PLATE TECTONICS NOTES

Plate tectonics- motion and formation of crustal plates

Lithosphere- the stiff upper layer of the Earth's crust, rock like
- Continental plate – less dense, thicker, usually made of granite
- Oceanic plate – more dense, thinner, usually made of basalt
- SEE ESRT CHART – LIST SOME OCEANIC PLATES, LIST SOME CONTINENTAL PLATES

Asthenosphere- the plastic, gel like layer, partially molten due to Fe, Si and S (lowers the melting point SEE ESRT CHART
- Show convection currents – heat rises and cool sinks – MOTION IS SLOW!

PLATE MOTION

Continental Drift – the movement of continents on top of the asthenosphere
- Wegner – historical aspect (50yrs of researching)
  - Mesosaurus (small reptile fossils on both SA and Af)
  - Rock profiles – matching unique layers and widths
  - Puzzle pieces – appear to fit together

Diverging Boundaries – plates moving away from each other –
- basalt comes up and solidifies creating a ridge ie Mid-Atlantic Ridge, East Pacific Rise. Some of our highest mountains are located here (even taller than Mt Everest) all under water
- heat flow- hottest areas are found on top of the ridge, rock gets cooler farther away

Converging Boundaries – plates are moving towards each other
- Collision boundaries – similar plates (ex continental vs continental) plates hit and make large mountain ranges ie. Himalyan mtns, Ural Mtns in Europe, Appalachian Mtns on east coast of NAmer
- Subduction – one plate more dense (oceanic) and plunges under the less dense (continental plate), creating a deep sea trench and mountain range (volcanic) ie Tonga Trench, Aleutian Trench, Peru-Chili Trench

Sliding Boundaries – plates remain next to each other and slide in opposite directions
- Ie. San Andreas fault

Magnetism - at ridges –diverging center
- basalt flows up and solidifies quickly. (fine texture rock)
- mafic it also contains Fe – w/ magnetic properties (magnetite)

rock aligns w/ Ea's lodestone N or S
lodestone flips inconsistently (7X over last 3 million yrs)
basaltic rock shows the N/S stripping across the seafloor.
Basalt at the ridge is younger than basalt farther from the ridge
New basalt pushes older basalt across the seafloor

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Review p250

Hot Spots – an extra hot spot from radioactive material continuously bubbles through the aesthenosphere to the surface creatin a volcano

The crust moves due to plate tectonics, the volcano is no longer over the hot spot
A new volcano is created – a chain over millions of years
The youngest on the hot spot, oldest is farthest away

Magma – internal molten rock
Lava – molten rock at the surface

NOTES ON VOLCANOES – CHAPTER 14

Introduce the word intrusive

Igneous intrusions: pluton – a mass of rock that cools inside other rocks

Dike – cuts across rock layers - magma is forced into vertical cracks. Usually made of basalt

Sills sheets of igneous rock that cut parallel to the layers they intrude, basalt
EX: Palisades of Hudson River, NY

Batholith, stocks the largest of all igneous intrusions a big dome of igneous rock chamber – granite

Volcanic neck – an extinct volcano erodes from outside in and leaves the vertical chamber due to resistance of the rock to weathering

Pyroclastic – thrown material includes tephra, bombs, cinders

Volcano crater caldera vent

Shield volcano – broad, slightly domed, resemble a warrior's shield, basalt ex Mauna Loa 1 of 5 shield volcanoes in Hawaii, total height 6 miles both below and above ocean surface, taller than Mt Everest. Being made over 1 million years, Midway Island, Galapagos Islands,

Kilauea on the Island of Hawaii -, erupted over 50x in recorded history
A shield volcano on Mars (Olympus Mons)

Cinder cone – built from ejected lava fragments, steep slopes, usually small (1000ft) forming near larger volcanoes

Ex: Par'icutin west of Mexico City 1943 started in a cornfield, for 2 weeks tremors, vent in 1 day 4o m came out and hardened by day 5 days 100m high continued for 200yrs 400m (1300ft)

Composite Cones – most occur on Pacific plate boundary (Ring of Fire) Fujiyama, Japan, Cascade Range in NW US, **Mt St Helens**, Mt Rainer, and Mt Shasta

Large , symmetrical alternating lava flows and pyroclastic material with a major vent, most violet types of volcanoes, eruptions can be unexpected Ex Vesuvius 79AD 20 000 residents buried

Discuss MT ST HELENS AT LENGTH

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I&A 1,2,3,
CT 1-7

EARTHQUAKES

Elastic rebound theory- the land works like a rubber band – it can stretch but will break at limited points

Focus – actual location of the earthquake , can be shallow, can be deep
Epicenter – location of the earthquake at the surface of the earth – lat &long pt.

P waves – primary
- Compressional – move parallel to the surface
- Travel fastest, arrive first (like a porche)
- Travel through solids and liquids

S waves – secondary
- Shear – move perpendicular to the surface
- Travel slowest, arrive second (like a SUV)
- Only travel through solids

Seismographs/SEISMOGRAMS – discuss design

TEACH A LOCATING EPICENTER SAMPLE

Discuss pg 280 at length

Shadow Zones – refracted waves causes certain areas of the earth to be blanked out of seismic action – speed and direction changes due to changes in mediums – use running from concrete to sand to water example . Show laser through prism or water to show refraction

DO EARTHQUAKE SUBDUCTION BOUNDARY LAB – GO OVER QUESTIONS, THEY CAN BE CONFUSING

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P289 I&A 2,3
CT 1-6

Faults – discuss different kinds of motion
Normal fault –one side drops down with respect to the other side-plates pulling
Reverse fault – one side is driven above the other-plates pushing
Strike slip fault- horizontal movement

Folds – plates pushing together causing an up and down wave and tilting in the rock profile [geosyncline, syncline (down curve), antisyncline (up curve)]
Uplift – layers are moved up much higher than they were formed
Fault block mountains – whole areas faulted and uplifted at same time, steep on one side and sloping on the other
Overturning – the fold is so extensive that the entire profile or part of the profile is actually flipped over – *The Regents will always notify of this option*