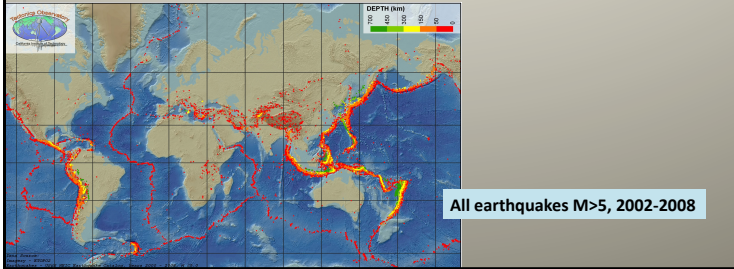
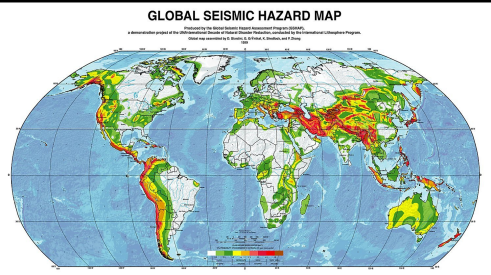
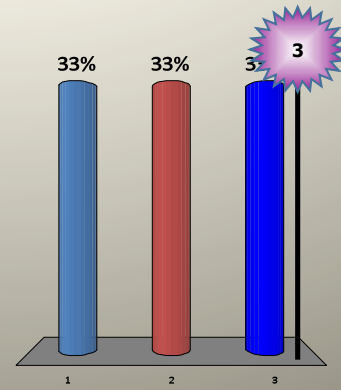


# Welcome to Class 7: Earth's Geology



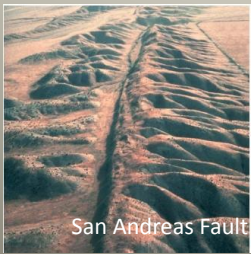
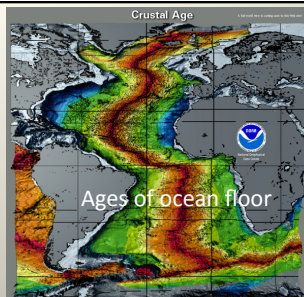
## Which of today's learning objectives appear most difficult?

1. Source/location of Energy driving plates.
2. The two plate types and name of three interfaces and what happens at interfaces.
3. Why is Earth hot, while other planets are not, and the 3 things needed for a global magnetic field.



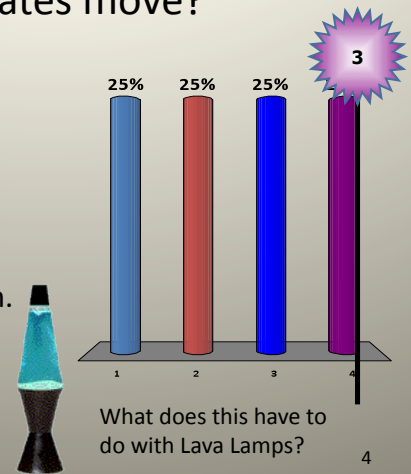
Be sure your channel is set: Go 80 Go (or Ch 80 Ch if you have an older model) 2

## Evidence for Plate Tectonics



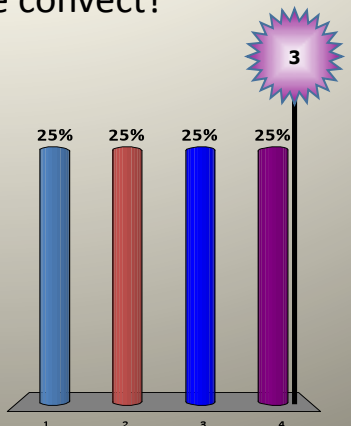
## Why do the plates move?

1. Pressure from volcanoes.
2. Radioactive heat escaping.
3. Coriolis force from the Earth's rotation.
4. Convection in the mantle.

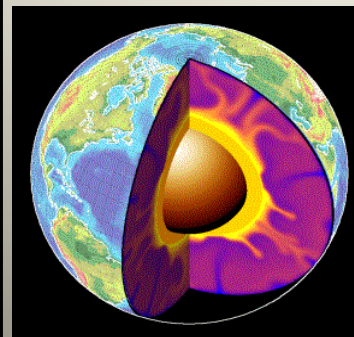


## Why does the mantle convect?

1. Coriolis force from the Earth's rotation.
2. Left over motion from Earth's formation.
3. Plate tectonics.
4. Escaping heat from the core.



## Heat is generated at the CENTER and must move outward to cold space



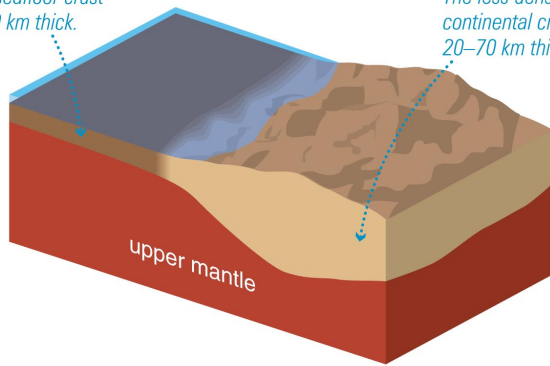
1. The inner core is metallic, and CONDUCTS heat away from center.
2. The mantle is NOT metal. So heat builds up at its bottom.
3. The hotter rock EXPANDS because its hotter. It becomes more BUOYANT.
4. The buoyant, hotter rock floats upward, bringing its heat with it.
5. It breaks the crust to release heat in volcanoes, ridge lines, etc.

This sets up a 'conveyer belt' of convective motion in the Mantle. The motion of the plates is simply a *consequence* of the heat moving out from the center. 6

# Continental vs. Seafloor Crust

The relatively dense, young seafloor crust is 5–10 km thick.

The less dense, older continental crust is 20–70 km thick.



# What happens at the boundaries when the plates move relative to each other?

1) SUBDUCTION

A) Continental is stretched away from Continental

2) CONVERGENT

B) Seafloor pushes into Continental

C) Continental pushes into Continental

3) RIFT

4) SEAFLOOR SPREADING

D) Seafloor is stretched away from Seafloor

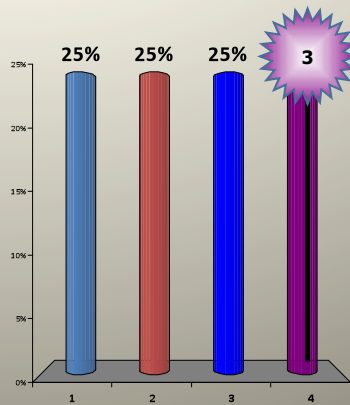
E) Seafloor pushes into Seafloor

5) FAULT

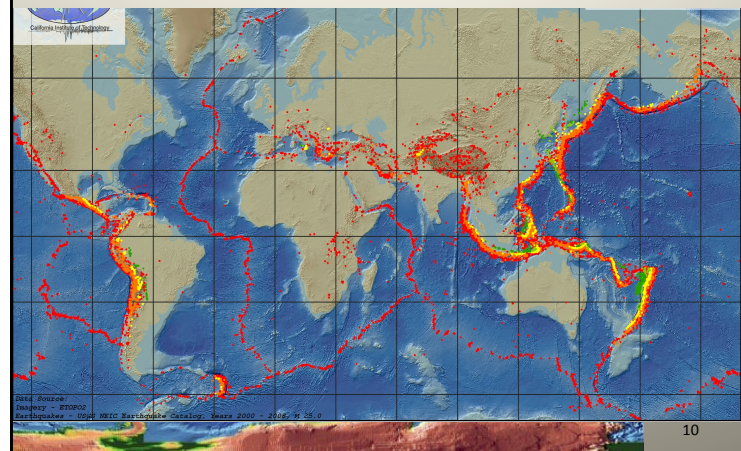
F) Plates moving sideways relative to each other

# Will the Earth ALWAYS be hot at its center?

1. Yes, from radioactive decay.
2. Yes, because it can trap the heat.
3. No, because radioactive decay will stop.
4. No, because it is always losing heat to space.

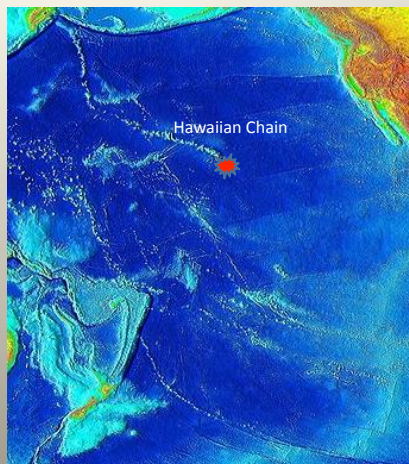


# Tectonics at Plate Boundaries

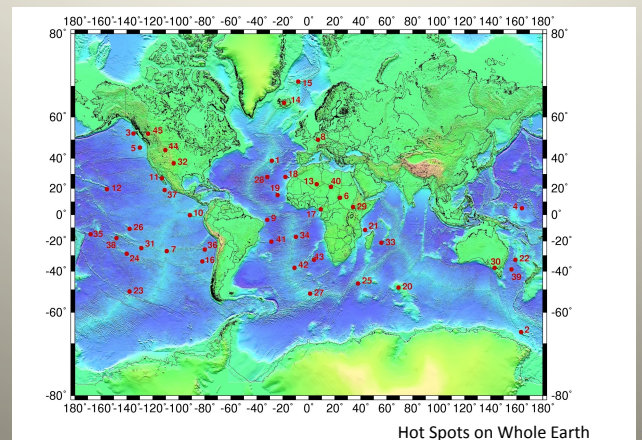


# Hot Spot Trails: Island chains

Hot mantle material rises up and the seafloor crust moves across it



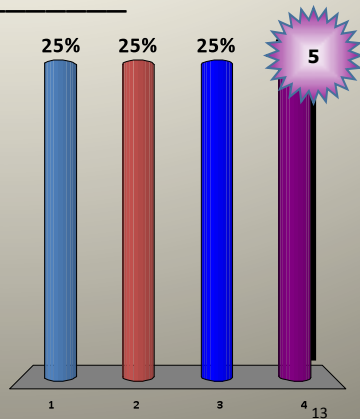
# Hot spots can exist in Continental Crust, too.



Hot Spots on Whole Earth

## PRS: Our Earth's magnetic field is generated in the \_\_\_\_\_

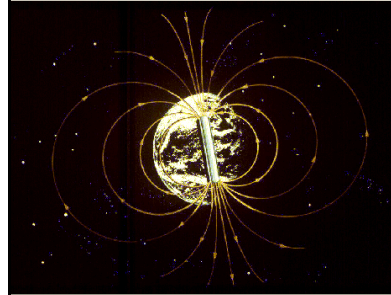
1. Crust
2. Mantle
3. Outer core
4. Inner core



## What is required for a planetary magnetic field to exist?

A planet will act like a large 'bar magnet' if it has the following characteristics:

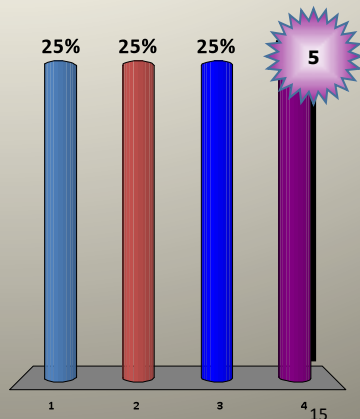
1. A conducting fluid (liquid or gas)
2. Movement or convection of that fluid
3. Moderately fast rotation of the planet



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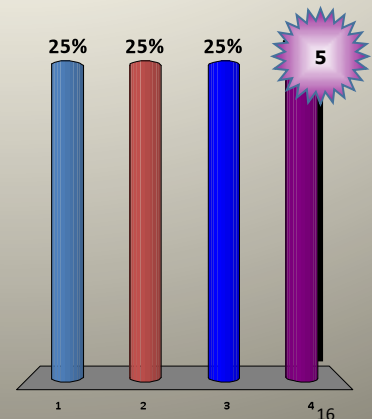
## Why doesn't Mars have a magnetic field?

1. It doesn't have a core of conducting material.
2. It doesn't rotate fast enough.
3. The core is not 'fluid' or liquid.
4. It does have one.



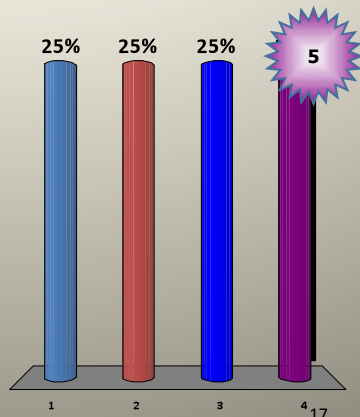
## Why doesn't Venus have a magnetic field?

1. It doesn't have a core of conducting material.
2. It doesn't rotate fast enough.
3. The core is not 'fluid' or liquid.
4. It does have one.



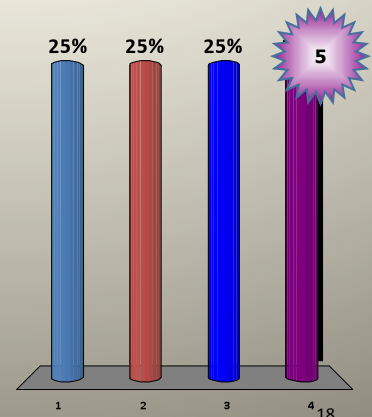
## Why doesn't Mercury have a magnetic field?

1. It doesn't have a core of conducting material.
2. It doesn't rotate fast enough.
3. The core is not 'fluid' or liquid.
4. It does have one.



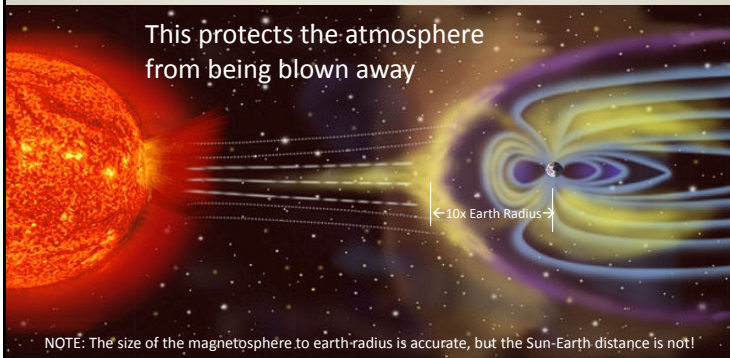
## Why doesn't Jupiter have a magnetic field?

1. It doesn't have a core of conducting material.
2. It doesn't rotate fast enough.
3. The core is not 'fluid' or liquid.
4. It does have one.



Solar wind (charged particles) can not penetrate the Earth's magnetic field

This protects the atmosphere from being blown away

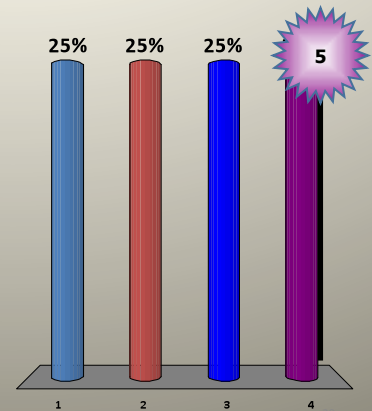


NOTE: The size of the magnetosphere to earth-radius is accurate, but the Sun-Earth distance is not!

Radiation (photons) from the sun is not blocked by the Magnetic field

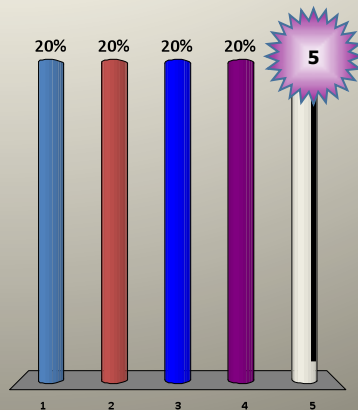
1. What is the difference between continental and seafloor crust?

1. Seafloor crust is always older
2. Continental crust is thinner
3. Continental crust presses deeper into the mantle
4. Seafloor crust is less dense



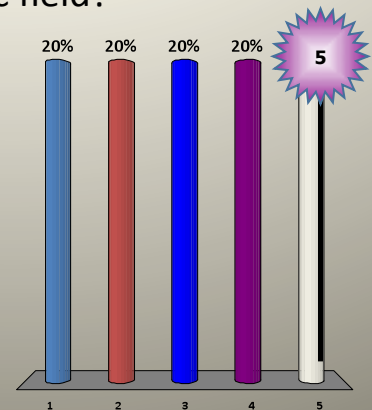
2. When seafloor crust moves over a hot spot it creates

1. A Subduction zone
2. A Seafloor spreading
3. A rift
4. An island chain
5. A fault



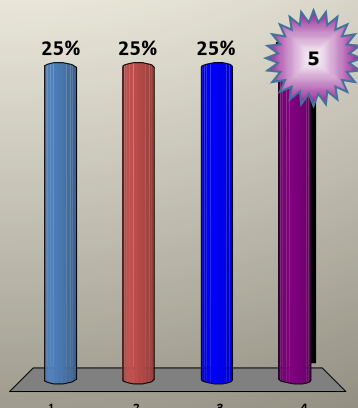
3. Which is not required to maintain a planetary magnetic field?

1. Volcanism
2. Conducting fluid
3. Convection of the fluid
4. Rotation of the planet
5. All of the above



4. The Earth's magnetic field provides

1. Energy for life
2. Protection of the atmosphere
3. Stable orbit for the Moon
4. All of the above



5. The Earth's greenhouse effect is driven by the fact that

1. Infrared light can not pass through the atmosphere
2. The Sun's radiation heats the Earth
3. The atmosphere blocks all radiation from escaping
4. All of the above

