

PHYSICAL PROCESSES OF GEOGRAPHY

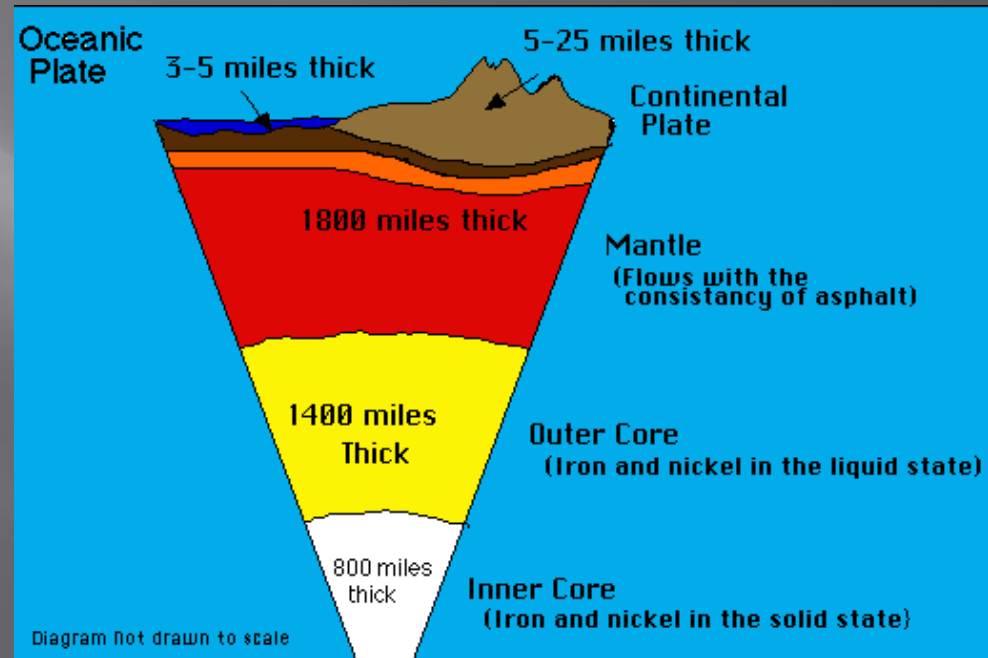
PART 1: INTERNAL FORCES OF CHANGE

A LAYERED PLANET

▣ CORE

▣ MANTLE

▣ CRUST



A LAYERED PLANET

- ▣ Earth is composed of three layers
 - Core(inner and outer core)
 - ▣ Super hot, solid inner core is about 4,000 miles below the surface
 - ▣ Liquid outer core goes down about 1,400 miles
 - Mantle
 - ▣ Hot, dense rock; 80% of the heat generated by the interior of the earth comes from the mantle
 - Crust
 - ▣ Depth ranges from 2 miles(under oceans) to 75 miles(under mountains)
 - ▣ Broken into over a dozen big slabs of rock called plates that rest on a partially melted layer in the upper mantle

PLATE MOVEMENT

- ▣ Most scientists believe the continents were once connected(Pangaea)
- ▣ Over millions of years, this supercontinent has broken apart and drifted away---we call this “Continental Drift” Theory
- ▣ Plates move at an average of 4 inches per year
 - Plates may crash into each other, pull apart or grind and slide past each other
 - They push up mountains, create volcanoes and produce earthquakes
 - When plates spread apart, magma, or molten rock, is pushed up from the mantle
 - When plates bump, they form a trench
 - We call these movements “plate tectonics”

Earth Environment

Pangaea – the supercontinent that broke apart into fragments we know as continents.

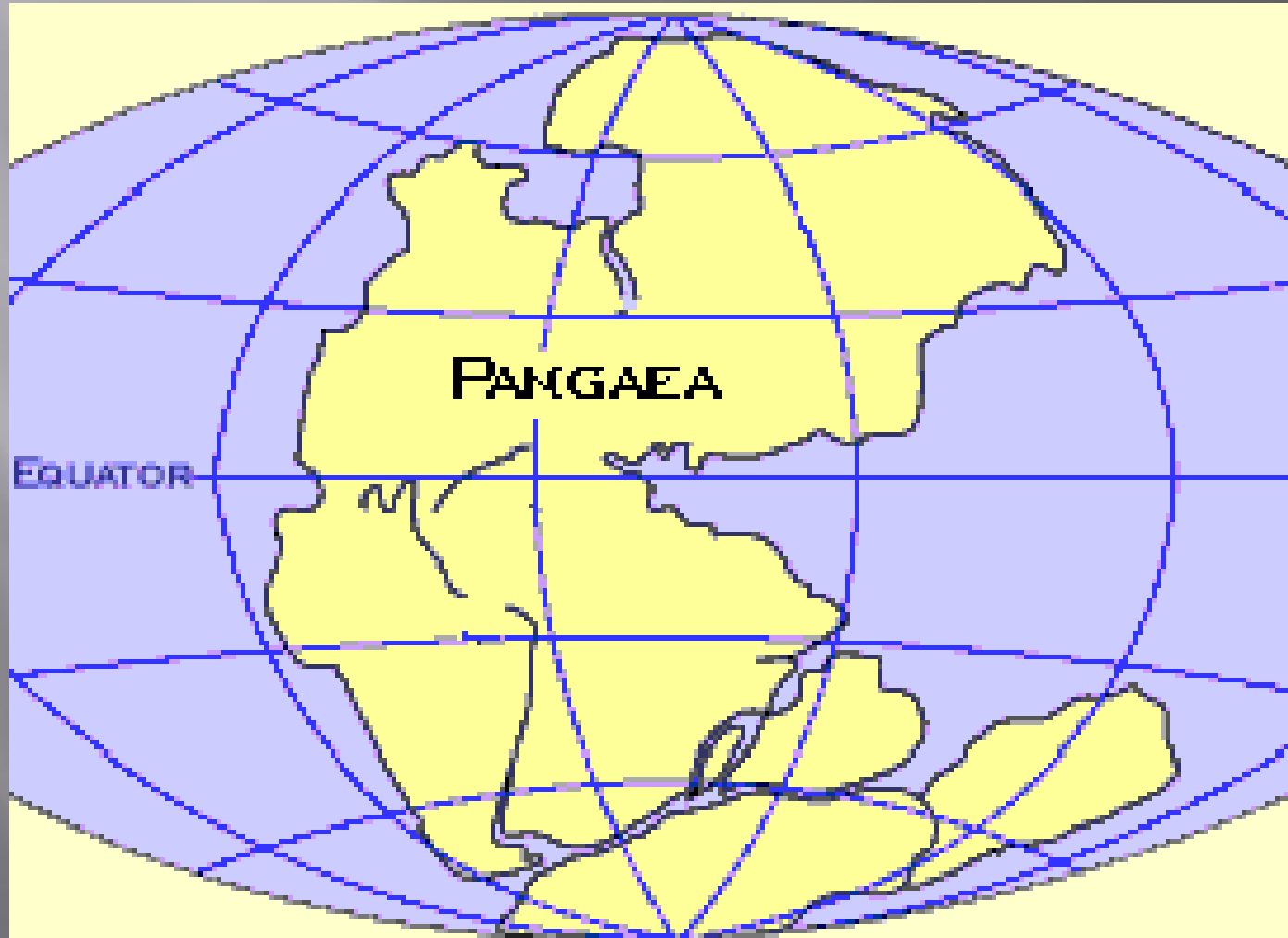
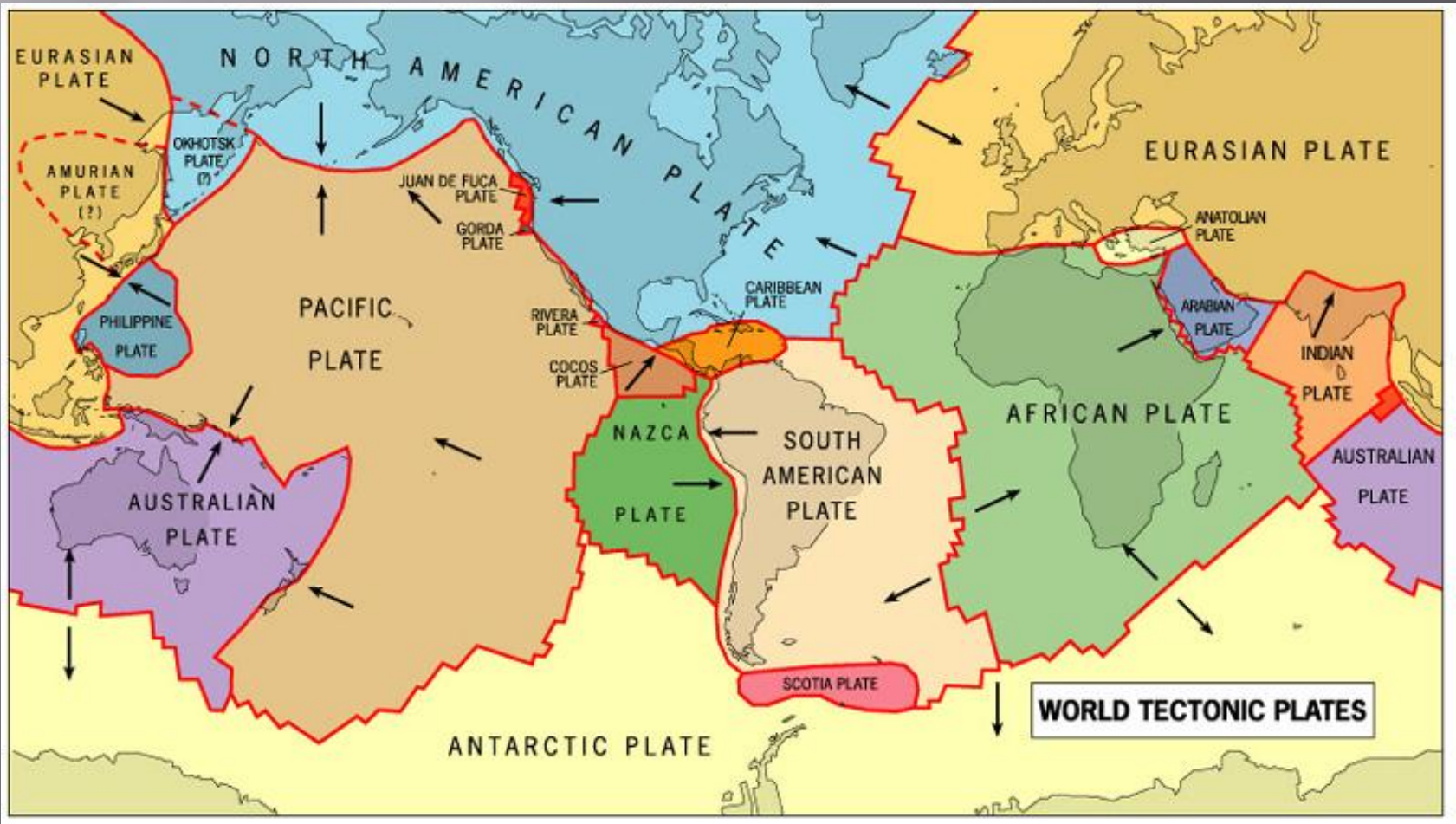
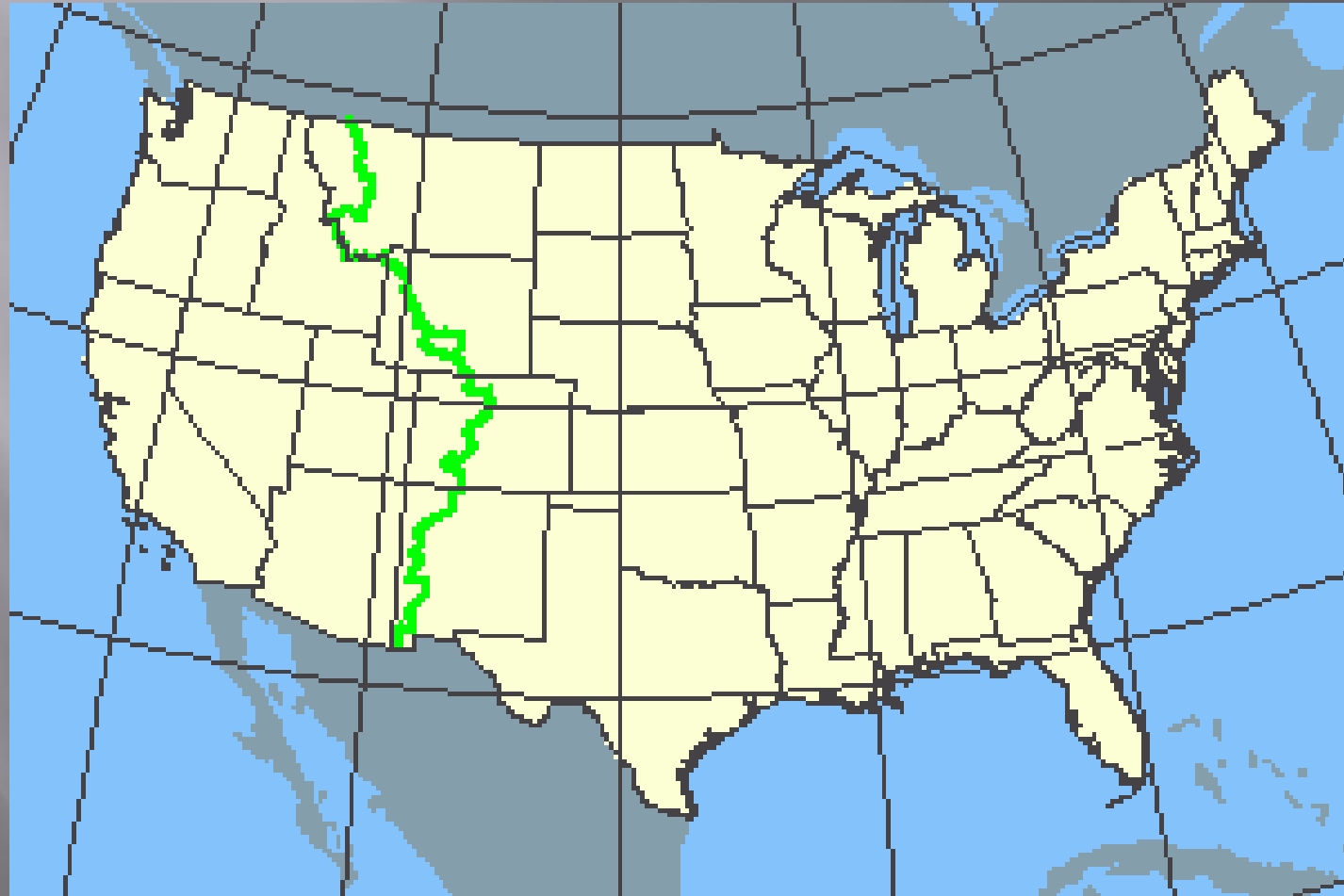


Plate Tectonics –
the earth is divided into plates, which are in motion. Earthquakes and volcanoes often occur along plate boundaries.



The Continental Divide is the high point of a continent. In the US it is in the Rocky Mountains



COLLIDING & SPREADING PLATES

- ▣ Mountains are formed in areas where giant continental plates collide(Himalayas were formed this way)
- ▣ When a sea plate collides with a continental plate...
 - Heavier sea plate dives below the continental plate, creating mountains....we call this “subduction”(Andes were formed this way)
 - The other thing that can happen is the ocean floor & continental shelf can level off....this basically causes continents to grow outward
- ▣ When two sea plates converge...
 - Island chains can be created at the convergence boundary
 - The other thing that can happen is “spreading” ---cracks can result, allowing magma to build up and harden; this can separate continents even more

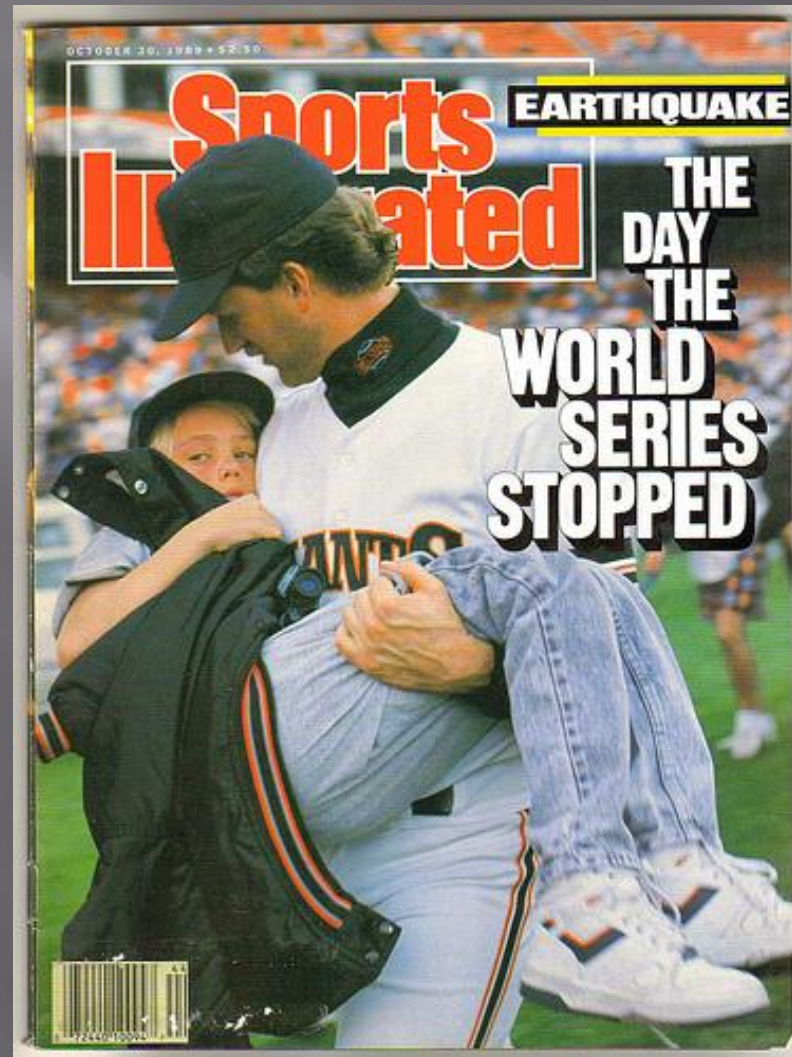
FOLDS, FAULTS, EARTHQUAKES & VOLCANOES

- ▣ Folds---bends in layers of rock due to moving plates
- ▣ Faults---cracks in the earth's crust due to moving plates
 - One famous fault is California's San Andreas Fault



FOLDS, FAULTS, EARTHQUAKES & VOLCANOES

- ▣ Earthquake
---sudden,
violent
movement
of plates
along a
fault line



1989 San Francisco Earthquake



1989 San Francisco Earthquake



1989 San Francisco Earthquake



1989 San Francisco Earthquake



1989 San Francisco Earthquake



FOLDS, FAULTS, EARTHQUAKES & VOLCANOES

- ▣ Volcano---lava or magma breaks through the crust
 - Molten rock may also heat underground water, causing hot springs or geysers



FOLDS, FAULTS, EARTHQUAKES & VOLCANOES



FOLDS, FAULTS, EARTHQUAKES & VOLCANOES

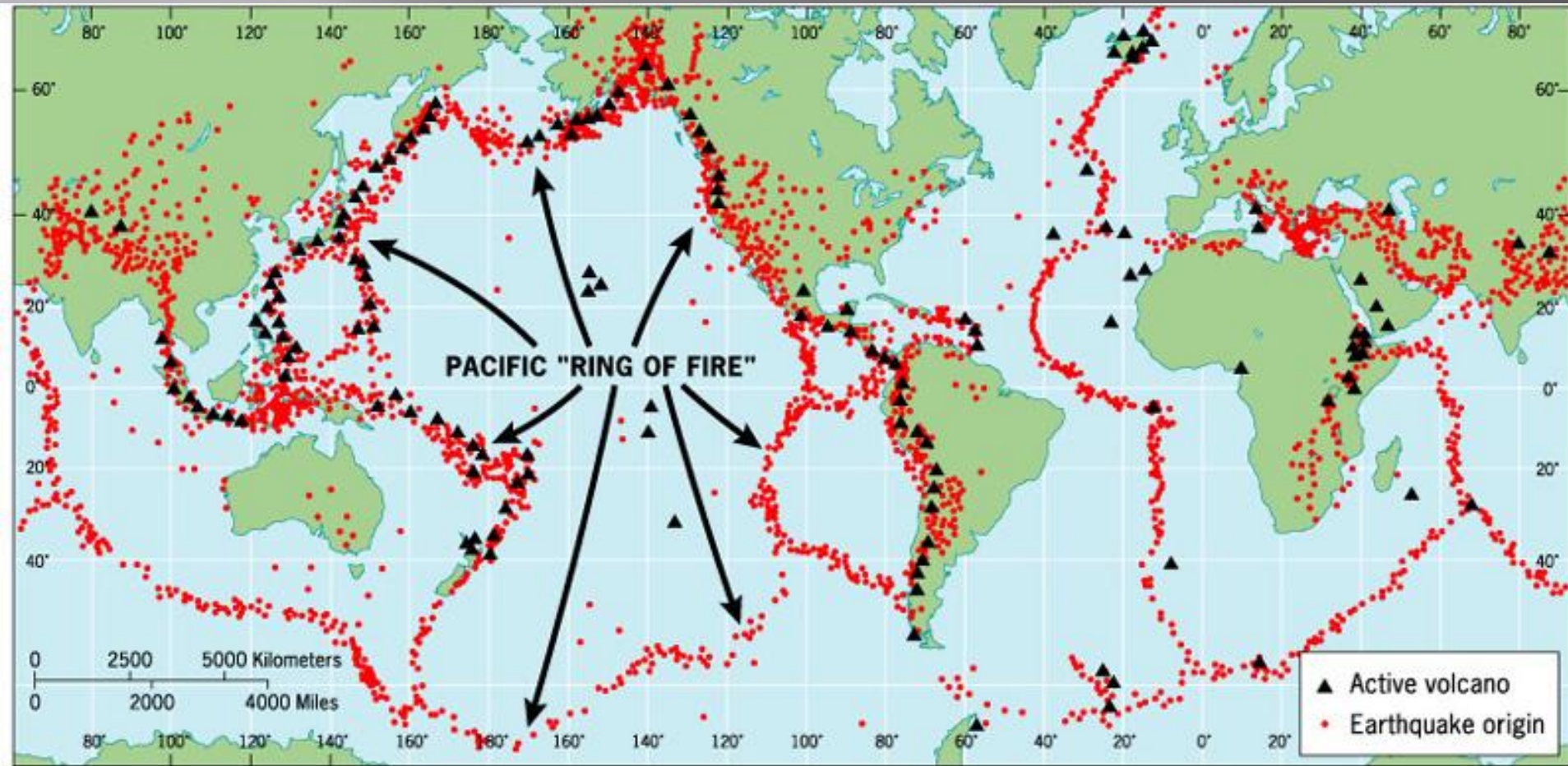


FOLDS, FAULTS, EARTHQUAKES & VOLCANOES

- ▣ Many of the world's earthquakes & volcanoes take place along the Pacific Ring of Fire



Pacific Ring of Fire



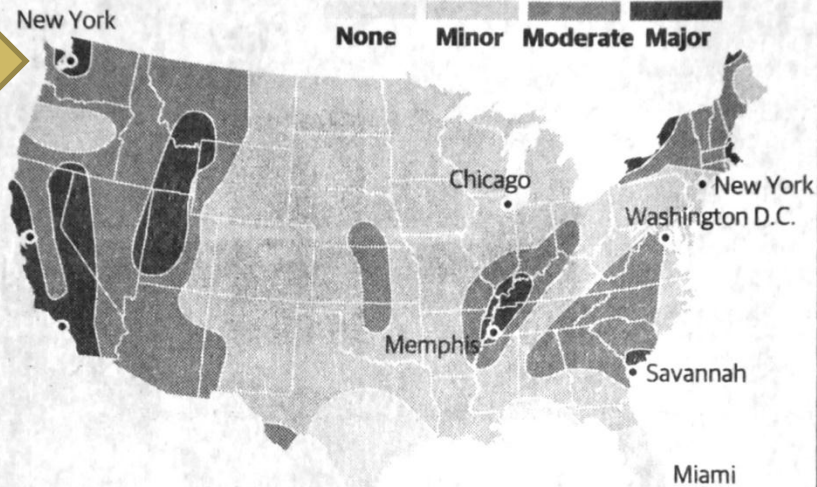
Compare locations of volcanoes and earthquakes to plate boundaries.



Earthquakes in the Northeast

Major earthquakes are not common in the northeastern U.S., but the region has had its share of seismic activity.

Risk of damage from earthquakes



Historical earthquakes in the Northeast

State	Year of record	Earthquakes
New York	1840 - 2007	755
Maine	1766 - 2007	544
New Hampshire	1638 - 2007	360
Massachusetts	1668 - 2007	355
New Jersey	1738 - 2007	141
Connecticut	1668 - 2007	137
Vermont	1843 - 2007	73
Rhode Island	1776 - 2007	38

This is sad...



Home Depot Display

- ▣ Where in the US?



PART 2: EXTERNAL FORCES OF CHANGE

WEATHERING

- ▣ Process that breaks down rocks on the surface into smaller pieces
- ▣ Two kinds
 - Physical(or mechanical)
 - ▣ Water seeping into rock and freezing
 - ▣ This type simply breaks down rock
 - Chemical
 - ▣ Changes the chemical makeup of rocks, transforming their minerals or combining them with new elements

EROSION

- ▣ Wearing away of the earth's surface by wind, glaciers or moving water
 - Wind Erosion: carries dust and soil and replaces it somewhere else (can be good or bad---Dust Bowl in 1930s was an example of bad wind erosion)
 - Glacial Erosion: can destroy forests, carve out valleys, alter course of rivers and create lakes/ponds
 - Water Erosion: picks up sediment and can also carve out valleys and canyons

PART 3: SHAPES AND SPHERES

LANDFORMS

- ▣ Four major types of landforms are mountains, hills, plateaus and plains



LANDFORMS

- ▣ Others include valleys, canyons and basins
- ▣ Landforms can contain rivers, lakes & streams
- ▣ The part of a continent that extends underwater is called a “continental shelf”
- ▣ Highest point: Mt. Everest (29,035 ft)
- ▣ Lowest dry land point: Dead Sea shore (-1,349 ft)
- ▣ Lowest known depression:
Mariana Trench (-35,827 ft)

WATER, LAND & AIR

The "...spheres"

- ▣ About 70% of the earth's surface is water
- ▣ Oceans, lakes, rivers and other bodies of water make up our "hydrosphere"
- ▣ The earth's crust, which includes the ocean floor and ocean basins, makes up our "lithosphere"
- ▣ The air we breathe is our "atmosphere"
 - Extends 1,000 miles above the surface; is made up mostly of nitrogen
- ▣ All parts of the earth that support life is called the "biosphere"