KS3 Geography: Extreme Planet

Y8 Natural Hazards

Keys to success

Understanding earth structure	Explaining plate margins
Identifying and explaining causes of earthquakes, categorising their impacts	Identifying and explaining causes of earthquakes, categorising their impacts

Crucial command words/ skills

Describe

Explain

Distribution

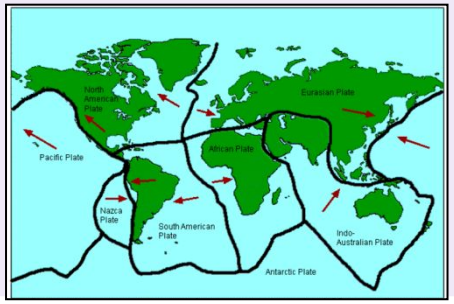
DID YOU KNOW?

The tectonic plates move between 2-5cm per year. That's about the same speed at which your fingernails grow!

16 Subject Specific Key Terms

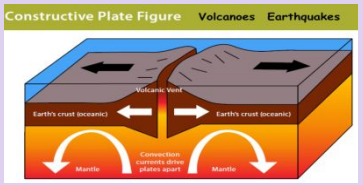
Conservative plate margin	Tectonic plate margin where two tectonic plates slide past each other.	**Magma**	Molten rock below the Earth's surface.
Constructive plate margin	Tectonic plate margin where rising magma adds new material to plates that are diverging or moving apart.	**Plate margin**	The margin or boundary between two tectonic plates.
Destructive plate margin	Tectonic plate margin where two plates are converging or coming together and oceanic plate is subducted. It can be associated with violent earthquakes & explosive volcanoes.	**Primary effects**	The initial impact of a natural event on people and property, caused directly by it, for instance the ground buildings collapsing following an earthquake.
Earthquake	A sudden or violent movement within the Earth's crust followed by a series of shocks	**Richter Scale**	A unit of measurement for the magnitude and strength of an earthquake. Typically ranges 1-10.
Epicentre	The point on the surface of the Earth, directly above the focus, where the shockwaves will be felt the strongest.	**Secondary effects**	The after-effects that occur as indirect impacts of a natural event, sometimes on a longer timescale, for instance fires due to ruptured gas mains resulting from the ground shaking.
Focus	The point below the Earth's within the crust where pressure is released and shockwaves travel outwards from.	**Tectonic Plate**	A rigid segment of the Earth's crust which can 'float' across the heavier, semi-molten rock below. Continental plates are less dense, but thicker than oceanic plates.
Immediate responses	The reaction of people as the disaster happens and in the immediate aftermath.	**Tsunami**	Waves generated by an earthquake on the sea bed.
Long-term responses	Later reactions that occur in the weeks, months and years after the event.	**Volcano**	An opening in the Earth's crust from which lava, ash and gases erupt.

Inside the Earth

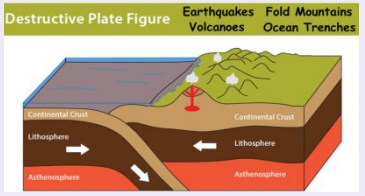


At around 22°C the thinnest layer of the Earth is solid. CRUST	**Consists of iron, nickel, sulphur and oxygen. This liquid layer is found 5,150km deep. It is thought to be 4,000-6,000 °C.** OUTER CORE
Its temperature ranges from 1,400° C to 3,000°C. It is made up of iron, oxygen, silicon, magnesium and aluminium. The majority of this layer is molten. MANTLE	This layer makes up 80% of the Earth's structure. MANTLE
The layer beneath the ocean bed is about 8km thick and is mainly made from a rock called basalt. CRUST	A huge solid metal ball of iron and nickel measuring 2,500 km wide. INNER CORE
At 5,000-6,000 °C this part of the Earth is 6,000 times hotter than our atmosphere. INNER CORE	The layer that makes up the land ranges from 8km to 70km thick and is mostly made from a rock called granite. CRUST
This layer is divided up into segments called tectonic plates. These are moving very slowly. CRUST	It is the movement of metals in this layer that creates our Earth's magnetic field. OUTER CORE

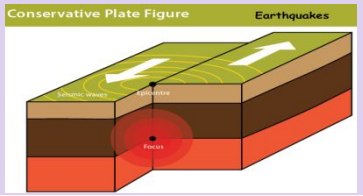
Plate Tectonics



Constructive margins are where two plates are **moving away** from each other. **Magma** (molten rock) **rises** to fill the gap and **cools, creating new crust**.



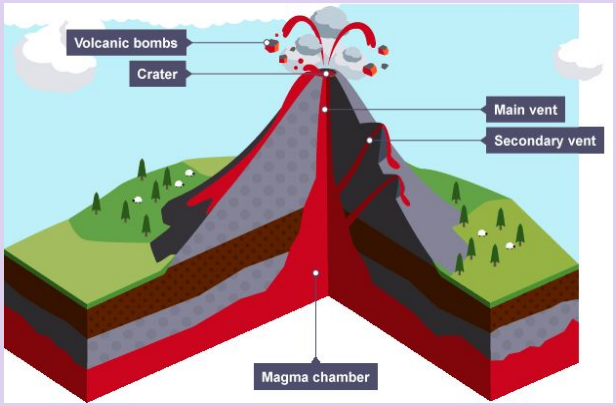
Destructive margins are where two plates are **moving towards** each other. Where an **oceanic plate** meets a **continental plate**, the denser **oceanic** plate is **forced down** into the mantle and **destroyed**. This often creates **volcanoes** and **ocean trenches** (very deep sections of the ocean floor where the oceanic plate goes down). When **two continental plates** meet, the plates **collide**, and the ground is **folded & forced upwards** to create **mountain ranges**.

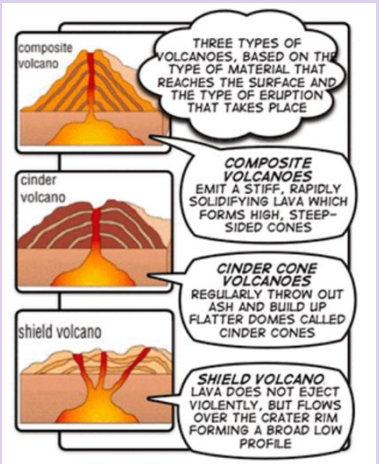


Conservative margins are where two plates are **moving sideways** from each other, or moving in the **same direction** but at **different speeds**. Crust **isn't created** or **destroyed**.

Volcanoes

Active volcanoes erupt often, or have erupted recently. **Dormant** volcanoes have not erupted for a long time, but can still erupt. **Extinct** volcanoes can no longer erupt and have not erupted for thousands of years.



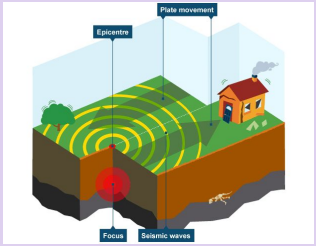


Earthquakes

Seismology	The study of earthquakes
Focus	The point within the Earth's crust where the rocks fracture and the earthquake begins.
Epicentre	The point directly above the focus on the Earth's surface where the earthquake is felt strongest
Shock Waves	The name of the vibrations of energy that travel through the Earth's crust. The further they travel, the weaker they become.
Seismom-eter	This piece of equipment will measure the strength of the earthquake by recording the vibrations caused by the tremors. The vibrations are plotted on a seismograph.
Richer Scale	Measures the magnitude (strength) of the earthquake on a scale of 1-10.

The Haiti Earthquake 2010

Haiti is part of a large Caribbean island called Hispaniola. The Dominican Republic is located to the east of Haiti and covers over half of the island.



Social impacts of the earthquake (effects on people)
3 million people affected.
Over 220,000 deaths.
300,000 injured.
1.3 million made homeless.
Several hospitals collapsed.

Economic impacts of the earthquake (effects on money and jobs)
30,000 commercial buildings collapsed.
Businesses destroyed.
Damage to the main clothing industry.
Airport and port damaged.

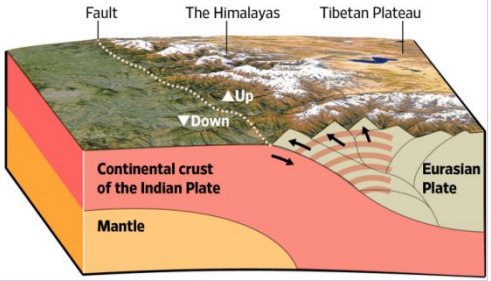
Cause of the earthquake
Haiti lies right on the **boundary** of the Caribbean and North American plates. There was slippage along a **conservative plate boundary** that runs through Haiti.
On 12 January 2010, a magnitude 7 earthquake hit Haiti at 16:53 local time. The earthquake's **epicentre** was 25 km west of Port-au-Prince, the capital. Most people, businesses and services were located in the capital.

Haiti is a very poor country without the money and **resources** to redevelop. It is one of the least developed countries in the world with most Haitians living on $2 or less per day, about £1.30. Because there were few **earthquake-resistant buildings**, the devastation was massive. Many buildings simply collapsed or were damaged beyond repair.

Nepal Earthquake, April 2015
9,000 dead & 23,000 injured

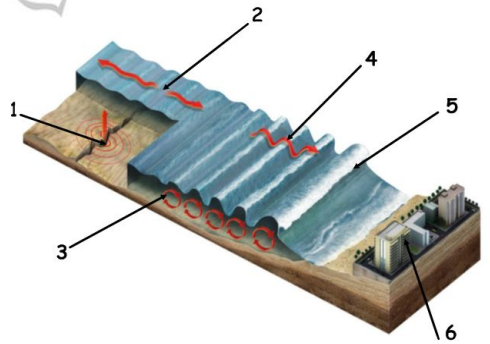
Continental Collision

As the Indian subcontinent pushes against Eurasia, pressure is released in the form of earthquakes. The constant crashing of the two plates forms the Himalayan mountain range.



Many buildings were old and not earthquake-proof.	The area is steep and hilly making it hard for rescue teams to access affected villages.
The earthquake triggered a massive avalanche on Mount Everest. This **killed 17 people.**	Planes carrying aid supplies were unable to land as the airport was full.
90% of the Nepalese army was mobilised to the worst affected areas, but their efforts were hampered by poor roads.	The **earthquake measured 7.8** on the Richter Scale – making it as powerful as the amount of energy released by a nuclear bomb.

Japan Tsunami, March 2011
15,000 dead & 6,000 injured



At a destructive margin where the **Pacific plate subducted below the Okhotsk plate**, and got stuck. **Pressure** built up and the **Okhotsk** plate snapped free releasing shockwaves.

1. The epicentre of earthquake along the fault line. Shock waves result in **uplift** of the water.
2. **High energy waves** travel outwards in both directions.
3. Sea movement showing crests and troughs of waves. Further away from land these waves remain evenly spaced and low in height.
4. As the **sea gets shallower** the waves get bigger and their **height increases.**
5. Just before the tsunami hits land, the **sea draws back** and the **crest of the wave is at its highest.**
6. All **buildings along the coast are at risk**, including those several miles inland.