic Boundary

Create subduction zone

Subduction Zone forms: Volcano, Trench, Mountain range

- Oceanic – Oceanic Boundary

Create subduction zone

subduction zone forms: Trench and volcanic arch islands

Plate Tectonics

- Transform Boundary

Plates slide past each other in opposite directions

Forms Earthquakes

Ex. California- San Andreas Fault

Plate Tectonics

- Divergent Boundary

 - Continental – Continental

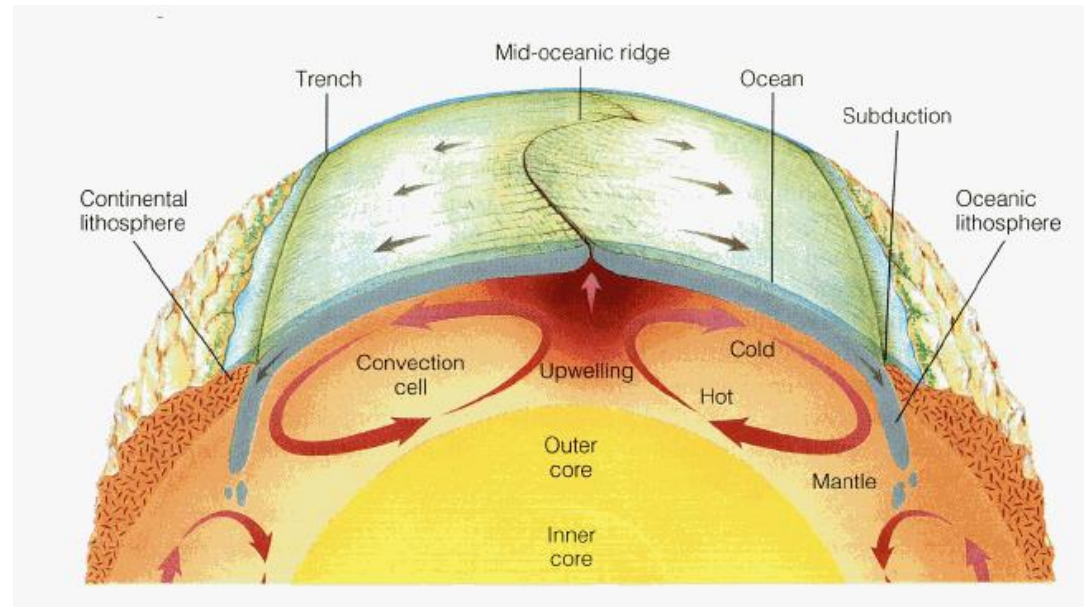
 - Forms Rift

 - Oceanic – Oceanic

 - Forms Ridges (sea floor spreading)

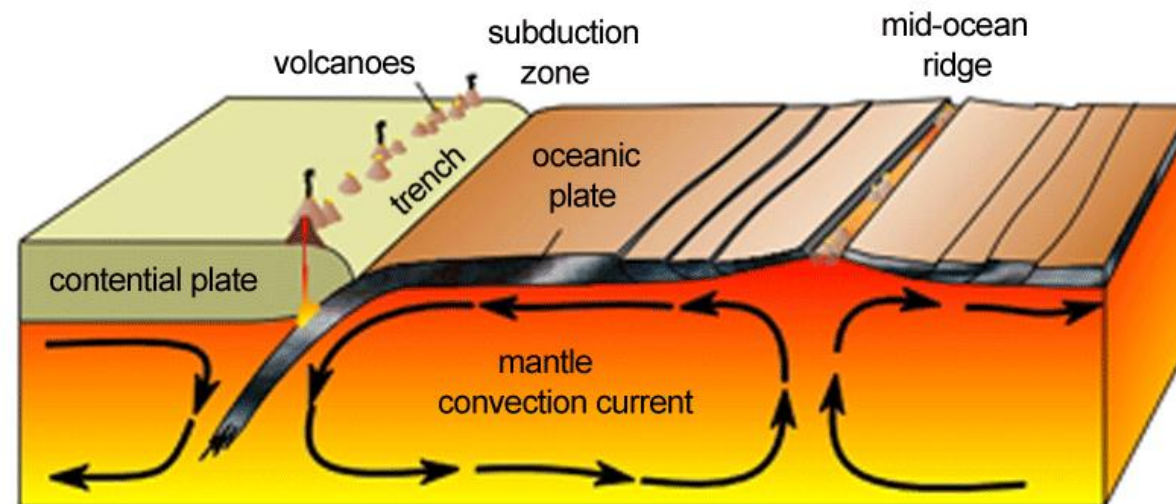
Convection Currents

- The movement of heat through fluids or gases
- As the material gains heat energy, the material will rise and transfer the energy to the surrounding material.
- As heat increases, density decreases.
- Convection currents move the magma in the mantle, causing the tectonic plates to move.



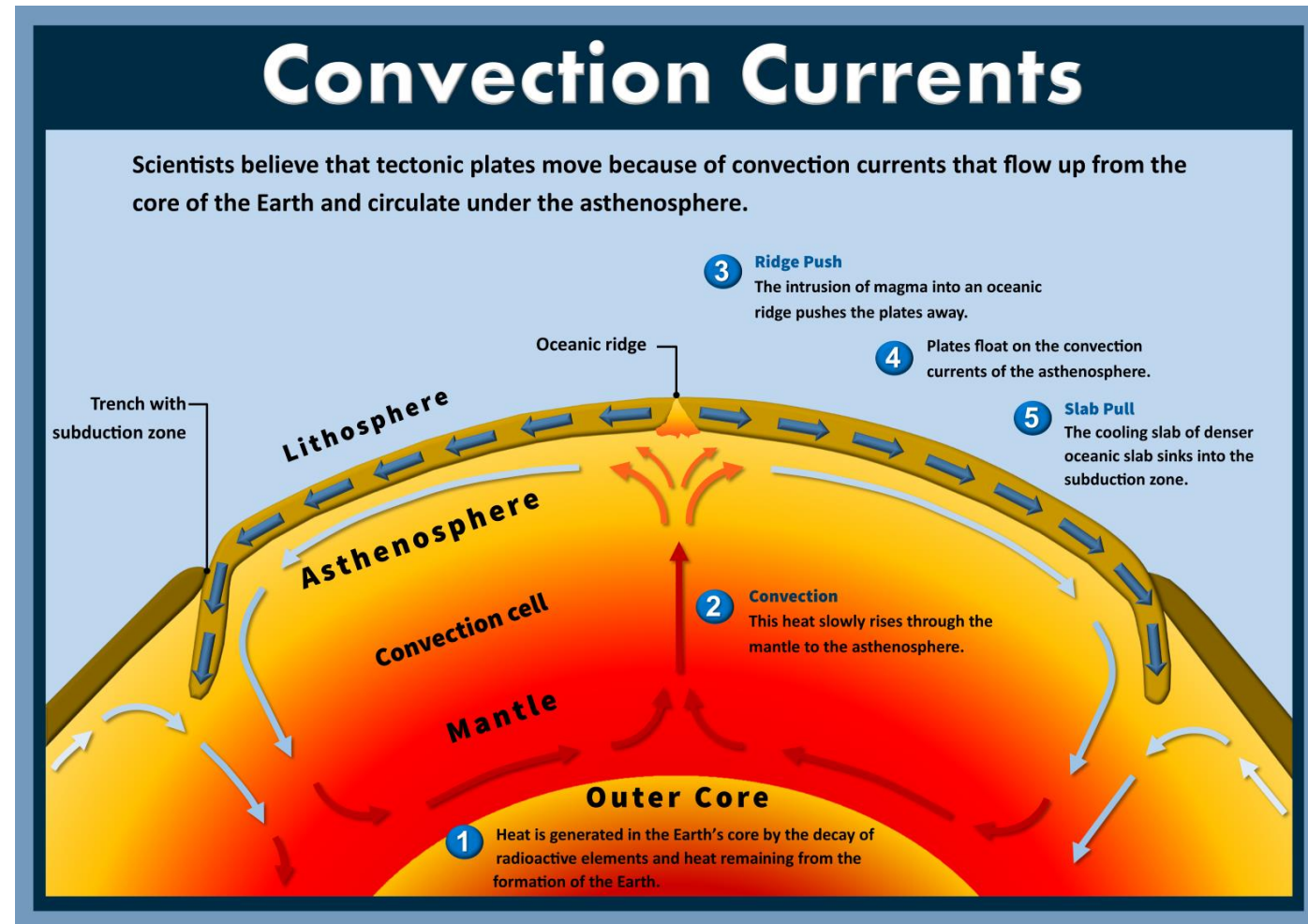
Convection Currents

- Tectonic Plate movement is caused by convection currents
- Ridges (sea floor spreading) caused by two convection current cells moving in opposite directions
- Subduction zones (located at convergent boundaries) caused by sinking of cold more dense material.



Convection currents

- Heat energy created in the Earth's core
- Radioactive materials in the Earth's core began to react and give off heat energy.
- The heat energy produced in the core causes the convection currents in the mantle

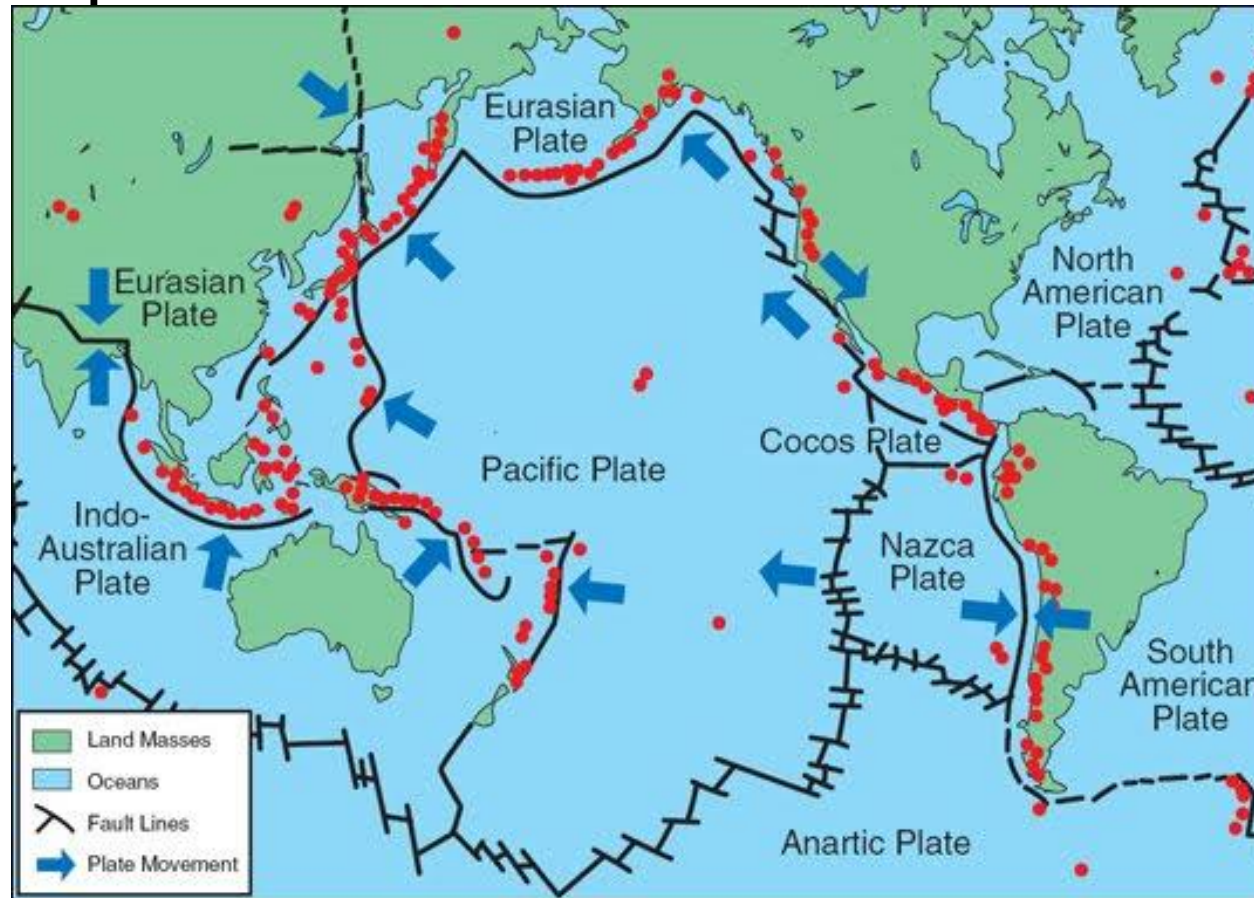


Now that you have completed the notes, don't forget to watch the video linked on the remediation tab.

Earthquakes

- As plates slide past one another friction and pressure builds.
- The pressure releases in the form of an earthquakes
- Earthquakes can be expected near plate boundaries
- The time of an earthquake is unpredictable, but we can expect more earthquakes to happen closer to boundaries.

Earthquakes



1. If you were constructing a building, what areas of the world would you need to take precautions against Earthquakes?
2. What is causing the large amount of earthquakes between the Nazca plate and the South American Plate?

Volcanoes

- Volcanoes can be caused by the interaction of tectonic plates.
- Convergent boundaries with subduction zones cause volcanoes to form.



Hot Spots

- Hot Spots are not the result of plate interactions and do not happen near plate boundaries.
- Hot Spots are the result of hot mantle material pushing up through the plate. This material will cool and harden.
- The Hot Spot stays in one location while the tectonic plate can move.
- In the picture below the oldest island is on the left and the youngest is still on the hot spot.
- The islands change size because the water erodes the island

Picture 1

