PLATE TECTONICS AND RELATED CONCEPTS

CONTINENTAL DRIFT

Continents seem to fit together like pieces of a puzzle

CONTINENTAL DRIFT

225 million years ago scientists believe that the land masses that form our continents today were once one large super continent called Pangeae. The evidence that our continents once fitted together and then moved apart is explained by **Alfred Wegeners Continental Drift Theory**.

CONTINENTAL DRIFT MODEL

PROBLEMS…

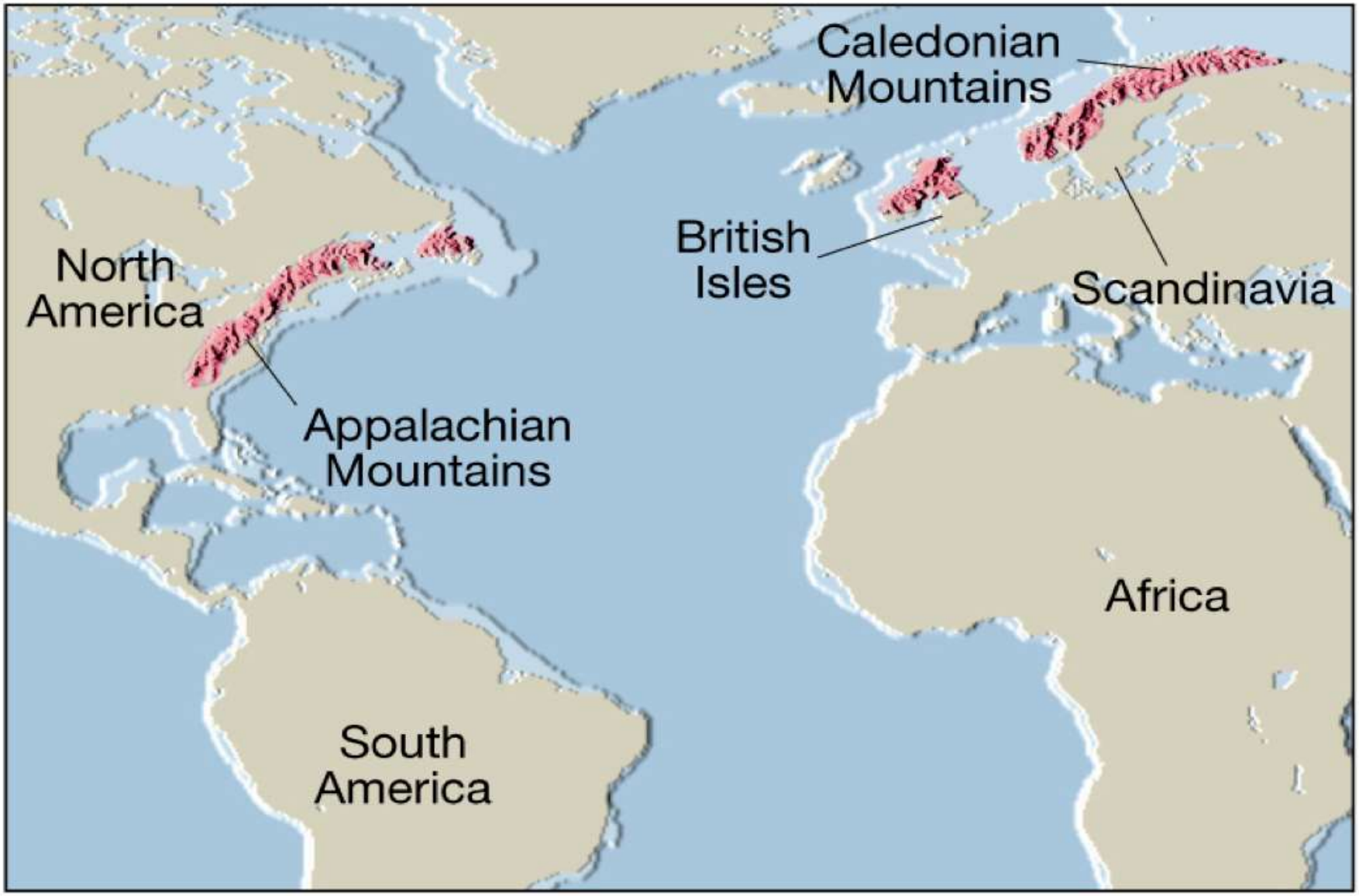
- **Alfred Wegener, a German researcher, in 1912 designed this model.**
- **Presented research to professionals.**
- **Did not provide a reasonable mechanism to explain how continents drifted.**

CONTINENTAL DRIFT

EVIDENCES FROM FOSSIL AND SEDIMENT…

Similar distribution of fossils such as the Mesosaurus.

CONTINENTAL DRIFT



SEAFLOOR SPREADING

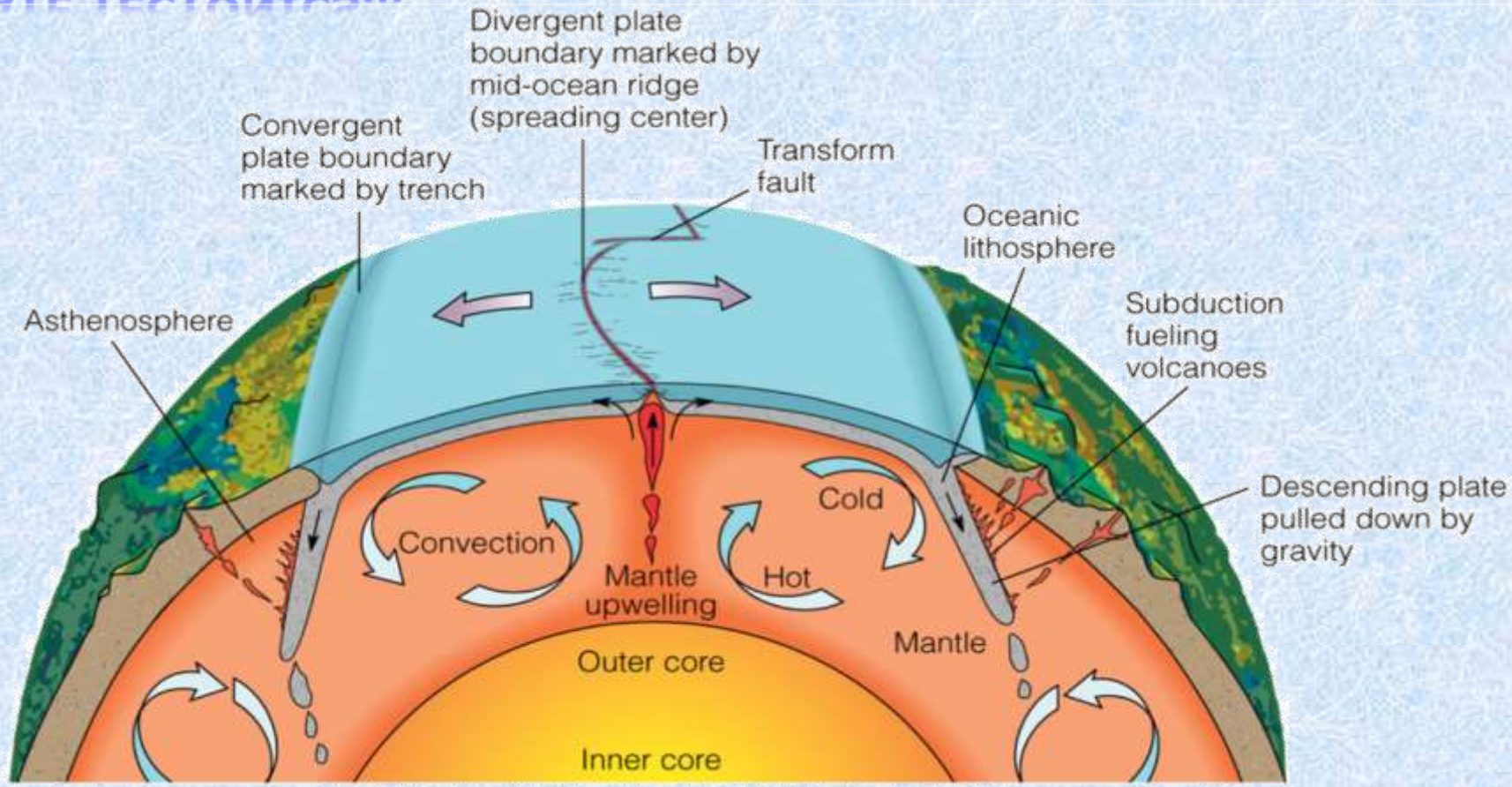
PHYSICAL GEOGRAPHY…

- Continental drift reexamined in 1960's with new information.
- New theory developed: Seafloor spreading.
- Supporting evidence for seafloor spreading…
  - - World seismicity
  - - Volcanism
  - - Age of seafloor
  - - Paleomagnetism
  - - Heat flow.

Theory combining continental drift and seafloor spreading termed Plate Tectonics.

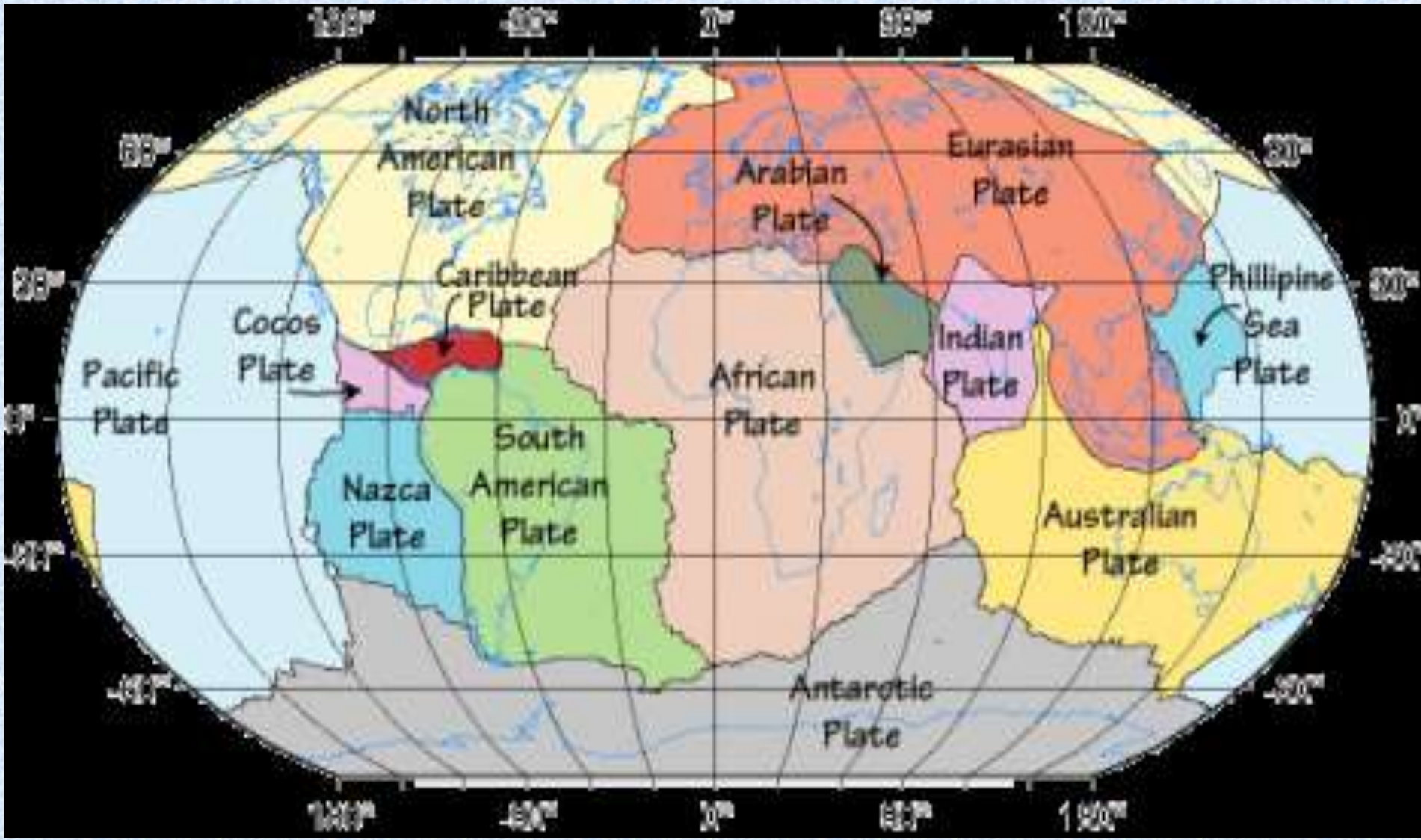
THEORY OF PLATE TECTONICS

PLATE TECTONICS…



John Tuzo Wilson, a Canadian, combined ideas of continental drift and seafloor spreading into "Plate Tectonics"

THEORY OF PLATE TECTONICS



PRINCIPLES OF PLATE TECTONICS

PLATE TECTONICS…

Earth's outermost layer composed of thin rigid plates moving horizontally.

Plates interact with each other along their edges (plate boundaries).

Plate boundaries have high degree of tectonic activity

- **Mountain building**
- **Earthquakes**
- **Volcanoes**

Three Types of Plate Boundaries…

- **Divergent**
- **Convergent**
- **Transform**

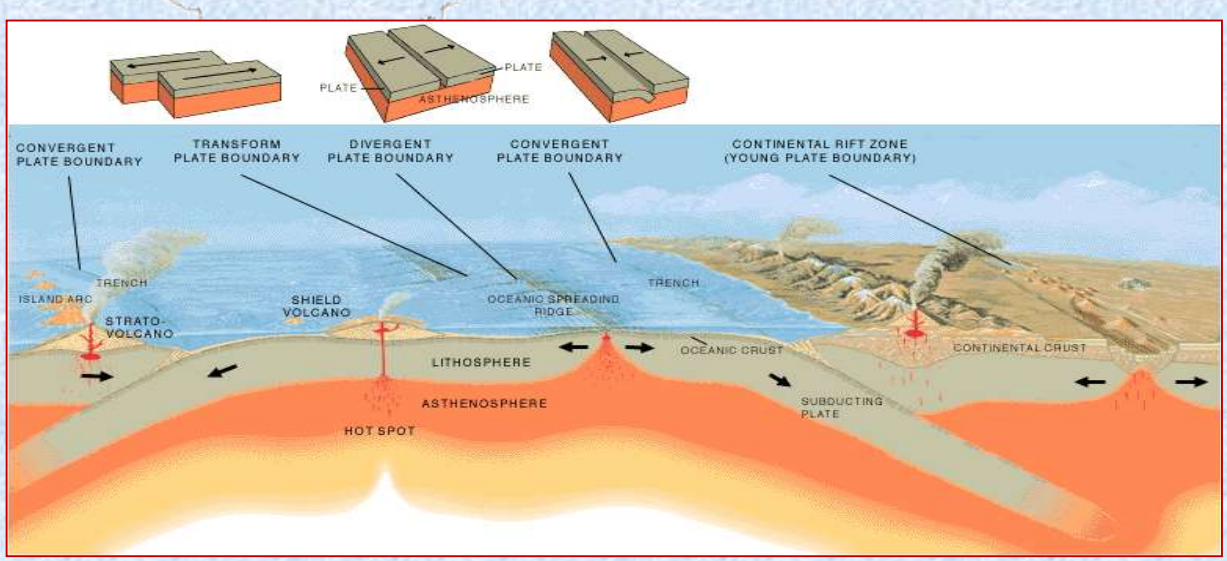
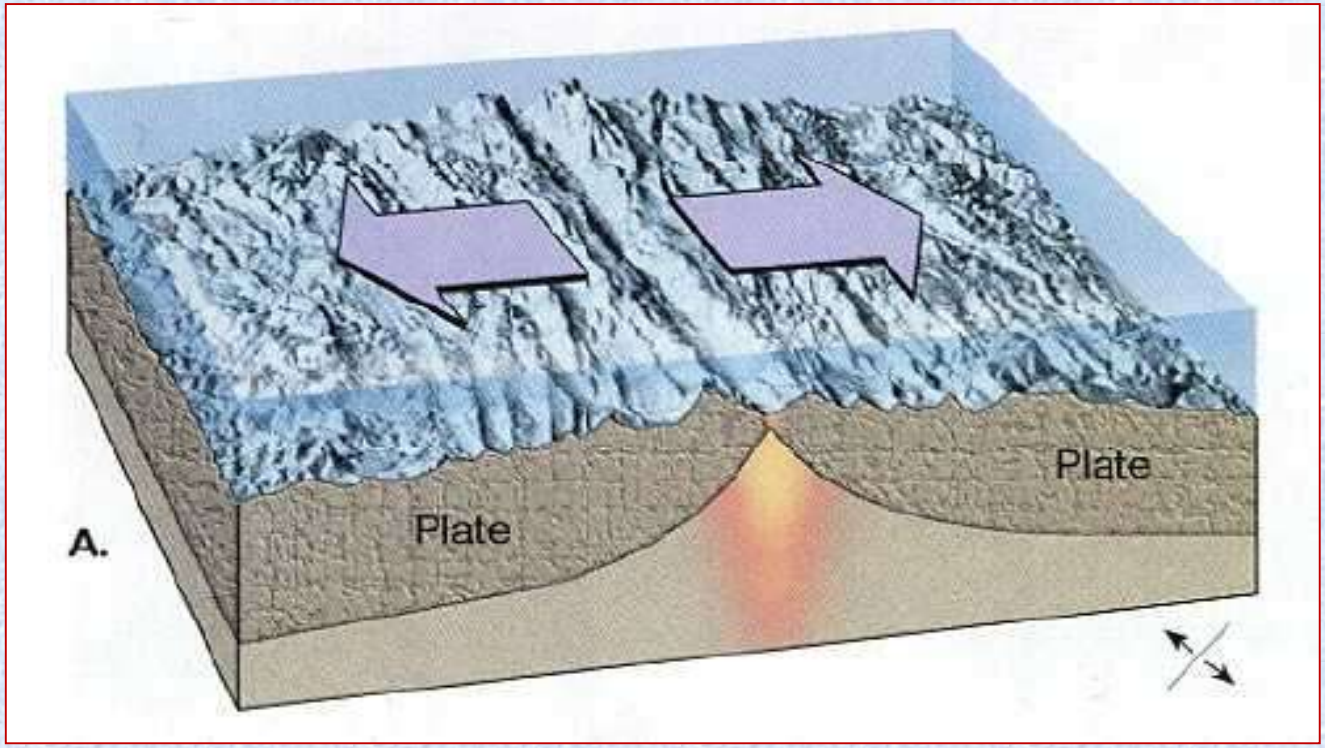


PLATE BOUNDARIES

DIVERGENT…



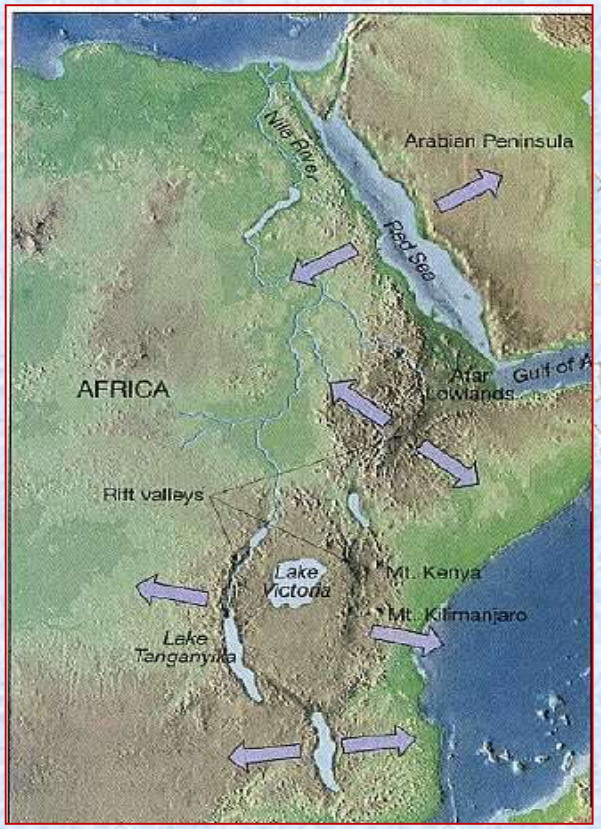
Plates move away from each other.

New Crust is being formed.

PLATE BOUNDARIES

DIVERGENT…

Examples…



East African Rift

Mid-Atlantic Ocean Ridge

PLATE BOUNDARIES

CONVERGENT…

Plates are moving toward each other. Crust is being destroyed. The Andes Mountain Range of western South America is another **example** of a **convergent boundary** between an oceanic and continental **plate**.

Three types of Convergent movement…

1. **Ocean – Continent**
2. **Ocean – Ocean**
3. **Continent – Continent**

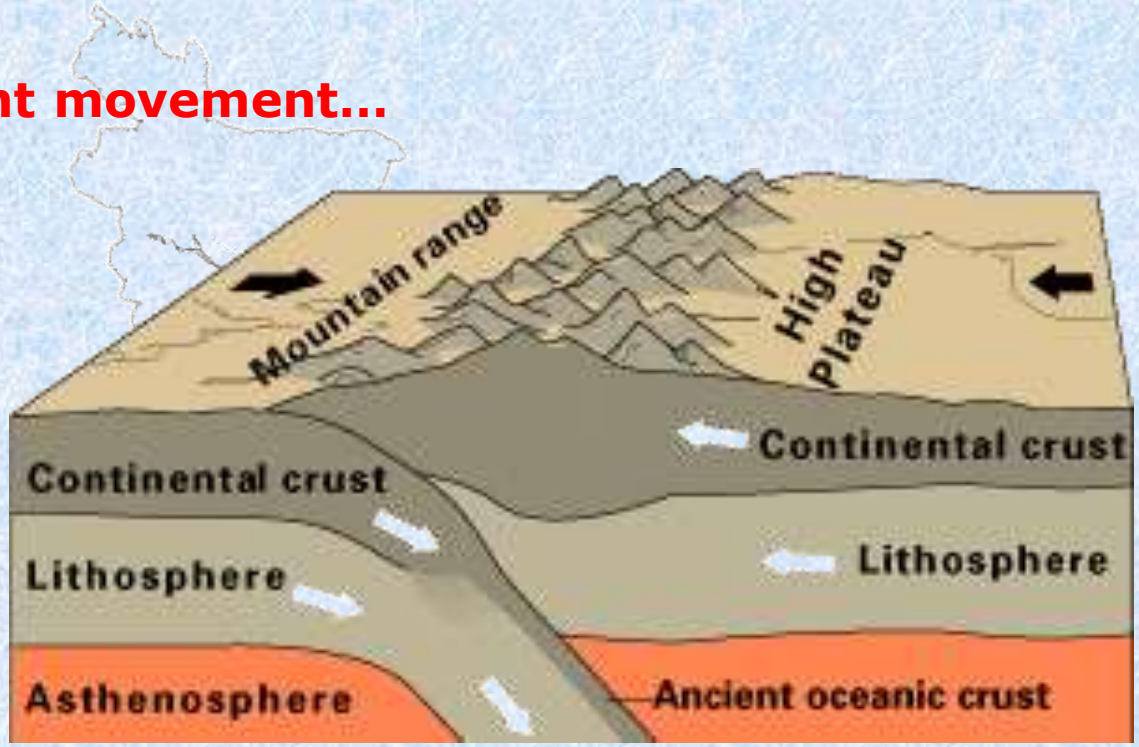


PLATE BOUNDARIES

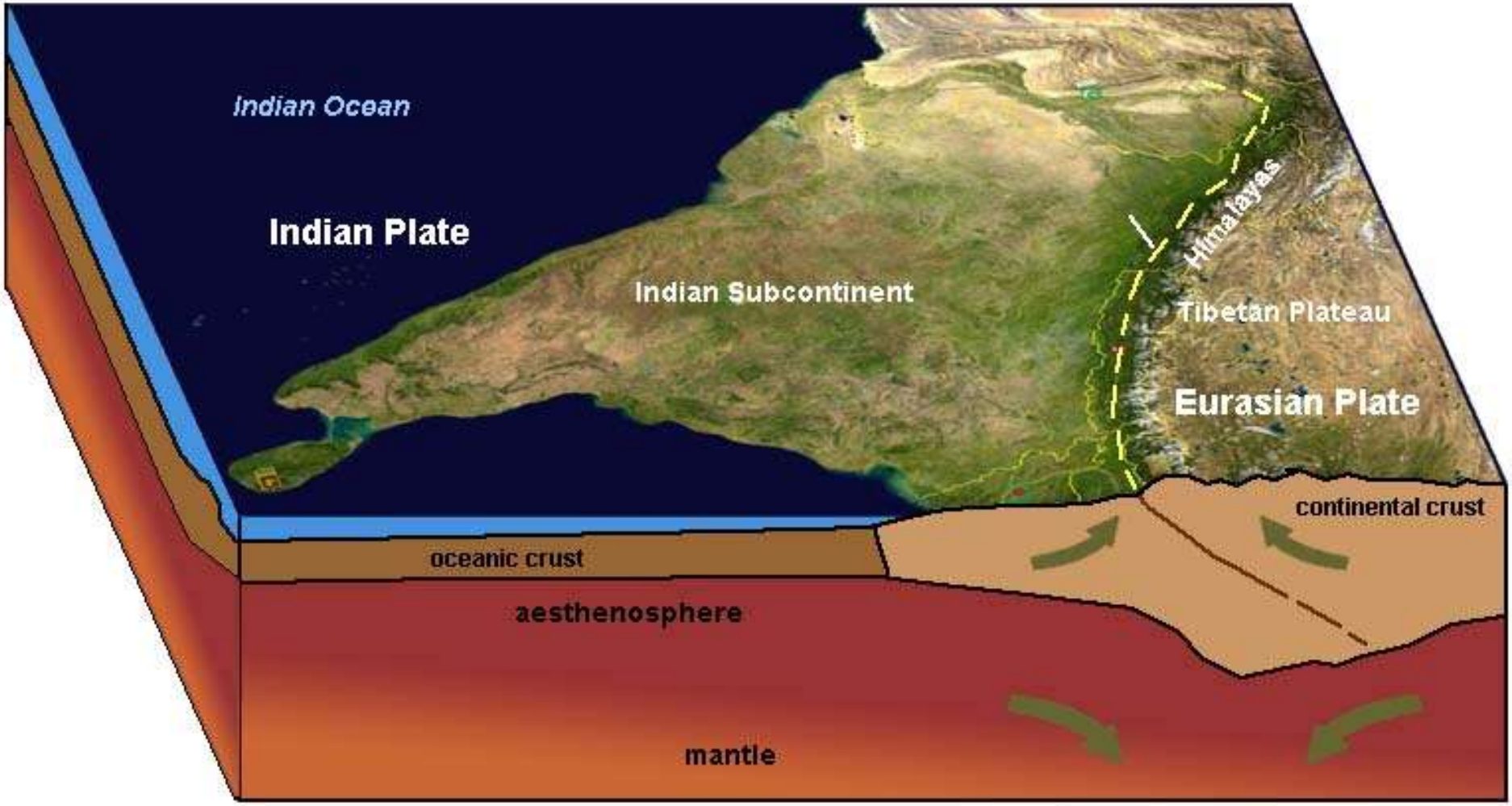
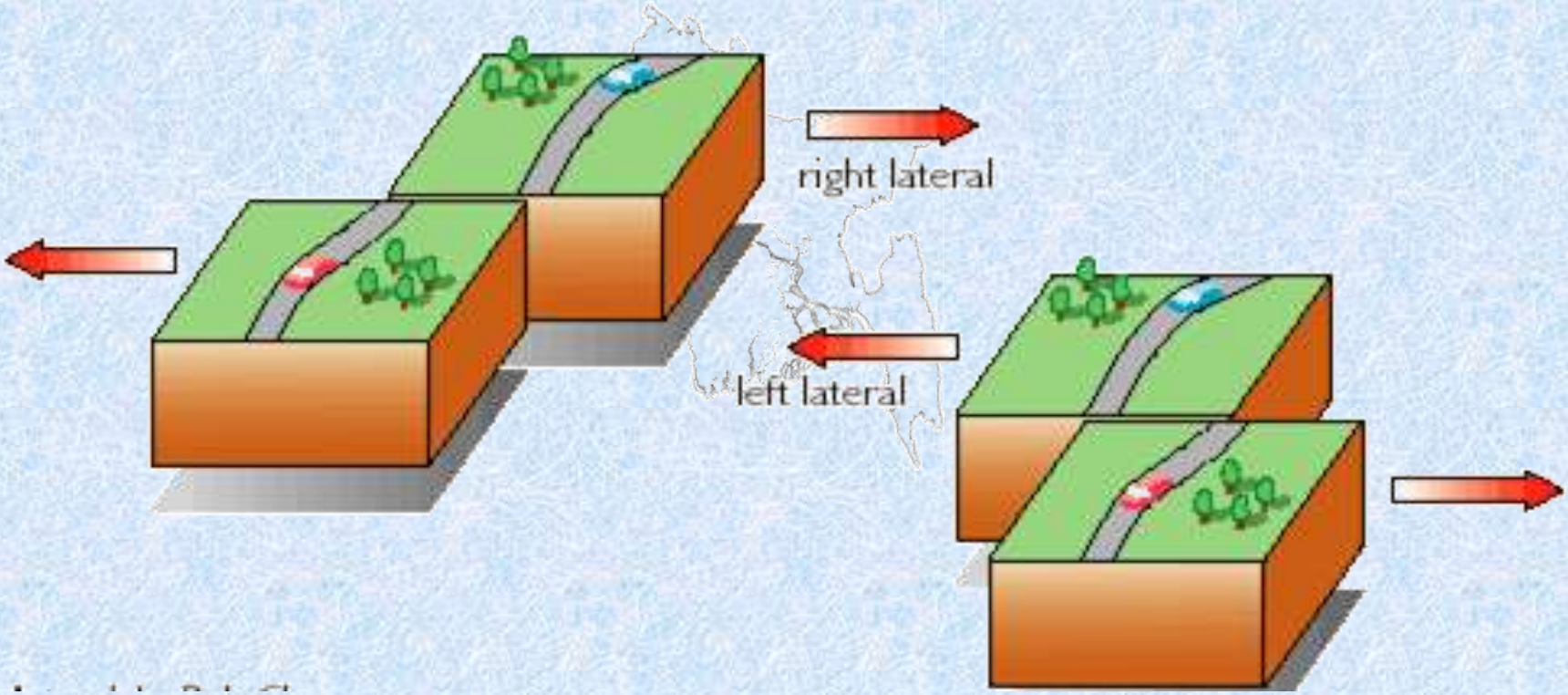


PLATE BOUNDARIES

TRANSFORM…

Crust is neither created nor destroyed.

Plates slide past one another.



TRANSFORM…

The **San Andreas Fault** is a continental transform fault that extends roughly 1,200 kilometers (750 mi) through California. It forms the tectonic boundary between the Pacific Plate and the North American Plate, and its motion is horizontal. The fault divides into three segments, each with different characteristics and a different degree of earthquake risk.

PLATE BOUNDARIES

Type of Margin	Divergent	Convergent	Transform
Motion	Spreading	Subduction	Lateral sliding
Effect	Constructive (oceanic lithosphere created)	Destructive (oceanic lithosphere destroyed)	Conservative (lithosphere neither created or destroyed)
Topography	Ridge/Rift	Trench	No major effect
Volcanic activity?	Yes	Yes	No