Knowledge Organiser

Geography

RAYNES
PARK HIGH SCHOOL

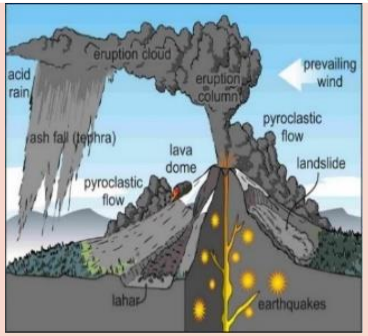
The Challenges of Natural Hazards

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

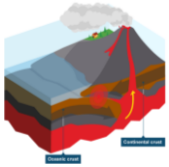
The crust is divided into tectonic plates which are moving due to convection currents in the mantle.

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.

Types of Plate Margins

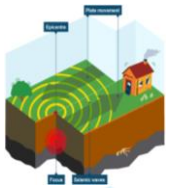
Destructive Plate Margin

When the denser plate subducts beneath the other, friction causes it to **melt and become molten magma**. The magma forces its ways 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.

LIC -CS: Gorkha Earthquake, Nepal 2015

Causes
On a constructive plate margin, involving the Eurasian & Indian plates.
The magnitude 7.8 earthquake was 80km northwest of capital, Kathmandu.
Aftershocks of 7.3 magnitude cause much more damage.

Effects:
- 8,900 killed, 16,800 injured and 1 million made homeless
- 26 hospitals destroyed, 50% schools
- Triggered avalanche on Mt. Everest
- Occurred just before monsoon season, Rice seed stored in homes was ruined in the rubble causing food shortages and income loss.

Management
UK's DEC raised US$126 million by September to provide emergency aid and start rebuilding the worst hit areas.
Temporary shelters set up – Red Cross provided tents for 225,000
UN distributed medical supplies to the worst affected areas.
Nepal's government carried out Post-Disaster Needs Assessment – reported that 23 areas required rebuilding.

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	Meteorological Hazard
These are hazards caused by land and tectonic processes.	**These are hazards caused by weather and climate.**

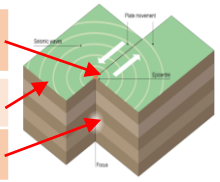
Causes of Earthquakes

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**.



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: Sendai – Japan 2011

Causes – Destructive plate boundary (subduction). 9.0 magnitude earthquake – triggered a tsunami

Effects
- Injuries: 6,152
- Still missing: 2,601
- Displaced: 300,000
- 15,800 people killed
- Coastal areas destroyed
- Buildings and cars swept away by tsunami
- Cost of damage: over $300 billion (the costliest disaster in history)
- Buildings destroyed: 45,700
- Hospitals destroyed: 11
- Homes without water: 1.5 million

Responses / Management
- Japanese Army cleared debris to allow supplies / aid to be delivered
- Displaced residents living in temporary housing
- 230 emergency teams sent to rescue people and recover bodies
- 120,000 blankets and bottles of water were provided for those in need
- NGO's sent 100's of aid packages including cooking equipment and gas stoves
- Exclusion zone was set up around the nuclear power plant at Fukushima
- New building are all constructed to

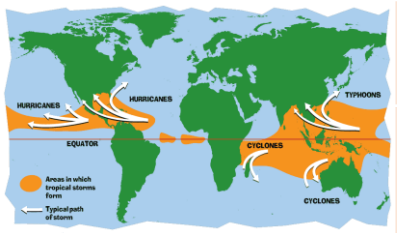
Global pattern of air circulation

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.

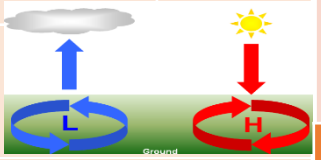
Distribution of Tropical Storms.

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.



High and Low Pressure

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

Scientist 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 **2rd 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: Boscastle Food 2004

Causes
- Saturated soils from previous rainfall (Impermeable ground)
- Summer storm brought 200mm of rainfall in 4 hours
- Steep slopes of river valley – high levels of surface runoff

Effect
- Properties and business were flooded
- Cars were washed into the harbour
- £300 million of damage
- 100 people airlifted to safety

Management
- £800,000 flood defence scheme
- Car park was raised to create an embankment and surface made permeable
- River channel was dredged
- River channel widened to increase capacity

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.

Unit 1b

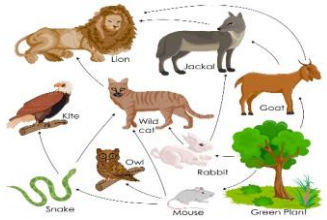
The Living World

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.



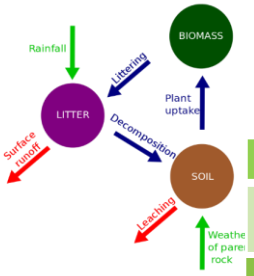
Food Web and Chains

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

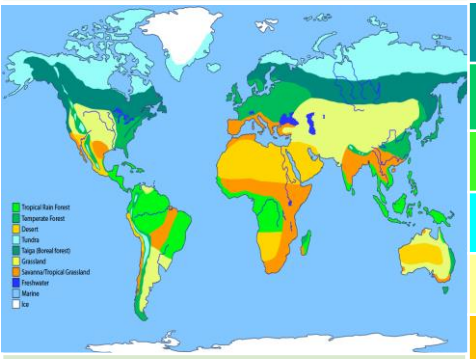
Plants take in **nutrients** to build into new organic matter. Nutrients are taken up when animals eat plants and then returned to the soil when animals die and the body is broken down by **decomposers**.

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.



	Coniferous forest
	Deciduous forest
	Tropical rainforests
	Tundra
	Temperate grasslands
	Tropical grasslands
	Hot deserts.

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.

Tropical Rainforest Biome

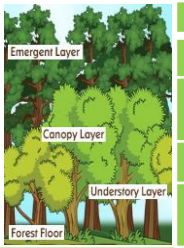
Tropical rainforest cover about **2 per cent** of the Earth's surface yet they are home to **over half of the world's plant and animals**.

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.



Layers of the Rainforest

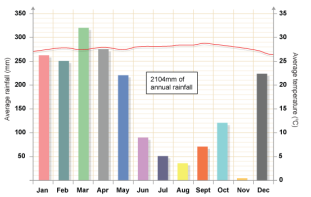
Emergent	Highest layer with trees reaching **50 metres.**
Canopy	Most life is found here as It receives **70% of the sunlight** and **80% of the life.**
U-Canopy	Consists of trees that reach **20 metres high.**
Shrub Layer	Lowest layer with **small trees** that have adapted to living in the **shade.**

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		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**. - Visitors **pick fruit** and berries, helping to **disperse seeds**. - Trees cut down to encourage **new growth for timber.**
Summer	Broad tree leaves grow quickly to **maximise photosynthesis**.	
Autumn	Trees shed leaves to **conserve energy** due to sunlight hours decreasing.	
Winter	Bacteria **decompose** the leaf litter, releasing the nutrients into the soil.	

Tropical Rainforests: Case Study Malaysia

Malaysia is a LIC country is 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

Orangutans	Large arms to swing & support in the tree canopy.
Drip Tips	Allows heavy rain to **run off leaves easily**.
Lianas & Vines	**Climbs** trees to reach sunlight at canopy.

Rainforest inhabitants

Many tribes have developed sustainable ways of survival. The rainforest provides inhabitants with…

- **Food** through hunting and gathering.
- **Natural medicines** from forest plants.
- **Homes and boats** from forest wood.

Issues related to biodiversity

Why are there high rates of biodiversity?

- **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.**

Main issues with biodiversity decline

- **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.**

Impacts of deforestation

Economic development

+ 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.

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.**

What are the causes of deforestation?

Logging

- 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.

Agriculture

- 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**.

Mineral Extraction

- **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.

Tourism

- **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.**

Energy Development

- 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.

Road Building

- **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

Uncontrolled and unchecked exploitation can cause irreversible damage such as loss of biodiversity, soil erosion and climate change.

Possible strategies include:

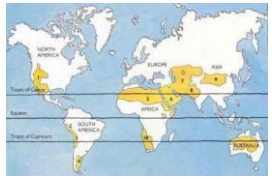
- **Agro-forestry** - Growing trees and crops at the same time. It prevents soil erosion and the crops benefit from the nutrients.
- **Selective logging** - Trees are only felled when they reach a particular height.
- **Education** - Ensuring those people understand the consequences of deforestation
- **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

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 worlds major deserts.



Major characteristics of hot deserts

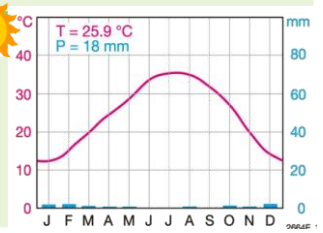
- **Aridity** – hot deserts are extremely dry, with annual rainfall below **250 mm**.
- **Heat** – hot deserts rise over **40 degrees.**
- **Landscapes** – Some places have dunes, but most are **rocky** with **thorny bushes.**

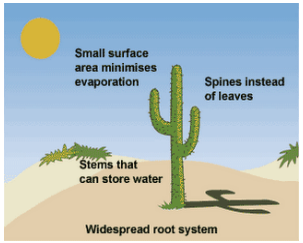
Hot Deserts inhabitants

- 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.**

Climate of Hot Deserts

- **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

Cactus	• **Large roots** to absorb water soon after rainfall. • **Needles** instead of leaves to reduce surface area and therefore **transpiration**.
Camels	• Hump for storing **fat (NOT water).** • **Wide feet** for walking on sand. • **Long eyelashes** to protect from sand.

Desert Interdependence

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

Opportunities and challenges in the Hot desert

Opportunities

- **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.**

Challenges

- **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
Reduce rainfall and rising temperatures have meant less water for plants.

Fuel Wood
People rely on wood for fuel. This removal of trees causes the soil to be exposed.

Overgrazing
Too many animals mean plants are eaten faster than they can grow back. Causing soil erosion.

Over-Cultivation
If crops are grown in the same areas too often, nutrients in the soil will be used up causing soil erosion.

Population Growth
A growing population puts pressure on the land leading to more deforestation, overgrazing and over-cultivation.

Strategies to reduce Desertification

- **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.
- **Soil Management** - leaving areas of land to rest and recover lost nutrients.
- **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.

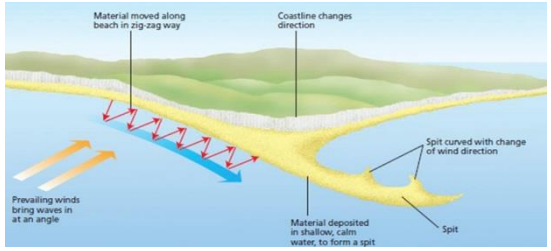
Mass Movement

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.

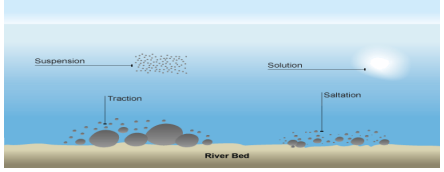


1) Swash moves up the beach at the angle of the prevailing wind.
2) Backwash moves down the beach at 90° to coastline, due to gravity.
3) Zigzag movement (Longshore Drift) transports material along beach.
4) Deposition causes beach to extend, until reaching a river estuary.
5) Change in prevailing wind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

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.

Formation of Bays and Headlands

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

Unit 1c

Physical Landscapes in the UK

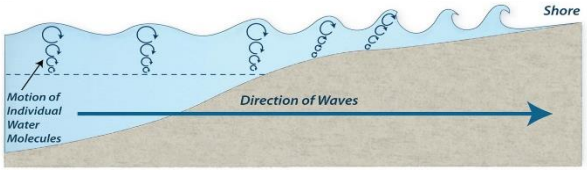
AQA

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

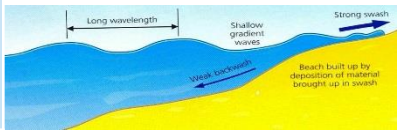
With repeated freeze-thaw cycles, the rock breaks off.

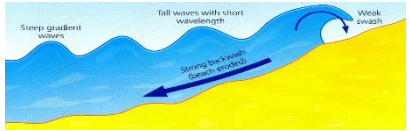
Size of waves

- **Fetch how far the wave has travelled**
- **Strength of the wind.**
- **How long the wind has been blowing for.**

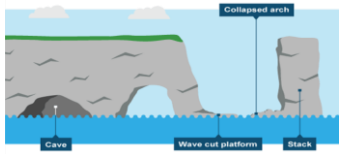
Types of Waves

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 from 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.**	✓ **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.**	✓ **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.**	✓ **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.**	✓ **Cheap** ✓ **Beach for tourists.** ✗ **Storms = need replacing.** ✗ **Offshore dredging damages seabed.**
Managed Retreat	**Low value areas of the coast are left to flood & erode.**	✓ **Reduce flood risk** ✓ **Creates wildlife habitats.** ✗ **Compensation for land.**

Case Study: Holderness Coastline

Location and Background - North West Coast of England in Yorkshire . Fastest Eroding coastline in Europe – approx. 2 meters per year. Stretches between Flamborough Head (Headland) in the North to Spurn Head (Spit) in the South.

Geomorphic Processes

- Flamborough Head is a chalk headland, The coastline to the south is made of soft bolder clay.
- The bolder clay is eroded by the powerful waves from the North Sea causing hydraulic action, abrasion etc.
- Eroded material in transported south by longshore drift and is deposited in the south in the estuary (mouth) of the River Humber and has created a large spit – Spurn Head

Effects

- 29 villages lost since Roman times. Many more houses now at risk especially at towns of Mappleton, Hornsea and Withernsea
- House prices have reduced – as little as £1
- Farmers are losing high quality, arable land to erosion
- Important habitats are being lost

Management

- Groynes, Rock Armour (granite) and Sea Walls added. Beaches have been nourished too to add more material.
- Some areas have been left to be eroded – Managed Retreat

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.

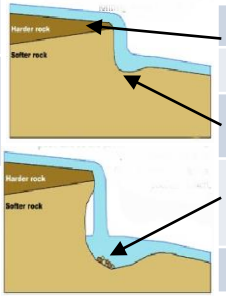
***Physical:* Relief**
Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.

***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.

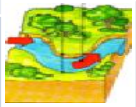
5) Waterfall retreats leaving steep sided gorge.

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.

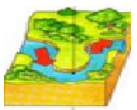
Formation of Ox-bow Lakes

Step 1



Erosion of outer bank forms river cliff. Deposition inner bank forms slip off slope.

Step 2



Further hydraulic action and abrasion of outer banks, neck gets smaller.

Step 3

Erosion breaks through neck, so river takes the fastest route, redirecting flow

Step 4

Evaporation and deposition cuts off main channel leaving an oxbow lake.

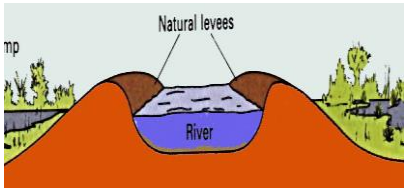
Lower Course of a River

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

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.

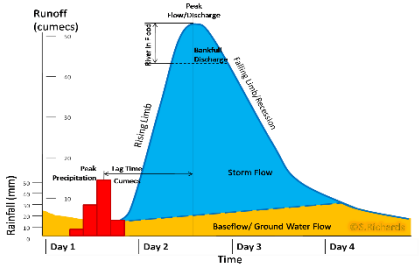
Hard Engineering

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

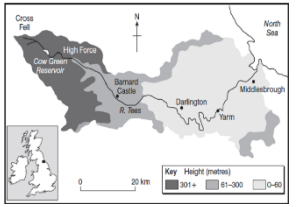
1. **Peak discharge** is the discharge in a period of time.
2. **Lag time** is the delay between peak rainfall and peak discharge.
3. **Rising limb** is the increase in river discharge.
4. **Falling limb** is the decrease in river discharge to normal level.



Case Study: The River Tees

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

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
-Towns such as Yarm and Middleborough are economically and socially important due to houses and jobs that are located there.
-Dams and reservoirs in the upper course, controls river's flow during high & low rainfall.
- Better flood warning systems, more flood zoning and river dredging reduces flooding.

Unit 2a

Urban Issues & Challenges

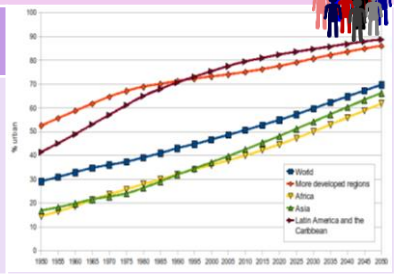
AQA

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 word 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.**

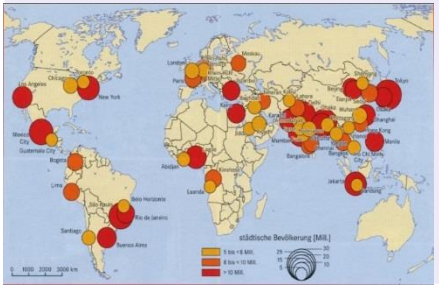
Push	Pull
• Natural disasters • War and Conflict • Mechanisation • Drought • Lack of employment	• More Jobs • Better education & healthcare • Increased quality of life. • Following family members.

Natural Increase (2) — **When the birth rate exceeds the death rate.**

Increase in birth rate (BR)	Lower death rate (DR)
• High percentage of population are child-bearing age which leads to high fertility rate. • Lack of contraception or education about family planning.	• 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 then.

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.

Sustainable Urban Living Example: BedZed

Background & Location	Sustainable Strategies
The Beddington Zero Energy Development is in Beddington, near Croydon in South London. It includes 82 homes.	▪ Large, south facing windows to maximise natural light and reduce the use of electricity. Triple glazing for insulation. ▪ Excellent bike parking facilities and close to a tram stop, bus stop and train station. People are less dependent on cars. ▪ Recycling facilities including for waste water

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: Croydon Tram

The Croydon tram transports people around the centre of Croydon and to other parts of South London e.g. Wimbledon.
It carries a lot of people between home and work and therefore reduces the number of cars on the road.
It connects with bus and train routes so is part of an integrated transport system.
It is electric so does not add to air pollution.

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: London Case Study

Location and Background

Located in SE of England
On the river Thames – built at the lowest bridging point
Grew from Roman settlement • Centre of trade due to docks.

City's Importance

- **.UK capital**
- **Financial capital**
- **Seat of government**
- **Richest city**
- **HQ of many large TNCs**
- **Leading universities**
- **Culture, entertainment, tourism**
- **Sporting events e.g. Wimbledon, Boat Race, Premiership Football**
- **Attracts much investment**

Growing Population

- **2015 – 8.6 million**
- **Huge growth during industrial revolution • 10 million by 2030predicted**
- **Very young population – e.g. 20/30s moving to London for work and social life**
- **Younger more likely to have children so high natural increase**
- **Many immigrants – net migration**
- **Diverse population – Shoreditch – cultural mix**

City's Opportunities

Social: Migration and multiculturalism has been advantageous for London e.g. food, BBC Asian radio, Notting Hill carnival

Economic: Biggest contributor to UK economy £274 billion (22% of total). Better educated. More managerial jobs. Range of jobs huge and financial centre. Integrated transport

Environmental: Urban greening – 47% of city is green. Produce oxygen, reduce danger of flooding, Reduce stress and allow for recreation.

City Challenges

Social: One of the big issues for London and other parts of the UK is INTEGRATION. Can all speak English, does it create ghettoes, problems in schools and hospitals. Urban deprivation (life expectancy, education etc.)

Economic: Higher than average rates of unemployment. Wages, although high, are not rising in line with housing meaning affordable housing is an issue. Congestion causes problems.

Environmental: With space at a premium how do we protect existing green spaces? Use all of brownfield and continue regeneration e.g. London Docklands and Lower Lea Valley.

Olympic Regeneration Projects, Stratford

Aims: Regeneration of Lower Lea Valley as part of new Olympic site for 2012 Olympics.
Obstacles: Putting land together under ODA Existing landowners leaving by 2007 Decontaminating land Removing electricity pylons Building of bridges to link sites

Positives	Negatives
The athletes' village has been relaunched as a housing estate. Unemployment OVERALL fell across London. Stadiums 25% recycled materials.	Poorer people properties demolished. Cost £8.77 billion of taxpayers money. Rents and property prices have gone up. Many materials came from overseas

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

Location and Background

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.

City's Importance

- **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

The city began when Portuguese settlers with slaves arrived in 1502. Since then, Rio has become home to various ethnic groups.

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.

This expanding population has resulted in the rapid urbanisation of Rio de Janeiro.

City's Opportunities

Social: Standards of living are gradually improving. The Rio Carnival is an important cultural event for traditional dancing and music.

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.

Environmental: The hosting of the major sporting events encouraged more investment in sewage works and public transport systems.

City Challenges

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.

Economic: The rise of informal jobs with low pay and no tax contributions. There is high employment in shanty towns called Favelas

Environmental: Shanty towns called Favelas are established around the city, typically on unfavourable land, such as hills.

Self-help schemes - Rocinha, Bairro Project

- **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.**

Unit 2b
The Changing Economic World

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 indictors 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

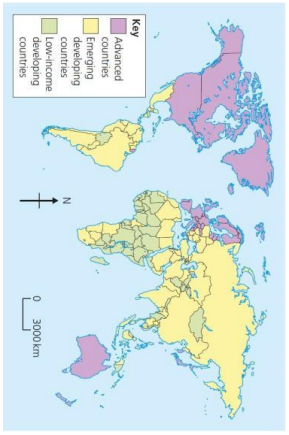
Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
Literacy rate	The percentage of population over the age of 15 who can read and write.
Life expectancy	The average lifespan of someone born in that country.

Mixed indicators

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

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.

Physical factors affecting uneven development

Natural Resources

- **Fuel sources** such as oil.
- Minerals and metals for fuel.
- **Availability for timber**.
- Access to **safe water**.

Natural Hazards

- Risk of tectonic hazards.
- Benefits from **volcanic material** and **floodwater.**
- Frequent hazards **undermines redevelopment**.

Climate

- **Reliability** of rainfall to benefit farming.
- **Extreme climates** limit industry and affects health.
- Climate can **attract tourists.**

Location/Terrain

- **Landlocked countries** may find trade difficulties.
- Mountainous terrain makes farming difficult.
- **Scenery attracts tourists**.

Human factors affecting uneven development

Aid

- 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

- 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

- 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

- **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

- **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

- **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.

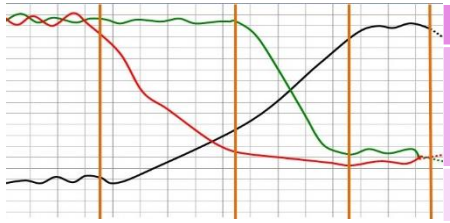
Consequences of Uneven Development

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.

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.

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.

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 Thailand

Location and Background
Thailand is a NEE in South East Asia. It is popular with tourists who are attracted by the tropical climate, exotic culture and beautiful beaches.

Tourist economy
-Tourism directly contributed $36.7 billion to the Thai economy in 2016. This is equivalent to 9.2 percent of total GNI.
- Tourism provides 5.73 million jobs for 15.1 percent of total employment

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.

Development and Environmental Problems
- Tourists do not always **spend much money** outside their resorts.
- Many workers in resorts like Phuket receive **low incomes**. Some rarely see their families as they have had to move so far.
- Tourists create **pollution** e.g. plastic litter left on beaches in Kho Phangan after full moon parties

Case Study: Economic Development in Malaysia

Location & Importance
Malaysia is a NEE in South East Asia. It is a tropical country just north of the equator.
The country's population is 37.5m.
The economy is growing fast making Malaysia a key player in rapidly changing region of the world.

Influences upon Malaysia's development

Political
Government has welcomed investment from TNC's.
They have invested in infrastructure and education.
Malaysia is a democracy but the media is heavily censored.

Social and Cultural
A highly educated workforce which has helped encourage FDI.
People have been willing to work very hard and have accepted relatively low wages.

Industrial Structures
75% of Malaysia's crop output is made up of the export crops of **rubber, palm oil and cocoa**.
Malaysia has moved into **manufacturing** and away from relying on primary products.
They have become leading exporters of **electrical appliances, electronic parts and components**

The role of TNCs
Investment from TNCs has provided jobs and grown the economy. **Shell** is involved in extracting Malaysian oil
HSBC operates in Malaysian banking (providing loans etc)

Changing Relationships
Malaysia is a member of **ASEAN** (Association of South East Asian Nations) which includes many other rapidly growing economies.
Main trading partners: Singapore, China, USA, Japan.

Environmental Impacts
The sea, rivers and air have been polluted by the discharge of waste products from factories.
Huge areas of tropical rainforest have been lost to the cultivation of crops such as oil palm.

Aid & Debt relief
Aid from the USA spent on areas such as anti terrorism strategies.
Developmental aid such as the building of dams have improved living standards and helped businesses develop.

Effects of Economic Development
Improvements in **Health Care** (increased life expectancy)
Improvements in **Education** (improved literacy)
HDI increased from 0.7 in 1996 to 0.79 in 2015, growing at an average annual rate of 0.67 %

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.

Unit 2c

The Challenge of Resource Management

AQA

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

Without enough nutritious food, people can become **malnourished**. This can make them ill . This can prevent people working or receiving education.

WATER

People need a supply of **clean and safe water** for drinking, cooking and washing. Water is also needed for food, clothes and other products.

ENERGY

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

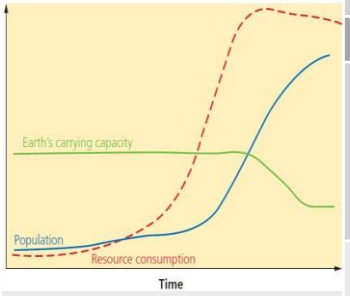
1. Population Growth

- 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**.

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!

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

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 faming 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**.

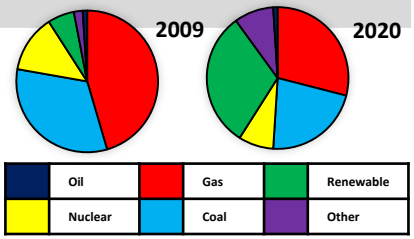
Energy in the UK

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

Water in the UK

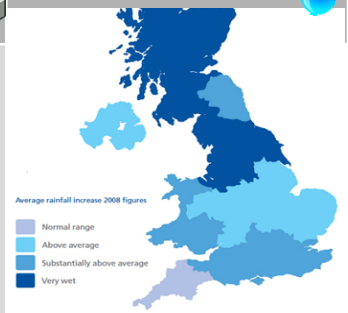
Growing Demand

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.

Management

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

Water Transfer

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

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

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.

Option 3: 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

- **Geology** determines the availability of fossil fuels.
- **Climate variations** will affect the potential use of renewable energy.
- **Natural disasters** can damage energy infrastructure.

Economic

- **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

- **New technology** is making once difficult energy sources now reachable/exploitable.

Political

- **Conflict** and turmoil in energy rich countries can affect exports.
- **Stricter regulations** over Nuclear.

Impact of Energy Insecurity

Sensitive environments

Exploration of energy resources threatens to harm sensitive areas such as the oil drilling in Alaska, USA.

Food production

Food production depends on the energy needed to power machinery and transport goods to different markets.

Energy conflict

Shortages of energy resources can lead to tensions and violence. Conflict can be caused by fear of energy insecurity.

Industry

Countries can suffer from shortfalls in energy leading to a decline in manufacturing and services.

Increasing Energy Supply

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.

C.S. UK Fracking

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

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.

C.S. NEE - Bihar, India

Husk Power Systems: electricity from crop waste. Local biomass, in the form of rice husks, is converted to electricity.

Benefits to the community

- Husk power plants supply power to 200,000 people
- Reduced need for diesel generators
- Opportunity to study in the evening