

Geologic Processes Unit

Name _____ Pd _____

P waves

- Primary Waves
- 1st to arrive
- Compress & expand the ground like an accordion

S waves

- Secondary Waves
- 2nd to arrive
- Vibrate the ground back + forth

Surface Waves

- Come from P/S waves
- Move slowly
- Can cause the ground to roll like ocean waves

How do they measure the size of the quake?

- Magnitude is the measurement of earthquake strength based on seismic waves & movement along faults

• 3 ways to measure magnitude:

- Mercalli Scale
- Richter Scale
- Moment Magnitude Scale

Mercalli Scale

- Measures the intensity
- Not precise

Richter Scale

- Rates the size of seismic waves using a particular seismograph
- Accurate measurements for nearby earthquakes

Moment Magnitude Scale

- Rates the total energy released by an earthquake near or far

What types of damage can a quake cause?

- Damage/destroy buildings
- Topple power lines
- Break water + gas lines
- Cause landslides
- Can cause after shocks days/months later
- Can cause tsunamis

EIZ back

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Tsunami

- Large wave that occurs when an earthquake displaces water in the ocean

What causes volcanoes?

- A volcano is a weak spot in Earth's crust where magma comes to the surface

• They form at:

- Divergent boundaries
- Convergent boundaries
- Hot spots

Divergent Boundaries

- most volcanoes occur here

Ex: mid ocean ridge

- Volcanic Belts occur along plate boundaries where lithospheric plates are weak

Ex: Ring of Fire

Ring of Fire

- Major volcanic belt formed by volcanoes that rim the Pacific Ocean

Convergent Boundaries

- Island Arc when 2 oceanic plates collide creating an arc of islands

Ex: Japan, New Zealand, Caribbean Islands

Hot Spots

- Where magma rises up from the mantle melting Earth's crust

- Often occur in the middle of a plate

Ex: Hawaiian Islands, Yellowstone National Park

How do volcanoes erupt?

- Magma is under extreme pressure in the mantle
- It bubbles up through cracks in Earth's crust
- Pressure decreases as magma nears Earth's surface
- Lava bubbles out of the volcano

What does the inside of a volcano look like? (sketch in the space below)

Boundaries, Volcanoes Earthquakes

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3 types of plate boundaries:

- * Transform
- * Divergent
- * Convergent

Transform

- * Place where 2 plates slip past each other moving in opposite directions
- * Earthquakes often occur along these boundaries

Divergent

- * Place where 2 plates move apart
- * Most occur at the mid-ocean ridge
- * Some occur on land creating a "rift valley" which is a deep valley
- * Great Rift Valley in Africa is 3,000km long

Convergent

- * Place where 2 plates come together
- * Collisions of 2 plates can cause:
 - Oceanic to oceanic
 - Oceanic to continental
 - Continental to continental
- * When 2 plates collide the more less dense plate comes out on top!
- * Continental - Continental: mountains form
- * Oceanic - Continental: oceanic dives under the continent
- * Oceanic - Oceanic: the more dense of the 2 sinks into the trench

What is an earthquake?

- * Shaking & trembling that results from the movements of rock beneath Earth's surface
- * The movement of Earth's plates creates stress that squeezes / pulls the rock in the crust

Stress

- * A force that acts on rock to change its shape & volume
- * 3 types of stress
 - Shearing
 - Tension
 - Compression

Shearing

- * Stress that pushes a mass of rock in opposite directions

Key E12

Front

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Tension

- * Stress that pulls on the crust stretching the rock so it becomes thinner in the middle

Compression

- * Stress that squeezes rock until it folds or breaks

What is a fault?

- * A break in the crust where slabs of rock slip past each other
- * Faults usually occur along plate boundaries

3 types:

- Strike-slip
- Normal
- Reverse

Strike-Slip Fault

- * Rocks on either side of the fault slip past each other sideways
- * Ex: San Andreas Fault

Normal Fault

- * The fault is at an angle
- * One block is above the fault & the other is below it
- * Ex: Rio Grande Rift Valley in New Mexico

Reverse Fault

- * Same structure as a normal fault, but the blocks move in opposite directions
- * Ex: Appalachian mountains

Where do earthquakes begin?

- * Earthquakes occur in the lithosphere 100km below Earth's surface
- * The focus is the point beneath the surface where the rock broke causing the earthquake
- * The epicenter is the point on the surface right above the focus

Seismic Waves

- * During an earthquake seismic waves race out from the focus in all directions
- * The seismic waves are greatest at the epicenter
- * Seismograph is the instrument used to record ground movement caused by seismic waves
- * 3 types:
 - P waves
 - S waves
 - Surface waves

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