

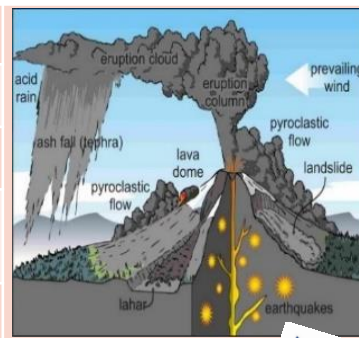


The structure of the Earth

The Crust	Varies in thickness (5-10km) beneath the ocean. Made up of several large plates.
The Mantle	Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection.
The Inner and outer Core	Hottest section (5000 degrees). Mostly made of iron and nickel and is 4x denser than the crust. Inner section is solid whereas outer layer is liquid.

Volcanic Hazards

Ash cloud	Small pieces of pulverised rock and glass which are thrown into the atmosphere.
Gas	Sulphur dioxide, water vapour and carbon dioxide come out of the volcano.
Lahar	A volcanic mudflow which usually runs down a valley side on the volcano.
Pyroclastic flow	A fast moving current of super-heated gas and ash (1000°C). They travel at 450mph.
Volcanic bomb	A thick (viscous) lava fragment that is ejected from the volcano.



Managing Volcanic Eruptions

Warning signs	Monitoring techniques
Small earthquakes are caused as magma rises up.	Seismometers are used to detect earthquakes.
Temperatures around the volcano rise as activity increases.	Thermal imaging and satellite cameras can be used to detect heat around a volcano.
When a volcano is close to erupting it starts to release gases.	Gas samples may be taken and chemical sensors used to measure sulphur levels.
Preparation	
Creating an exclusion zone around the volcano.	Being ready and able to evacuate residents.
Having an emergency supply of basic provisions, such as food	Trained emergency services and a good communication system.

Convection Currents

LIC-CS: Nepal Earthquake 2015



The crust is divided into tectonic plates which are moving due to convection currents in the mantle.

Causes
On a destructive plate margin, involving the Indo Australian and Eurasian plates. The **magnitude 7.9 earthquake** was **50 miles** to the north west of Nepal's capital Kathmandu. The plates are colliding at about **45mm** per year. .

Effects
9000 people died and 8 million affected. Many **emotionally affected**. **3 million homeless**. **7000 schools destroyed**. **Avalanche on Mt Everest** killed at least 19 people along with **landslides**

Management
Search and rescue teams inc. helicopters for those trapped on Mt Everest. **Hall a million tents**. **300 000 people migrated** to Kathmandu. June 2015 International conference to discuss rebuilding.

Earthquake Management



PREDICTING

Methods include:

- Satellite surveying (tracks changes in the earth's surface)
- Laser reflector (surveys movement across fault lines)
- Radon gas sensor (radon gas is released when plates move so this finds that)
- 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
- Improving earthquake prediction

HIC - CS: Chile 2010



Causes

Formed on a destructive plate boundary involving the Nazca and South American plate. **The magnitude was 8.8** on the Richter scale. **The earthquake struck just off the coast of Chile** causing a tsunami warning to be issued.

Effects

Around **500 people** killed. **12 000 injured** and **800 000 people** affected. **220 000 homes** and **4500 schools** destroyed. Cost of **US\$30 billion**. **1500 km** of roads destroyed. **Several coastal towns devastated by tsunami waves**.

Management

Emergency services quick to act. **Temporary repairs happened within 24 hours**. Power restored to **90% of homes** in 10 days. **Helping reconstruction plan to help 200 000 homes** affected. Strong copper economy rebuilt without foreign aid.

- 1 Radioactive decay of some of the elements in the core and mantle generate a lot of heat.
- 2 When lower parts of the mantle molten rock (Magma) heat up they become **less dense** and **slowly rise**.
- 3 As they move towards the top they cool down, become **more dense** and **slowly sink**.
- 4 These **circular movements** of semi-molten rock are **convection currents**
- 5 Convection currents create **drag** on the base of the tectonic plates and this causes them to move.

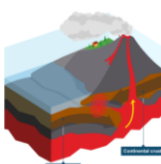
Unit 1a



The Challenges of Natural Hazards

Types of Plate Margins

Destructive Plate Margin



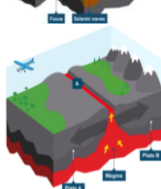
When the denser plate subducts beneath the other, friction causes it to **melt and become molten magma**. The magma forces its way up to the surface to form a volcano. This margin is also responsible for **devastating earthquakes**.

Constructive Plate Margin



Here two plates are **moving apart** causing new magma to reach the surface through the gap. Volcanoes formed along this crack cause a submarine mountain range such as those in the **Mid Atlantic Ridge**.

Conservative Plate Margin



A conservative plate boundary occurs where plates **slide past each other** in opposite directions, or in the same direction but at different speeds. This is responsible for earthquakes such as the ones happening along the San Andreas Fault, USA.

What is a Natural Hazard

A natural hazard is a natural process which could cause death, injury or disruption to humans, property and possessions.

Geological Hazard

These are hazards caused by land and tectonic processes.

Meteorological Hazard

These are hazards caused by weather and climate.

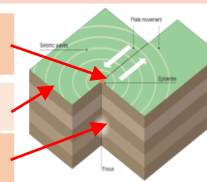
Causes of Earthquakes

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 point directly above the focus, where the seismic waves reach first, is called the **EPICENTRE**.

SEISMIC WAVES (energy waves) travel out from the focus.

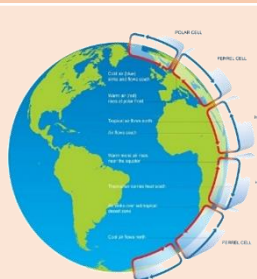
The point at which pressure is released is called the **FOCUS**.



Global pattern of air circulation

Atmospheric circulation is the large-scale movement of air by which heat is distributed on the surface of the Earth.

Hadley cell	Largest cell which extends from the Equator to between 30° to 40° north & south .
Ferrel cell	Middle cell where air flows poleward between 60° & 70° latitude.
Polar cell	Smallest & weakness cell that occurs from the poles to the Ferrel cell.



Distribution of Tropical Storms.

High and Low Pressure

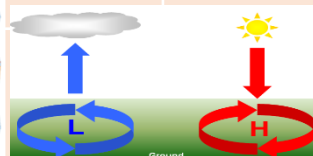
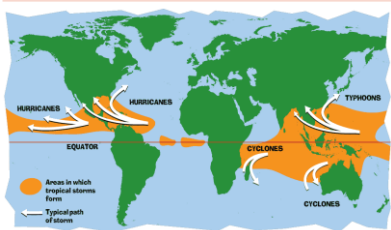
They are known by many names, including **hurricanes** (North America), **cyclones** (India) and **typhoons** (Japan and East Asia). They all occur in a band that lies roughly **5-15°** either side of the Equator.

Low Pressure

Caused by **hot air rising**. Causes **stormy, cloudy weather**.

High Pressure

Caused by **cold air sinking**. Causes **clear and calm weather**.



Formation of Tropical Storms

1	The sun's rays heats large areas of ocean in the summer and autumn. This causes warm, moist air to rise over the particular spots
2	Once the temperature is 27° , the rising warm moist air leads to a low pressure . This eventually turns into a thunderstorm. This causes air to be sucked in from the trade winds .
3	With trade winds blowing in the opposite direction and the rotation of earth involved (Coriolis effect), the thunderstorm will eventually start to spin .
4	When the storm begins to spin faster than 74mph , a tropical storm (such as a hurricane) is officially born.
5	With the tropical storm growing in power, more cool air sinks in the centre of the storm, creating calm, clear condition called the eye of the storm .
6	When the tropical storm hits land, it loses its energy source (the warm ocean) and it begins to lose strength. Eventually it will 'blow itself out'.

Changing pattern of Tropical Storms

Scientists believe that **global warming is having an impact on the frequency and strength of tropical storms**. This may be due to an **increase in ocean temperatures**.

Management of Tropical Storms



Protection
Preparing for a tropical storm may involve construction projects that will improve protection.

Aid
Aid involves assisting after the storm, commonly in LIDS.

Development
The scale of the impacts depends on the whether the country has the resources cope with the storm.

Planning
Involves getting people and the emergency services ready to deal with the impacts.

Prediction
Constant monitoring can help to give advanced warning of a tropical storm

Education
Teaching people about what to do in a tropical storm.

Primary Effects of Tropical Storms

- The intense winds of tropical storms can destroy whole **communities, buildings and communication networks**.
- As well as their own destructive energy, the winds can generate abnormally high waves called **storm surges**.
- Sometimes the most destructive elements of a storm are these subsequent **high seas and flooding** they cause to coastal areas.



Secondary Effects of Tropical Storms

- People are **left homeless**, which can cause distress, poverty and ill health due to lack of shelter.
- Shortage of clean water and lack of proper sanitation** makes it easier for diseases to spread.
- Businesses are damaged** or destroyed causing employment.
- Shortage of food as **crops are damaged**.

Case Study: Typhoon Haiyan 2013



Causes

Started as a tropical depression on **2nd November 2013** and gained strength. Became a Category 5 "**super typhoon**" and made landfall on the Pacific islands of the Philippines.

Effects

- Almost **6,500 deaths**.
- 130,000 homes destroyed**.
- Water and sewage systems destroyed had caused **diseases**.
- Emotional grief** for dead.

Management

- The UN raised **£190m in aid**.
- USA & UK sent **helicopter carrier ships** deliver aid remote areas.
- Education** on typhoon preparedness.

Case Study: Somerset Levels 2014



Causes

Wettest January on record (since 1910) caused by a succession of depressions over the Atlantic Ocean. 350mm rain fell in Jan and Feb 100mm more than average. High tides and storm surges in the Bristol Channel. Rivers had not been dredged in 20 years.

Effect

- Over 600 house flooded.
- Many people cut off from supplies.
- Cost of the flood **£10 million**
- 1000 livestock evacuated.
- Floodwater heavily contaminated with pollutants.
- Local roads and railway blocked.

Management

- Villages cut off were accessed by boats.
- £20 million flood action** planned by Somerset County Council – To include: 8Km of river Tone and Parret dredged; Road levels raised; River banks raised; by 2024 consideration will be given to a tidal barrage at Bridgewater.

What is Climate Change?



Climate change is a large-scale, long-term shift in the planet's weather patterns or average temperatures. Earth has had tropical climates and ice ages many times in its 4.5 billion years.

Recent Evidence for climate change.

Global temperature

Average global temperatures have increased by more than **0.6°C since 1950**.

Ice sheets & glaciers

Many of the world's glaciers and ice sheets are melting. E.g. the Arctic sea ice has declined by **10% in 30 years**.

Sea Level Change

Average global **sea level has risen by 10-20cms** in the past 100 years. This is due to the additional water from ice and thermal expansion.

Enhanced Greenhouse Effect



Recently there has been an increase in **humans burning fossil fuels** for energy. These fuels (gas, coal and oil) emit **greenhouse gases**. This is making the Earth's atmosphere thicker, therefore trapping more solar radiation and causing **less to be reflected**. As a result, the Earth is becoming warmer.

Evidence of natural change

Orbital Changes

Some argue that climate change is linked to how the Earth orbits the Sun, and the way it wobbles and tilts as it does it.

Sun Spots

Dark spots on the Sun are called Sun spots. They increase the **amount of energy Earth receives** from the Sun.

Volcanic Eruptions

Volcanoes release large amounts of **dust containing gases**. These can **block sunlight** and results in cooler temperatures.

Managing Climate Change

Carbon Capture

This involves new technology designed to reduce climate change.

Planting Trees

Planting trees increase the amount of carbon is absorbed from atmosphere.

International Agreements

Countries aim to cut emissions by signing international deals and by setting targets.

Renewable Energy

Replacing fossil fuels based energy with clean/natural sources of energy.



What is an Ecosystem?

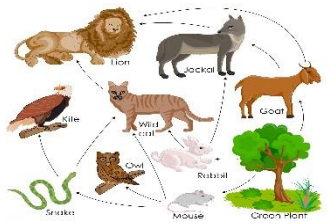
An ecosystem is a system in which organisms interact with each other and with their environment.

Ecosystem's Components

Abiotic These are **non-living**, such as air, water, heat and rock.

Biotic These are **living**, such as plants, insects, and animals.

Flora	Plant life occurring in a particular region or time.
Fauna	Animal life of any particular region or time.

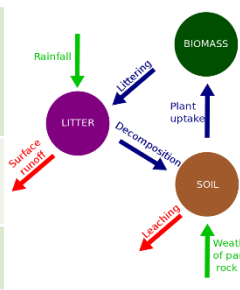


Food Web and Chains

Simple **food chains** are useful in explaining the basic principles behind ecosystems. They show only one species at a particular trophic level. **Food webs** however consists of a network of many food chains interconnected together.

Nutrient cycle

Plants take in **nutrients** to build into new organic matter. Nutrients are taken up when animals eat plants and then returned to the soil when animals die and the body is broken down by **decomposers**.

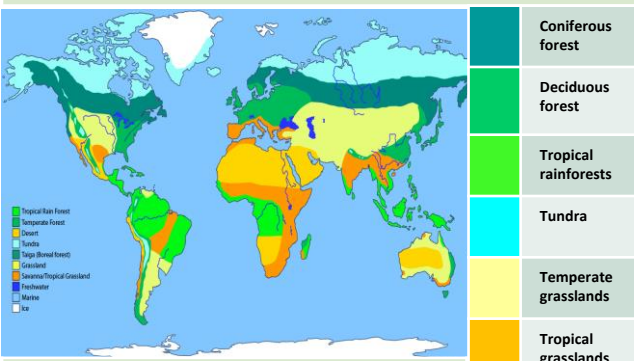


Litter This is the **surface layer** of vegetation, which over time breaks down to become **humus**.

Biomass The total **mass of living organisms** per unit area.

Biomes

A biome is a **large geographical area of distinctive plant and animal groups**, which are adapted to that particular environment. The climate and geography of a region determines what type of biome can exist in that region.



The **most productive biomes** – which have the greatest biomass- grow in climates that are **hot and wet**.

Biome's climate and plants

Biome	Location	Temperature	Rainfall	Flora	Fauna
Tropical rainforest	Centred along the Equator.	Hot all year (25-30°C)	Very high (over 2000mm/year)	Tall trees forming a canopy; wide variety of species.	Greatest range of different animal species. Most live in canopy layer
Tropical grasslands	Between latitudes 5°- 30° north & south of Equator.	Warm all year (20-30°C)	Wet + dry season (500-1500mm/year)	Grasslands with widely spaced trees.	Large hoofed herbivores and carnivores dominate.
Hot desert	Found along the tropics of Cancer and Capricorn.	Hot by day (over 30°C) Cold by night	Very low (below 300mm/year)	Lack of plants and few species; adapted to drought.	Many animals are small and nocturnal: except for the camel.
Temperate forest	Between latitudes 40°- 60° north of Equator.	Warm summers + mild winters (5-20°C)	Variable rainfall (500-1500m /year)	Mainly deciduous trees; a variety of species.	Animals adapt to colder and warmer climates. Some migrate.
Tundra	Far Latitudes of 65° north and south of Equator	Cold winter + cool summers (below 10°C)	Low rainfall (below 500mm/ year)	Small plants grow close to the ground and only in summer.	Low number of species. Most animals found along coast.
Coral Reefs	Found within 30° north – south of Equator in tropical waters.	Warm water all year round with temperatures of 18°C	Wet + dry seasons. Rainfall varies greatly due to location.	Small range of plant life which includes algae and sea grasses that shelters reef animals.	Dominated by polyps and a diverse range of fish species.

Unit 1b The Living World



Tropical Rainforest Biome

Tropical rainforest cover about **2 per cent** of the Earth's surface yet they are home to **over half of the world's plant and animals**.

Interdependence in the rainforest

A rainforest works through **interdependence**. This is where the plants and animals **depend on each other** for survival. If one component changes, there can be **serious knock-up effects** for the entire ecosystem.



Distribution of Tropical Rainforests

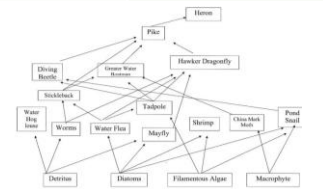
Tropical rainforests are **centred along the Equator** between the Tropic of Cancer and Capricorn. Rainforests can be found in South America, central Africa and South-East Asia. **The Amazon** is the world's largest rainforest and takes up the majority of northern South America, encompassing countries such as Brazil and Peru.

CASE STUDY: UK Small Scale Ecosystem: Freshwater Pond Ecosystem



There are a range of habitats within a freshwater pond due to variations in light, water and oxygen.

Components & Interrelationships		Impact of Change
Banks	Grasses, bushes and trees. Habitats for birds and flying insects.	<ul style="list-style-type: none"> Use of fertilisers leads to eutrophication (overgrowth of algae and loss of oxygen) Drainage or drought leads to loss of species diversity Introduction of Perch. Perch eat frogs, less food up the food chain
Pond Edge	Plenty of oxygen and light, reeds grow, shelter for a wide range of plants / insects.	
Surface	Lots of oxygen and light. Ducks, water boatmen. Species breath through gills, lungs or skin	
Centre / Bottom	Species breath through gills or skin. Fish main predator / Less light, decomposers and scavengers.	

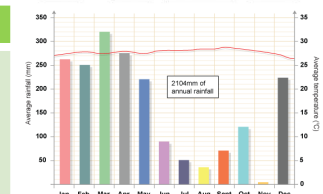


Rainforest nutrient cycle

The **hot, damp conditions** on the forest floor allow for the **rapid decomposition** of dead plant material. This provides plentiful nutrients that are easily absorbed by plant roots. However, as these nutrients are in high demand from the many fast-growing plants, they do not remain in the soil for long and stay close to the surface. If vegetation is removed, the soils quickly become **infertile**.

Climate of Tropical Rainforests

- Evening temperatures rarely fall below **22°C**.
- Due to the **presence of clouds**, temperatures rarely rise above **32°C**.
- Most afternoons have heavy showers.
- At night with no clouds insulating, temperature drops.





Tropical Rainforests: Case Study Malaysia









Malaysia is a LIC country in south-east Asia. 67% of Malaysia is a tropical rainforest with 18% of it not being interfered with. However, Malaysia has the fastest rate of deforestation compared to anywhere in the world

Adaptations to the rainforest		Rainforest inhabitants
Orangutans	Large arms to swing & support in the tree canopy.	Many tribes have developed sustainable ways of survival. The rainforest provides inhabitants with... <ul style="list-style-type: none"> • Food through hunting and gathering. • Natural medicines from forest plants. • Homes and boats from forest wood.
Drip Tips	Allows heavy rain to run off leaves easily .	
Lianas & Vines	Climbs trees to reach sunlight at canopy.	


Issues related to biodiversity

Why are there high rates of biodiversity?	What are the causes of deforestation?
<ul style="list-style-type: none"> • Warm and wet climate encourages a wide range of vegetation to grow. • There is rapid recycling of nutrients to speed plant growth. • Most of the rainforest is untouched. 	<p>Logging </p> <ul style="list-style-type: none"> • Most widely reported cause of destructions to biodiversity. • Timber is harvested to create commercial items such as furniture and paper. • Violent confrontation between indigenous tribes and logging companies. <p>Agriculture </p> <ul style="list-style-type: none"> • Large scale 'slash and burn' of land for ranches and palm oil. • Increases carbon emission. • River saltation and soil erosion increasing due to the large areas of exposed land. • Increase in palm oil is making the soil infertile.

Main issues with biodiversity decline	Mineral Extraction	Tourism
<ul style="list-style-type: none"> • Keystone species (a species that are important of other species) are extremely important in the rainforest ecosystem. Humans are threatening these vital components. • Decline in species could cause tribes being unable to survive. • Plants & animals may become extinct. • Key medical plants may become extinct. 	<p></p> <ul style="list-style-type: none"> • Precious metals are found in the rainforest. • Areas mined can experience soil and water contamination. • Indigenous people are becoming displaced from their land due to roads being built to transport products. 	<p></p> <ul style="list-style-type: none"> • Mass tourism is resulting in the building of hotels in extremely vulnerable areas. • Lead to negative relationship between the government and indigenous tribes • Tourism has exposed animals to human diseases.

Impacts of deforestation	Energy Development	Road Building
<p>Economic development </p> <ul style="list-style-type: none"> + Mining, farming and logging creates employment and tax income for government. + Products such as palm oil provide valuable income for countries. - The loss of biodiversity will reduce tourism. <p>Soil erosion </p> <ul style="list-style-type: none"> - Once the land is exposed by deforestation, the soil is more vulnerable to rain. - With no roots to bind soil together, soil can easily wash away. 	<p></p> <ul style="list-style-type: none"> • The high rainfall creates ideal conditions for hydro-electric power (HEP). • The Bakun Dam in Malaysia is key for creating energy in this developing country, however, both people and environment have suffered. 	<p></p> <ul style="list-style-type: none"> • Roads are needed to bring supplies and provide access to new mining areas, settlements and energy projects. • In Malaysia, logging companies use an extensive network of roads for heavy machinery and to transport wood.


Sustainability for the Rainforest



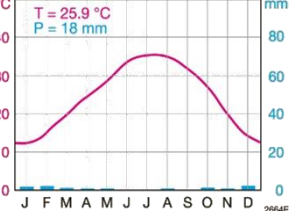
Climate Change
<p></p> <ul style="list-style-type: none"> -When rainforests are cut down, the climate becomes drier. -Trees are carbon 'sinks'. With greater deforestation comes more greenhouse emissions in the atmosphere. -When trees are burnt, they release more carbon in the atmosphere. This will enhance the greenhouse effect.
<p>Uncontrolled and unchecked exploitation can cause irreversible damage such as loss of biodiversity, soil erosion and climate change.</p> <p>Possible strategies include:</p> <ul style="list-style-type: none"> • Agro-forestry - Growing trees and crops at the same time. It prevents soil erosion and the crops benefit from the nutrients. • Selective logging - Trees are only felled when they reach a particular height. • Education - Ensuring those people understand the consequences of deforestation • Afforestation - If trees are cut down, they are replaced. • Forest reserves - Areas protected from exploitation. • Ecotourism - tourism that promotes the environments & conservation

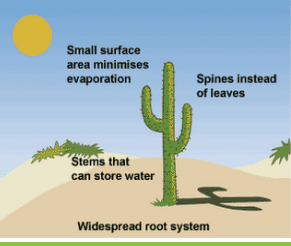

Hot Desert: Case Study Thar Desert – India/Pakistan



The Thar Desert is located on the border between India and Pakistan in Southern Asia. With India soon becoming the most populated country in the world in the next five years. With this, more people will plan to live in the desert.

Distribution of the world's hot deserts	Major characteristics of hot deserts
<p>Most of the world's hot deserts are found in the subtropics between 20 degrees and 30 degrees north & south of the Equator. The Tropics of Cancer and Capricorn run through most of the world's major deserts.</p> 	<ul style="list-style-type: none"> • Aridity – hot deserts are extremely dry, with annual rainfall below 250 mm. • Heat – hot deserts rise over 40 degrees. • Landscapes – Some places have dunes, but most are rocky with thorny bushes.


Hot Deserts inhabitants	Climate of Hot Deserts
<ul style="list-style-type: none"> - People often live in large open tents to keep cool. - Food is often cooked slowly in the warm sandy soil. - Head scarves are worn by men to provide protection from the Sun. 	<p> </p> <p>T = 25.9 °C P = 18 mm</p>  <ul style="list-style-type: none"> • Very little rainfall with less than 250 mm per year. • It might only rain once every two to three years. • Temperate are hot in the day (45 °C) but are cold at night due to little cloud cover (5 °C). • In winter, deserts can sometimes receive occasional frost and snow.

Adaptations to the desert	Desert Interdependence
<p></p> <p>Small surface area minimises evaporation</p> <p>Spines instead of leaves</p> <p>Stems that can store water</p> <p>Widespread root system</p> <p>Cacti</p> <ul style="list-style-type: none"> • Large roots to absorb water soon after rainfall. • Needles instead of leaves to reduce surface area and therefore transpiration. <p>Camels</p> <ul style="list-style-type: none"> • Hump for storing fat (NOT water). • Wide feet for walking on sand. • Long eyelashes to protect from sand. 	<p>Different parts of the hot desert ecosystem are closely linked together and depend on each other, especially in such a harsh environment.</p>

Opportunities and challenges in the Hot desert

Opportunities	Challenges
<ul style="list-style-type: none"> • There are valuable minerals for industries and construction. • Energy resources such as coal and oil can be found in the Thar desert. • Great opportunities for renewable energy such as solar power at Bhaleri. • Thar desert has attracted tourists, especially during festivals. 	<ul style="list-style-type: none"> • The extreme heat makes it difficult to work outside for very long. • High evaporation rates from irrigation canals and farmland. • Water supplies are limited, creating problems for the increasing number of people moving into area. • Access through the desert is tricky as roads are difficult to build and maintain.

Causes of Desertification

Desertification means the turning of semi-arid areas (or drylands) into deserts.	Climate Change	Overgrazing	Over-Cultivation	Population Growth	Strategies to reduce Desertification
	<p></p> <p>Reduce rainfall and rising temperatures have meant less water for plants.</p>	<p>Too many animals mean plants are eaten faster than they can grow back. Causing soil erosion.</p>	<p>People rely on wood for fuel. This removal of trees causes the soil to be exposed.</p>	<p>A growing population puts pressure on the land leading to more deforestation, overgrazing and over-cultivation.</p>	<ul style="list-style-type: none"> • Water management - growing crops that don't need much water. • Tree Planting - trees can act as windbreakers to protect the soil from wind and soil erosion. Great Green Wall, Africa. • Soil Management – Zai pits, Niger and Bunds, Sahel region to reduce run off related soil erosion • Technology – using less expensive, sustainable materials for people to maintain. i.e. sand fences, terraces to stabilise soil and solar cookers to reduce deforestation.

Relief of the UK

Relief of the UK can be divided into uplands and lowlands. Each have their own characteristics.

Key

- Lowlands
- Uplands

Areas +600m: Peaks and ridges cold, misty and snow common. i.e. Scotland

Areas - 200m: Flat or rolling hills. Warmer weather. i.e. Fens

Types of Erosion

The break down and transport of rocks – smooth, round and sorted.	
Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolves rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

Types of Transportation

A natural process by which eroded material is carried/transported.

Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.

Mass Movement

A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.

1	Rain saturates the permeable rock above the impermeable rock making it heavy.
2	Waves or a river will erode the base of the slope making it unstable.
3	Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
4	The debris at the base of the cliff is then removed and transported by waves or river.

Formation of Coastal Spits - Deposition

Example: Spurn Head, Holderness Coast.

Material moved along beach in zig-zag way. Coastline changes direction. Spit curved with change of wind direction. Material deposited in shallow, calm water, to form a spit. Prevailing winds bring waves in at an angle. Spit.

Types of Weathering

Weathering is the breakdown of rocks where they are.

Carbonation	Breakdown of rock by changing its chemical composition.
Mechanical	Breakdown of rock without changing its chemical composition.

What is Deposition?

When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.



- 1) Swash moves up the beach at the angle of the prevailing wind.
- 2) Backwash moves down the beach at 90° to coastline, due to gravity.
- 3) Zigzag movement (Longshore Drift) transports material along beach.
- 4) Deposition causes beach to extend, until reaching a river estuary.
- 5) Change in prevailing wind direction forms a hook.
- 6) Sheltered area behind spit encourages deposition, salt marsh forms.

Unit 1c Physical Landscapes in the UK

AQA

Formation of Bays and Headlands

Bay Soft rock. **Headland** Hard rock.

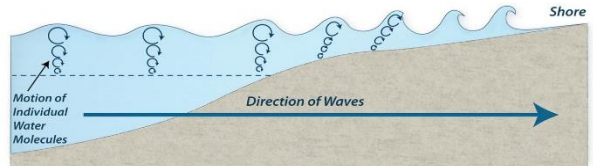
- 1) Waves attack the coastline.
- 2) Softer rock is eroded by the sea quicker forming a bay, calm area causes deposition.
- 3) More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

How do waves form?

Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

Why do waves break?

- 1) Waves start out at sea.
- 2) As waves approaches the shore, friction slows the base.
- 3) This causes the orbit to become elliptical.
- 4) Until the top of the wave breaks over.



Mechanical Weathering Example: Freeze-thaw weathering

Stage One	Water seeps into cracks and fractures in the rock.		Stage Two	When the water freezes, it expands about 9%. This wedges apart the rock.		Stage Three	With repeated freeze-thaw cycles, the rock breaks off.	
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Size of waves

Types of Waves

Constructive Waves	Destructive Waves
This wave has a swash that is stronger than the backwash. This therefore builds up the coast.	This wave has a backwash that is stronger than the swash. This therefore erodes the coast.

Formation of Coastal Stack

Cave. Wave cut platform. Stack. Collapsed arch.

Example: Old Harry Rocks, Dorset

- 1) Hydraulic action widens cracks in the cliff face over time.
- 2) Abrasion forms a wave cut notch between HT and LT.
- 3) Further abrasion widens the wave cut notch to form a cave.
- 4) Caves from both sides of the headland break through to form an arch.
- 5) Weather above/erosion below –arch collapses leaving stack.
- 6) Further weathering and erosion eaves a stump.

Coastal Defences

Hard Engineering Defences		
Groynes	Wood barriers prevent longshore drift, so the beach can build up.	<ul style="list-style-type: none"> ✓ Beach still accessible. ✗ No deposition further down coast = erodes faster.
Sea Walls	Concrete walls break up the energy of the wave. Has a lip to stop waves going over.	<ul style="list-style-type: none"> ✓ Long life span ✓ Protects from flooding ✗ Curved shape encourages erosion of beach deposits.
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	<ul style="list-style-type: none"> ✓ Cheap ✓ Local material can be used to look less strange. ✗ Will need replacing.

Soft Engineering Defences

Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	<ul style="list-style-type: none"> ✓ Cheap ✓ Beach for tourists. ✗ Storms = need replacing. ✗ Offshore dredging damages seabed.
Managed Retreat	Low value areas of the coast are left to flood & erode.	<ul style="list-style-type: none"> ✓ Reduce flood risk ✓ Creates wildlife habitats. ✗ Compensation for land.

Case Study: Hunstanton Coast

Location and Background
 Located on the North-West coast of Norfolk. The town is a popular sea resort for tourists to visit all year round. In 2013, the town suffered damage from a storm surge. The Sea Life Centre was flooded and closed for a number of months.

Geomorphic Processes

- Old Hunstanton is dominated by dunes that are formed when sand is trapped and built up behind objects.
 -Hunstanton Cliffs are made from three different bands of rock (sandstone, red chalk and white chalk).
 -Hunstanton Cliff are exposed to cliff retreat. This is when a wave-cut notch develops enough for the cliff face to become unstable and eventually collapses.
 -Longshore drift travels from Sheringham in the north to the Wash in the south.

Management

-Hunstanton is protected by a number of groynes. These trap sand to build up the beach for better protection.
 -The town is also protected by large sea walls to prevent flooding and deflect the waves energy.
 -\$15 million has been spent on beach nourishment to add sediment to beach for increased protection against flooding.

Water Cycle Key Terms

Precipitation	Moisture falling from clouds as rain, snow or hail.
Interception	Vegetation prevent water reaching the ground.
Surface Runoff	Water flowing over surface of the land into rivers
Infiltration	Water absorbed into the soil from the ground.
Transpiration	Water lost through leaves of plants.

Physical and Human Causes of Flooding.

Physical: Prolong & heavy rainfall Long periods of rain causes soil to become saturated leading runoff.	Physical: Geology Impermeable rocks causes surface runoff to increase river discharge.
Physical: Relief Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.	Human: Land Use Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.

Upper Course of a River

Near the source, the river flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

Formation of a Waterfall

- 1) River flows over alternative types of rocks.
- 2) River erodes soft rock faster creating a step.
- 3) Further hydraulic action and abrasion form a plunge pool beneath.
- 4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.
- 5) Waterfall retreats leaving steep sided gorge.

Middle Course of a River

Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

Formation of Ox-bow Lakes

Step 1	Step 2
Erosion of outer bank forms river cliff. Deposition inner bank forms slip off slope.	Further hydraulic action and abrasion of outer banks, neck gets smaller.
Step 3	Step 4
Erosion breaks through neck, so river takes the fastest route, redirecting flow	Evaporation and deposition cuts off main channel leaving an oxbow lake.

Lower Course of a River

Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.

Formation of Floodplains and levees

When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials build up to form natural levees.

- ✓ Nutrient rich soil makes it ideal for farming.
- ✓ Flat land for building houses.

River Management Schemes

Soft Engineering	Hard Engineering
<p>Afforestation – plant trees to soak up rainwater, reduces flood risk.</p> <p>Demountable Flood Barriers put in place when warning raised.</p> <p>Managed Flooding – naturally let areas flood, protect settlements.</p>	<p>Straightening Channel – increases velocity to remove flood water.</p> <p>Artificial Levees – heightens river so flood water is contained.</p> <p>Deepening or widening river to increase capacity for a flood.</p>

Hydrographs and River Discharge

River discharge is the volume of water that flows in a river. Hydrographs who discharge at a certain point in a river changes over time in relation to rainfall

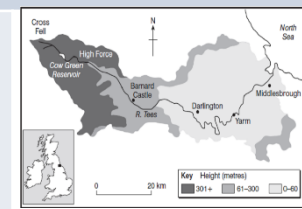
1. **Peak discharge** is the discharge in a period of time.
2. **Lag time** is the delay between peak rainfall and peak discharge.
3. **Rising limb** is the increase in river discharge.
4. **Falling limb** is the decrease in river discharge to normal level.

Case Study: The River Exe

Location and Background
 Located in the South West of England and flows 56km south from Exmoor through Tiverton and Exeter to it's mouth at Exmouth.

Geomorphic Processes

Upper – Features include V-Shaped valley at Prayers Mead near Simonsbath. Confluence with River Barle at Dulverton.
Middle – Meander at Upexe
Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary between Topsham and Exmouth.



Management

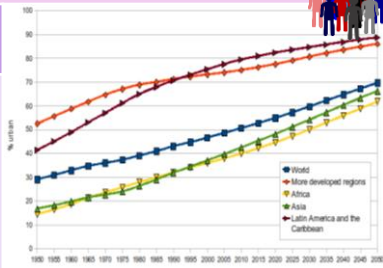
-Flood relief channel at Cowley to divert water from main channel
 -Steel Flood gate at St Davids to protect station
 -Raised embankments, river straightening and widening at Exe Bridges to increase capacity and speed
 -Trevor Weir flood relief channel to divert water on to wachlands away from high value Marsh

What is Urbanisation?

This is an increase in the amount of people living in urban areas such as towns or cities. In 2007, the UN announced that for the first time, more than 50 % of the world's population live in urban areas.

Where is Urbanisation happening?

Urbanisation is happening all over the world but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.



Causes of Urbanisation

Rural - urban migration (1)

The movement of people from rural to urban areas.

Push

- Natural disasters
- War and Conflict
- Mechanisation
 - Drought
- Lack of employment

Pull

- More Jobs
- Better education & healthcare
- Increased quality of life.
- Following family members.

Natural Increase (2)

When the birth rate exceeds the death rate.

Increase in birth rate (BR)

- High percentage of population are child-bearing age which leads to high fertility rate.
- Lack of contraception or education about family planning.

Lower death rate (DR)

- Higher life expectancy due to better living conditions and diet.
- Improved medical facilities helps lower infant mortality rate.

Types of Cities

Megacity

An urban area with over 10 million people living there.

More than two thirds of current megacities are located in either NEEs (Brazil) and LICs (Nigeria). The amount of megacities are predicted to increase from 28 to 41 by 2030.

Sustainable Urban Living

Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations also can use them.

Water Conservation

This is about reducing the amount of water used.

- Collecting rainwater for gardens and flushing toilets.
- Installing water meters and toilets that flush less water.
- Educating people on using less water.

Energy Conservation

Using less fossil fuels can reduce the rate of climate change.

- Promoting renewable energy sources.
- Making homes more energy efficient.
- Encouraging people to use energy.

Creating Green Space

Creating green spaces in urban areas can improve places for people who want to live there.

- Provide natural cooler areas for people to relax in.
- Encourages people to exercise.
- Reduces the risk of flooding from surface runoff.

Waste Recycling

More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill.

- Collection of household waste.
- More local recycling facilities.
- Greater awareness of the benefits in recycling.

Unit 2a



Urban Issues & Challenges

Sustainable Urban Living Example: Freiburg

Background & Location

Freiburg is in west Germany. The city has a population of about 220,000. In 1970 it set the goal of focusing on social, economic and environmental sustainability.



Sustainable Strategies

- The city's waste water allows for rainwater to be retained.
- The use of sustainable energy such as solar and wind is becoming more important.
- 40% of the city is forested with many open spaces for recreation, clean air and reducing flood risk.

Integrated Transport System

This is the linking of different forms of public and private transport within a city and the surrounding area.

Brownfield Site

Brownfield sites is an area of land or premises that has been previously used, but has subsequently become vacant, derelict or contaminated.

Traffic Management

Urban areas are busy places with many people travelling by different modes of transport. This has caused urban areas to experience different traffic congestion that can lead to various problems.

Environmental problems

- Traffic increases air pollution which releases greenhouse gases that is leading to climate change.



Economic problems

- Congestion can make people late for work and business deliveries take longer. This can cause companies to loose money.

Social Problems

- There is a greater risk of accidents and congestion is a cause of frustration. Traffic can also lead to health issues for pedestrians.

Congestion Solutions

- Widen roads to allow more traffic to flow easily.
- Build ring roads and bypasses to keep through traffic out of city centres.
- Introduce park and ride schemes to reduce car use.
- Encourage car-sharing schemes in work places.
- Have public transport, cycle lanes & cycle hire schemes.
- Having congestion charges discourages drivers from entering the busy city centres.



Traffic Management Example: Bristol

In 2012 Bristol was the most congested city in the UK. Now the city aims to develop it's integrated transport system to encourage more people to use the public transport. The city has also invested in cycle routes and hiring schemes.



Greenbelt Area

This is a zone of land surrounding a city where new building is strictly controlled to try to prevent cities growing too much and too fast.

Urban Regeneration

The investment in the revival of old, urban areas by either improving what is there or clearing it away and rebuilding.

Urban Change in a Major UK City: Bristol Case Study




Urban Change in a Major NEE City: RIO DE JANEIRO Case Study




Location and Background
<p>Bristol is the largest city in the south west of England. It has a population of 440 500. Bristol developed in the 18th century as a part of triangular trade links.</p> 


City's Importance
<ul style="list-style-type: none"> The city has two universities. The city has the largest concentration of silicon chip manufacture outside California Bristol is the UK's eighth most popular city with foreign visitors with attractions including Brunel's ship SS Great Britain and Bristol Zoo. Bristol has an airport which links it to major European Cities and the USA.

Location and Background
<p>Rio is a coastal city situated in the South East region of Brazil within the continent of South America. It is the second most populated city in the country (6.5 million) after Sao Paulo.</p> 

City's Importance
<ul style="list-style-type: none"> Has the second largest GDP in Brazil It is headquarters to many of Brazil's main companies, particularly with Oil and Gas. Sugar Loaf mountain is one of the seven wonders of the world. One of the most visited places in the Southern Hemisphere. Hosted the 2014 World Cup and 2016 Summer Olympics.

Migration to Bristol
<p>Between 1851 and 1891 Bristol's population doubled when people arrived looking for work. Large numbers come from EU countries e.g. Poland.</p>  <p>Positive impacts include providing a hard working and motivated workforce, improve the level of skills where there are shortages whilst contributing to the location and national economy. Negative impacts include the challenge of integration, needing to provide additional services including schools for children with English as a second language.</p>

City's Opportunities
<p>Social: Bristol has various cultural attractions such as Bristol Rovers stadium and the harbourside. Also Cabot Circus is very popular with shoppers.</p> <p>Economic: There are high-tech industries including Aardman Animations (Wallace and Gromit), the defence Procurement agency and the aerospace industry.</p> <p>Environmental: Bristol won 2015 European Green Capital, with lots of urban greening taking place. 27% of the city is a wildlife network. 30% covered with trees.</p>

Migration to Rio De Janeiro
<p>The city began when Portuguese settlers with slaves arrived in 1502. Since then, Rio has become home to various ethnic groups.</p>  <p>However, more recently, millions of people have migrated from rural areas that have suffered from drought, lack of services and unemployment to Rio. People do this to search for a better quality of life.</p> <p>This expanding population has resulted in the rapid urbanisation of Rio de Janeiro.</p>

City's Opportunities
<p>Social: Standards of living are gradually improving. The Rio Carnival is an important cultural event for traditional dancing and music.</p> <p>Economic: Rio has one of the highest incomes per person in the country. The city has various types of employment including oil, retail and manufacturing.</p> <p>Environmental: The hosting of the major sporting events encouraged more investment in sewage works and public transport systems.</p>

City Challenges
<p>Social: In Filwood there are high levels of social deprivation, with over 1300 crimes a year. Whereas Stoke Bishop is very affluent with less than 300 crimes a year.</p> <p>Economic: Closure of the steelworks and factories caused large scale unemployment. Poor transport connections to large economic hubs such as London and Manchester.</p> <p>Environmental: Industrial decline has led to lots of derelict buildings. For example Stokes Croft. There is also a lot of waste and pollution.</p>

EXETER – PRINCESSHAY REGENERATION
<p>Aims: Exeter wanted to attract more businesses and investment into the city centre after Cribbs Causeway, Bristol and Drake Circus, Plymouth had left it run down.</p> <p>Main features: Brownfield sites and empty shops were pulled down and redeveloped in to larger floor spaces shops, this attracted many high street chains. The third floor up were developed into flats. Restaurants were also encouraged into the area so there were attractions at day and night.</p>

City Challenges
<p>Social: There is a severe shortage of housing, schools and healthcare centres available. Large scale social inequality, is creating tensions between the rich and poor.</p> <p>Economic: The rise of informal jobs with low pay and no tax contributions. There is high employment in shanty towns called Favelas</p> <p>Environmental: Shanty towns called Favelas are established around the city, typically on unfavourable land, such as hills.</p>

Self-help schemes - Rocinha, Bairro Project
<ul style="list-style-type: none"> The authorities have provided basic materials to improve peoples homes with safe electricity and sewage pipes. Government has demolished houses and created new estates. Community policing has been established, along with a tougher stance on gangs with military backed police. Greater investment in new road and rail network to reduce pollution and increase connections between rich and poor areas.



What is development?

Development is an improvement in living standards through better use of resources.

Economic	This is progress in economic growth through levels of industrialisation and use of technology.
Social	This is an improvement in people's standard of living. For example, clean water and electricity.
Environmental	This involves advances in the management and protection of the environment.

Measuring development

These are used to compare and understand a country's level of development.



Economic indicators examples

Employment type	The proportion of the population working in primary, secondary, tertiary and quaternary industries.
Gross Domestic Product per capita	This is the total value of goods and services produced in a country per person, per year.
Gross National Income per capita	An average of gross national income per person, per year in US dollars.

Social indicators examples



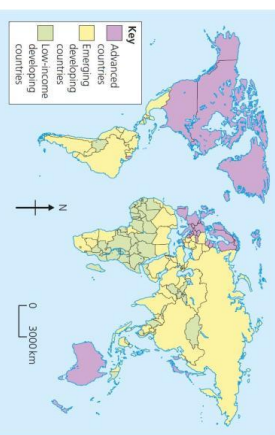
Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
Literacy rate	The percentage of population over the age of 15 who can read and write.
Life expectancy	The average lifespan of someone born in that country.

Mixed indicators

Human Development Index (HDI)	A number that uses life expectancy, education level and income per person.
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Variations in the level of development

LICs	Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.
NEEs	These countries are getting richer as their economy is progressing from the primary industry to the secondary industry. Greater exports leads to better wages.
HICs	These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.



Causes of uneven development

Development is globally uneven with most HICs located in Europe, North America and Oceania. Most NEEs are in Asia and South America, whilst most LICs are in Africa. Remember, development can also vary within countries too.

Unit 2b



The Changing Economic World

Physical factors affecting uneven development

Natural Resources <ul style="list-style-type: none"> Fuel sources such as oil. Minerals and metals for fuel. Availability for timber. Access to safe water. 	Natural Hazards <ul style="list-style-type: none"> Risk of tectonic hazards. Benefits from volcanic material and floodwater. Frequent hazards undermines redevelopment.
Climate <ul style="list-style-type: none"> Reliability of rainfall to benefit farming. Extreme climates limit industry and affects health. Climate can attract tourists. 	Location/Terrain <ul style="list-style-type: none"> Landlocked countries may find trade difficulties. Mountainous terrain makes farming difficult. Scenery attracts tourists.

Human factors affecting uneven development

Aid <ul style="list-style-type: none"> Aid can help some countries develop key projects for infrastructure faster. Aid can improve services such as schools, hospitals and roads. Too much reliance on aid might stop other trade links becoming established. 	Trade <ul style="list-style-type: none"> Countries that export more than they import have a trade surplus. This can improve the national economy. Having good trade relationships. Trading goods and services is more profitable than raw materials.
Education <ul style="list-style-type: none"> Education creates a skilled workforce meaning more goods and services are produced. Educated people earn more money, meaning they also pay more taxes. This money can help develop the country in the future. 	Health <ul style="list-style-type: none"> Lack of clean water and poor healthcare means a large number of people suffer from diseases. People who are ill cannot work so there is little contribution to the economy. More money on healthcare means less spent on development.
Politics <ul style="list-style-type: none"> Corruption in local and national governments. The stability of the government can effect the country's ability to trade. Ability of the country to invest into services and infrastructure. 	History <ul style="list-style-type: none"> Colonialism has helped Europe develop, but slowed down development in many other countries. Countries that went through industrialisation a while ago, have now develop further.

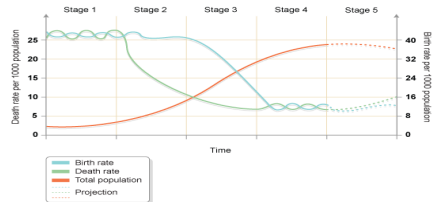
Consequences of Uneven Development

Levels of development are different in different countries. This uneven development has consequences for countries, especially in wealth, health and migration.

Wealth	People in more developed countries have higher incomes than less developed countries.
Health	Better healthcare means that people in more developed countries live longer than those in less developed countries.
Migration	If nearby countries have higher levels of development or are secure, people will move to seek better opportunities and standard of living.

The Demographic Transition Model

The demographic transition model (DTM) shows population change over time. It studies how birth rate and death rate affect the total population of a country.



STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
High DR High BR Steady	BR Low Declining DR Very High	Rapidly falling DR Low BR High	Low DR Low BR Zero	Slowly Falling DR Low BR Negative
e.g. Tribes	e.g. Kenya	e.g. India	e.g. UK	e.g. Japan

Reducing the Global Development Gap

Microfinance Loans



People in LICs receiving small loans from traditional banks.
Grameen Bank
+ Loans enable people to begin their own businesses
- Its not clear they can reduce poverty at a large scale.



Foreign-direct investment



This is when one country buys property or infrastructure in another country.
+ Leads to better access to finance, technology & expertise.
- Investment can come with strings attached that country's will need to comply with.



Aid

This is given by one country to another as money or resources.
+ Improve literacy rates, building dams, improving agriculture.
- Can be wasted by corrupt governments or they can become too reliant on aid.



Fair trade

This is a movement where farmers get a fair price for the goods produced.
+ Paid fairly so they can develop schools & health centres.
- Only a tiny proportion of the extra money reaches producers.

Intermediate Technology



Simple tools, machines & affordable equipment that improve QoL. Maya Pedal
+ Renewable energy is less expensive and polluting.
- Requires initial investment and skills in operating technology

CS: Reducing the Development Gap In Jamaica



Location and Background

Jamaica is a LIC island nation part of the Caribbean. Location makes Jamaica an attractive place for visitors to explore the tropical blue seas, skies and palm filled sandy beaches



Tourist economy



-In 2015, 2.12 million visited.
-Tourism contributes 27% of GDP and will increase to 38% by 2025.
-130,000 jobs rely on tourism.
-Global recession 2008 caused a decline in tourism. Now tourism is beginning to recover.

Multiplier effect

-Jobs from tourism have meant more money has been spent in shops and other businesses.
-Government has invested in infrastructure to support tourism.
-New sewage treatment plants have reduced pollution.

Development Problems

- Tourists do not always spend much money outside their resorts.
- Infrastructure improvements have not spread to the whole island.
- Many people in Jamaica still live in poor quality housing and lack basic services such as healthcare.

Case Study: Economic Development in Nigeria



Location & Importance

Nigeria is a NEE in West Africa. Nigeria is just north of the Equator and experiences a range of environments.
Nigeria is the most populous and economically powerful country in Africa. Economic growth has been base on oil exports.



Influences upon Nigeria's development

Political

Suffered instability with a civil war between 1967-1970. From 1999, the country became stable with free and fair elections. Stability has encouraged global investment from China and USA.

Social

Nigeria is a multi-cultural, multi-faith society. Although mostly a strength, diversity has caused regional conflicts from groups such as the Boko Haram terrorists.

Cultural

Nigeria's diversity has created rich and varied artistic culture. The country has a rich music, literacy and film industry (i.e. Nollywood). A successful national football side.

Industrial Structures



Once mainly based on agriculture, 50% of its economy is now manufacturing and services. A thriving manufacturing industry is increasing foreign investment and employment opportunities.

The role of TNCs

TNCs such as Shell have played an important role in its economy.
+ Investment has increased employment and income.
- Profits move to HICs.
- Many oil spills have damaged fragile environments.



Changing Relationships

Nigeria plays a leading role with the African Union and UN. Growing links with China with huge investment in infrastructure. Main import includes petrol from the EU, cars from Brazil and phones from China.

Environmental Impacts

The 2008/09 oil spills devastated swamps and its ecosystems. Industry has caused toxic chemicals to be discharged in open sewers - risking human health. 80% of forest have been cut down. This also increases CO² emissions.

Aid & Debt relief

+ Receives \$5billion per year in aid. + Aid groups (ActionAid) have improved health centres, provided anti-mosquito nets and helped to protect people against AIDS/HIV. - Some aid fails to reach the people who need it due to corruption.

Effects of Economic Development

Life expectancy has increased from 46 to 53 years. 64% have access to safe water. Typical schooling years has increased from 7 to 9.

Case Study: Economic Change in the UK



UK in the Wider World

The UK has one of the largest economies in the world. The UK has huge political, economic and cultural influences. The UK is highly regarded for its fairness and tolerance. The UK has global transport links i.e. Heathrow and the Eurostar.



Causes of Economic Change

De-industrialisation and the decline of the UK's industrial base. Globalisation has meant many industries have moved overseas, where labour costs are lower. Government investing in supporting vital businesses.

Towards Post-Industrial

The quaternary industry has increased, whilst secondary has decreased. Numbers in primary and tertiary industry has stayed the steady. Big increase in professional and technical jobs.

Developments of Science Parks

Science Parks are groups of scientific and technical knowledge based businesses on a single site.
• Access to transport routes.
• Highly educated workers.
• Staff benefit from attractive working conditions.
• Attracts clusters of related high-tech businesses.

CS: UK Car Industry



Every year the UK makes 1.5 million cars. These factories are owned by large TNCs. i.e. Nissan.
• 7% of energy used there factories is from wind energy.
• New cars are more energy efficient and lighter.
• Nissan produces electric and hybrid cars.

Change to a Rural Landscape

Social

Rising house prices have caused tensions in villages. Villages are unpopulated during the day causing loss of identity. Resentment towards poor migrant communities.

Economic

Lack of affordable housing for local first time buyers. Sales of farmland has increased rural unemployment. Influx of poor migrants puts pressures on local services.



Improvements to Transport



A £15 billion 'Road Improvement Strategy'. This will involve 10 new roads and 1,600 extra lanes. £50 billion HS2 railway to improve connections between key UK cities. £18 billion on Heathrow's controversial third runway. UK has many large ports for importing and exporting goods.

UK North/South Divide




- Wages are lower in the North.
- Health is better in the South.
- Education is worse in the North.
+ The government is aiming to support a Northern Powerhouse project to resolve regional differences.
+ More devolving of powers to disadvantaged regions.

Resource Challenges

Resources are things that humans require for life or to make our lives easier. Humans are becoming increasingly dependent on exploiting these resources, and as a result they are in high demand.

Significance of Water

Resources such as food, energy and water are what is needed for basic human development.

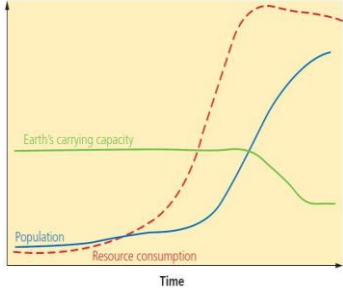
FOOD 	WATER 	ENERGY 
Without enough nutritious food, people can become malnourished . This can make them ill. This can prevent people working or receiving education.	People need a supply of clean and safe water for drinking, cooking and washing. Water is also needed for food, clothes and other products.	A good supply of energy is needed for a basic standard of living. People need light and heat for cooking or to stay warm. It is also needed for industry.

Demand outstripping supply

The demand for resources like food, water and energy is rising so quickly that supply cannot always keep up. Importantly, access to these resources vary dramatically in different locations

1. Population Growth

- Currently the global population is **7.3 billion**.
- Global population has risen **exponentially** this century.
- Global population is expected to reach **9 billion by 2050**.
- With more people, the **demand** for food, water, energy, jobs and space **will increase**.



3. Changing Technology and Employment

- The demand for resources has driven **the need for new technology** to reach or gain more resources.
- More people in the **secondary and tertiary industry** has increased the **demand for resources** required for electronics and robotics.

2. Economic Development

- As **LICs** and **NEEs** develop further, they require **more energy** for industry.
- LICs** and **NEEs** want similar lifestyles to **HICs**, therefore they will need to **consume more resources**.
- Development means **more water is required** for food production as diets improve.

Resource Reliance Graph

Consumption – The act of using up resources or purchasing goods and produce.
Carry Capacity – A maximum number of species that can be supported.

Resource consumption exceeds Earth's ability to provide!

Food in the UK

Growing Demand

- The UK imports about 40% of its food. This increases people's **carbon footprint**.
- There is growing demand for greater choice of **exotic foods** needed all year round.
- Foods from abroad are more affordable.
- Many food types are unsuitable to be grown in the UK.

Impact of Demand

Foods can travel long distances (food miles). Importing food adds to our carbon footprint.
 + Supports workers with an income
 + Supports families in LICs.
 + Taxes from farmers' incomes contribute to local services.
 - Less land for locals to grow their own food.
 - Farmers exposed to chemicals.

Agribusiness

Farming is being treated like a large industrial business. This is increasing food production.
 + Intensive farming maximises the amount of food produced.
 + Using machinery which increases the farms efficiency.
 - Only employs a small number of workers.
 - Chemicals used on farms damages the habitats and wildlife.

Sustainable Foods

Organic foods that have little impact on the environment and are healthier have been rising. Local food sourcing is also rising in popularity.

- Reduces emissions by only eating food from the UK.
- Buying locally sourced food supports local shops and farms.
- A third of people **grow their own food**.

Water in the UK

Growing Demand

The average water used per household has risen by 70%. This growing demand is predicted to increase by 5% by 2020.
 This is due to:

- A growing UK population.
- Water-intensive appliances.
- Showers and baths taken.
- Industrial and leisure use.
- Watering greenhouses.

Deficit and Surplus

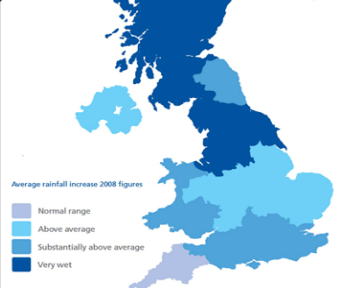
The north and west have a **water surplus** (more water than is required).
 The south and east have a **water deficit** (more water needed than is actually available).
 More than half of England is experiencing **water stress** (where demand exceeds supply).

Pollution and Quality

Cause and effects include:

- Chemical run-off from farmland can destroy habitats and kills animals.
- Oil from boats and ships poisons wildlife.
- Untreated waste from industries creates unsafe drinking water.
- Sewage containing bacteria spreads infectious diseases.

Water stress in the UK



Unit 2c

The Challenge of Resource Management

Energy in the UK

Growing Demand

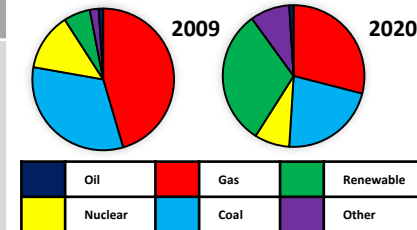
The UK **consumes less energy** than compared to the 1970s despite a smaller population. This is due to the **decline of industry**.

Energy Mix

The majority of UK's energy mix comes from **fossil fuels**. By 2020, the UK aims for 15% of its energy to come from **renewable sources**. These renewable sources do not contribute to **climate change**.

Changes in Energy Mix

- 75% of the UK's oil and gas has been used up.
- Coal consumption has declined.
- UK has become too dependent on imported energy.



Management

UK has **strict laws** that limits the amount of discharge from factories and farms.
Education campaigns to inform what can be disposed of safely.
Waste water treatment plants remove dangerous elements to then be used for safe drinking.
 Pollution traps catch and filter pollutants.

Water Transfer

Water transfer involves moving water through pipes from areas of surplus (Wales) to areas of deficit (London) Kielder Water.
Opposition includes:

- Effects on **land and wildlife**.
- High maintenance **costs**.
- The **amount of energy** required to move water over long distances.

Energy in the UK (continued)

Significance of Renewables

+ The UK government is investing more into low carbon alternatives.
 + UK government aims to meet targets for reducing emissions.
 + Renewable sources include wind, solar and tidal energy.
 - Although infinite, renewables are still expensive to install.
 - Shale gas deposits may be exploited in the near future

Exploitation

Nuclear

- New plants provide job opportunities.
- Problems with safety and possible harm to wildlife.
- Nuclear plants are expensive.

Wind Farm





- Locals have low energy bills.
- Reduces carbon footprint.
- Construction cost is high.
- Visual impacts on landscape.
- Noise from wind turbines.

Do Question 3 and Question 6



Do Not Do Question 4 or 5

Question 6: ENERGY

Energy security means having a reliable, uninterrupted and affordable supply of energy available. Energy insecurity can be experienced by countries with both a high and low energy consumption. Technology is increasing energy consumption.

Physical 	Economic 
<ul style="list-style-type: none"> Geology determines the availability of fossil fuels. Climate variations will affect the potential use of renewable energy. Natural disasters can damage energy infrastructure. 	<ul style="list-style-type: none"> Cost of extracting fossil fuels is becoming costly and difficult. Price of fossil fuels are volatile to potential political changes. Infrastructure for energy is costly, especially for LICs.
Technology 	Political 
<ul style="list-style-type: none"> New technology is making once difficult energy sources now reachable/exploitable. 	<ul style="list-style-type: none"> Conflict and turmoil in energy rich countries can affect exports. Stricter regulations over Nuclear.

Impact of Energy Insecurity

Sensitive environments	Food production 
Exploration of energy resources threatens to harm sensitive areas such as the oil drilling in Alaska, USA.	Food production depends on the energy needed to power machinery and transport goods to different markets.
Energy conflict	Industry
Shortages of energy resources can lead to tensions and violence. Conflict can be caused by fear of energy insecurity.	Countries can suffer from shortfalls in energy leading to a decline in manufacturing and services.
Increasing Energy Supply	C.S. UK Fracking 

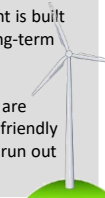
Non-renewables

Fossil Fuels - Conventional power stations can be made more efficient with carbon capture overcoming the environmental impacts.

Nuclear - Once a nuclear plant is built it can provide a cheap and long-term dependable source of energy.

Renewables

Wind, Solar, Biomass - These are examples of environmentally friendly renewable sources that can't run out but cost a lot to install.



Fracking is used to extract natural gas trapped in underground shale rock. It is a method considered by the UK.

Advantages

- Estimated to create 64,000 jobs.
- UK has large shale gas reserves.
- Is far cheaper than natural gas.

Disadvantages

- May cause groundwater pollution
- Is a non-renewable resource.
- May trigger minor earthquakes.

Sustainable Energy Supply	C.S. NEE - Chambamontera 
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This involves **balancing supply & demand**. It also includes **reducing waste & supporting the environment**.

Home design - Building homes to conserve energy. i.e. roof insulation.
Reduce demand - Changing attitudes towards energy used to save energy.
Efficient technology - Making cars more efficient by improving engine design and weight. i.e. Hybrid engines.
Transport - Using public buses & bikes.

Chambamontera is an isolated community in the Andes of Peru. It introduced a micro-hydro to exploit water power as an energy source.

Benefits to the community

- Provides renewable energy.
- Low maintenance & running costs
- Has little environmental impacts.
- Using local labour and materials.
- Businesses are developing.
- Less wood is needed to be burnt.

GEOGRAPHY COMMAND WORDS

Command	How do I respond in my writing ?
Annotate	Annotations are extended labels. When annotating, you should write brief descriptive or explanatory sentences linked to features referenced in the question.
Assess	Like analyse, assess means to break the theme of the question down into parts but offer your opinion on the successes and failures to reach an informed judgement.
Calculate	You need to use the data (numbers) within the question, or resource that the question is based on, and apply a mathematical function to get your answer.
Compare	An effective comparison will make clear references to both similarities and differences between the items within the questions.
Complete	You are directed to use information available to you (a resource with the question or your knowledge) to finish a task. This is most commonly linked to cloze paragraphs (a.k.a. gap-fill) style questions.
Contrast	Writing to show contrast will make clear references to just differences between the items within the questions.
Describe	Write details of what the feature/item or theme are like within the question. Do not explain as a description requires no explanation.
Discuss	Describe and explain a balance of the similarities and differences, or positives and negatives of whatever the question is about. Evidence is important to include—as is your opinion. Always add a conclusion to summarise your discussion.
Draw	Using a pencil, produce a simple diagram (plan view/cross-section/ field sketch or box style) of the theme within the question. Quite often, you will be asked to label or annotate your drawing too
Evaluate	Systematically break down the theme of the question to make an informed judgement supported by evidence for the strengths, weaknesses (or limitations), opportunities to improve a way of working or concept, to reach conclusions.
Explain	Give reasons for why something is like it is. Write in a way that shows cause and effect. The words 'because', '...as a result', '...this is due to', 'consequently' should be in your writing.
Identify	Identify the name of a feature or item referenced in the question. Synonyms are: give/name or state.
Label	Labelling is simply naming features or parts of something; these are not sentences

Justify	Write a convincing argument to reach a conclusion supported by evidence.
Outline	Give a brief overview of the whole theme of the question. You can describe or explain just the main points in limited detail. The amount you write depends on the amount of content within the question.
Plot	Add data (results or values) onto a graph. Read the axis labels carefully to understand the units. If present, your plotted data should 'look' like the other data already present on the graph.
Suggest	Explain a possible reason for theme of the question. 'Suggest' questions are asking you to put forward an idea you have.
To what extent	The question is asking how far you agree with something—from fully agree to totally disagree—often a statement or a quote for example. Give your opinion immediately and examine arguments that support and discount your opinion. Support with evidence to reach a conclusion.

GEOGRAPHY ASSESSMENT OBJECTIVES

AO1	Demonstrate knowledge of location, places, processes, patterns, environments at different scales
AO2	Demonstrate geographical understanding of concepts and how they are used in relation to places, environments and processes; interrelationships between places, environments and processes.
AO3	Application of knowledge and understanding to interpret, analyse and evaluate information and issues to make judgements.
AO4	Select, adapt and use a variety of skills and techniques to investigate questions and issues and communicate finding.

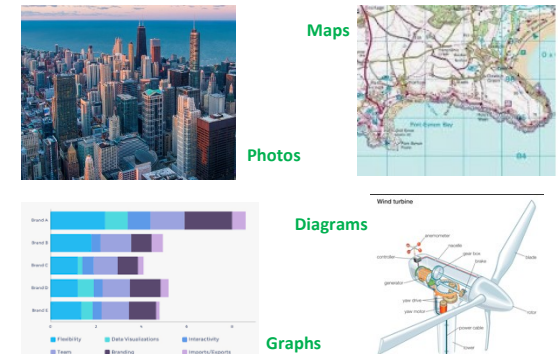
Assessment Objectives are the ways that your knowledge of the subject could be assessed using the command words. For example, the command word 'explain' would be AO2, and 'evaluate' would be AO3.

ADDITIONAL EXAM SKILLS

'Study figure X...'

The majority of questions in geography GCSE exam papers have a linked resource for you to include in your answer - such as photo, graph, map, diagram or set of data. Before you even get to the question, you are commanded to '**study**' the resource; they've essentially given you something to use in your answer—so study it well to find the best bits to include!

Examples of 'Figures' in exams:



'Using a case study or an example you have studied...'

When commanded to '**use an example**' in a question response, you must try to link your knowledge to a real world example as evidence to demonstrate that you have understood beyond just a theory or idea.

In addition to learning lots of 'examples' at GCSE level, you will learn a small selection of detailed 'case studies'; these cover knowledge of specific important geographical events or phenomena, or important places. Unlike 'examples', you will definitely get examined on your knowledge of 'case studies' at GCSE level