8.04: Tectonics

Structure of the Earth

1	**crust**	(n) the rocky, outer layer of earth made up of rock and minerals
2	**mantle**	(n) a layer of dense rock found below the crust
3	**outer core**	(n) a liquid layer of mostly molten metals that lies between the mantle and inner core
4	**inner core**	(n) a solid ball of metals that lies at the centre of earth
5	**continental crust**	(n) parts of Earth's crust that are found below landmasses
6	**oceanic crust**	(n) parts of Earth's crust that are found below oceans

Theory

1	**tectonic plates**	(n) individual sections of the Earth's crust and the upper mantle that lies beneath it
2	**plate boundary**	(n) locations where tectonic plates meet and interact
3	**convection currents**	(n) the movement of fluids because of temperature differences
4	**subduction**	(n) the process where one tectonic plate slides beneath another and sinks into the mantle, usually when a denser oceanic plate meets a lighter continental plate
5	**continental drift**	(n) a theory that proposed earth's continents were once one landmass (supercontinent) that gradually drifted apart over time
6	**Pangaea**	(n) a supercontinent made up of all the world's land masses before they were broken up into the different continents we recognise today
7	**geological timescale**	(n) a timeline that shows the history of the Earth, divided into eons, eras, periods and epochs
8	**era**	(n) a major division of time within an eon, marked by significant changes in Earth's life and landforms

Volcanoes and Earthquakes

1	**shield volcano**	(n) a wide, gently sloping volcano formed by runny (low-viscosity) lava that flows easily over long distances, building a shape similar to a warrior's shield
2	**composite volcano**	(n) a tall, steep-sided volcano made of alternating layers of ash and thick, sticky lava; these volcanoes often produce explosive eruptions
3	**lava**	(n) molten rock that has erupted onto the Earth's surface from a volcano and begins to cool and solidify
4	**magma**	(n) molten rock located beneath the Earth's surface in the mantle or crust, which can rise through cracks and erupt as lava
5	**geothermal energy**	(n) energy produced by heat from beneath the Earth's surface, often used for electricity or heating
6	**epicentre**	(n) the point on the Earth's surface directly above the focus; it is usually where the shaking is felt most strongly and where the most damage occurs
7	**focus**	(n) the point inside the Earth's crust where the earthquake starts; it is the place where the rocks first break and release energy in the form of seismic waves
8	**seismic waves**	(n) waves of energy that travel through the Earth during an earthquake
9	**Moment Magnitude Scale**	(n) a modern scale used to measure the total energy released by an earthquake (Mw)
10	**seismometer**	(n) the instrument that detects and measures ground vibrations caused by seismic waves (earthquakes)

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Living Near Volcanoes

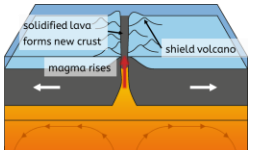
Opportunities	Challenges
fertile soils	volcanic eruptions
geothermal energy	gases
tourism	ash clouds

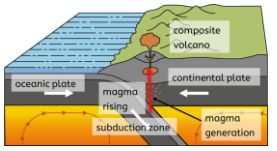
Preparing for Earthquakes

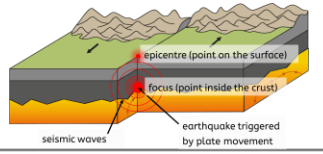
	Advantages	Disadvantages
Earthquake resistant buildings	designed to withstand shaking and therefore are less likely to collapse	expensive to build
Earthquake drills	people can react quickly and calmly without panic	people can forget proper actions if drills are not repeated regularly or if they do not feel realistic enough
Training emergency services	response teams can mobilise quickly and respond more efficiently	requires significant time, funding, technology and ongoing training
Land use planning	keeps people away from the most dangerous fault lines or areas	difficult and costly to move communities

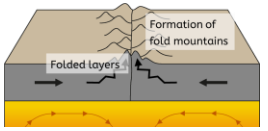
Types of Plate Boundaries

1	**constructive**	(n) a type of tectonic plate boundary where two plates move apart, allowing magma to rise and create new crust, often forming mid-ocean ridges or rift valleys
2	**destructive**	(n) a type of tectonic plate boundary where an oceanic plate is forced beneath a continental plate (subduction); this process destroys crust, generates magma, and often leads to explosive volcanic eruptions
3	**conservative**	(n) a type of tectonic boundary where two plates slide past each other horizontally, often causing earthquakes
4	**collision* (additional)**	(n) a type of tectonic plate boundary where two continental plates move towards each other and collide









Earthquake Case Study: Nepal 2015

Location: Asia, landlocked, between India and China, in the Himalayan mountain range.

Magnitude, focus and epicentre: Gorkha earthquake 7.8 Mw. Collision boundary between the Indian and Eurasian plates. Focus depth 15-16km (shallow). Epicentre was 80km northwest of Kathmandu, the capital city.

Effects	Responses
8,773 people were killed and over 23,000 injured	ActionAid supported more than 150,000 people and provided food to over 18,500 families and emergency shelter to 7,000 families
600,000 homes were destroyed	The Oxfam International programme helped more than 600,000 people; provided clean water, sanitation, food and shelter
7000 schools were damaged or destroyed	Disasters Emergency Committee (DEC) raised £87 million from 13 charities which was used to rebuild schools with earthquake resistance

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