NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Unit Notes Earth Forces and Changes

* Chemical Composition of the Earth
	+ Earth is divided into three compositional layers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Crust
		- The outermost layer of the earth
		- Ranging from 5 – 100 km thick
		- Made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Thinnest layer on earth
		- Two types of crust
			* Continental\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ composition
			* Oceanic\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ composition
	+ Mantle
		- Layer between crust and the core
		- Extremely thick and contains most of the \_\_\_\_\_\_\_\_\_\_ of the earth (67%) or 2900 km thick
		- Made mostly of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- No one has ever seen what the mantle looks like
	+ Core
		- Extends from the bottom of the mantle to the center of the earth
		- Core is made of iron, nickel, sulfur and oxygen
			* This was determined because on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ passing through the core
		- The diameter is the size of the planet Mars
* Physical Composition of the Earth (divided into 5 layers)
* LAMOI
* The structure of the earth is made of 5 physical layers:
	+ Lithosphere
	+ Asthenosphere
	+ Mesosphere
	+ Outer Core
	+ Inner Core
* Lithosphere
	+ Outermost rigid layer of the earth
	+ Made of the crust and the upper mantle
	+ Divided into pieces called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Divisions are the continents and the ocean basin
* Asthenosphere
	+ A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the mantle where pieces of the lithosphere move
	+ Made of solid rock, looks like putty, moves slowly
* Mesosphere
	+ “middle sphere”
	+ Hot and stronger than the asthenosphere due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Outer Core & Inner Core
	+ Outer-liquid layer
	+ Inner-solid layer of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LET’S DRAW THEM TOGETHER:



Representing:

Representing:

 3

2

8

7

6

5

4

1.

* Tectonic Plates
	+ Pieces of the lithosphere that move on top of the Asthenosphere
	+ Fit together like the pieces of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ 10 major tectonic plates
		- Not always divided on continental lines!!!
* Mapping the Earth
	+ Since no one has ever even drilled through the crust, how do we know about the earth’s structure?
		- Seismic waves!
			* When an earthquake occurs, vibrations of seismic waves are produced and travel at different speeds depending on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the earth’s material
* 7-2 Continental Drift
* Alfred Wegener-
	+ Proposed the idea of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the early 1900’s
	+ This theory stated that continents can drift apart from one another and have done so in the past
	+ Explains why fossils of the same plants and animals are found on different continents separated by oceans
* Pangaea
	+ Pangaea is the great landmass occurring about \_\_\_\_\_\_\_\_\_\_\_\_\_ million years ago
	+ Broke up into two big pieces 180 million years ago
		- Called Laurasia (North) and Gondwana (South)
	+ 65 million years ago Laurasia and Gondwana broke up into smaller pieces:
		- South America, North America, Eurasia, Africa, India, Australia and Antarctica
		- <http://www.scotese.com/pangeanim.htm>
		- <http://education.sdsc.edu/optiputer/flash/pangea_4.htm>
* Sea Floor Spreading
	+ The process of creating new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as older materials are pulled away.
	+ Tectonic plates move away from each other, the sea floor spreads apart and magma rises to fill in the gap
	+ The oldest crust in the Atlantic ocean is found along the edge of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 7-3 Plate Tectonics
	+ Plate tectonics is the theory that the earth’s lithosphere is divided into plates that move around on top of the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Causes of plate tectonics-FORCES
	+ Ridge push- oceanic lithosphere is higher than continental lithosphere and \_\_\_\_\_\_\_\_\_\_\_\_slides down the boundary
	+ Convection-hot material rises while cooler material \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Slab Pull-oceanic lithosphere denser than Asthenosphere, edge of oceanic plate sinks and pulls the rest of the tectonic plate
* Boundaries
	+ Convergent-when tectonic plates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one another
	+ Divergent-when tectonic plates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one another
	+ Transform-when tectonic plates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one another horizontally
* Deformation
	+ Stress-the amount of force per unit are that is put on a given material
	+ Deformation-when rock changes its shape due to\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Rock layers can bend when stress is placed on them
		- Or they can break
	+ Compression-type of stress that occurs when an object is squeezed, when two tectonic plates collide
		- Rocky Mountains and the Cascade Range
		- Tension-stress occurring when forces act to stretch an object
* Folding
	+ Occurs when rock layers bend due to stress
	+ Assume that sedimentary rock layers are horizontal, so any time there is a fold, a deformation has taken place
	+ Two common types: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Faulting
* The surface along which rocks break and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ each other
	+ - Normal Faults
		- Reverse Faults
		- Strike Slip Faults
	+ Normal Faults
		- The normal fault causes the hanging wall to move down relative to the footwall
		- Occur when tectonic plates cause tension that pulls rocks apart
	+ Reverse Faults
		- Causes the hanging wall to move up relative to the footwall or the reverse of a normal fault

DRAW THEM:

NORMAL

REVERSE

STRIKE SLIP

* + - Occurs when tectonic plates causes compression pushing the rocks together
	+ Strike Slip Faults
		- Occurs when opposing forces cause rock to break and move horizontally
* Mountain Building
* Three of the common types of mountains
	+ Folded
	+ Fault block
	+ volcanic
* Folded mountains
	+ Form when rock layers are squeezed together and pushed upwards
	+ Examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Fault Block
	+ Form when large blocks of the earth’s crust drop down relative to other blocks
	+ examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Volcanic Mountains
	+ Form when molten rock erupts onto the earth’s surface
	+ Tend to form over the types of convergent boundaries that include subduction zones
	+ Examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Earthquakes
* What are earthquakes?
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-branch of science devoted to earthquakes
		- Seismologists-study earthquakes
* Where do they occur?
	+ Near the edges of tectonic plates
* Why?
	+ Because tectonic plates move in different directions and at different speeds
	+ As a result of this, \_\_\_\_\_\_\_\_\_\_\_occur
		- Fault-a break in the Earth’s crust along with blocks of the crust which slide relative to one another
* Faults
	+ Occur near the\_\_\_\_\_\_\_\_\_\_ of tectonic plates
* Causes of Earthquakes
	+ As tectonic plates pull, push or scrape against one another, stress builds up and the rocks in the plates deform
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-the change in the shape of rock in response to stress
* Deformation
	+ Occurs in two ways:
		- 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ deformation-like a piece of putty, does not lead to earthquakes
		- 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ deformation- like a rubber band, does lead to earthquakes
			* You can stretch a rubber band only so far before it breaks and when it does break, it releases energy and the broken pieces return to the un-stretched shape= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Earthquakes

|  |  |  |
| --- | --- | --- |
| * **Plate motion**
 | * **Fault type**
 | * **Characteristic of earthquake**
 |
| * Transform
 | * Strike-slip
 | * Moderate, shallow
 |
| * Convergent
 | * Reverse fault
 | * Strong, deep
 |
| * Divergent
 | * Normal fault
 | * Weak, shallow
 |

* Earthquakes Travel
	+ Seismic waves are energy that travel through the earth
		- Seismic waves that travel through the earth are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* Two types of body waves
				+ 1.P waves-primary waves
				+ 2. S waves-secondary waves
		- Seismic waves that travel along the earth’s surface are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Primary Waves
	+ Primary waves are body waves
		- Pressure waves
		- Travel through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Are the fastest seismic waves
		- Travel ahead of the other seismic waves
		- First to be detected
* Secondary waves
	+ Also body waves
	+ Are shear waves
	+ Second fastest seismic waves
	+ Shearing stretches rock sideways from side to side
	+ Cannot travel through\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Are slower than P waves
	+ Always arrive second
* Surface Waves
	+ Move the ground up and down in circles as the waves travel along the surface
	+ Feels like they are on a roller coaster
	+ Are more slow than body waves
	+ Are more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than body waves
* 7-2 measurement
	+ Seismographs-instruments located at or near the surface of the earth that record \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Seismogram-tracing the earthquake motion created by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Where did it happen
	+ Seismograms are used to find an earthquake’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-the point on the earth’s surface directly above an earthquakes starting point
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-the point inside the Earth where an earthquake begins
* When??
	+ Seismograms calculate the time an earthquake started and comparing the arrival times of the P waves and the S waves
	+ S-P Time method
		- 1. collect several seismograms from the same earthquake at different locations
		- 2. determine the location or distance from each seismograph the earthquake was
	+ Earthquake Strength
		- The Richter Scale- commonly used to measure earthquake strength.
			* Named after \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, developed in the 1930’s
			* On the Richter scale, each time the magnitude increases by one unit, the energy of the earthquake increases by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ times

|  |  |
| --- | --- |
| **Modified Richter Scale** |  |
| **Magnitude** | **Effects** |
| 2.0 | Detected only by seismograph |
| 3.0 | Can be felt at epicenter |
| 4.0 | Felt by most in the area |
| 5.0 | Causes damage at epicenter |
| 6.0 | Causes widespread damage |
| 7.0 | Causes great, widespread damage |

* + - Example: if an earthquake is a 6 on the Richter scale, it would release 63.4 times more energy than a 4 on the Richter scale
		- Before the Richter Scale
		- We had the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to classify earthquakes (developed in 1902)
			* Based on observations of people who \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the quake
* 8-3 Society
	+ Earthquake hazard-measures how prone an area is to experiencing earthquakes in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Determined by present earthquake activity and previous earthquake activity
	+ Forecasting
		- Predicting when and where an earthquake will occur
			* By closely monitoring active faults
		- Earthquake frequency can be related to how often they occur
* Gap Hypothesis
	+ States that the sections of active faults that have had few earthquakes are likely to be the sites of strong earthquakes in the future.
		- This is because the area that had relatively few earthquakes have had \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Preparing for an earthquake
	+ Earthquake resistant buildings:
		- Mass damper
		- Cross bracing
		- Flexible pipes
		- Active tendon system
		- Base isolators
* 8-4 earthquakes everywhere?
	+ The moon-
		- Experiences moon quakes
			* Can last \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than those on earth
	+ Mars
		- Mainly active due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but Marsquakes do occur
	+ Sun
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-generally much stronger than earthquakes
* Volcanoes
	+ A volcano is a mountain that forms when molten rock, called \_\_\_\_\_\_\_\_\_\_\_\_, is forced to the earth’s crust
		- Magma or Lava
			* Magma-occurs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the earth
			* Lava- magma that flows out onto the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Nonexplosive eruptions
	+ Lava Flows- come from non explosive eruptions
		- Relatively calm outpouring of lava
		- Usually releases a tremendous amount of molten rock
		- What kind of rocks would these form?????
			* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
				+ What does this non explosive eruption mean to the world?

Although explosive eruptions are more attention-getting, non explosive accounts for more significant role in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Much of the ocean floor is covered with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Formed many of the Pacific Islands (island arc)

* Explosive Eruptions
	+ In this kind of eruption, clouds of hot debris and toxic gases shoot out from the volcano
		- The pieces that are blown into the air harden and form dust sized particles that can be in the atmosphere for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Example
	+ Mt Saint Helen
		- Erupted in 1980
		- Washington
		- Blasted away most of the one side of the mountain
		- Flattened and scorched 600 km^2
* Volcano Makeup
	+ What are the basic features of a volcano?
		- MAGMA in a chamber
		- Vents
		- Lava, which is the outpouring of the magma
* MAGMA
	+ Magma is made of a variety of substances and has differing compositions, which is the determinant factor in whether a volcano is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Composition
	+ Water:
		- If a volcano has a high water content, it is more likely to explode (if the silica content is also high)
		- This occurs because of the high gas buildup =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Silica:
		- Silica rich magma has a thick, stiff consistency and flows slowly and tends to harden in the volcano vents
		- This leads to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ eruptions
* Pyroclastic Material
	+ Pyroclastic material is the rock fragments created by explosive volcanic eruptions
* Lava ranges in consistency from thick to thin
	+ Thick lava
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-is so thick that it barely creeps
	+ Thinner lava
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- looks like wax
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- jagged lava
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- forms underwater
* Pyroclastic Material
	+ This material is produced when magma explodes form a volcano and solidifies in the air
	+ Comes as big as boulders or as small as dust
	+ Types:
		- Blocks-largest pieces, solid rock
		- Bombs- blobs that harden in the air
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- little stones, pebble like
		- Ash- when gases in stiff magma expand and explode into glasslike slivers
* Volcanic Effects
	+ The effects on the land can be great, after a volcanic eruption
		- Pyroclastic material can be very detrimental to streams and bodies of water
		- Escaping gases can affect global climate patterns
		- Ash is also very detrimental
			* Ash is ejected during an explosion and can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sun for long periods of time
* Fallout
	+ Cloud of hot ash can move rapidly and sometimes take the shape of an avalanche, which chokes and sears the landscape
	+ Ash can also mix with water causing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like mixture that also flows
		- This causes livestock loss, crop shortage, food shortage
			* Though the ash can be useful as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_after the initial devastation
* Climatic change
	+ With large scale eruptions, the ash and dust can block out the sun by reaching the upper atmosphere
		- They can travel globally and block out enough sun to change the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* Mt Pinatubo erupted in 1991 and the average temp change globally was a drop of \_\_\_\_\_\_\_\_\_\_ degrees C
				+ Disrupting the climate globally
				+ Causing lower average temps=wetter, cooler summers and colder longer winters!
* The moon
	+ What are the dark patches on our moon?
		- Early on, astronomers believed they were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* Now we know they are basins filled with solidified lava that erupted after the moon’s formation
* Volcano Types
	+ Volcanoes result from the buildup of rock around the vent
	+ There are three basic types of volcanoes:
		- Shield
		- Cinder cone
		- Composite
* Shield volcanoes
	+ Are built from layers of lava from repeated \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ eruptions
	+ Lava is runny, so it spreads over a wide area
	+ Volcano has gently \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Can be enormous in size
	+ Mauna Kea (Hawaii) is the largest mountain on earth (when measured from the sea floor)
* Cinder Cone
	+ Small volcanoes made from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ eruptions
	+ Steep slopes and narrow base
	+ Paricutin, Mexico (site of formed very quickly)
	+ Erupt for a short time and occur in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Erode quickly
* Composite
	+ Sometime called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Most common type
	+ Form from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which then are followed by quieter eruptions
	+ Mt. Fuji, Japan
	+ Broad base and steep sides

DRAWINGS:

|  |  |  |
| --- | --- | --- |
| Shield | Cinder Cone | Composite |
|  |  |  |

* Craters and Calderas
	+ Crater-at top of central vent is a funnel shaped pit
	+ Caldera-forms when magma chamber that supplies material to a volcano empties and the roof collapses
* Lava Plateau
	+ Fissures- long cracks in the crust
	+ This forms a lava plateau
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plateau formed 15 million years ago (Oregon)
* 9-3 Causes
* Formation of Magma
	+ How does magma form?
		- Forms in the lower crust and upper mantle
		- Made of intensely hot and pliable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Pressure and temperature
		- Rock in the mantle is considered a solid
			* Temp in the mantle will melt any rock
		- Pressure in the mantle keeps rocks tightly packed, which prevents its change to a liquid state
		- A decrease in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is what causes the magma to form!!!!!
* Density
	+ When magma is formed, it rises toward the surface of the earth because it is less dense than the rock surrounding it
	+ Magma is a mix of liquid and solid mineral material and is less dense than solid rock, so it rises
	+ Where do they form?
		- Active volcanoes are around \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Plate boundary of the pacific ocean has so many volcanoes it is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_