# What Is the Theory of Plate Tectonics

# A. Earth’s lithosphere is broken into pieces called plates

### Plates meet at boundaries

### Plates move 1 of 3 ways

#### Move apart= divergent



#### Move together = convergent



#### Slip past = transform



### Mid 1960’s geologist combined their knowledge about sea floor spreading, plates and plate motion into a single theory called plate tectonics



### Theory of Plate Tectonics states that Earth’s plates are in slow, constant motion driven by convection currents in the mantle

#### This explains formation, movement and subduction of plates

## Mantle Convection and Plate Motion

### Earth plates move due to large convection currents in the mantle

### During subduction gravity pulls denser plates down into the mantle

#### The rest of the plate moves too

## Plate Motion Over Time

### Scientists use satellites to measure plate motion

#### Plates move very slowly – 1 to 12 cm. per year

#### North American and Eurasian plates move about 2.5 cm a year

#### Plates have been moving for hundreds of millions of years

### Movement of plates has greatly changed the placement, size and shape of the oceans

### Plate movement produces earthquakes, volcanoes, mountain ranges, and deep ocean trenches

### Evidence exists that other supercontinents existed before Pangaea

##### Pangaea= 350-250 mya

##### About 200 mya it split

## Plate Boundaries

### Edges of Earth’s plates meet at boundaries

#### Faults are breaks in Earth’s crust where rocks have slipped past each other

#### Faults form along plate boundaries

#### Plates collide, pull apart, or grind past each other

#### Movement produced changes in the Earth’s surface and ocean floor

### Divergent Boundaries

#### Plates pull apart

#### Most occurring at mid-ocean ridges

#### Can rise above sea level= Iceland

#### Creates rift valleys- Earth crust diverge on land

##### African Rift Valley is made up of several rift valleys

### Convergent Boundaries

#### Boundary where 2 plates collide

##### Ex. Andes Mountains

#### When plates collide, density determines which one comes out of top

##### Oceanic-oceanic = oceanic crust cools and becomes denser the further away from the ridge. Older, cooler crust sinks

##### Oceanic – Continental = more dense oceanic pushes up continental

###### Oceanic crust sinks as subduction occurs

###### Water leaves crust and goes into mantle

###### Lowering melting point of magma in the wedge

###### Allowing that magma to rise to form volcanoes

##### 3. Continental – continental

###### Neither is dense enough to sink

###### Squeeze crust together to form mountains

### Transform Boundaries

#### Where 2 plates slip past each other

###### Ex. San Andreas Fault

##### Moving in opposite directions

##### Beneath surface, sides of plates are rocky and jagged

##### Can lock in place

##### Forces cause plates to unlock

##### Earthquakes can occur when a plate suddenly slips

##### Crust is neither created or destroy