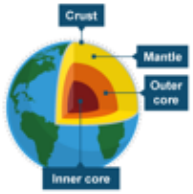
Plate tectonics

https://www.bgs.ac.uk/discoveringGeology/hazards/earthquakes/structureOfEarth.html

Structure of the earth



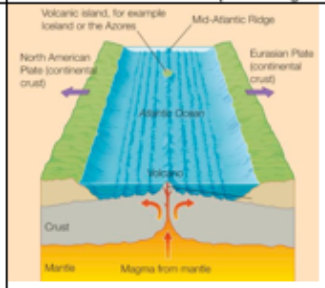
1. The inner core is 5,500°C - extremely hot. It is a very dense solid made from iron and nickel.

2. The outer core is 2,000 km thick and is a liquid.

3. The mantle is semi-molten and about 3,000 km thick.

4. The crust is the rocky outer layer. It is thin compared to the other sections, approximately 5 to 70 km thick.

Constructive plate margin

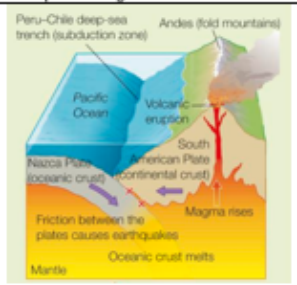


1. A constructive plate boundary, sometimes called a **divergent plate margin**, occurs when plates move apart.

2. Volcanoes are formed as magma wells up to fill the gap, and eventually new crust is formed.

Destructive plate margin

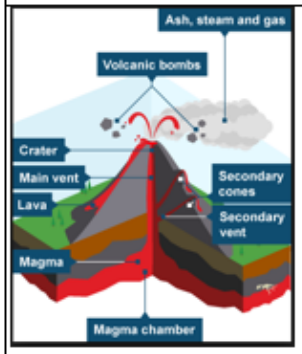
1. Destructive plates move towards each other.
2. This occurs when oceanic and continental plates move together.
3. The oceanic plate is forced under the lighter **continental** plate.
4. Friction causes melting of the oceanic plate and may trigger earthquakes. Magma rises up through cracks and erupts onto the surface.



Conservative plate margin

1. A conservative plate boundary, sometimes called a **transform plate margin**, occurs where plates slide past each other in opposite directions, or in the same direction but at different speeds.

Volcanoes



1. A **volcano** is an opening in the Earth's crust. It allows hot magma, ash and gases to escape from below the surface.

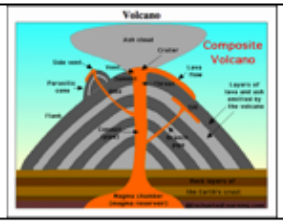
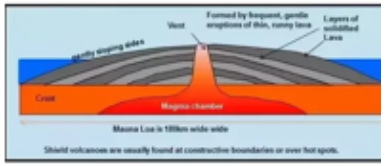
2. There are two types of volcano, composite and shield.

3. Composite volcanoes are steep-sided and cone-shaped, made up of layers of ash and lava and containing sticky lava which doesn't flow very far. Mount Etna in Italy is a composite volcano.

4. Shield volcanoes have gently sloping sides and runny lava that covers a wide area. Gases escape very easily from shield volcanoes. Mauna Loa in Hawaii is a shield volcano.

https://www.youtube.com/watch?v=VNGUdObDoLk

Composite and shield volcanoes: There are a number of key differences between composite and shield volcanoes

	Composite	Shield
Diagram		 Shield Volcano
Plate Boundary	Form at destructive plate boundaries.	Form at constructive plate boundaries.
Lava	Thick lava.	Thin, runny lava.
Eruptions	Eruptions happen less often but are usually violent. The eruption consists of ash, pyroclastic flow and lava.	Eruptions happen often but they are usually quite eruption is mainly lava, with little pyroclastic flow.
Example	Mount Vesuvius in Naples, Italy. Mount St. Helens, USA	Mauna Loa in Hawaii. La Cumbre, The Galapagos I

Keywords

1.	**Hazard risk**	1.	Probability or chance that a natural hazard may take place.
2.	**Plate margins**	2.	The border between two types of plates.
3.	**Primary effects**	3.	Initial impact of natural event caused directly by the hazard.
4.	**Secondary effects**	4.	After effects that occur as indirect impacts, sometimes on a longer timescale.
5.	**Immediate responses**	5.	Reaction of people as the disaster happens.
6.	**Long term responses**	6.	Later reactions that occur, days, weeks, months or years after the event.

Mount St. Helens, USA, 1980: (HIC)

In 1980, Mount St. Helens, a composite volcano in a rural area in the Northeast of the USA, erupted.

Effects: - More then 200 homes were destroyed. - 57 died as a result of the eruption. - 185 miles of roads and 15 miles of railways were damaged. - Damage to to property was estimated at $1.1 billion.

Responses and PPP: - Seismographs began closely monitoring the volcano roughly 3 months before the eruption. - Hundreds of tourists and scientists flocked to the area. However, the government imposed an exclusion zone around the volcano to prevent loss of life. - The US government issued $950 million in emergency funds to help recovery efforts.

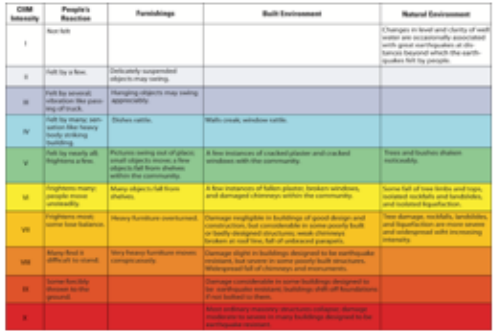
Year 8 – Geography / Natural Hazards – HT1

Plate tectonics

https://www.bgs.ac.uk/discoveringGeology/hazards/earthquakes/structureOfEarth.html

Measuring earthquakes

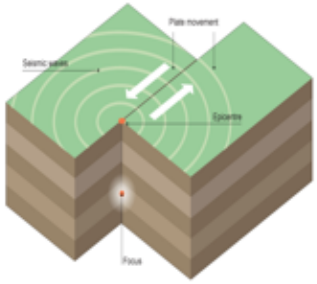
Each year scientists record over 20,000 earthquakes. Most of these earthquakes are small and are not noticed by ordinary people.
- Earthquakes are measured according to two different scales: the Richter scale and the Mercalli scale.
- Some argue that the Mercalli scale is not as reliable as the Richter scale because it is subjective and can vary according to where you are. The Mercalli Scale (without the final 2 levels):



https://www.usgs.gov/media/images/modified-mercalli-intensity-mmi-scale-assigns-intensities

Causes of Earthquakes

Earthquakes are caused when two plates become **locked** causing **friction** to build up. From this **stress**, the **pressure** will eventually be released, triggering the plates to move into a new position. This movement causes energy in the form of **seismic waves**, to travel from the **focus** towards the **epicentre**. As a result, the crust vibrates triggering an earthquake.



The effects of an earthquake:

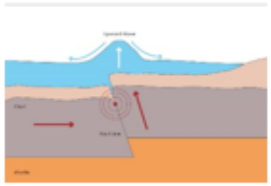
The damage of an earthquake depends on the ability of the country to predict, prepare for and protect people from the effects of the earthquake (PPP).

Short Term:
People may be killed or injured. Homes may be destroyed. Infrastructure may be disrupted. Water supplies may be contaminated.

Long Term:
Disease may spread. People may have to be re-housed, sometimes in refugee camps.

Tsunami

Tsunamis are a series of ocean waves which are caused when earthquakes or other disturbances displace a large amount of water. (Other disturbances can include volcanic eruptions, underwater explosions and meteorite impacts!)
- Tsunamis are not caused by tides, and so it is technically incorrect to refer to them as "tidal waves".
- Tsunamis are usually barely noticeable in water, but get larger and more powerful as they approach land.
- As a result, tsunamis can have a huge effect on countries which are hit by them.



Earthquake Management

Predicting
Methods include:
- Satellite surveying (tracks changes in the earth's surface)
- Laser reflector (surveys movement across fault lines)
- Seismometer
- Water table level (water levels fluctuate before an earthquake).
- Scientists also use seismic records to predict when the next event will occur.

Protection
You can't stop earthquakes, so earthquake-prone regions follow these three methods to reduce potential damage:
- Building earthquake-resistant buildings
- Raising public awareness - education (great shakeout, USA)
- Improving earthquake prediction

Keywords

Epicentre	The point directly above the focus, where the seismic waves reach first
Seismic Waves	(Energy waves) travel out from the focus.
Focus	The point at which pressure is released
Seismometer:	A machine which detects and records vibrations in the earth's crust.
Prediction:	Attempting to know when an earthquake will happen. This can be done by measuring vibrations in the crust and by studying previous major earthquakes
Protection:	Trying to reduce the damage people suffer during an earthquake. This could include building houses in safe areas.

Haiti, 2010: (LIC)

In 2010, Haiti experienced an earthquake measuring 7.0 on the richter scale originating from the boundary between the Caribbean and North American plates.

Effects:
- 220,000 people died.
- 1 million people were made homeless and the main port, airport and roads were severely damaged.
- 2 million people had no food or clean water.
- Many homes and businesses were looted because of a lack of government presence.

Responses and PPP:
- Haiti has no history of earthquakes. As a result, their buildings were not prepared and people were not drilled.
- Other countries, such as the USA, sent aid to help. However, the damaged airport found it difficult to cope.
- Due to a weak and poor government people are still living in camps almost 10 years after the earthquake.

Year 8– Geography / Natural Hazards – HT1