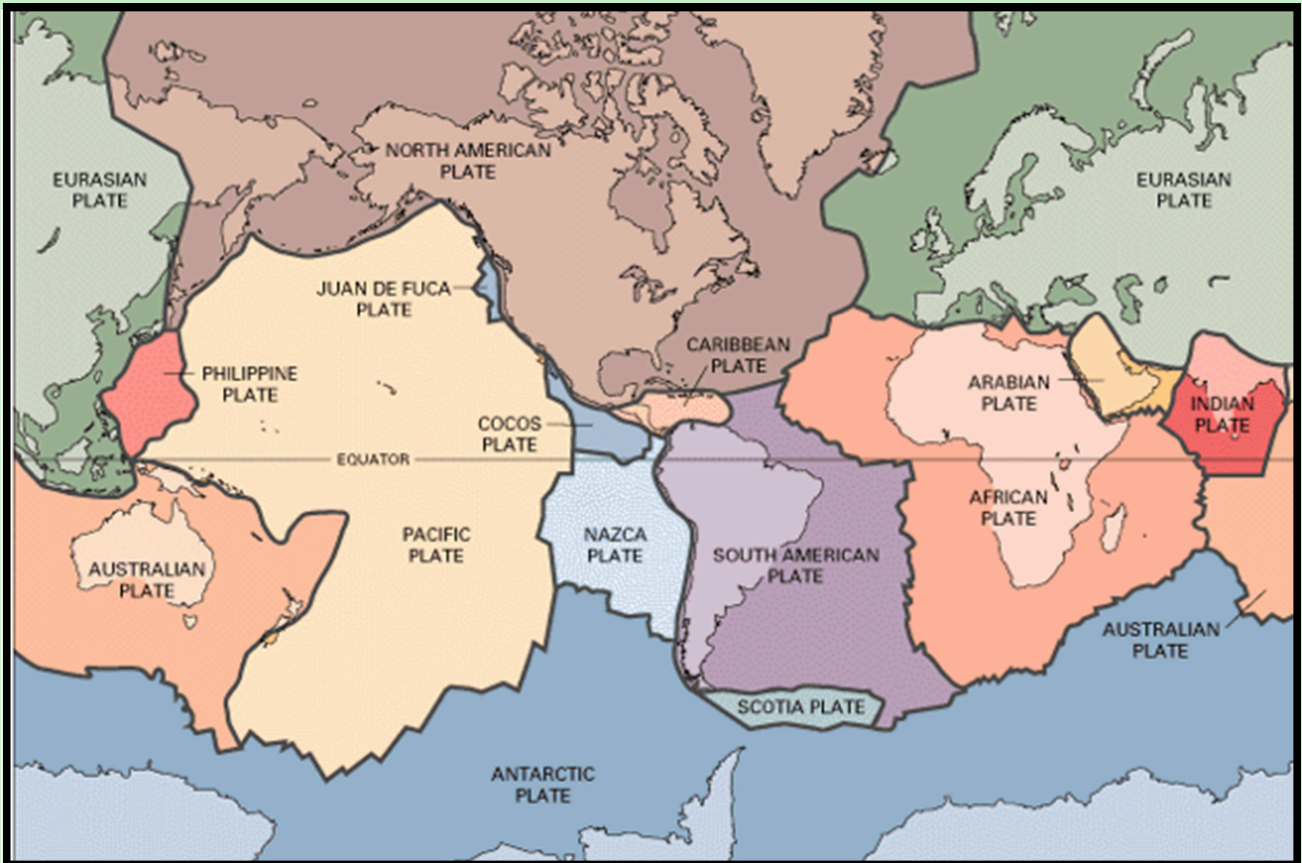


PLATE TECTONICS



THE MAIN 16 PLATES

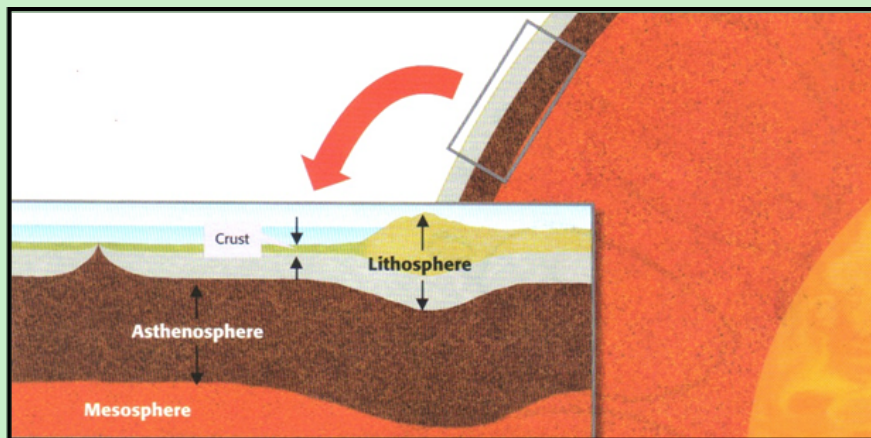


INSIDE THE EARTH



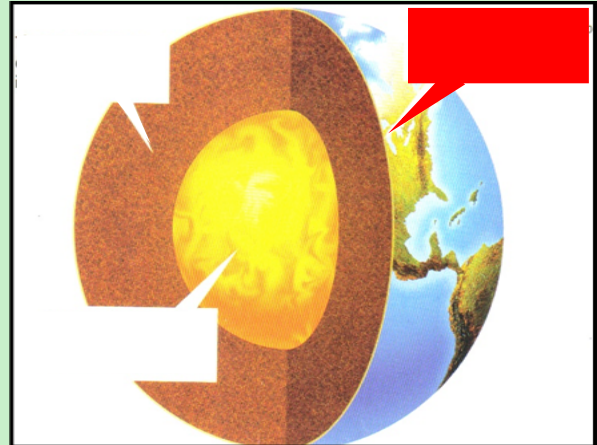
EARTH'S LAYERS

Earth's compositional layers are the _____, _____ & _____.



The 2 types of crust are

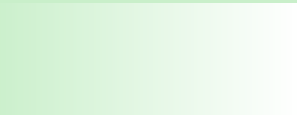
and _____



Minerals that compose the crust are _____, _____,

and other low density minerals, but there is twice as much Fe, Ca and Mg in

_____ crust which makes it denser than _____



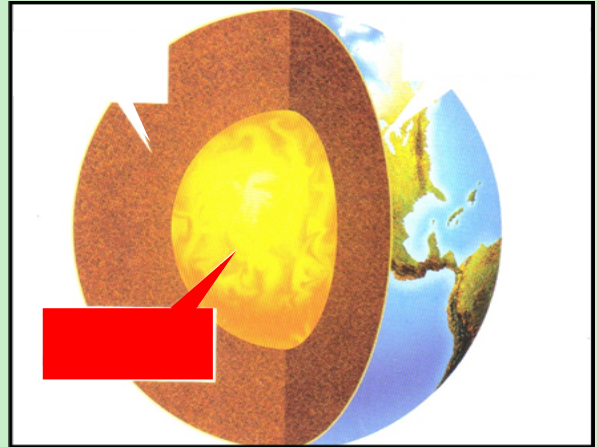
Earth's _____ is much thicker than the crust and composes most of Earth's _____

The mantle has much more _____
and less _____ than the crust.
Scientists know about mantle composition from
studying _____

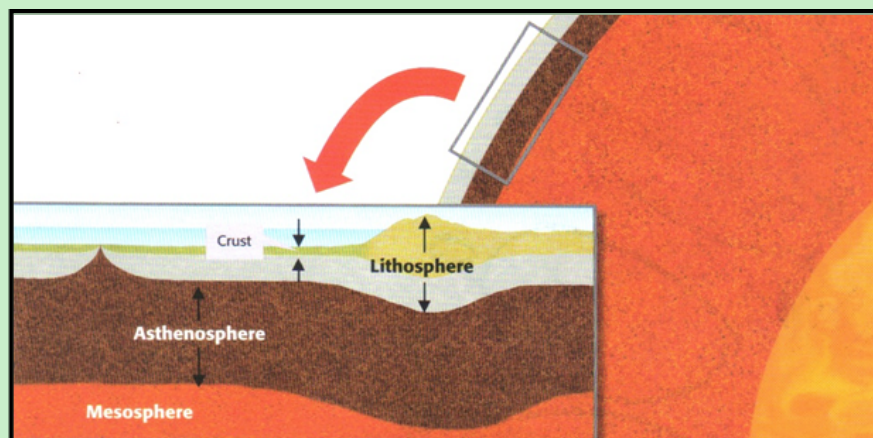


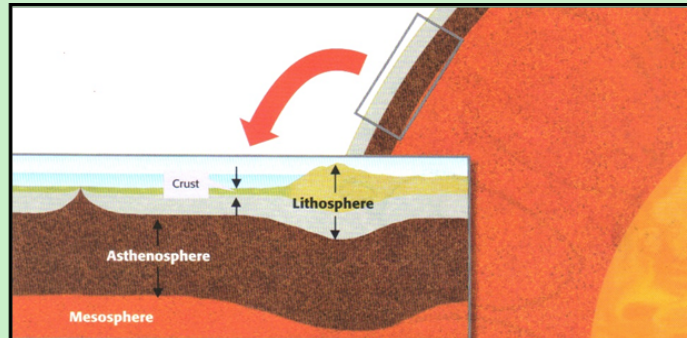
Earth's _____ extends from
the mantle to the center.

It is composed mainly of _____
and _____.



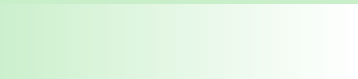
Earth's physical layers are the _____, _____,
_____, _____ & _____

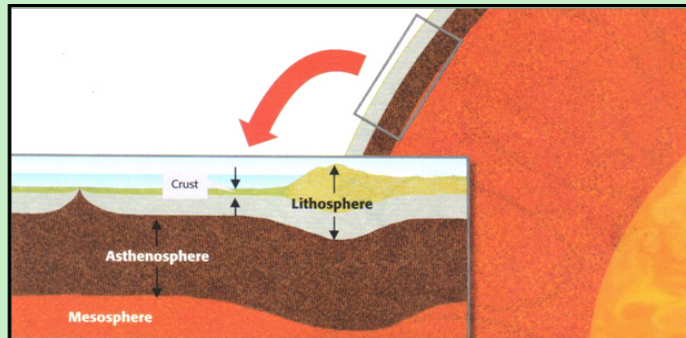




The lithosphere is made up of the _____ and the _____.

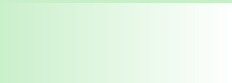
The lithosphere is divided into sections called _____

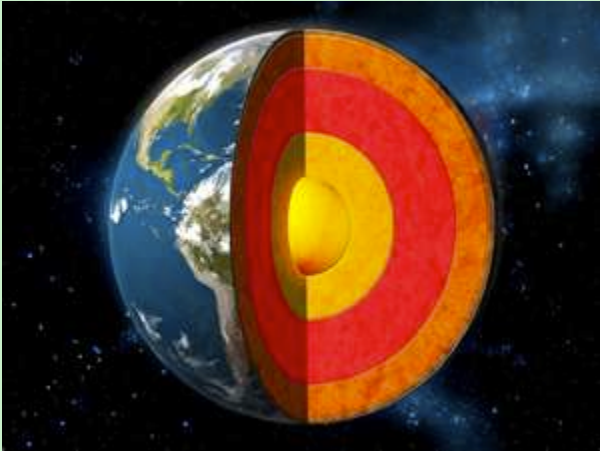




The _____ is the plastic layer of the mantle on which the tectonic plates move.

The _____ extends from beneath the asthenosphere to the outer core.

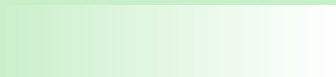




The _____
is composed mainly of iron and nickel
existing in a _____
state due to the intense pressure within
the earth.

The _____ is the center of our earth. It is solid
_____ and _____ due to the intense pressure.

The inner core spins within the outer core, creating Earth's magnetic field.

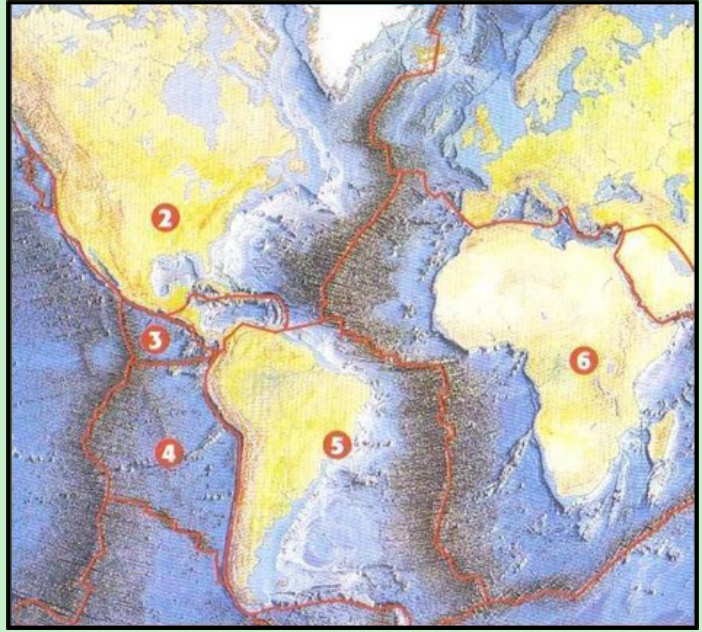


The _____ is broken into
_____ that move
around on the _____.

tectonic plates

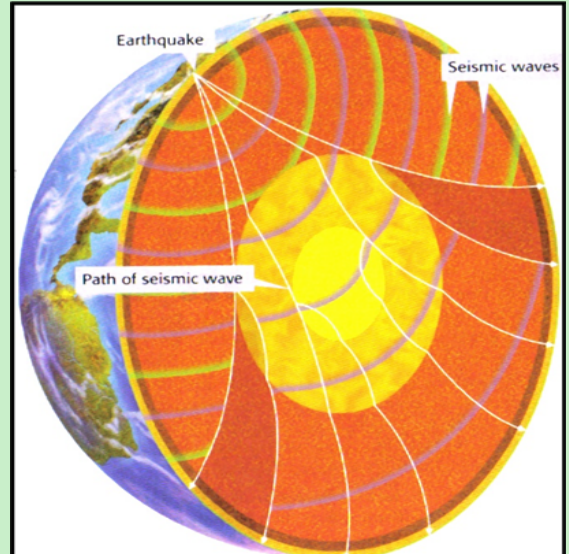
asthenosphere

lithosphere



They appear to fit together like the pieces of a jigsaw puzzle.

- Scientists know about the interior of Earth from the study of _____ produced by _____.
- Seismic waves travel at different speeds depending on the _____ and _____ of the layers they pass through.



RESTLESS CONTINENTS



THE HISTORY OF PLATE TECTONICS

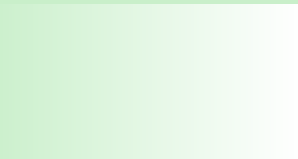
In the early 1900's, _____ theorized that the continents were once joined and moved apart through time.

He called his theory _____, and used evidence like matching _____, _____ and _____ on now far separated continents.



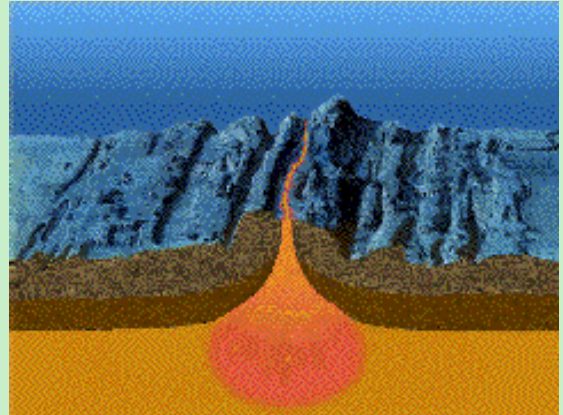
Continental Drifting

Unfortunately, he had no theory of *what caused* the movement.



In the 1950's, Harry Hess' theory of _____
explained how Continental Drift occurred.

His theory was based on the discovery of the _____
and _____.



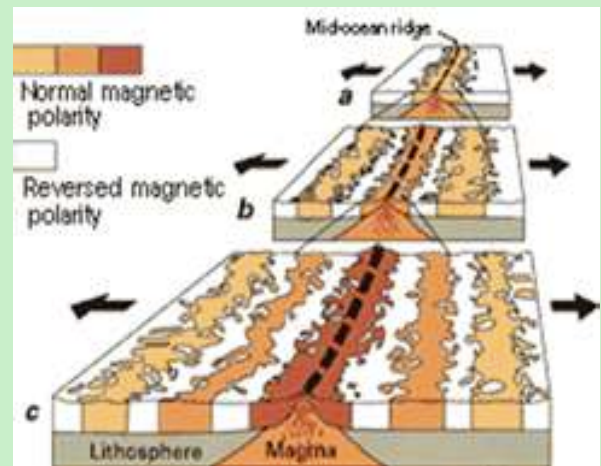
Magnetic Reversals

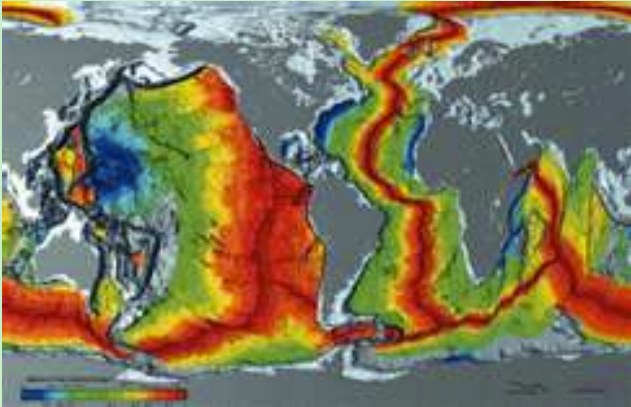


As magma rises to the surface it cools, forming new ocean floor.

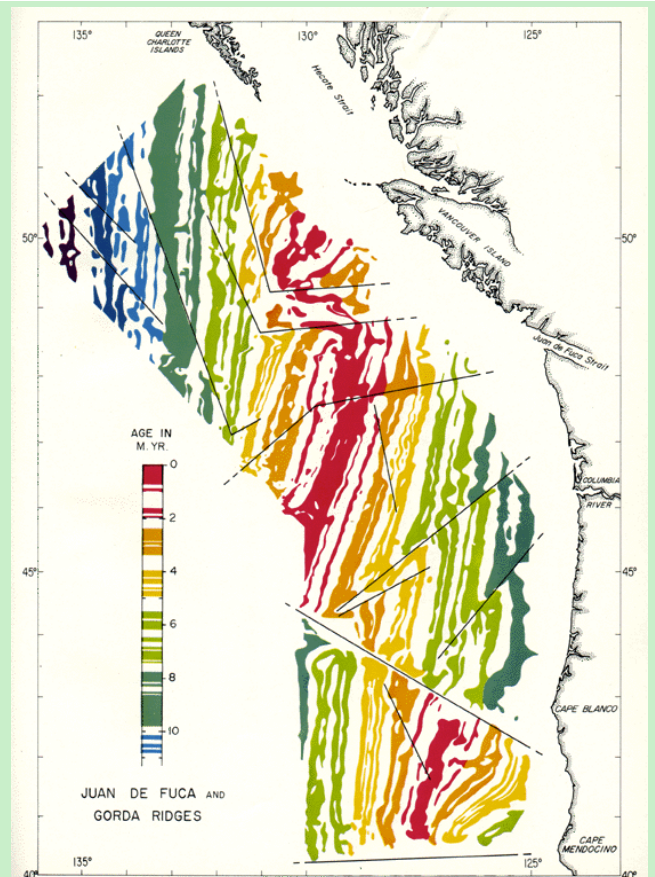
The iron crystals in the new rocks align themselves to magnetic north.

When Earth's polarity switches, it is recorded in the crystal alignment of the basaltic rocks on the ocean floor.



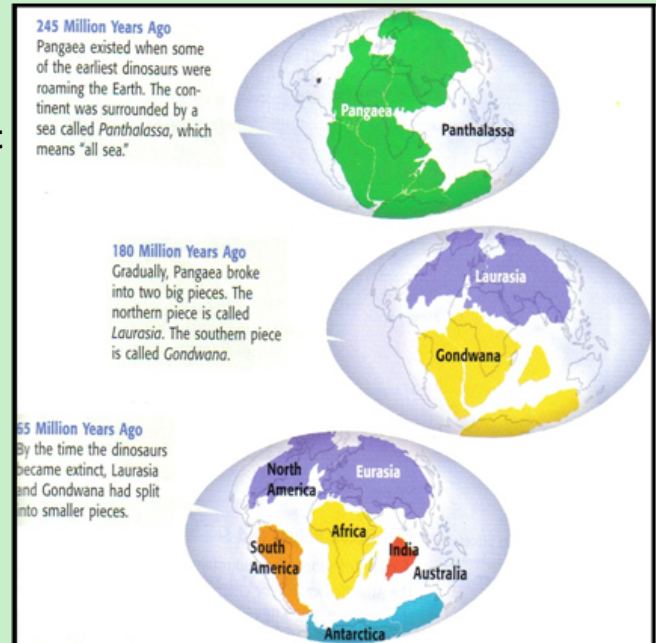


Scientists also determine the age of the sea floor by looking at radioactive minerals in the basaltic rocks.

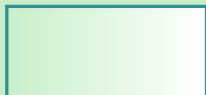
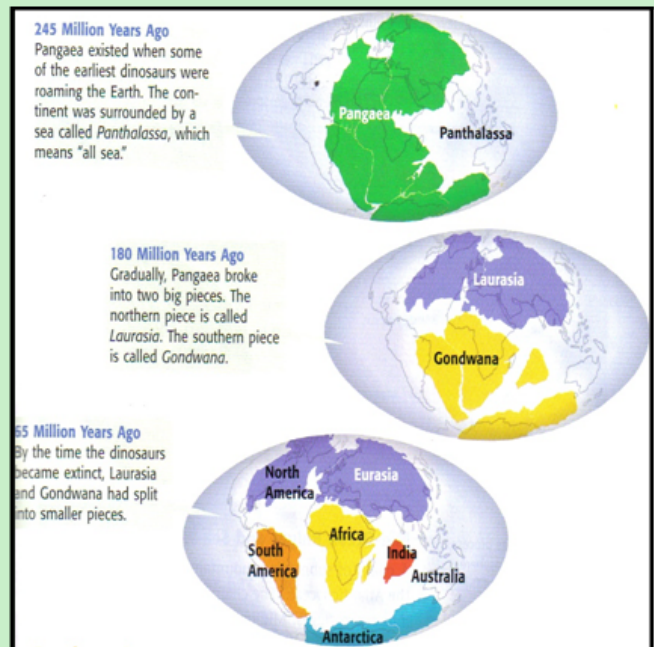


_____ was the supercontinent that existed at the beginning of the _____ Era, and was centered at the equator.

The northern portion was _____; the southern portion was _____.



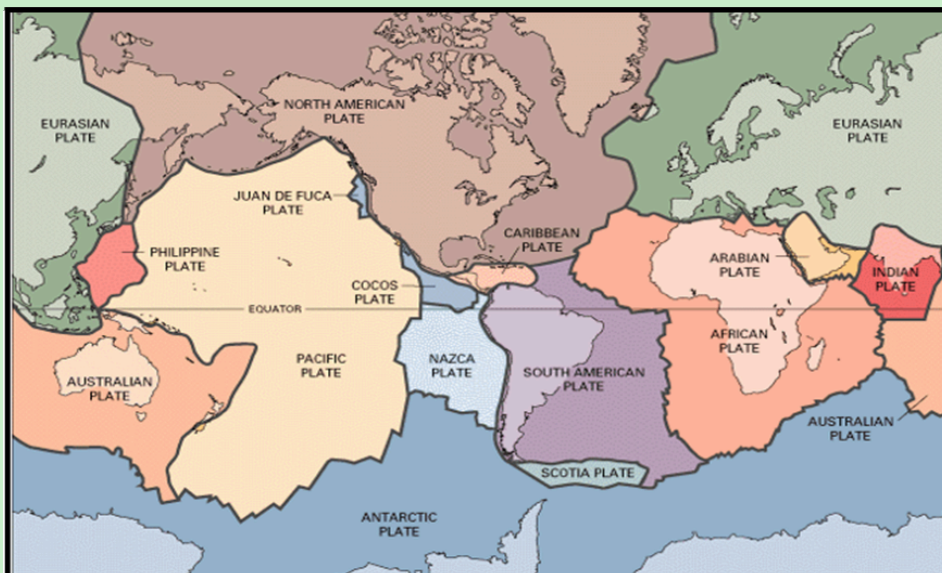
_____ was the
superocean surrounding Pangaea;
the smaller inland sea was the
_____.



THE THEORY OF PLATE TECTONICS



In the 1970's, the theory of _____ states that the _____ is broken into _____ that move around on the _____.



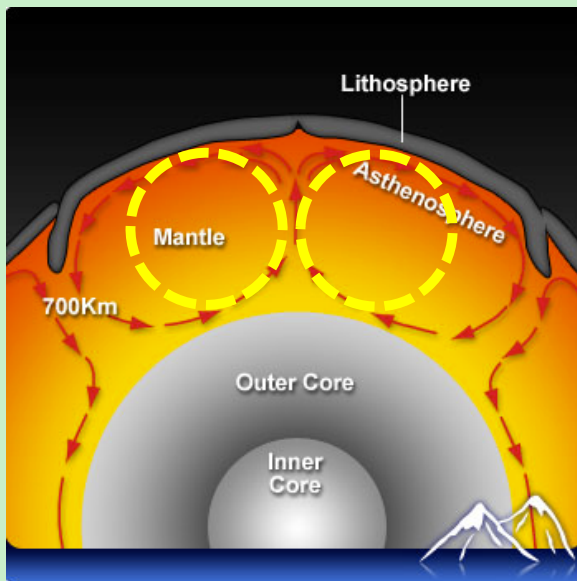
asthenosphere

lithosphere

Plate Tectonics

tectonic plates

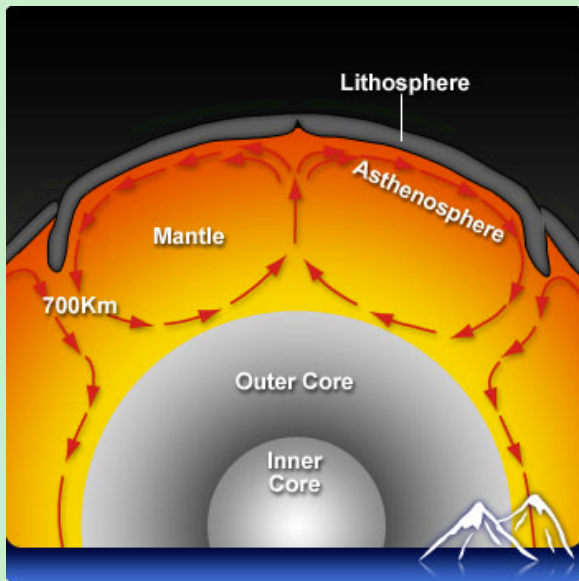
Causes of plate movement



1.

The rise of hot _____ density magma and fall of cooled _____ density magma in Earth's _____ creates _____ that push and pull the tectonic plates, providing the mechanism for Seafloor Spreading.





2.

_____ occurs as rising magma forces cooling sea floor away and downhill from the ridge.

3.

_____ occurs along
_____ where
_____ and the plate's own
_____ pulls it into the mantle.

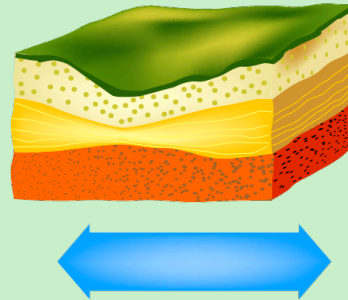
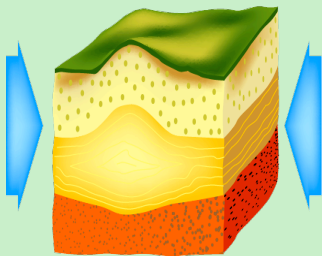


DEFORMING THE EARTH'S CRUST

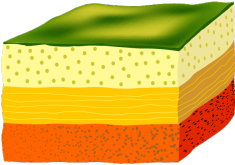


_____ is the amount of force on a given material.

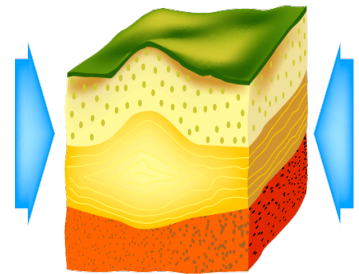
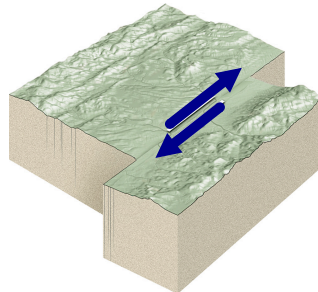
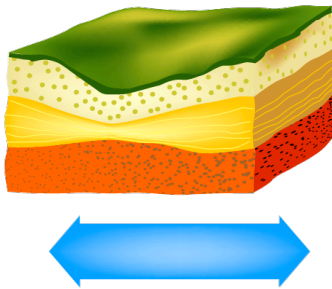
_____ is the change in shape of rock due to stress.



Before Stress



The 3 types of stress are **compressional**,
tensional and **shear**.

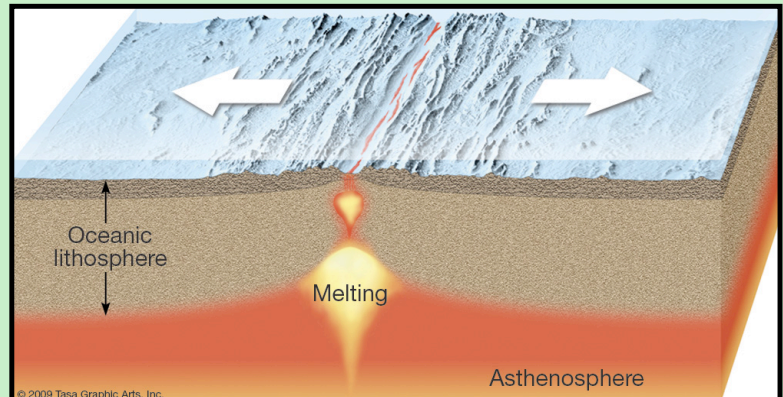
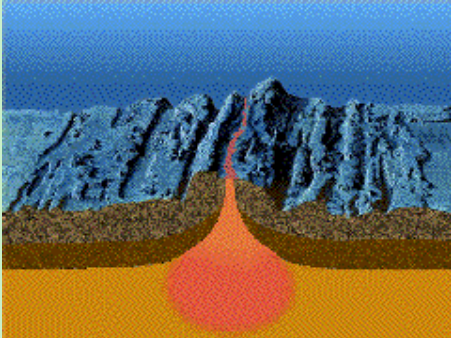




_____ stress occurs along
convergent boundaries where plates collide.

_____ stress occurs along
divergent boundaries where plates pull away from
each other.

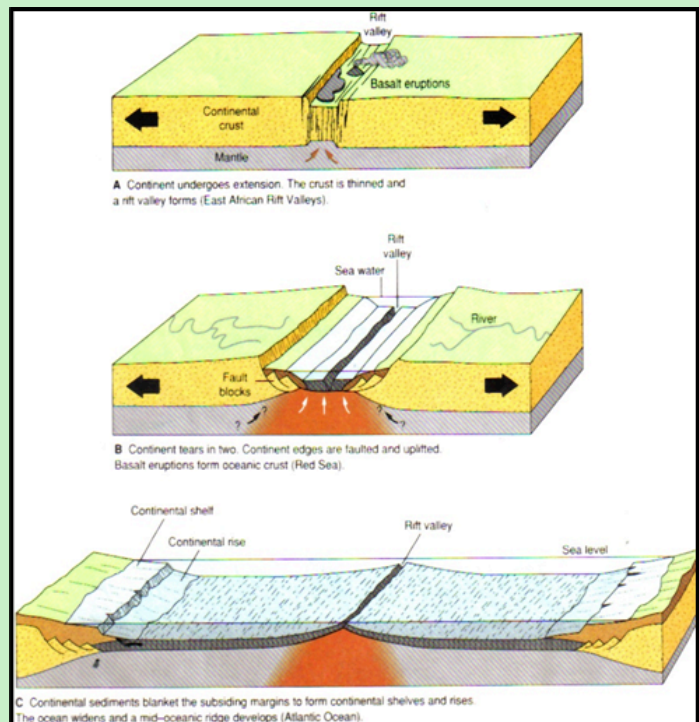
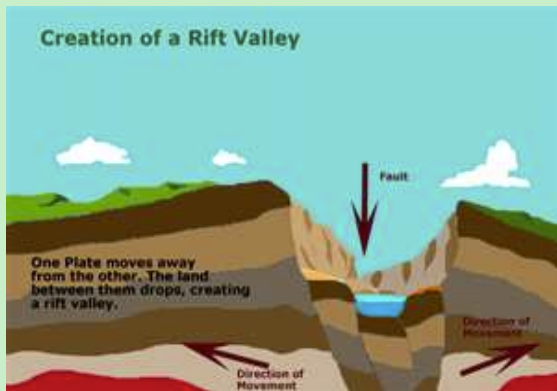
_____ stress occurs along
strike-slip boundaries where plates grind laterally
past each other.



_____ boundaries occur where tectonic plates move away from each other.

This creates _____, _____

Divergent boundaries can separate continents and create oceans.



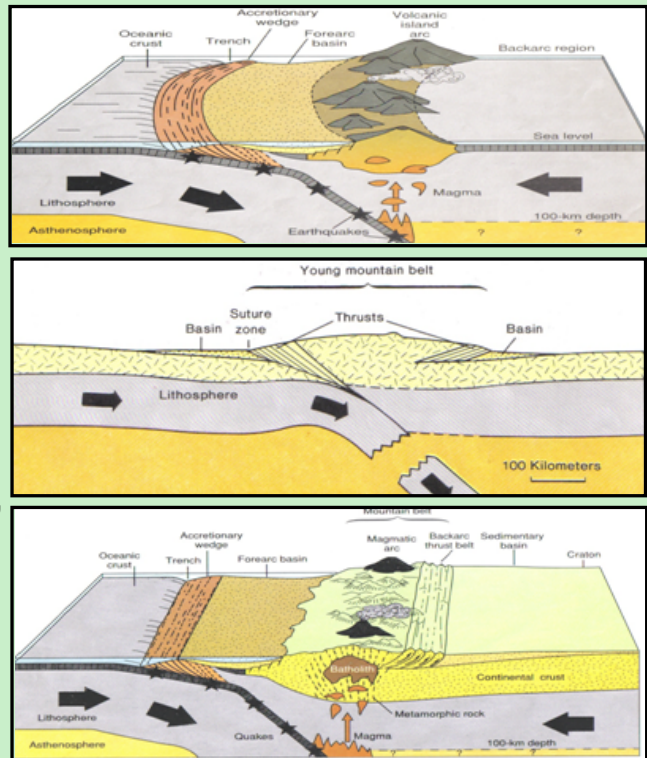


The East African Rift Valley


_____ boundaries
are where lithospheric plates come
together.

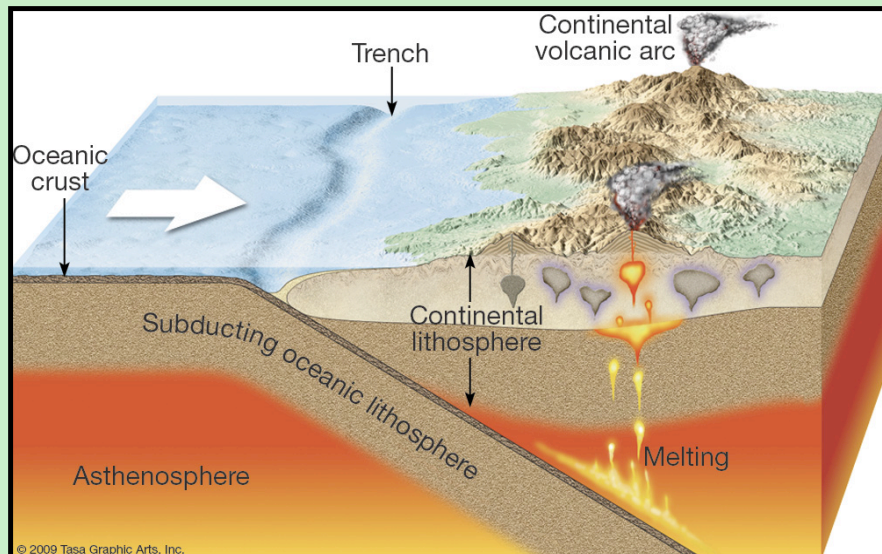
These boundaries create _____

_____, _____,



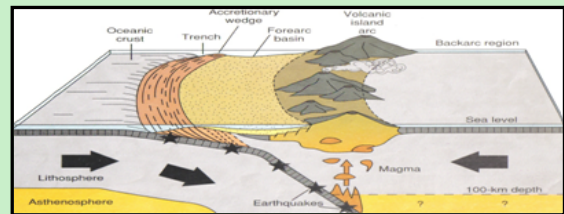
Convergent Boundaries

 Subduction

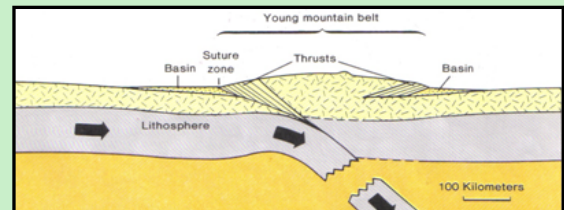


Continent-Continent

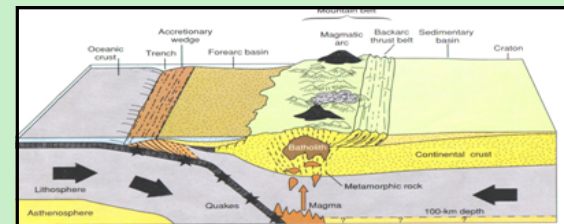
Older, cooler & denser ocean crust is subducted, creating deep focus earthquakes, volcanic island arcs and subduction zones.



No crust is subducted because granite is low density; creates shallow focus earthquakes and folded mountains.

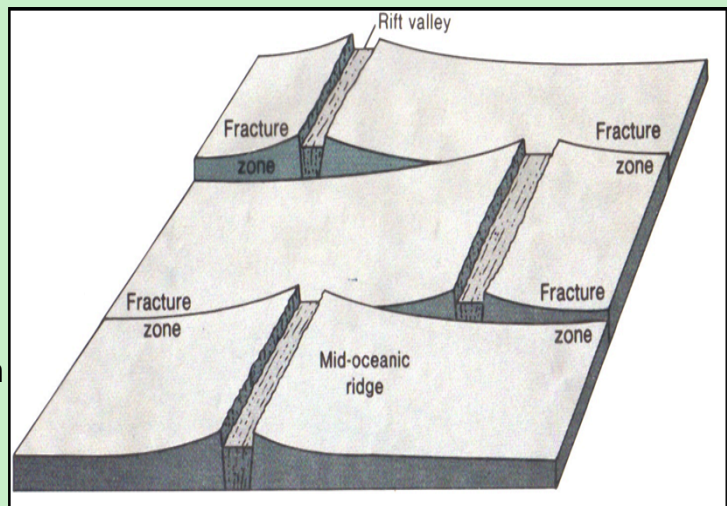


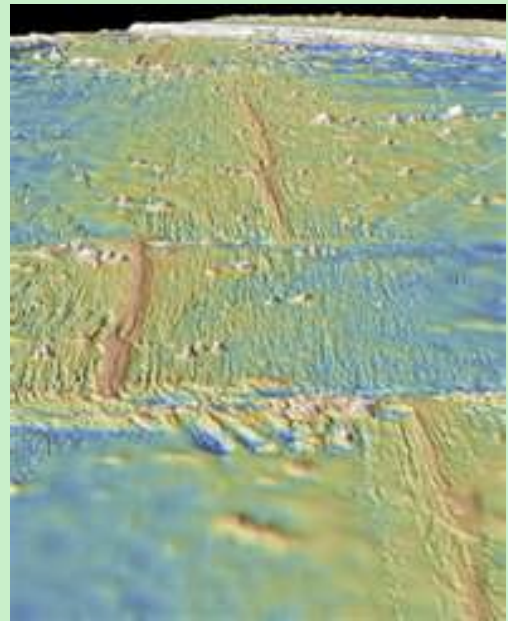
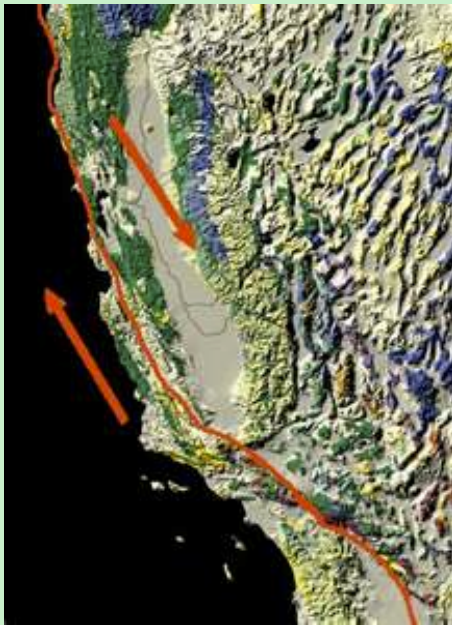
Ocean crust is subducted because it is denser, creating subduction zones, explosive volcanoes and deep focus earthquakes.



_____ boundaries occur where two plates move laterally, trying to slide past each other.

Transform boundaries cut through other types of boundaries, like divergent boundaries.





MOVEMENT OF PLATE BOUNDARIES

Convergent Divergent Transform

Label the boxes below to indicate the movement of the three types of boundaries.

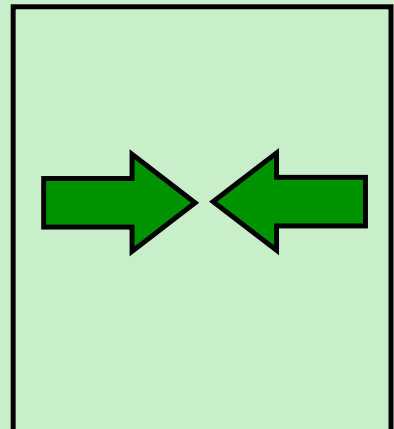
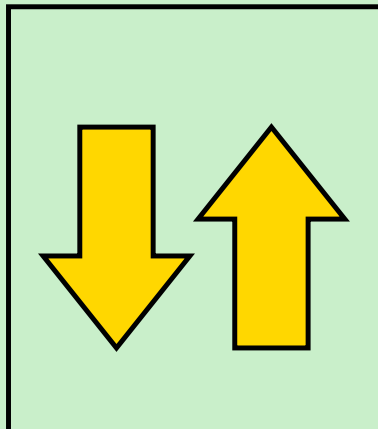
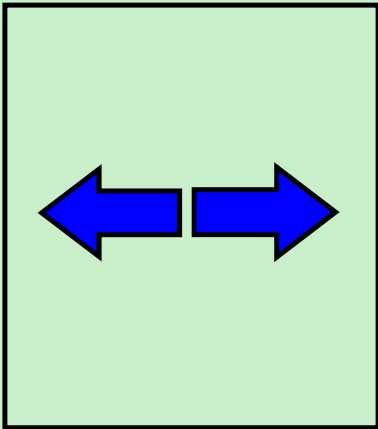
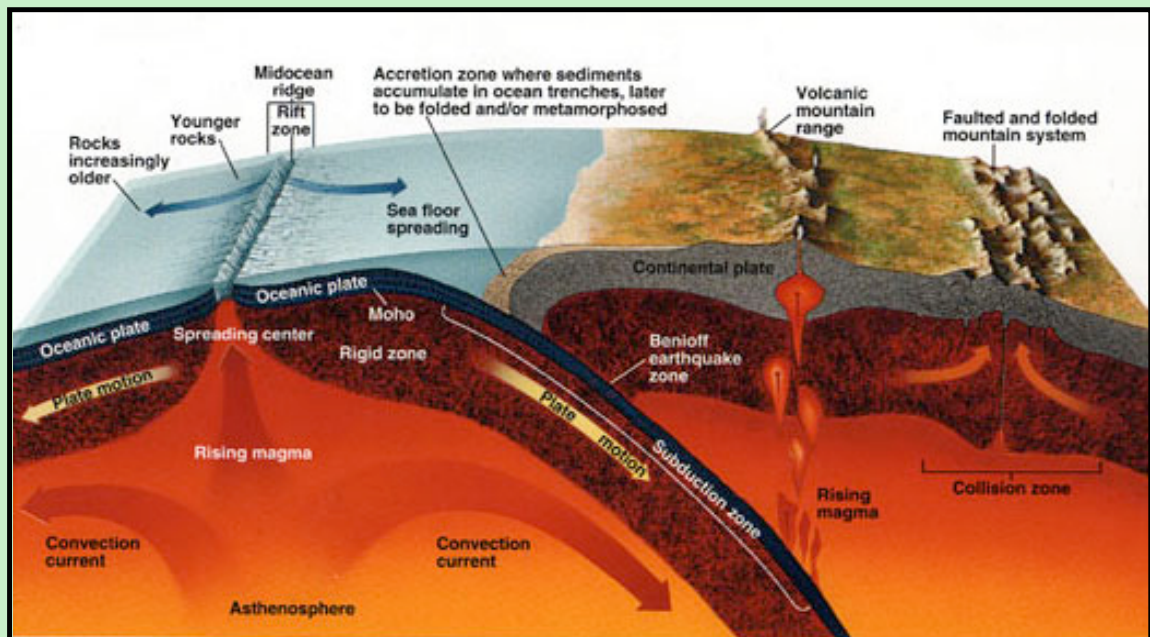


Plate Movement



THE CREATION & DESTRUCTION OF EARTH'S CRUST

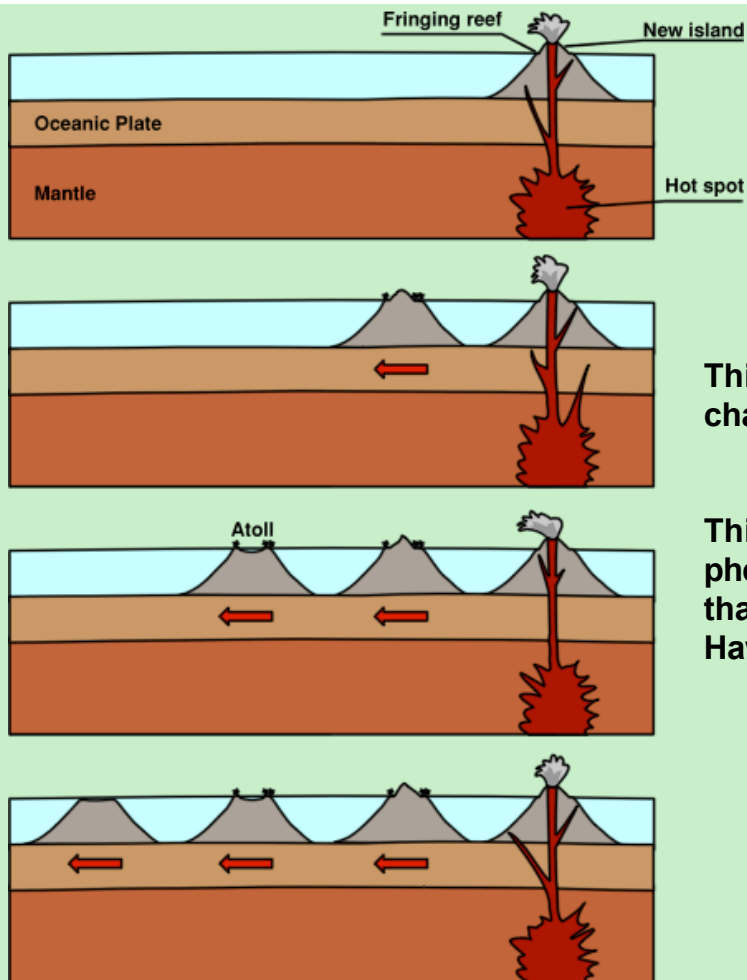


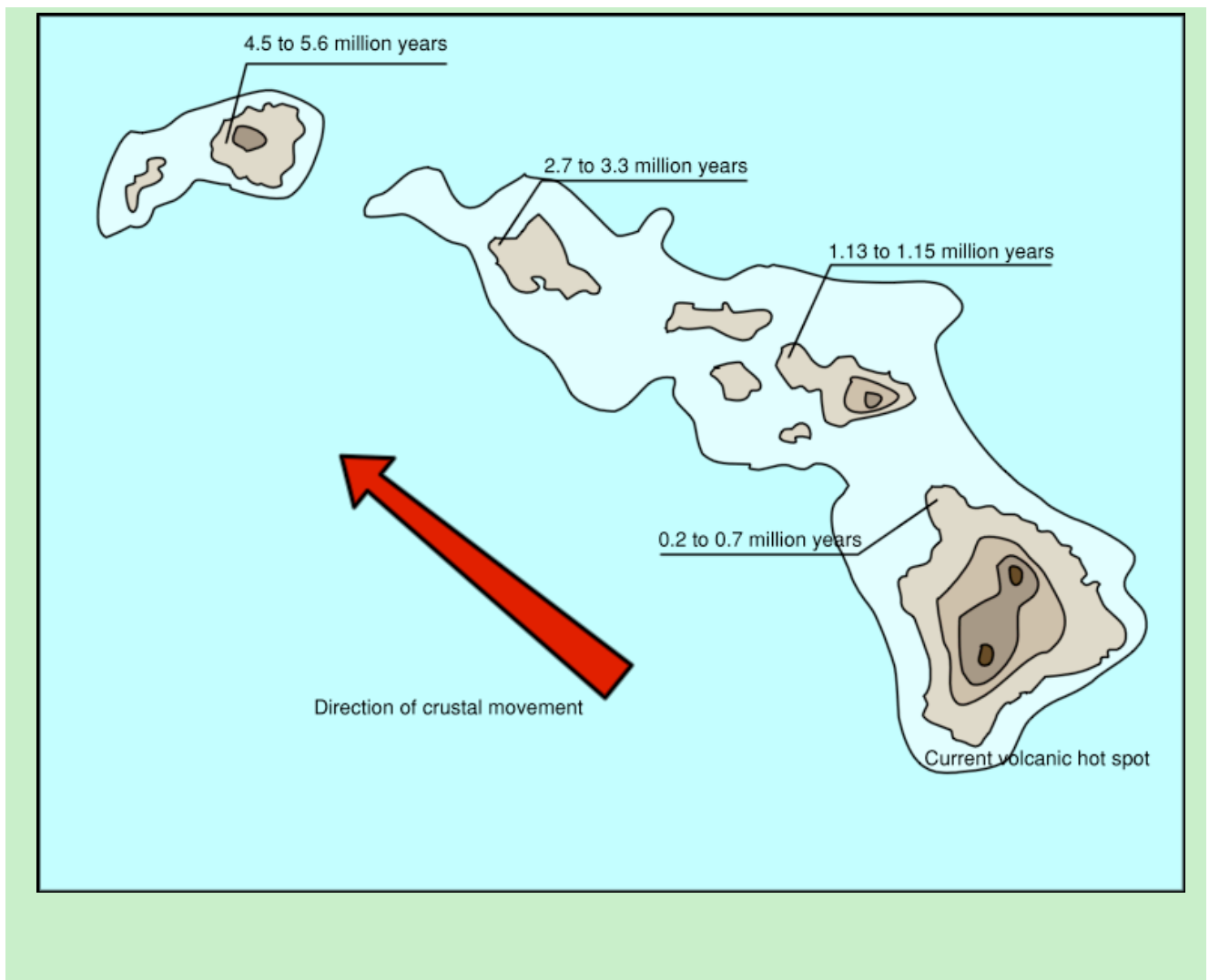
A hot spot is an area in the lithosphere where magma is very close to the surface.

As the plate moves, the hot-spot stays in the same place.

This can create a chain of volcanoes.

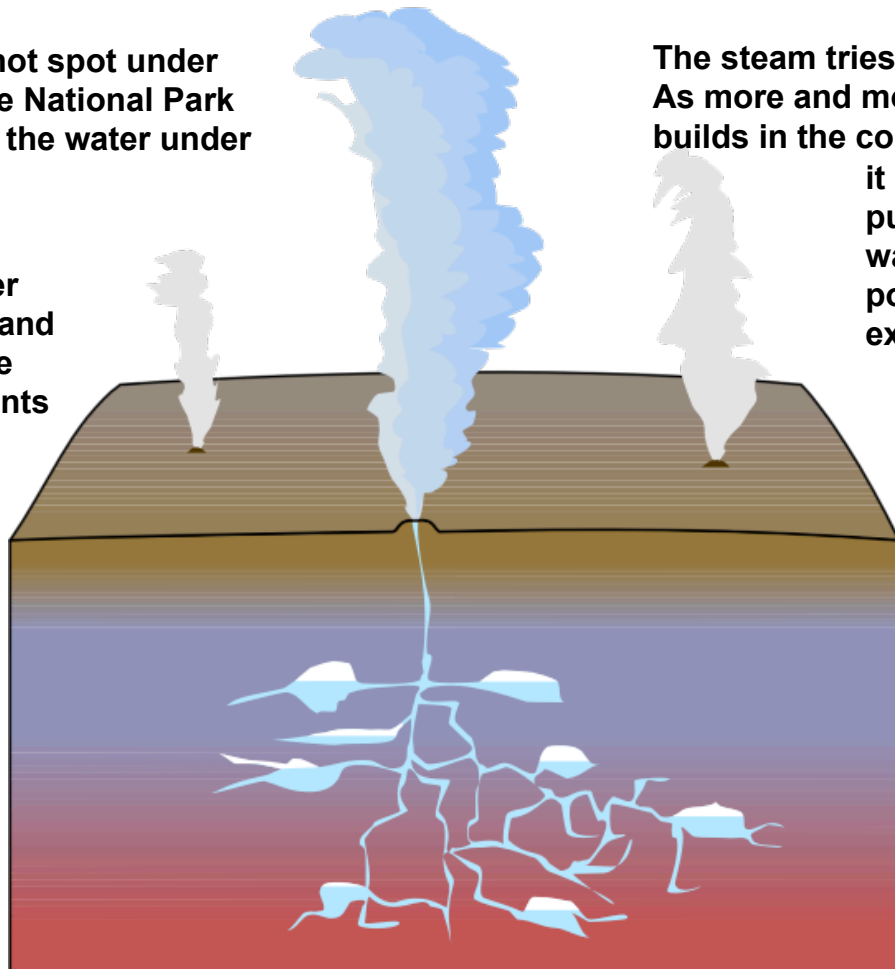
This is the phenomenon that created the Hawaiian Islands.





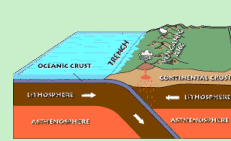
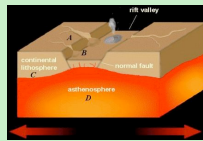
There is a hot spot under Yellowstone National Park that warms the water under the ground.

As the water gets hotter and hotter in the compartments under the ground, it begins to evaporate.



The steam tries to escape. As more and more steam builds in the compartments, it eventually pushes the water out in a powerful explosion.

What forms at each boundary?



Convergent Boundary

Divergent Boundary

Transform Boundary

FOLDING

Folding occurs due to _____

stress

limb

axial plane

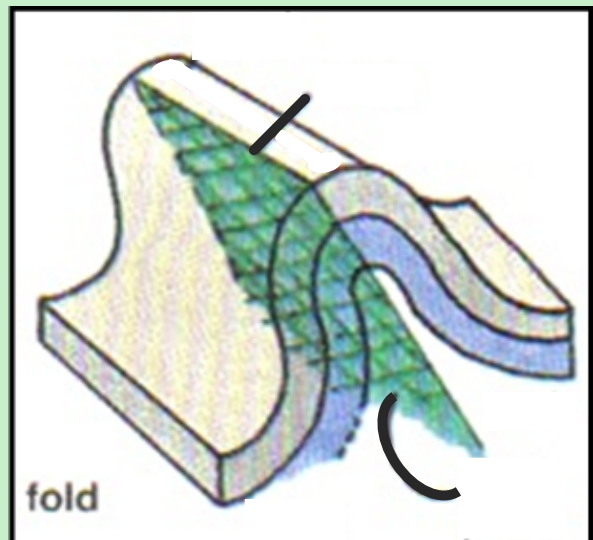
axis

PARTS OF A FOLD

The _____
cuts the fold in half.

The fold _____ is the line where
the axial plane meets the surface.

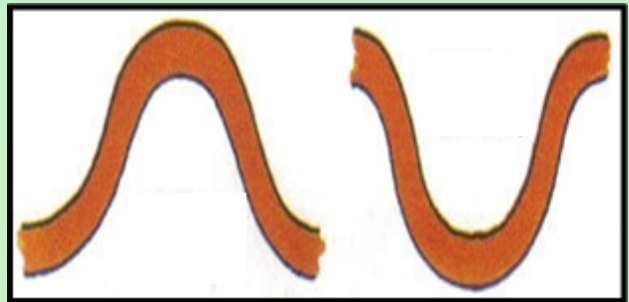
_____ are the sides
of the fold, falling away from the axial plane.



An _____ is the hill or downward facing part of the fold.

A _____ is the valley or upward facing part of the fold.

Label the types of folds . . .



Limb of a very large fold in western Arkansas



Nearly vertical limbs of a fold







FAULTING

A _____ is where rocks break and slide past each other.

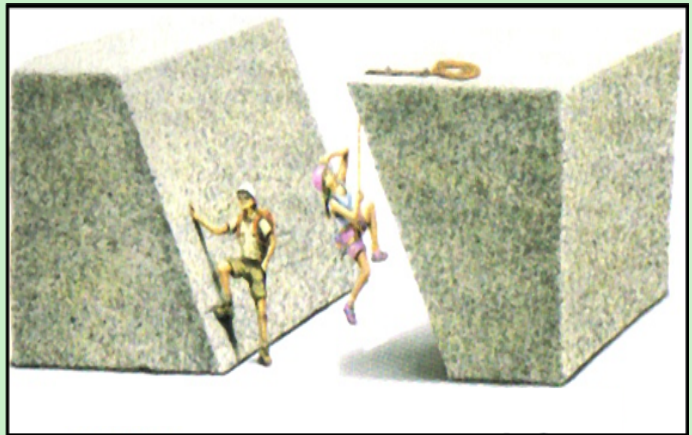
The crust on either side of the fault are called _____

The surface where movement occurs is called the _____

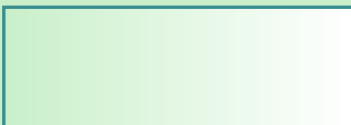
The _____ is the fault block beneath the fault plane.

The _____ is the fault block above the fault plane.

foot wall
hanging wall fault plane



Types of faults



strike-slip

reverse

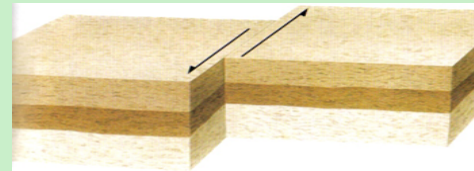
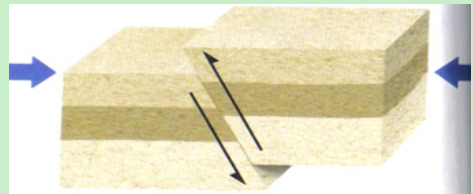
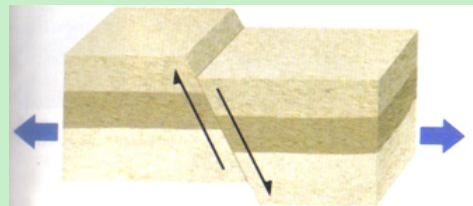
normal or gravity

TYPES OF FAULTS

In a _____ fault the foot wall is up relative to the hanging wall.

In a _____ fault the hanging wall is up relative to the foot wall.

In a _____ fault the fault blocks move laterally relative to each other.

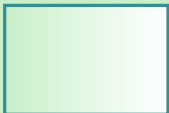


Notice the movement along this fault plane.

What type of fault is this? _____

What type of stress created this fault?

Along what type of boundary did this fault occur?



Note the striations created by movement along this fault plane.



What type of fault is shown?

FAULTED FOLD

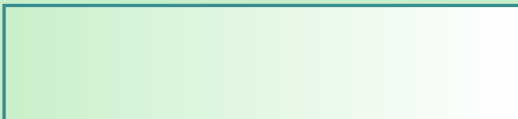


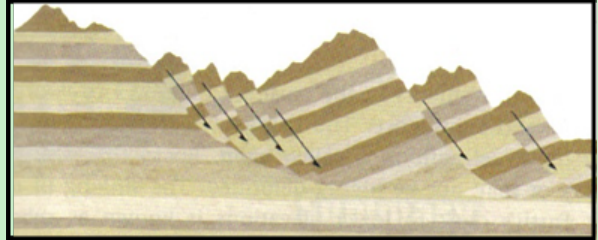
_____ mountains
form where plates _____

_____ stress
squeezes rocks layers together, pushing
them upwards.



The highest mountain ranges in the world are formed by folding, including the
_____, _____ &
_____ ranges.





_____ mountains form where _____
stress causes large blocks of crust to break and drop.

These types of mountains are steeper on one face than the other.

The _____ Mountains are an example.



_____ mountains form
along _____
boundaries where subducting rock melts
and rises through the crust.

_____ boundaries
produce mid-ocean ridges where rising
magma creates long mountain chains.

They can also form in the middle of plates
above _____.

