



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.

Responses to Earthquakes: Nepal - LIC

- Immediate Responses**
- Search/rescue teams from UK, India & China sent
 - Helicopters to Mt Everest to rescue people
 - 1/2m tents
 - Aid from many countries
 - 300,000 migrated from Kathmandu

- Long-term**
- Lakes emptied to prevent flooding
 - 7000 schools rebuilt
 - Repairs to Everest Base Camp for tourism
 - Stricter controls on building regs

Responses to Earthquakes: Chile - HIC

- Immediate**
- Quick action from emergency services
 - Repairs in 24hrs for Route 5 so aid could get to Santiago
 - Power/water restored to 90% in 10 days
 - US\$60m raised in appeal

- Long-term**
- 200,000 houses reconstructed
 - Copper exports meant economy recovered without aid



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: Haiti 2010



Causes

The earthquake was caused by the North American Plate sliding past the Caribbean Plate at a conservative plate margin. The pressure that was built up because of the friction between the 2 plates was eventually released a magnitude 7 earthquake with an epicentre 16 miles West of Port-au-Prince and a shallow focus of 5 miles.

Primary Effects

- 316,000 killed, 1 million homeless
- 250,000 homes destroyed, 60% of Government buildings
- Transport badly damaged 50+ hospitals and 1300+ schools damaged
- Prison destroyed – 4,000 inmates escaped

Secondary Effects

- 1 in 5 people lost their job. Clothing industry badly affected
- Hospitals and morgues became overcrowded
- Spread of Cholera from dead bodies
- Difficulty getting aid into country



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: Christchurch, New Zealand 2011

Causes The 6.3 magnitude earthquake struck New Zealand at 12:51 on 22 February 2011. The epicentre was 6 miles South East of Christchurch and the focus was very shallow at 3.1 miles. The earthquake occurred on a conservative plate margin where the Pacific Plate slid past the Australian Plate in the opposite direction.

Primary Effects

- 181 killed, 2000 injured, 800,000 affected
- Hundreds of kms of water and sewage pipes damaged
- 50% + of Central City buildings severely damaged including the cathedral
- 80% of city without electricity

Secondary Effects

- Business out of action for long periods causing losses of income and jobs
- Damage to roads through liquefaction made it difficult for emergency services
- People suffered from mental health conditions

The Challenges of Natural Hazards

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.

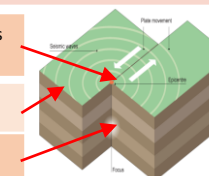
Causes of Earthquakes

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.

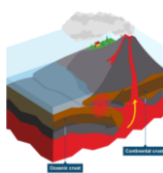
The point at which pressure is released is called the **FOCUS**.



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**.



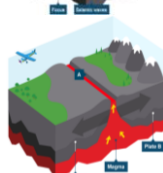
Constructive Plate Margin

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

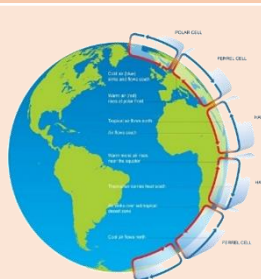
A conservative plate boundary occurs where plates **slide past each other** in opposite directions, or in the same direction but at different speeds. This is responsible for earthquakes such as the ones happening along the San Andreas Fault, USA.



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

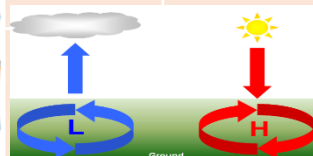
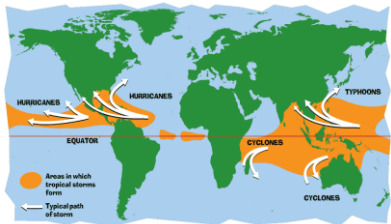
They are known by many names, including **hurricanes** (North America), **cyclones** (India) and **typhoons** (Japan and East Asia). They all occur in a band that lies roughly **5-15°** either side of the **Equator**.

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: Storm Eva, 2015



Causes

Dec 2015 was the wettest December on record – average: 120mm, Dec 2015: 230mm. This meant that the River Ouse, York peaked at 5.2m above normal.

Effects

- Foss Barrier failed
- 400 people evacuated
- 300y/o Tad bridge collapsed
- A64 shut
- Jorvik Centre shut for a year
- 3500 properties affected

Management

- £10m to improve York defences
- 10,000 sandbags used
- 600 military personnel used to help with clear up
- £1m in aid donated
- Foss Barrier pumping station improved and raised



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?

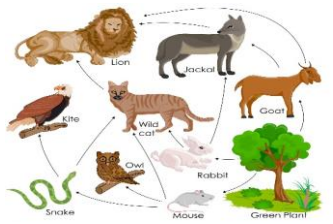
An ecosystem is a system in which organisms interact with each other and with their environment.

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.

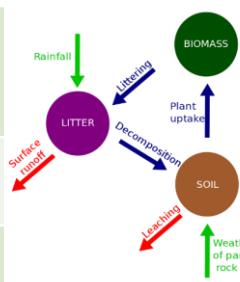


Food Web and Chains

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**.

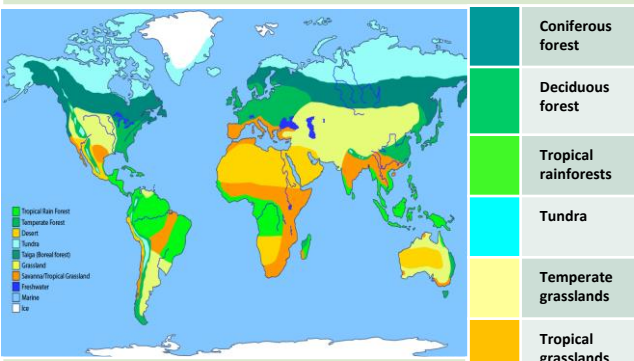


Litter This is the **surface layer** of vegetation, which over time breaks down to become **humus**.

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 200mm/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

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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.

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.

CASE STUDY: UK Ecosystem: Epping Forest, Essex



This is a typical English lowland deciduous woodland. **70% of the area** is designated as a **Site of Special Scientific Interest (SSI)** for its biological interest, with **66%** designated as a **Special Area of Conservation (SAC)**.

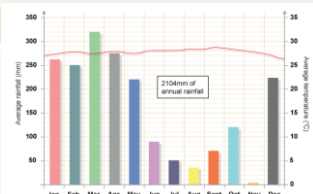
Components & Interrelationships

Season	Flora	Management
Spring	Flowering plants (producers) such as bluebells store nutrients to be eaten by consumers later.	- Epping has been managed for centuries. - Currently now used for recreation and conservation .
Summer	Broad tree leaves grow quickly to maximise photosynthesis .	- Visitors pick fruit and berries, helping to disperse seeds .
Autumn	Trees shed leaves to conserve energy due to sunlight hours decreasing.	- Trees cut down to encourage new growth for timber .
Winter	Bacteria decompose the leaf litter, releasing the nutrients into the soil.	

Layers of the Rainforest



Layer	Description
Emergent	Highest layer with trees reaching 50 metres .
Canopy	Most life is found here as it receives 70% of the sunlight and 80% of the life .
U-Canopy	Consists of trees that reach 20 metres high .
Shrub Layer	Lowest layer with small trees that have adapted to living in the shade .



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?	Logging	Agriculture
<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. 	<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. 	<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. 	<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. 	<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
<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. 	<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. 	<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.

Soil erosion

- 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**.

Climate Change

-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**.

Cold Environments Case Study: Svalbard

Svalbard is a Norwegian territory in the Arctic Ocean and the most northerly permanently inhabited group of islands in the world. It experiences Polar and Tundra climates. The main town of Longyearbyen has a population of 2700.

Distribution of the world's cold environments

Cold environments are located at, and surrounding the North and South Pole. The very most north and south points have Polar Biome. Tundra climate is found between 90 and 60 degrees north.

Major Characteristics of Cold Environments

TUNDRA: Winter temps as low as -20, short, but quite warm summers, high amounts of snow, Permafrost soil (permanently frozen), infertile soil, soils may be waterlogged, low growing flowering plants

Adaptations

Behavioral Adaptations

- Polar bears dig dens to protect themselves from cold winds.
- The ability to be a strong swimmer help with hunting and swimming through ice.

Physical Adaptations

- The white fur of the polar bear helps it blend in with the snow and ice.
- The thick layer of fat under its skin helps it stay warm in such cold temperatures.
- Its long and round ears help maintain body heat and don't allow the cold water to enter the ears.

Major characteristics of cold environments

POLAR: Temp as low as -50, low precipitation, permanently frozen soil, some plants like Moss and Lichens, Polar Bears in Arctic, Penguins in Antarctic

Interdependence

Different parts of the cold environment ecosystem are **closely linked together and depend on each other**, especially in a such a harsh environment.

Adaptations to the cold environments	
Arctic Fox	Lives on cliff sides for shelter, white fur to camouflage, one of thickest furs of all mammals.
Bearberry	Red berried plant. Low growing and thick stems to survive strong winds, leathery leaves to retain moisture n dry climate, hairy stems to retain hear,

Opportunities and challenges in Cold Environments - Svalbard

Opportunities	Challenges
<p>Mineral extraction: coal mining vital. Employs 300+</p> <p>Energy Development: coal mined on island is burned to generate electricity at Longyearbyen power station. Is Norway's only coal fired power station . Geothermal energy used as sits on constructive plate margin</p> <p>Fishing: Barents Sea home to reserves of Cod, Herring and Haddock. Fishing monitored by Norway and Russia to ensure sustainability</p> <p>Tourism: 70,000 visitors a year (30,000 on cruise ships). Longyearbyen harbour has been enlarged. 300 jobs for locals</p>	<p>Extreme Temp: temps fall to -30 in Winter. Dangerous to work outside (frostbite). Several layers of clothing must be worn which makes work difficult</p> <p>Construction: Construction (houses, shops, roads, harbour facilities, mines) is difficult due to temp and limited daylight hours. Most construction happens in Summer</p> <p>Accessibility: Only reached by plane or ship. Limited transport around the 5 islands. One international airport. Only 50kn of road in Longyearbyen – none serve outlying communities. Most people use snowmobiles.</p>

Threats to Cold Environments	Why do we need to protect cold envs?	Strategies to manage Cold Env
Cold Environments are fragile. Tundra wildlife takes a long time to recover	Indigenous Tribes Inuit live in Arctic Alaska – depend on wildlife for hunting and fishing	Use of Tech: Trans Alaskan Pipeline (raised and insulated to not melt permafrost, raised to allow animal migrations, earthquake resistant)
Oil Spills Polluted rivers and habitats, risk of fire, forest cleared for building of pipes	Species Home to many birds, animals and plants	Action by Governments: Natural Environment Policy Act (protects rights of native people from Oil companies)
Off Road Vehicle Damage Takes place in summer when snow has melted which make soil soggy. Can take decades for the soil to recover	Scientific Research Unpolluted and unspoilt environments are important for scientific research n climate change	National Oceanic and Atmospheric Administration (oversees sustainable fishing)
		International Agreements: Antarctic Treaty
		Conversation Groups: WWF

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

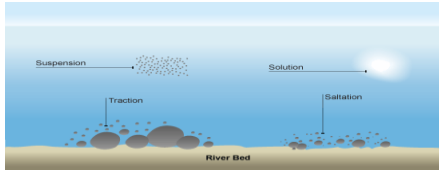
Example: Spurn Head, Holderness Coast.

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

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

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Physical Landscapes in the UK

Formation of Bays and Headlands

Bay
Soft rock

Headland
Hard rock

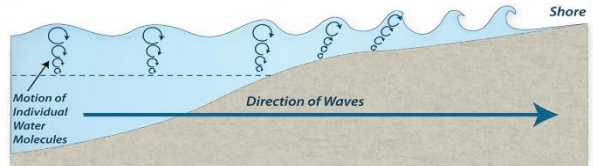
- 1) Waves attack the coastline.
- 2) Softer rock is eroded by the sea quicker forming a bay, calm area causes deposition.
- 3) More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

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

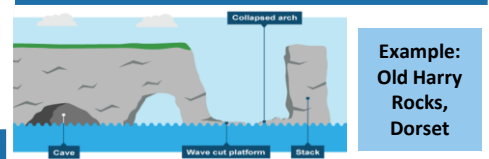
Stage One		Stage Two		Stage Three	
Water seeps into cracks and fractures in the rock.		When the water freezes, it expands about 9%. This wedges apart the rock.		With repeated freeze-thaw cycles, the rock breaks off.	

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



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: Holderness Coast

Location and Background
 East Yorkshire between Flamborough Head and Spurn Point. Fastest eroding coastline in western Europe (approx. 2m per year). Formed 12,000 years ago by glacial deposits – boulder clay (soft rock), north of coastline is chalk (hard rock). Predominant prevailing wind from north east, so material is transported by LSD south east. SMP introduced in 1998 – mainly “hold the line/do nothing”. Only 11km of 50km coast is protected.

Management
Bridlington (tourism, residential) – 3.6km of high recurved sea walls and rock armour. Groynes to stop LSD.
Hornsea (tourism, residential) – 1.86km of concrete sea walls, rock armour and groynes – recently upgraded to meet rising sea levels and increase beach size.
Mablethorpe (tourism, residential) – 2.26km of sea walls, groynes, rock armour and offshore reef. Recent upgrade to recurve sea wall.
Easington (North Sea gas terminal) – 1km of rock armour to protect terminal. Reviewed & renewed whilst gas available.
Skipsea/Ulrome (campsites) – privately paid for gabions to protect key assets (shop, bar, restaurant)
Other areas (farmland, small villages, campsites) – “do nothing”. Monitoring erosion and implementing “roll back” so gradually moving campsites further away from coastal edge.

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

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 Tees (Landforms), River Ouse (Management)

Location and Background
 Located in the North of England and flows 137km from the Pennines to the North Sea at Redcar.

Geomorphic Processes
Upper – Features include V-Shaped valley, rapids and waterfalls. Highforce Waterfall drops 21m and is made from harder Whinstone and softer limestone rocks. Gradually a gorge has been formed.
Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town.
Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.

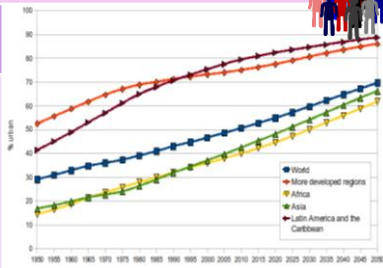
Management – River Ouse, York
 -Clifton Ings – water storage, holds 2.3m³ of water lowering river levels by 150mm
 -Marygate–concrete flood walls reinforced with steel, 460mm higher than previous flood
 -Museum Gardens – raised natural embankments
 -Foss Barrier – prevents Ouse flowing into Foss, failed in 2015, £17m upgrade = 8 pumps pumping 50tonnes of water per second

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?

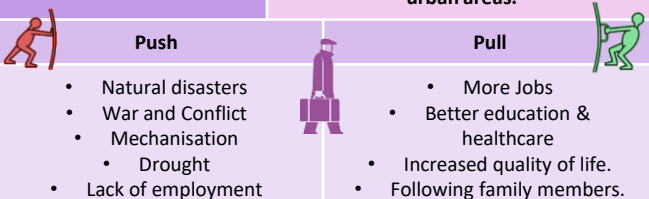
Urbanisation is happening all over the world but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.



Causes of Urbanisation

Rural - urban migration (1)

The movement of people from rural to urban areas.



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.

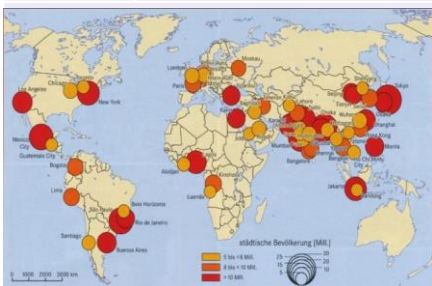
Lower death rate (DR)

- 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

GEOGRAPHY DEPARTMENT



Urban Issues & Challenges

Sustainable Urban Living Example: Curitiba

Background & Location	Sustainable Strategies
Capital of Parana State in south east Brazil. Suffered expected problems from rapid urban growth: unemployment, congestion, lack of services, favelas.	<ul style="list-style-type: none"> Transport – speedy eco-buses (4000 passengers per bus per day) Parks – 28 parks/open spaces Housing – site & service (like Rio) Waste – 2/3 recycled Economy – CIC built – 50,000 jobs, 150,000 indirect jobs



Greenbelt

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.

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.

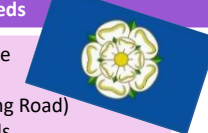
Congestion Solutions

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



Traffic Management Example: Leeds

- Guided bus routes on A64 Crossgates to city centre
- Modern, cleaner bendy buses in city centre
- New Park & Ride at Elland Road (1 of 7 around Ring Road)
- Car Share Priority Lanes on Ring Road in East Leeds
- Free bus pass for people in Harehills (poverty)
- Priority parking for electric cars
- Congestion Charge proposed for city
- Pedestrian zones in centre
- 20mph zones around schools/residential areas
- Urban Traffic Control (UTC) – up-to-date traffic info
- Bus only lanes through Headingley (student area) into city and Universities
- Clean Air Zone for Leeds approved



ELLAND ROAD PARK & RIDE

Route Map & Stops



CLEAN AIR ZONES



Urban Change in a Major UK City: Leeds Case Study



Location and Background	
Leeds is in West Yorkshire in northern England. The population is 720,000 making it the 3 rd largest in the UK. It grew during the 18 th Century Industrial Revolution.	It grew because of the textile trade, pasture land & soft water and the navigable River Aire to Goole/Hull (ports). It's a bridging point for the River Aire. Nearby coal fields.

City's Importance
<ul style="list-style-type: none"> The regional centre for West Yorkshire 2nd biggest financial city after London Change from manufacturing to finance/commerce Strategic position on M62 (Liverpool/Hull), A1 (Edinburgh/London), rail links, LBA 3 universities – Uni of Leeds over 20,000 students including overseas Sport – YCCC, ECB, Leeds Rhinos, Leeds United

Migration to Leeds
<p>Net migration – 3,400 (expected to fall to 2,500 due to Brexit). 2,600 short-term migrants.</p> <p>Reasons for migrating to Leeds:</p> <p>Work – 9,520 new migrants for work (1,900 from Romania, 1,100 from Poland, 5,500 from Spain/India/Italy)</p> <p>Study – 8,460 international students in 2016. Over 75% from outside EU</p> <p>Protection – 744 asylum seekers, 45 unaccompanied asylum seeking children, 63 resettled Syrian refugees</p>

City's Opportunities
<p>Social: Vibrant nightclub/bar scene due to large student population. Sport: Leeds Rhinos, YCCC, Leeds United, England RL, ECB. Headingley Stadium undergoing major redevelopment to continue getting international cricket and rugby league in the city. Tetley Wharf / Bodington Manor – new housing developments</p> <p>Economic: German Markets in Millennium Square. Leeds Arena now brings in music/sport events. West Yorkshire Playhouse attracts plays. Major development of city's shopping attractions to attract big companies.</p>

City Challenges
<p>Life Expectancy: Wike: 86.8 years, Harehills: 77.8 years</p> <p>Education (no qualifications): Wike: 22%, Harehills: 45%</p> <p>Unemployment: Wike: 1.5%, Harehills: 9.5%</p> <p>Carless Households: Wike: 15%, Harehills: 51%</p> <p>Average House Price: Wike: £335,000, Harehills: £76,000</p> <p>House Sales: Wike: 582, Harehills: 1</p> <p>Households in Deprivation (at least 1 category): Wike: 17%, Harehills: 91%</p> <p>National Deprivation Ranking (wards out of 32,844): Wike: 32,653, Harehills: 310</p>

Leeds Regeneration Projects
<p>Trinity Centre/Victoria Centre: city centre locations with primary use for retail. Trinity based around Topshop, Victoria around John Lewis. Lots of retail moved to these centres for prime location. Bars/casinos/restaurants also opened in them.</p> <p>Leeds Dock: main project – Royal Armouries museum to bring in tourists. Dock area tidied up, boat trips, boat bars. Gyms/office space/residential areas all opened. Restaurants closed. Dock extremely quiet during the day. Sky has opened offices. Improved lighting and CCTV to increase safety of the area.</p>

Urban Change in a Major NEE City: Rio de Janeiro Case Study



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 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: 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

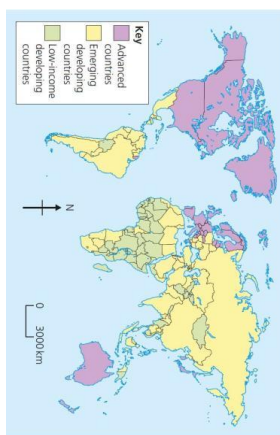
Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
Literacy rate	The percentage of population over the age of 15 who can read and write.
Life expectancy	The average lifespan of someone born in that country.

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

GEOGRAPHY DEPARTMENT

AQA

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



This involves people in LICs receiving smalls loans from traditional banks.

- + 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.

Debt Relief

This is when a country's debt is cancelled or interest rates are lowered.

- + Means more money can be spent on development.
- Locals might not always get a say. Some aid can be tied under condition from donor country.



Technology

Includes tools, machines and affordable equipment that improve quality of life.

- + 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.

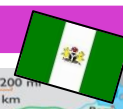
Multiplier effect

- 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 2nd economically powerful country in Africa. Economic growth is base on oil exports.



Influences upon Nigeria's development

Political

Suffered instability with a civil war between 1967-1970. From 1999, the country become 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, literature 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 is bringing huge investment in Nigeria's 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. An increase in 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.

Reducing Impacts of Industry on Environment (Torr Quarry, Somerset)

Impacts of Quarrying:

- Destroy habitats
- Pollute water courses
- Scar landscape

Employs 100 people, contributes £15m to local economy. Methods to become sustainable: Restored to create wildlife lakes - recreation/water supply. Limestone features created. 200 acres of planted trees/grass. Monitoring noise, vibration, water and emissions.



Effects of Changes to Rural Landscape

Growth – South Cambridgeshire

Commuters use services where they work (decline in rural economy) 80% car ownership Breakdown in community spirit Lack of affordable housing for young Increase in poorer EU migrants Higher fuel costs due to demand

Decline – Outer Hebrides

School closures due to numbers Young, working age are leaving Increasingly ageing population Post Office closures Farming jobs only 2 days a week Only a few fishing boats remain Foreign owned ships dominate 27% increase in tourism – unable to cope



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.

Global Distribution of Resources

Resource is a stock or supply of something that has a value or purpose. The three most important are: food, water, energy

Food
Human health is affected by how much food is eaten and nutritional value of food. WHO suggest 2000-2400 calories a day to be healthy. Over 1 billion people fall below this level and are described as malnourished. Another 2 billion suffer from undernutrition – a poorly-balanced diet lacking in minerals and vitamins. Growing issue with obesity in HICs.

Water
Quantity and quality of water are important for well-being and economic development. Water is vital for people, animals, crops and food supply. Important source for providing energy. As population grows – more people face water shortages. Imbalance is mainly due to climate and rainfall. Rainwater needs to be stored in reservoirs or taken from rivers – all very expensive. By 2025, UN predicts 50 countries facing water scarcity.

Energy
Energy is required for economic development – powers factories, machinery and fuel for transport. Past – rely on your own supply. Today – energy is traded. Energy consumption is increasing as world becomes more developed – demand increases. HICs use far more than LICs. Middle East provides most of oil, yet consumption is relatively small.

Provision of Food in the UK

By 2037, population of UK predicted to be 73million increasing the demand for food. UK is not self-sufficient for food supplies and imports 40% of all food consumed.

Why does the UK import so much food?

- UK-produced food can be expensive due to poor harvests and price of animal feed.
- Demand for greater choice and more exotic foods.
- Availability of cheaper food from abroad imported by supermarkets
- UK climate is unsuitable for production of some foods (cocoa, tea, bananas)
- Demand for seasonal food all year round (strawberries, apples)

UK food miles (distance food travels) is increasing and therefore our carbon footprint (emission of CO₂) is also increasing due to production and transportation of food.



Unit 2c The Challenge of Resource Management

Responding to the Challenges of Food Provision

Agribusiness – Lynford House Farm, East Anglia

570 hectares of land using chemicals, machinery and other investments. Flat, fertile land is intensively farmed – maximise productivity and profitability. Main crops- wheat, sugar beet, potatoes. Chemicals widely used as pesticides and fertilisers. Machinery costs are high but make farm more efficient. 54-million litre reservoir built to avoid water shortage

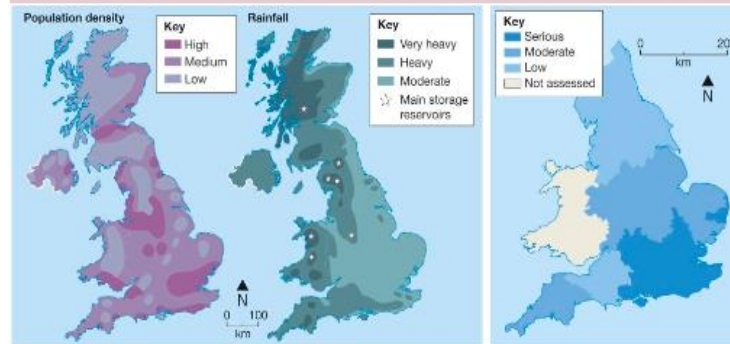
Organic Produce - Riverford Organic Farms, Devon

Organic food and dairy farm providing local fresh food to local people weekly. Reduces food miles. Supports local farmers. Provides local employment. Builds strong links between grower and customer.



Provision of Water in the UK

50% of UK water is used domestically, 21% is wasted through leakage. Demand for water expected to increase by 5% by 2020 due to: rising population, more houses, increase in water-intensive domestic appliances.



B UK population density and water supply

C Water stress in England

Managing Water Quality

Water quality is just as important and water quantity. The Environment Agency is in charge of managing water quality.

Managing Water Quality

- Monitoring quality of river water
- Filtering water to remove sediment
- Purifying water by adding chlorine
- Restricting recreational use of water sources
- Imposing strict regulations for use of water

Deterioration of Groundwater

- Leaching from old underground mine workings
- Discharge from industrial sites
- Runoff from chemical fertilisers used on farmland
- Water used for cooling in power stations released back into rivers.

Water Transfer – Kielder Water, Northumberland, UK

Largest man-made reservoir in Europe. Dam is 1.2km long and 50m high. Benefits Newcastle, Sunderland, Durham, Darlington, Middlesbrough. Transferred by aqueduct – Airy Holm, Frosterly and Eggleston. (Airy Holm – Frosterly; Frosterly – Wear; Eggleston – Tees)

Advantages

- Income created through tourism
- Reliable water source – sold to rest of UK
- Provides hydro-electric power
- Dam prevents river flooding nearby towns
- New habitats created
- In 1995 droughts – Kielder provided water for North East.

Disadvantages

- Conservation areas were disrupted/removed for the scheme
- Habitats destroyed – flooded an Area of Outstanding Natural Beauty
- People had to be relocated
- Never been less than 90% full – not needed/waste of money
- 1.5m trees cut down

