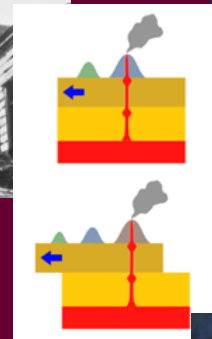
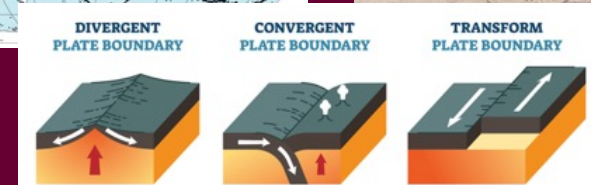
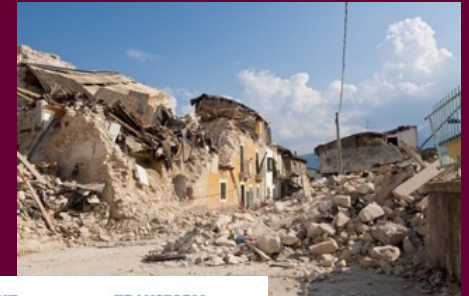
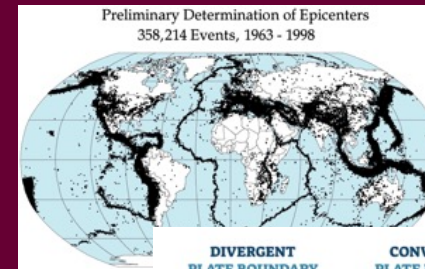


Earthquakes, Volcanoes, and Tsunamis

- Earthquakes
- Tectonic Plates, Boundaries, and Seismic Waves
- The Great Chilean Earthquake
- Volcanoes
- Types of Volcanoes
- Volcano Dangers
- Mount Tambora
- Tsunamis
- Social and Environment Impact of Tsunamis



Preview File

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- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready



Part 1 - Earthquakes



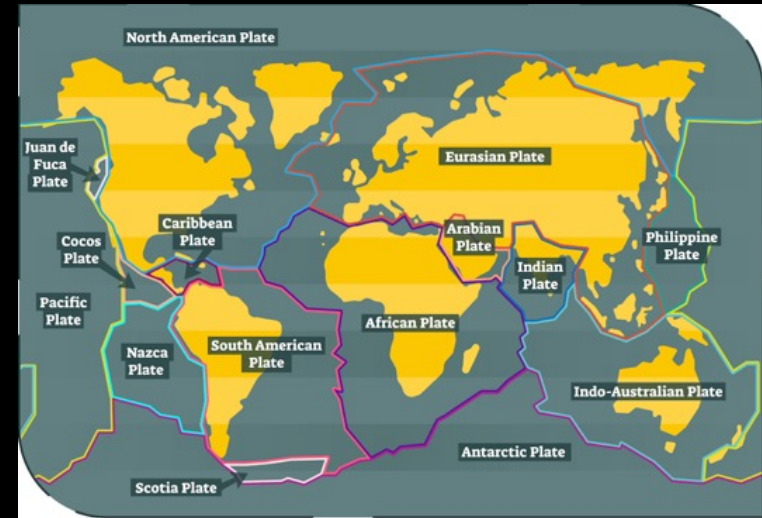
Earthquakes



CLICK THE VIDEO
IMAGE IN SLIDESHOW
MODE TO ACCESS THE
VIDEO.

1

- Earth's surface is made of tectonic plates
 - Comprise the lithosphere: layer of crust and mantle
- These plates are always moving



North American Plate

Eurasian Plate

**Juan de
Fuca
Plate**

**Caribbean
Plate**

**Arabian
Plate**

**Philippine
Plate**

**Cocos
Plate**

**Indian
Plate**

**Pacific
Plate**

African Plate

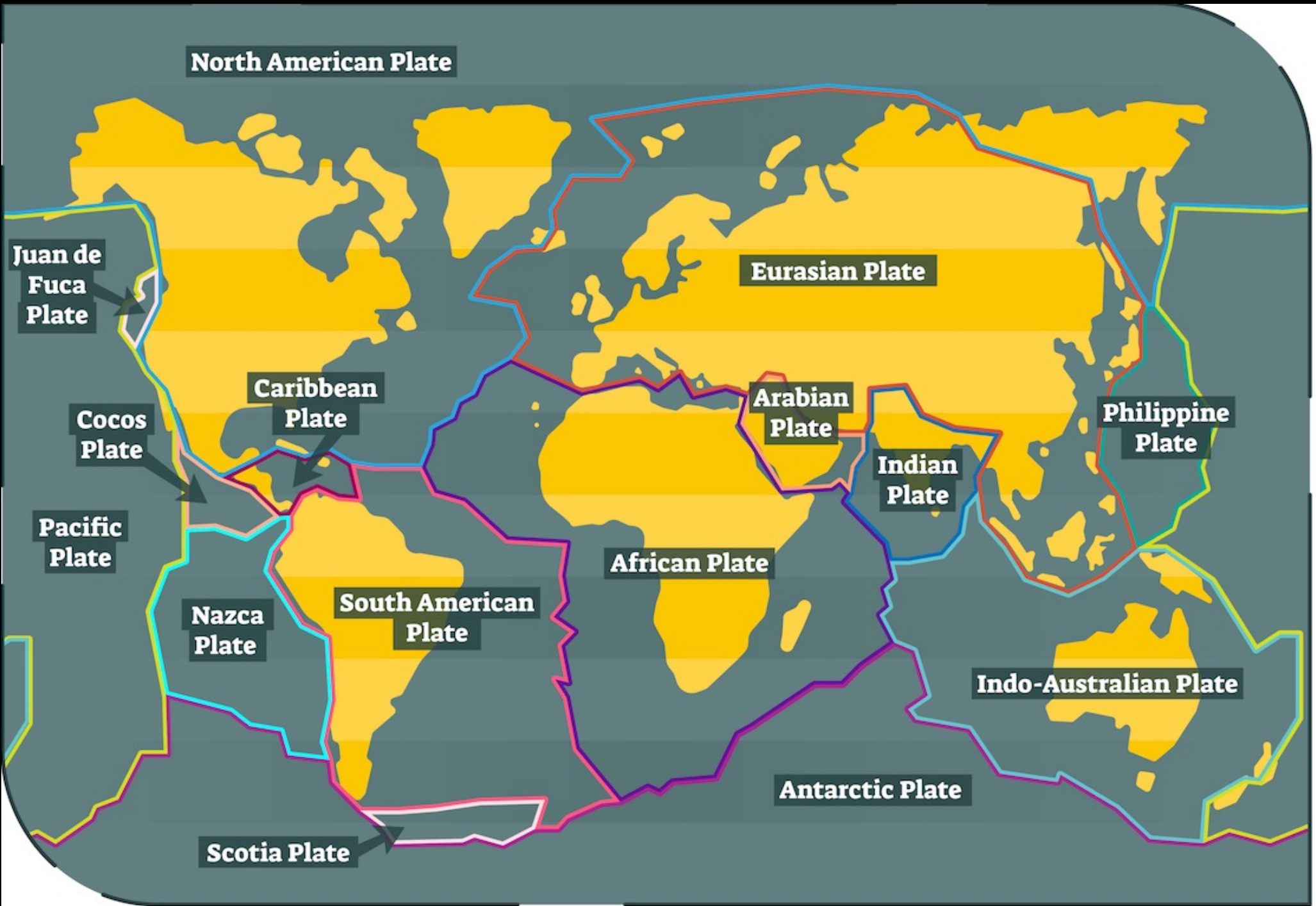
**Nazca
Plate**

**South American
Plate**

Indo-Australian Plate

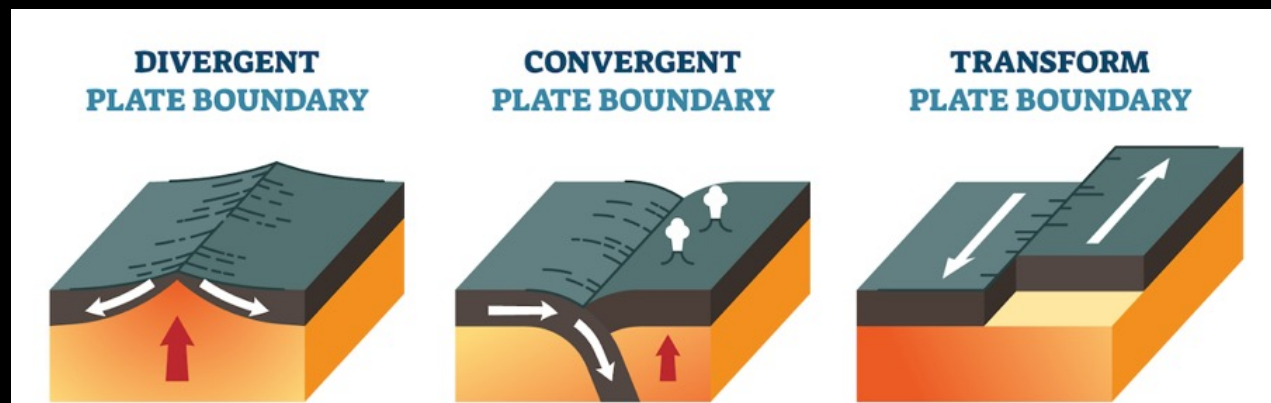
Antarctic Plate

Scotia Plate



Earthquakes

- _____
- While they are stuck together, their kinetic (motion) energy is stored
- _____
- Faults exist along plate boundaries



Earthquakes

- Energy is released as a seismic wave
- It radiates out from point of energy release like other waves (e.g., light, sound, water)



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Earthquakes

Stages

1. Foreshocks: minor shaking prior to a larger earthquake

2. _____

3. Aftershocks: _____



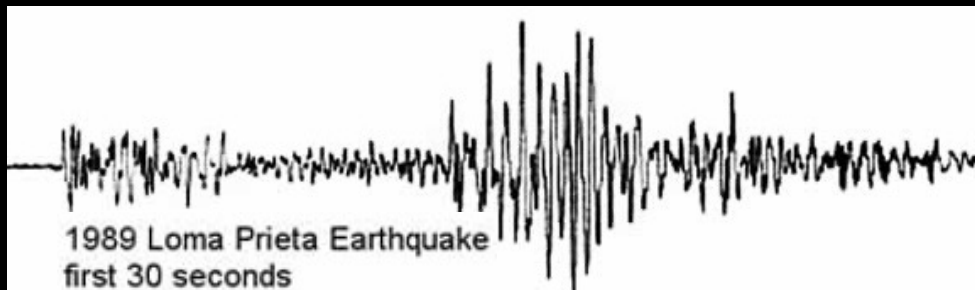
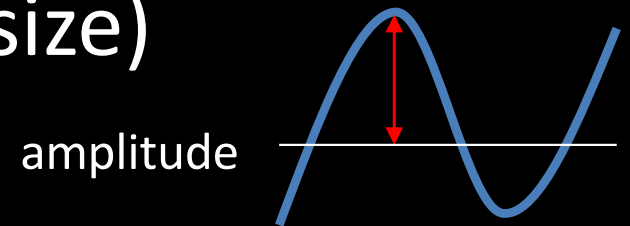
Earthquake Measurements

- Seismologists study earthquakes using seismographs

—

•

- Measured in amplitude (wave size)
- Logarithmic (base 10)
- Range: <1 to >8



Loma Prieta

Earthquake Measurements

Richter Scale

- <1-2.9: _____
- 8 or higher: _____
- _____

Modified Mercalli Scale

- _____
- _____
- More Subjective

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2

I: NOT FELT
II - III: WEAK
IV: LIGHT
V: MODERATE
VI: STRONG
VII: VERY STRONG
VIII: SEVERE
IX: VIOLENT
X - XII - EXTREME

Mercalli Scale

Earthquake Measurements

Moment Magnitude Scale

- _____
- _____
- More accurate
- Standard all over the world



Collapsed Gran Hotel building in the San Salvador metropolis, after the shallow 1986 San Salvador earthquake



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The Great Chilean Earthquake



The Great Chilean Earthquake

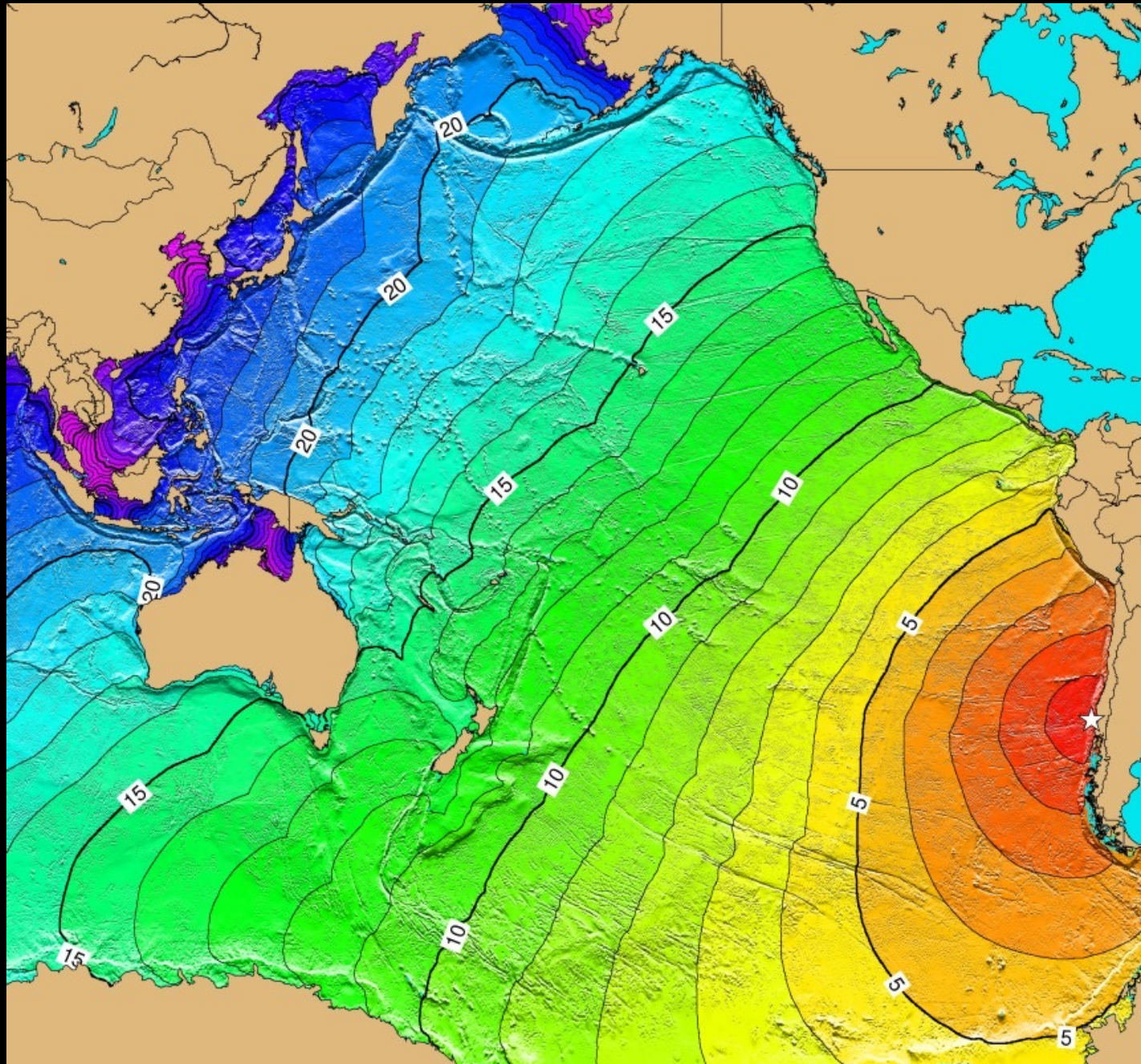
- Most damage and death due to the resulting tsunamis
- _____
 - 15 hours after quake: _____
 - _____
 - 24 hours after quake: tsunami reached the Philippines, where 32 people were killed



The Great Chilean Earthquake



4



Epicenter

The Great Chilean Earthquake



Tsunami damage in Japan



Tsunami
damage in
Hawaii

Part 2 - Volcanoes



Volcanoes



5



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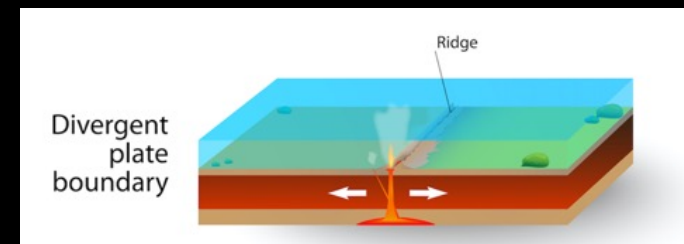
- _____
- Molten magma escapes at vents as lava

Volcanoes

Occur at subduction zones, divergent plate boundaries, and within plates

- Subduction zones: lower plate melts, and mixes with other gases as it rises and explodes through the surface

- _____
- Magma ascends into space left behind when plates move apart
- Less explosive



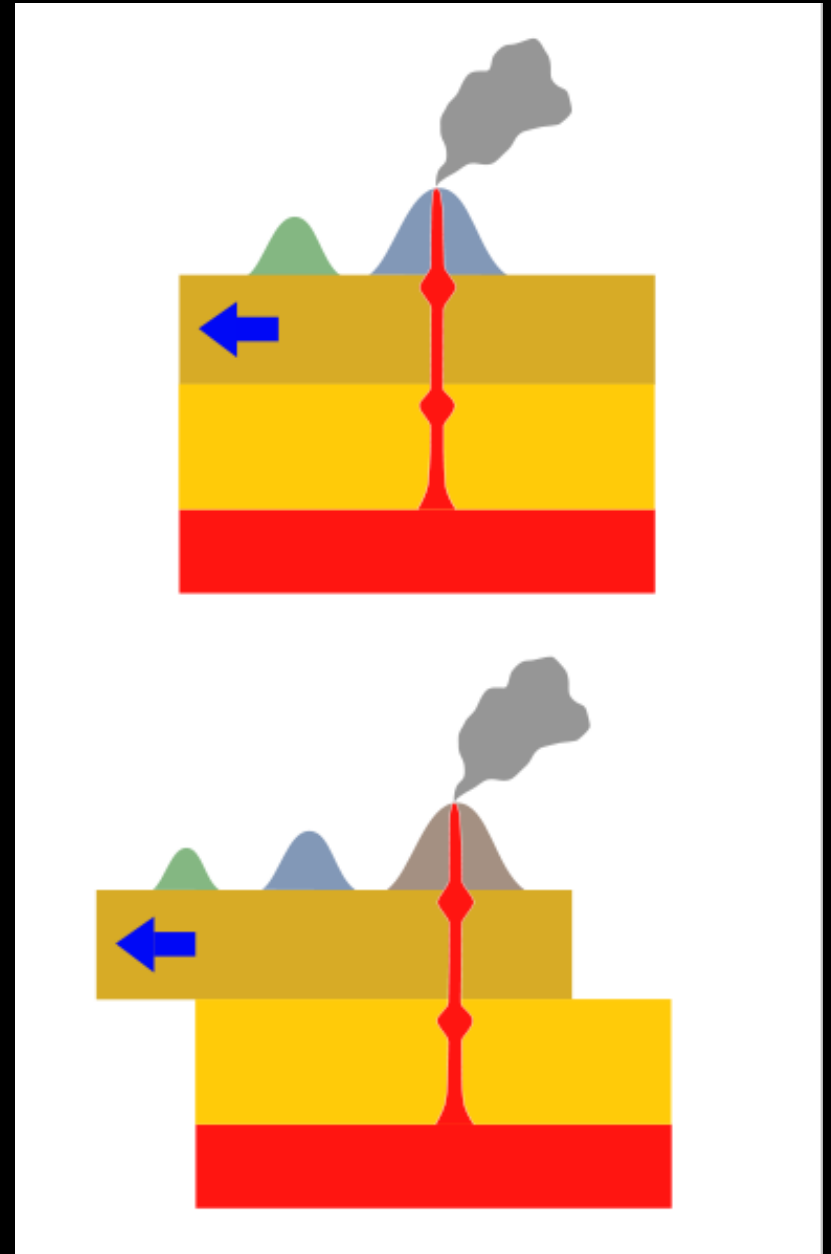
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Hot Spot Volcanoes

This diagram shows a cross section through Earth's lithosphere (in yellow) with magma rising from the mantle (in red).

The lower diagram illustrates a hotspot track caused by their relative movement.

As the



Volcanoes

- ---

 - Currently erupting or showing signs of potential eruption (e.g., minor earthquakes, gas venting)
- ---

 - No signs of potential eruption but activity considered possible
- ---

 - Hotspot volcanoes that have moved away from the magma column are considered extinct

3 Main Types of Volcanoes

- - Alternate layers of cinder, ash, and lava
 - Cones symmetrical with steep slopes
- - Wide with flat tops and gentle slopes
- - Composed of rock debris that erupted from the vent
 - Cone circular or oval
 - Most have bowl-shaped crater at top



Mt. Fuji – Japan – Composite Volcano



Mauna Loa, a shield volcano in Hawaii



Parícutin
erupting in 1943



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Volcano Dangers

- - Masses of ash, gas, and other materials
 - Hot: 100-700°C (212-1300°F)
 - Fast: 160 km (100 mi) per hour

- -
- Ash accumulation

- -



Ash cloud of Pinatubo during 1991 eruption.

Mount Tambora

- Largest volcanic eruption in recorded history
- April 5-10, 1815, with smaller eruptions continuing until July
- Devastation
 - _____
 - _____
 - Northern Coast of Sumbawa Island, Indonesia
- Forest, grassland, buildings burned
- Caused earthquakes and tsunamis



Mount Tambora



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Mount Tambora

- 1816: “the year without a summer”
- _____
 - Snow and frost in June, July, and August
 - Crops perished and people starved
- _____
- Mount Tambora remains active to this day

Part 3 - Tsunamis



Tsunamis

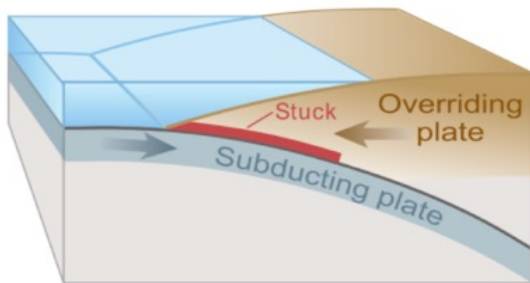


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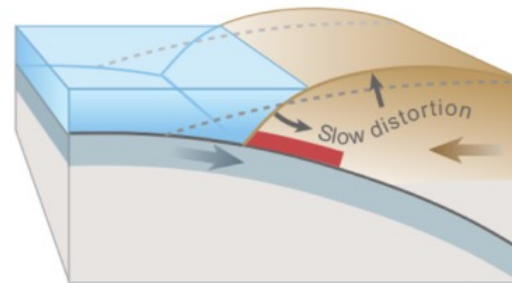
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- _____
- _____
- Most of the time, the disturbance is caused by the movement of tectonic plates due to an earthquake
- In more rare events, this displacement of water can be the result of volcanic eruptions, glacial carving, meteorite impacts, or landslides



Drawing of tectonic plate boundary before earthquake



Overriding plate bulges under strain, causing tectonic uplift

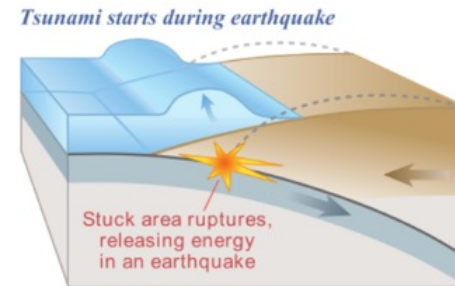
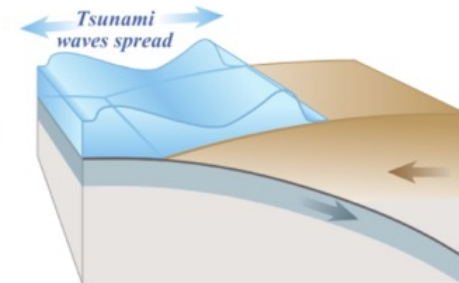


Plate slips, releasing energy into the water



The energy released produces tsunami waves

Tsunamis

- Similar to dropping a rock into a pool and seeing the waves move outwards from the impact site
- _____
- What results is a huge tidal wave that can be 30 meters (100 feet) high moving at an incredible speed



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Tsunamis – Why Are They So Destructive?

- _____
- _____
- Since they're so large, they have a lot of momentum, meaning, they are hard to stop
- Think about the difference between throwing a tennis ball 5 m/s and throwing a bowling ball at 100 m/s, which would create more damage?

Tsunamis – Social Impact

- The force with which
- _____
- They will be crowded together and potentially injured without medical assistance
- Many will die before help can arrive



Tsunamis – Environmental

- Tsunamis can also have significant and devastating effects on the environment
- _____
- Assuming this displacement doesn't kill the species immediately, it will severely impact the survival of the organism

