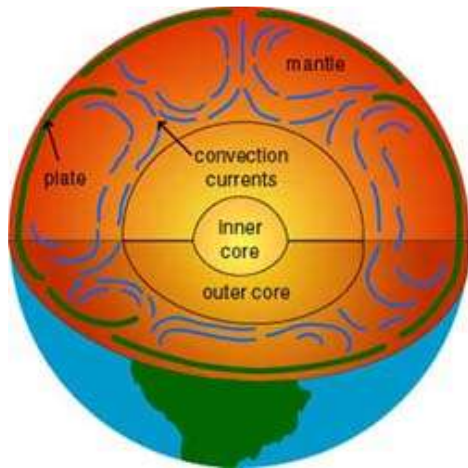


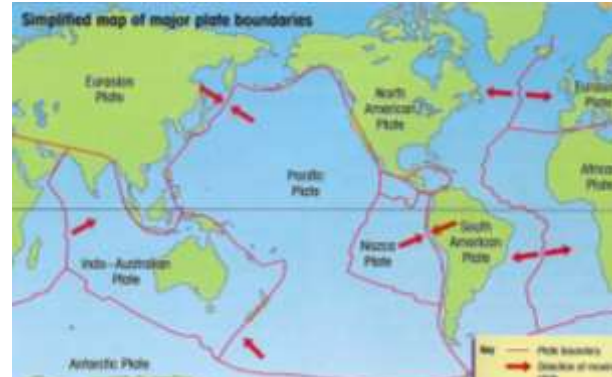
Year 8 – Unit 1 - Tectonics Knowledge Organiser

Layers of the Earth



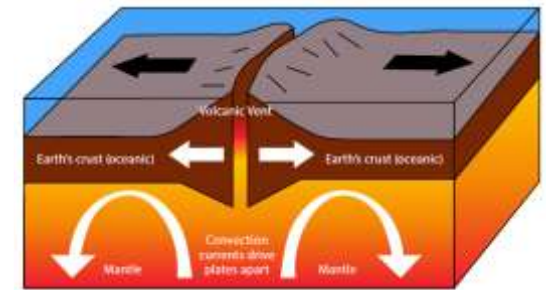
Inner Core: centre of the earth; solid; 5500°C.
Outer Core: 2000km thick, second hottest, liquid metal.
Mantle: 3000km thick; semi-molten; convection currents active here.
Crust: Rocky outer layer; broken in to oceanic crust (approx. 5km thick, holds the earth's oceans, can be destroyed) and the continental crust (approx. 35 to 50km thick, holds the Earth's continents, cannot be destroyed).

Convection Currents are found in the mantle. The core heats the magma, which rises towards the crust, cools, spreads, sinks and the process repeats. This moves the plates on top causing continental drift.



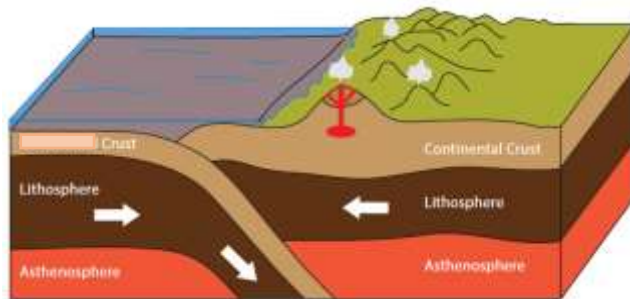
This map shows the major tectonic plates and the movement at their boundaries (where tectonic plates meet). At these plate boundaries, the majority of tectonic events will occur such as volcanoes and earthquakes. The Ring of Fire is a huge concentration of tectonic activity around the Pacific Ocean. Volcanoes can occur away from boundaries at hotspots e.g. Hawaii in the middle of the Pacific Ocean

Constructive Margin



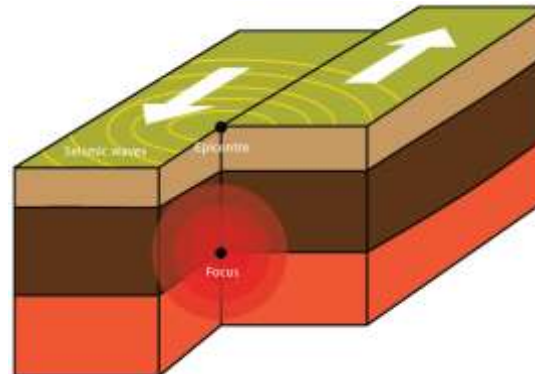
1. **Convection currents** move the plates away from each other;
2. **Small earthquakes** will be felt, and a **gap** will be created;
3. Fast flowing **lava** seeps out creating **shield volcanoes** and **new land** e.g. Iceland;
4. The **Mid-Atlantic Ridge** is a famous constructive margin creating 3 cm of new land each year.

Destructive Margin



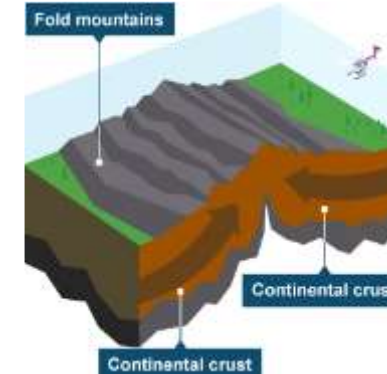
1. A **destructive margin** occurs due to **convection currents** moving the plates **towards** each other;
2. **Oceanic crust** moves towards the **continental crust**. The oceanic is forced down as it is denser than continental.
3. As it is forced down it is called **subduction**. **Friction** causes earthquakes to occur and the oceanic crust melts creating magma.
4. **Pressure builds up** and an eruption takes place producing sticky lava = **composite volcano** formed.

Conservative Margin



1. Conservative margins occur due to **convection currents** causing plates to **slide past** each other, sometimes they will **stick**, causing **pressure to build up** and **friction**.
2. The **convection currents** keep trying to move the plates until they **slip past** each other causing an **earthquake**;
3. An example is the **San Andreas Fault** in the USA.

Collision Margins



1. A collision margin occurs due to convection currents pushing two **continental** plates towards each other;
2. Remember - **continental crust cannot be destroyed**;
3. As they hit **violent earthquakes** happen (e.g. Nepal 2015).
4. They push upwards to create **fold mountains** (e.g. Himalayas).

You must know the different plate boundaries and be able to give examples from around the world.

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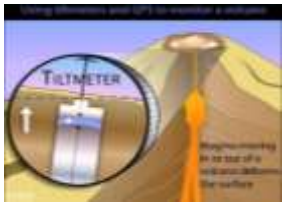
Why do people live near volcanoes?

- Creates **tourism** (e.g. Vesuvius in Italy);
- They form **new land** (e.g. Surtsey, Iceland);
- **Precious stones** can be found nearby;
- **Geothermal** power plants can locate near volcanoes;
- The ash makes the **land fertile** meaning jobs for farmers;
- **Friends and family** may live here;
- Some people **take the risk** as it has not erupted in so long;
- **Some people cannot afford to live elsewhere.**



Predicting volcanic eruptions

- The **shape** may change (measured by **tilt-meters**).
- Measure **gas emissions** (e.g. sulphur). This can be done by robots.
- Monitor **tremors (magma moving)**.
- Nearby **water temperatures** rising.



Preparing for volcanic eruptions

- **Evacuation and exclusion zones** around the volcano;
- Train the **emergency services**;
- **Reinforce roofs** of buildings so unaffected by falling ash;
- Ensure **medical, food and water supplies** are stocked;
- **Diversion channels** for lava flows can be created.

Why do people live in and around seismic areas (prone to Earthquakes)

- Industry and jobs in that area;
- **Friends and family** may live here;
- People place a lot of faith in earthquake prediction and/or prevention methods;
- Some people **take the risk** as it has not erupted in so long;
- **Some people cannot afford to live elsewhere.**

Predicting earthquakes

- Monitor using **seismographs** for irregularities in tremors and plate movements;
- Monitor **local animal behaviour** – they will sense minor earthquakes and tremors;
- Measure **radon gas** – this will increase as cracks appear in the rocks;
- Measure **underground water levels** – these will rise as the plates lock;
- NB – earthquakes cannot be effectively predicted!

Preparing for earthquakes

- Retro-fit existing buildings with earthquake proof measures (e.g. cross-bracings, springs, etc);
- Ensure new buildings are built to withstand or absorb seismic activity;
- Practice earthquake drills;
- Train the emergency services;
- Prepare earthquake kits at home;
- Ensure streets are as wide as possible (e.g. San Francisco) so emergency services can gain access.

Other important information

Two ways to measure earthquakes:

- The **Richter Scale** – uses a **seismograph** which measures the size (magnitude) of the **seismic waves**. Measured on a **logarithmic scale** (e.g. a “8” on the scale is 10x stronger than a “7”, and 100x stronger than a “6”, and so on).
- The **Mercalli Scale** – visual scale, giving a ranked score of 1 (least) to 12 (most) of the **damage caused** by tremors.

Volcanic hazards

Shield volcanoes

- Located on constructive plate margins.
- More gentle eruptions
- Runny, lava that flows a long way.
- Gentle sloped volcanoes.



Composite volcanoes

- Located on destructive plate margins.
- Steep slopes as lava is sticky and doesn't flow far.
- Violent, dangerous eruptions.
- Pyroclastic flows and volcanic bombs add danger.



Examples of recent volcanic eruptions:

- Eyjafjallajökull, Iceland 2010 - (stratovolcano)
- Volcán de Fuego, Guatemala 2018 (composite)
- La Palma, Spain 2021 (stratovolcano)
- Tonga 2022 (stratovolcano)

What are the hazards of eruptions?

- **Lava** – some lava is runnier and faster flowing than others. Lava is incredibly hot and can melt everything in its path. E.g. houses and key infrastructure.
- **Tephra (volcanic bombs)** – rocks that fly out of volcanoes at high speeds. These can injure or kill people and damage buildings.
- **Pyroclastic flow** – hot gas and ash that comes out of composite volcanoes at high speeds. This is often the most dangerous part of eruptions. Pompeii was destroyed by a pyroclastic flow from Mount Vesuvius.
- **Ash** – Poisonous to breath in and also dangerous. It can cause dangerous driving conditions and a few inches can be heavy enough to damage roofs. Can pollute rivers and lakes and kill crops.
- **Lahars** – mudflows caused by eruptions melting snow and ice on mountains. These can be deadly for example Mount Pinatubo.

Why are some eruptions worse than others?

- Type of eruption. Composite volcanoes are more severe than shield.
- Wealth of the country:
 - o **Monitoring** – Equipment such as tiltmeters and seismometers are more likely to be used in HICs. Some eruptions e.g. Mount Ontake can happen without warning.
 - o **Protection** - HICs are more likely to be more prepared and have emergency shelters, supplies and stronger buildings to protect people from hazards. Emergency services in poorer countries are also not as well trained and equipped.



A volcano shelter in Japan. An example of a protection strategy.

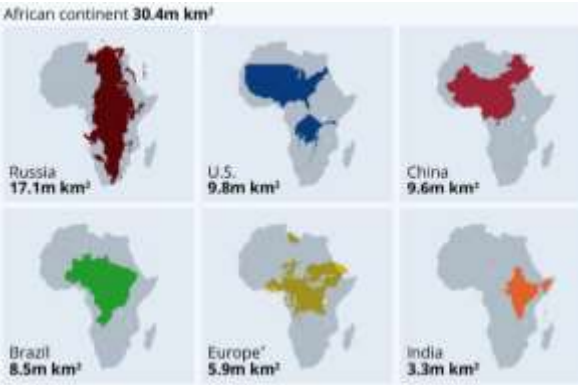
Practice questions:

- Describe the global distribution of plate boundaries and tectonic hazards.
- Explain how the movement at constructive, destructive, collision and conservative margins creates different tectonic events and landforms.
- Explain how tectonic hazards can be monitored, predicted and prepared for.
- Compare the causes, effects and responses to a tectonic hazard in a developed and developing country.

Year 8 unit 2 – Africa



Africa is a huge continent made up of 54 countries. It has a huge cultural diversity and is home to people with many different races, cultures and languages. The size of Africa is often understated. It is the second largest continent on the earth. The images below give you an idea of its huge scale.



Africa is incredibly mineral rich. Johannesburg is known as the city of gold and is home to the Headquarters of mining companies from all over the world.

Africa often suffers from negative stereotypes. Although it is the poorest continent its countries have varied development and wealth. It has rich natural resources and is home to incredibly wealthy people and areas. The pictures below challenge some of the typical perceptions of Africa.



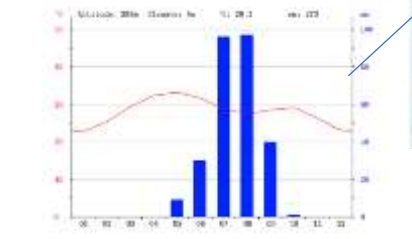
Tourism is a rapidly increasing industry in Africa. Countries such as Egypt (shown in figure) earn a large proportion of their GNP from the industrv.



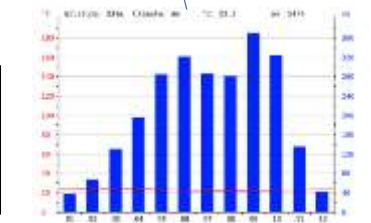
Not all Africans are poor. Over the past decade 19,000 Africans have become millionaires. Cities such as Lagos (shown) have big financial districts home to many large businesses.



Africa has a varied climate. It is not just hot and dry. The map shows lots of Africa has high rainfall. A varied climate and altitude lead to a wide variety of biomes from hot deserts to snowy mountains.



Places like Niger have a clear dry season and wet season. There is no rain for 6 months of the year and very hot temperatures. This will lead to savannah or desert biomes.



High altitude locations like the Atlas Mountains have snow despite the low latitudes.



Equatorial Guinea has high amounts of rainfall all year. Temperatures are constant around 23-25°C. This will lead to tropical rainforests.

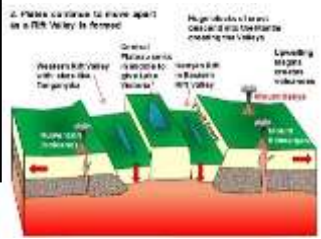
Rift Valley:

- A physical landform over 3700km long in Eastern Africa formed by tectonic processes.
- Four giant Lakes in the Rift Valley contain 1/4 of the fresh water on the planet.
- The surrounding volcanoes have made fertile soil important for farming. The Rift Valley is one of the birth places of humanity (ancient remains have been found).

The Rift Valley sits over a hot spot which causes uprising magma



Convection currents pull the plates apart. The weakened crust sinks forming steep sided valleys.



Barriers to development:

Many African countries are struggling to develop and are LICs. Here are some reasons why.

Physical factors	Human factors
<ul style="list-style-type: none"> Natural diseases such as malaria – puts a strain on health and drains GDP by approx 1.3% (dev). Lack of fresh water – affects health and sanitation. (dev) Extreme temperatures – can affect farmers income and cause famine. (dev). Climate change – rising temperatures can make farming more difficult and lead to more droughts (dev) Landlocked – central African countries do not have a coastline meaning trade is more difficult (dev) 	<ul style="list-style-type: none"> Conflict – damage to infrastructure and huge economic and social cost (dev) Lack of good jobs – reliance on primary jobs and lower wages (dev) HIV/Aids – many families in Sub Saharan Africa have lost main wage earners (dev) Lack of good education – affects careers, wages and taxes to government (dev) Corrupt or poor governments – money is wasted and not properly invested where needed (dev) Colonialism – has led to resources being exploited and unfair trade systems in some countries. (dev)

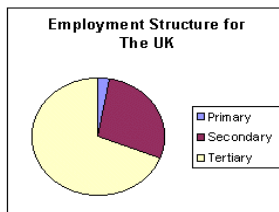
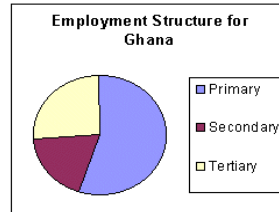
Changing industry in Africa

Many African countries currently rely on Primary industry e.g. Ghana has around 60% primary workers compared to around 5% in the UK. This can have a number of problems:

- Lower average wages = less tax.
- Reliance on low value primary exports. E.g. cocoa/fish.
- Vulnerability to extreme weather affecting harvests.

However this is changing:

- Tourism is a growing industry. Countries such as Kenya, Ghana and Egypt are popular destinations.
- TNCs are investing in African cities as there is a young, cheap workforce.



Benefits of tourism in Kenya	Negatives of tourism in Kenya
<ul style="list-style-type: none"> - Provides jobs - Provides foreign currency e.g. \$ £ - Reduces reliance on primary industry and farming. 	<ul style="list-style-type: none"> - Lots of profit heads to HICs as TNCs dominate. - Environmental impact e.g. coral reef damage at Mombasa and wildlife stressed in Nat. Parks. - Maasai forced off their land. Loss of culture.



Hopefully this module has changed your perceptions on Africa. It is a dynamic, rapidly changing continent that has suffered from negative perceptions. It is beautiful, varied and has a bright future.

Potential solutions to development: Although some types of aid can create problems. Bottom up aid projects can have a huge impact on development. For example:

Aid Case Study – Tree Aid

Background

- Set up in the **Sahel** region of Africa. A dry, arid region.

Reasons aid is needed

- Cutting down trees is causing less moisture to stay in the area, causing more **droughts** – less food and water
- Population pressure** and little money means trees are exploited for selling as wood or burning for fuel.

Features

- Tree seeds** given so tree nurseries can be set up for food production, in total over 24 million trees have been planted.
- Bikes and Donkey** carts given so that finished items can be taken to market to sell, these are easy to maintain and stop dependence.
- People taught** how to look after the trees and get maximum amounts of food, so they can become self-sufficient

Success / Sustainability

- More food** such as cashew and shea nuts, which can be used as food and as products to sell, this means more money to send children to school, which is improving literacy rates.
- The tree roots stop **soil erosion** meaning that more crops can be grown and higher yields achieved, increasing profits for farmers.
- The trees **hold moisture** in the area, meaning less drought and less chance of death through dehydration or lack of food.

Changes in urban Africa – Cities in Africa are growing rapidly as the continent develops. Rural-urban migration is high as people try to make better lives. Do they find what they are looking for?

Reasons for urban growth

Push factors

- Lack of job opportunities in rural areas.
- Conflict makes some rural areas dangerous. E.g. Northern Kenya.
- Poverty and a lack of services e.g. basic education, no running water.

Pull factors

- More access to services such as healthcare and education.
- More choice of careers in secondary and tertiary sectors.
- Better quality housing.
- Often safer from natural hazards e.g. droughts.



Migrants are drawn to cities for better opportunities. However many end up in squatter settlements. E.g. Kibera in Nairobi where life is tough.

