

Name _____

Homeroom _____

The Earth's Crust Outline

The Earth's Layers

◆ The _____

-Varies from 5-60 KM

-In most places, a _____ layer of

_____ rocks covers the mostly

_____ -like rocks of the

_____ **crust**

-The _____ **crust**, under layers of marine _____, is composed of

_____ and _____ rocks similar to basalt

◆ The _____

-Extends to a depth of about 2900 KM

-Earthquake waves travel _____ in the mantle than they do in the crust

-Composed mostly of _____, the dark mafic _____ olivine and pyroxene

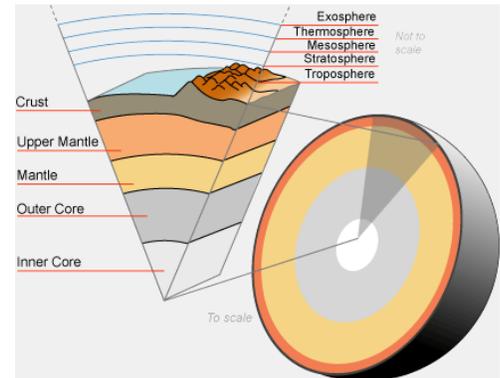
◆ The _____

-Composed of _____ and _____

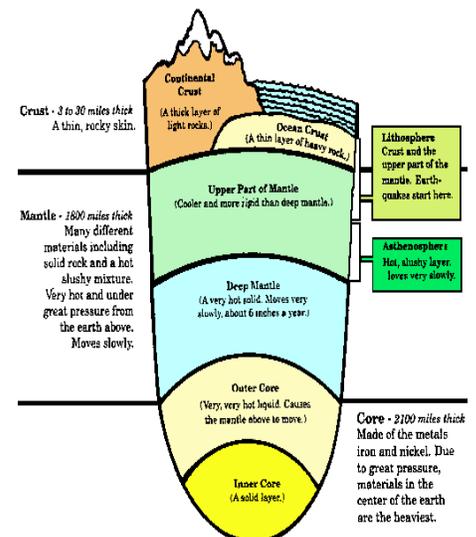
- _____ **Core** is thought to be _____ because S-waves are

_____ to pass through the outer core

-The _____ **Core** seems to be _____



The Earth's Layers



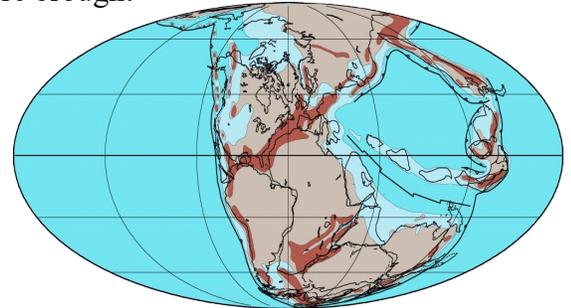
Continental Drift

◆ In _____, Alfred _____, proposed that in the distant _____, Earth's _____ were all _____ as a single _____

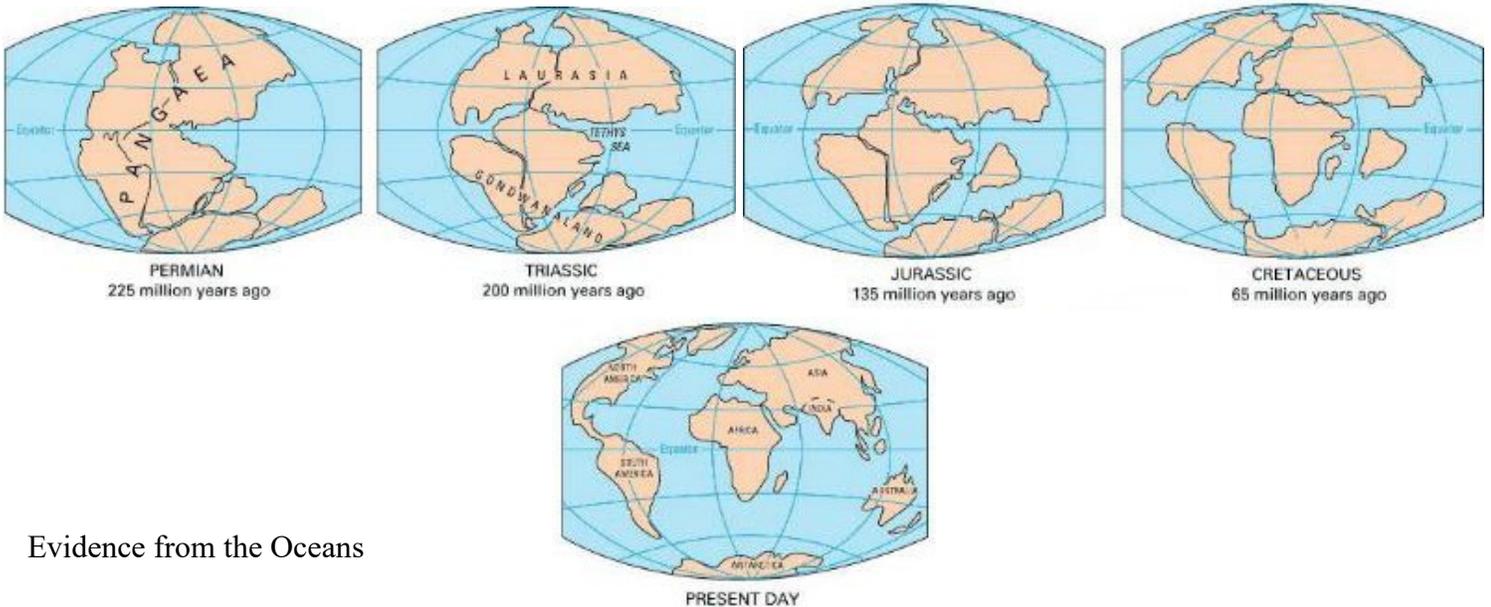
◆ He said that the _____ have _____ and _____ as they have _____ over Earth's _____ for _____ of years

◆ _____ proposed that if the _____ areas were brought back _____, the move would _____ up ancient _____ ranges, similar continental rock _____ and evidence of ancient _____

◆ There are even similar _____ on both sides of the _____ that would be brought back _____ by the re-assembly of _____



Continental Drift



Evidence from the Oceans

◆ In the _____ both _____ and the analysis of _____ material showed the _____ of the oceanic crust _____ with _____ from the mid-ocean ridges

—Some _____ were growing _____ from the _____

◆ Scientists also used _____ measurements of the _____ crust

Plate Tectonics

◆ The _____ of _____

is composed of about a _____

major rigid, _____ crustal

_____ and several smaller

◆ These _____ contain areas of light

_____ rock and dense _____ bottoms

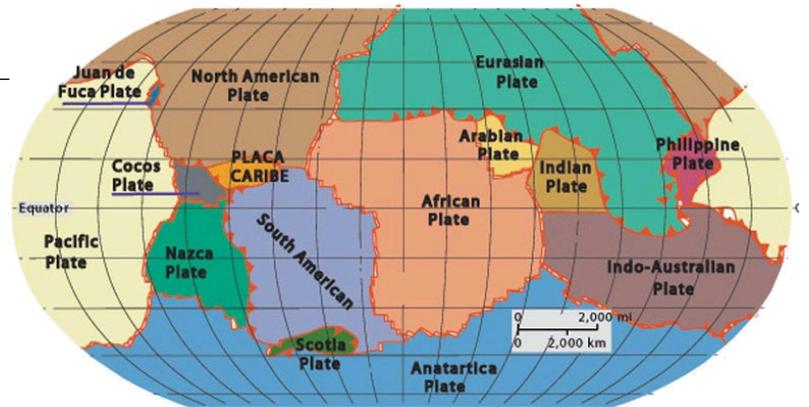


Plate Boundaries

◆ The _____ along which _____ meet and

◆ _____ boundaries occur from

_____ plates

—As a result of this collision _____ rise as the crust _____

◆ _____ occurs when a _____ oceanic plate _____ beneath a

_____ continental plate

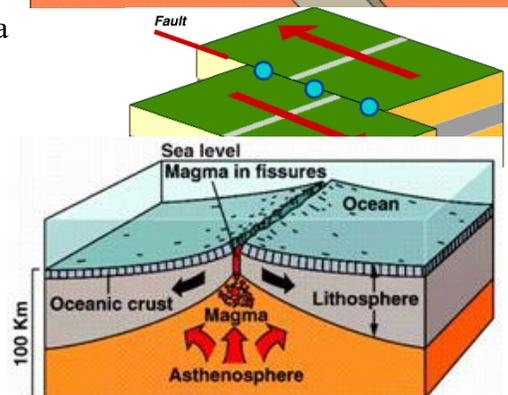
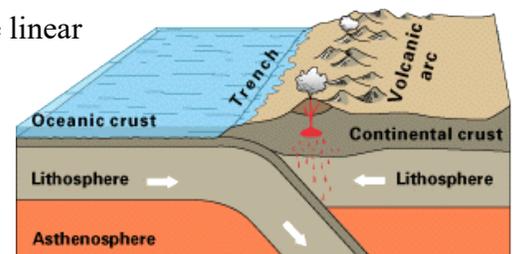
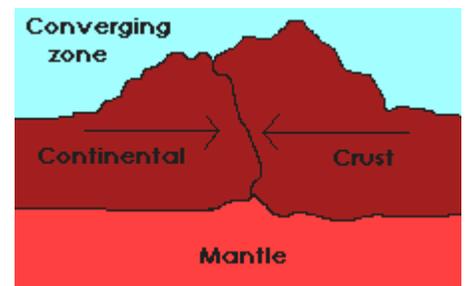
◆ _____ forms ocean _____ that are linear

fractures and are the _____ parts of the

◆ When a plate _____ past another plate, they meet at a

_____ boundary

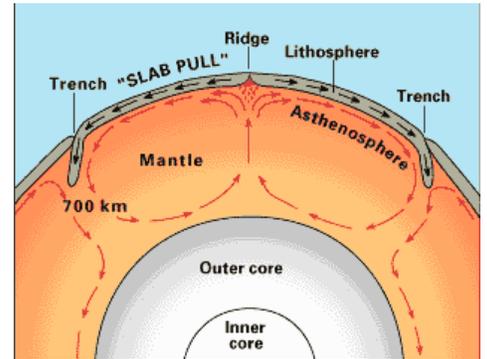
◆ A _____ boundary (_____) is found at



the mid-_____ ridges where _____ material creates new _____ that moves _____ from the _____ in both directions

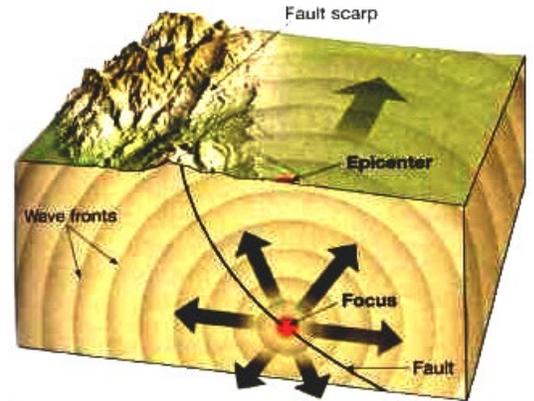
What Moves the Plates?

- ◆ _____ within _____ enable _____ to _____ from the Earth's _____
- ◆ These _____ create and expand the ocean _____, and they carry the _____ as " _____ " of lighter _____



Earthquakes

- ◆ Any _____, _____, or rapid _____ of the Earth's _____
- ◆ Most occur when _____ builds along a zone of _____ or a _____ in the rock known as a _____
- ◆ When the crust _____, _____ is released
- ◆ The _____ radiates in all directions through _____
- ◆ The place _____ where the break occurs is the _____ of the earthquake
- ◆ The _____ is the location at the Earth's _____ just above the _____



Measuring Earthquakes

- ◆ _____ (_____ Scale)
- _____ are the most reliable measures of earthquakes

-Each increase in _____ unit of magnitude means a _____-fold increase in shaking

◆ _____ (_____ Scale)

-Based upon the _____ of _____ who experienced the _____ and _____ the destruction

Mercalli vs. Richter scale

MODIFIED MERCALLI SCALE		RICHTER SCALE	
I.	Felt by almost no one.	2.5	Generally not felt, but recorded on seismometers.
II.	Felt by very few people.		
III.	Tremor noticed by many, but they often do not realize it is an earthquake.	3.5	Felt by many people.
IV.	Felt indoors by many. Feels like a truck has struck the building.		
V.	Felt by nearly everyone; many people awakened. Swaying trees and poles may be observed.		
VI.	Felt by all; many people run outdoors. Furniture moved, slight damage occurs.	4.5	Some local damage may occur.
VII.	Everyone runs outdoors. Poorly built structures considerably damaged; slight damage elsewhere.		
VIII.	Specially designed structures damaged slightly, others collapse.	6.0	A destructive earthquake.
IX.	All buildings considerably damaged, many shift off foundations, Noticeable cracks in ground.		
X.	Many structures destroyed. Ground is badly cracked.	7.0	A major earthquake.
XI.	Almost all structures fall. Very wide cracks in ground.	8.0	Great earthquakes.
XII.	Total destruction. Waves seen on ground surfaces, objects are tumbled and tossed.	and up	

Seismic Waves

◆ _____-Waves

- _____ (they arrive first), Pressure, or Push-Pull

-Material _____, _____, and particles move back and forth in the path of the wave.

-Sound waves that travel through _____, _____, or _____.

◆ _____-Waves

- _____ (arrive later), Shear, or Side-to-side

-Material shears out of _____ and _____ back

-Travels only through _____

◆ _____ Waves

-Travel along the earth's _____

-The _____ waves but the ones that _____ in large earthquakes

An Earthquake's Epicenter

◆ _____

-Scientists who study _____

◆ Use the _____ in the _____ of P and S-Waves from three seismic _____ stations to locate the epicenter

Earthquake Origin Time

◆ To find the _____, a seismologist needs to know the _____ and _____ time of the _____-waves

Earthquake Shadow Zones

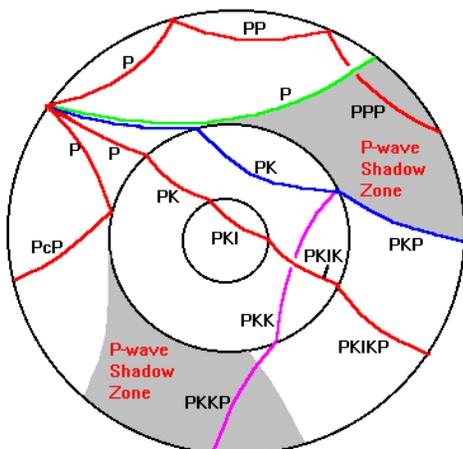
◆ When a major _____ occurs, both _____-waves and _____-waves are received over most of the _____

◆ The opposite side of the _____ will receive _____-waves but no _____-waves

-S-waves can _____ penetrate the _____ outer core

◆ There is also a region where _____ P-waves or S-waves are _____

◆ Refraction (_____) of the waves at the _____-_____ boundary causes this ring-shaped region known as the _____



Earthquake P-wave Shadow Zones

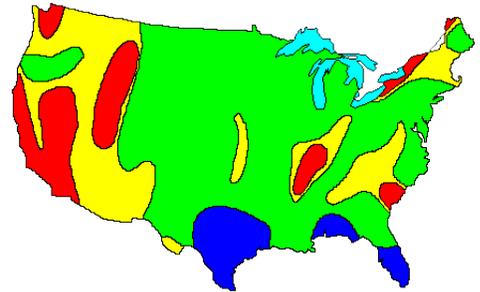
Earthquake P-wave Shadow Zones

- ◆ A P-wave traveling through the outer core is labeled K
- ◆ A bounce off the core is labeled c
- ◆ A P-wave in the inner core is I
- ◆ S-waves do not pass through the _____, because the outer core is _____

Seismic Hazards

◆ _____ can cause damage by _____, _____ of the crust, or large _____ in oceans, called _____

- ◆ Seismic Risk Level Maps for the U.S.
Probability of damage in 100 years
Blue = none
green = minor
yellow = moderate
red = major

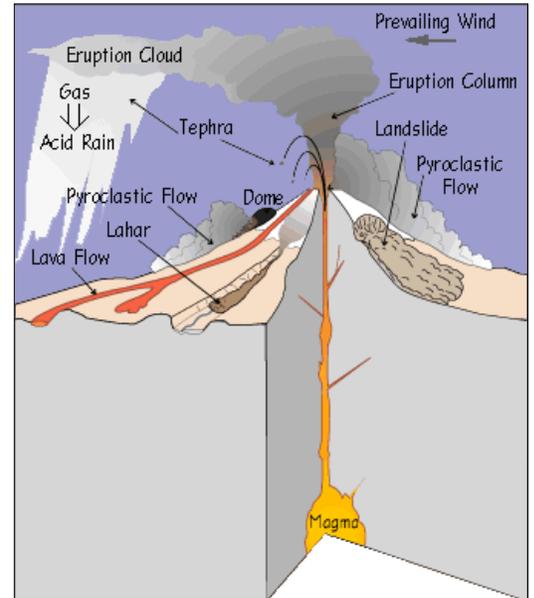


Volcanoes

- ◆ A _____ is a weak spot in the crust where molten material, or _____, comes to the surface.
- ◆ Volcanic belts form along the _____ of Earth's plates

Volcanic Hazards

- ◆ When _____ erupt they may spew hot _____, hot _____, and/or _____ gases
- ◆ The _____ and _____ can _____ cities, and the _____ fumes can _____ people
- ◆ Volcanoes can also provide _____ soil that is composed of _____ volcanic

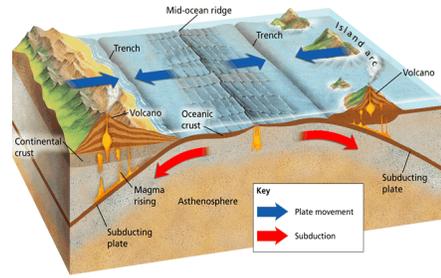


The "Ring of Fire"

- ◆ A large number of the world's _____ and _____ events occur around the edges of the _____ Ocean
- ◆ _____, the western coast of the United States are on the _____ of _____
- ◆ These areas are _____ frequently by _____ and _____

Volcanoes and Plate Boundaries

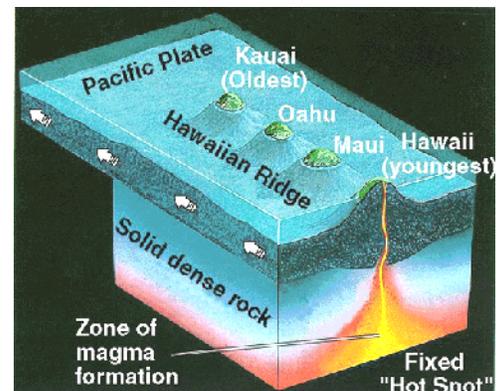
- ◆ Volcanoes often form where two _____ collide or where an _____ plate collides with a _____ plate.



- ◆ In both situations, an oceanic plate sinks through a trench.

Hot Spots

- ◆ In several places on _____, hot plumes of _____ pierce the _____
- ◆ As a crustal plate _____ over this source of _____, _____ form at the _____
- ◆ This _____ of a plate leads to the formation of a _____ of _____ of differing _____
- ◆ One example is the _____



Volcanic Eruptions

- ◆ _____ eruption happens when lava flows out and over the land.
- ◆ _____ eruptions are the strongest eruptions.
 - Gases and tephra are sent up to _____ into the atmosphere.
 - _____ is material produced by volcanic eruptions
- ◆ _____ eruptions molten basaltic rock is thrown upward in strands from one vent.
 - The eruptions come every few minutes and are caused by bursts of gases
- ◆ _____ eruptions are steam and debris from the inside of a volcano.
 - _____ heats up water below the surface and causes it to boil. When enough pressure builds up, the steam blows the top off of the volcano.

Types of Volcanoes

- ◆ SHIELD
 - the eruption is _____



- _____ sloping
- consist of _____ lava flows

◆ CINDER CONE

- the eruption is _____
- _____-sloped
- consist of _____ lava



◆ COMPOSITE

- the eruptions _____ between quiet and explosive
- build into _____ mountains
- consists of layers of lava which _____ and _____ layers of the earth
- sometimes called _____



Volcanoes in the U.S

- ◆ Active volcanoes in the U.S. are found mainly in _____, _____, California, _____ and _____.

Famous U.S. Volcanoes

- ◆ _____ **in Washington** – last erupted in _____ killing 57 people
- ◆ _____ **in Hawaii** – the largest volcano on our planet and one of the most active volcano on our planet. It erupts quite often and is constantly monitored for its next eruption