

Toynbee Curriculum


KS4 Knowledge Maps

GEOGRAPHY


Personal Best

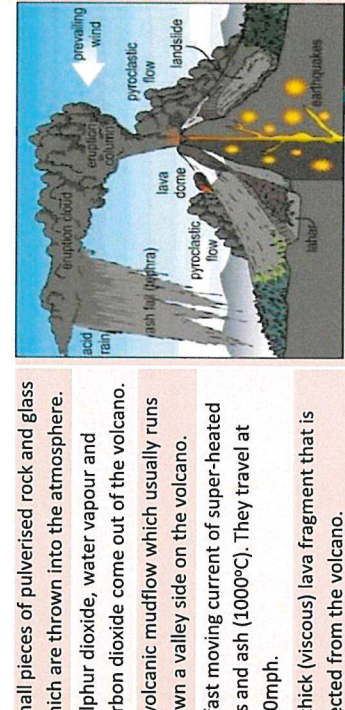
Toynbee School



	Warming 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.	

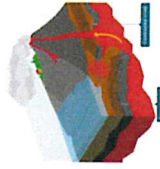
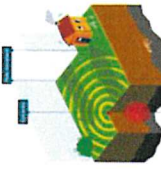

Earthquake Management
PREDICTING
Methods include:
<ul style="list-style-type: none"> Satellite surveying (tracks changes in the earth's surface) Laser reflector (surveys movement across fault lines) Radon gas sensor (radon gas is released when plates move so this finds that) Seismometer Water table level (water levels fluctuate before an earthquake). Scientists also use seismic records to predict when the next event will occur.

	LIC - CS: Haiti Earthquake 2010
Causes	On a conservative plate margin, involving the Caribbean & North American plates. The magnitude 7.0 earthquake was only 15 miles from the capital Port au Prince. With a very shallow focus of 13km deep.
Effects	230,000 people died and 3 million affected. Many emotionally affected. 250,000 homes collapsed or were damaged. Millions homeless. Rubble blocked roads and shut down ports.
Management	Individuals tried to recover people. Many countries responded with appeals or rescue teams. Heavily relied on international aid, e.g. \$330 million from the EU. 98% of rubble remained after 6 months.




Inner and outer core	Varies in thickness (5-10km) beneath the ocean. Made up of several large plates.	Ash cloud	Small pieces of pulverised rock and glass which are thrown into the atmosphere.
Mantle	Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection.	Gas	Sulphur dioxide, water vapour and carbon dioxide come out of the volcano.
	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.	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.

Convection Currents
the crust is divided into tectonic plates which are moving due to convection currents in the mantle.
Radioactive decay of some of the elements in the core and mantle generate a lot of heat.
When lower parts of the mantle molten rock (Magma) heat up they become less dense and slowly rise.
As they move towards the top they cool down, become more dense and slowly sink.
These circular movements of semi-molten rock are convection currents
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, it 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	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	Conservative plate boundary occurs where plates move in opposite directions, or in the same direction but at different speeds. This is responsible for earthquakes such as the ones happening along the San Andreas Fault, USA.		

What is a Natural Hazard	A natural hazard is a natural process which could cause death, injury or disruption to humans, property and possessions.
Geological Hazard	These are hazards caused by land and tectonic processes.
Meteorological Hazard	These are hazards caused by weather and climate.
Causes of Earthquakes	Earthquakes are caused when two plates become locked causing friction to build up. From this stress, the pressure will eventually be released, triggering the plates to move into a new position. This movement causes energy in the form of seismic waves to travel from the focus towards the epicentre. As a result, the crust vibrates triggering an earthquake.
	The point directly above the focus, where the seismic waves reach first, is called the EPICENTRE.
	SEISMIC WAVES (energy waves) travel out from the focus.
	The point at which pressure is released is called the FOCUS.

Unit 1a	AQA
The Challenges of Natural Hazards	

PROTECTION	You can't stop earthquakes, so earthquake-prone regions follow these three methods to reduce potential damage:
	<ul style="list-style-type: none"> Building earthquake-resistant buildings Raising public awareness Improving earthquake prediction
HIC - CS: Eyjafjallajökull (E15) Eruption, Iceland 2010	
Causes	The North-American and Eurasian plates move apart on a constructive plates.
	The disruption caused by Eyjafjallajökull was the result of a series of small volcanic eruptions from March to October.
Effects	The thick ice cap melted which caused major flooding.
	No reported deaths.
	Airspace closed across Europe, with at least 17,000 flights cancelled
	Costed insurers £65m to cancelled flights.
Management	Iceland had a good warning system with texts being sent to residents within 30 minutes.
	Large sections of European airspace were closed down due ash spread over the continent.
	Airlines developed ash monitoring equipment.

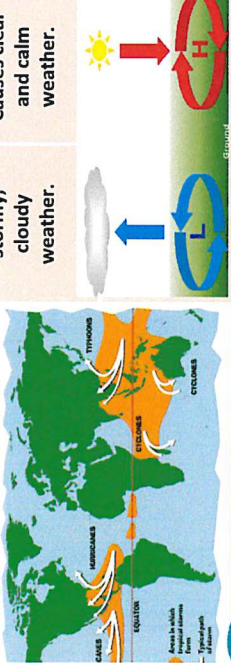
Atmospheric circulation is the large-scale movement of air by which heat is distributed on the surface of the Earth.



- Largest cell which extends from the Equator to between 30° to 40° north & south.
- Middle cell where air flows poleward between 60° & 70° latitude.
- Smallest & weakest 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.



Formation of Tropical Storms

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.

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.

With trade winds blowing in the opposite direction and the rotation of earth involved (Coriolis effect), the thunderstorm will eventually start to spin.

When the storm begins to spin faster than 74mph, a tropical storm (such as a hurricane) is officially born.

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.

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'.

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.

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

Prediction
Constant monitoring can help to give advanced warning of 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.

Causes
The heat wave was caused by an anticyclone (areas of high pressure) that stayed in the area for most of August. This blocked any low pressure systems that normally brings cooler and rainier conditions.

Effect

- People suffered from heat strokes and dehydration.
- 2000 people died from causes linked to heatwave.
- Rail network disrupted and crop yields were low.

Management

- The NHS and media gave guidance to the public.
- Limitations placed on water use (hose pipe ban).
- Speed limits imposed on trains and government created 'heatwave plan'.

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.

- Average global temperatures have increased by more than 0.6°C since 1950.
- Many of the world's glaciers and ice sheets are melting. E.g. the Arctic sea ice has declined by 10% in 30 years.
- 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

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.

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

International Agreements

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

1. What is an Ecosystem?

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

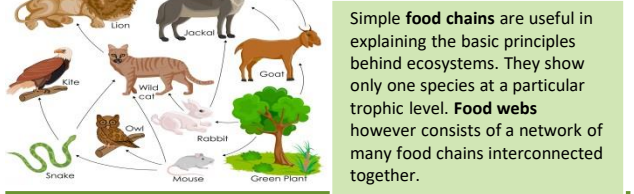
2. Ecosystem's Components

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.

3. Food Web and Chains

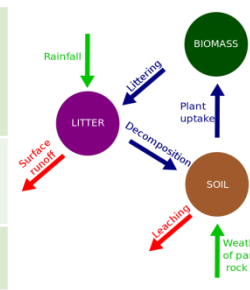


4. Nutrient cycle

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**.

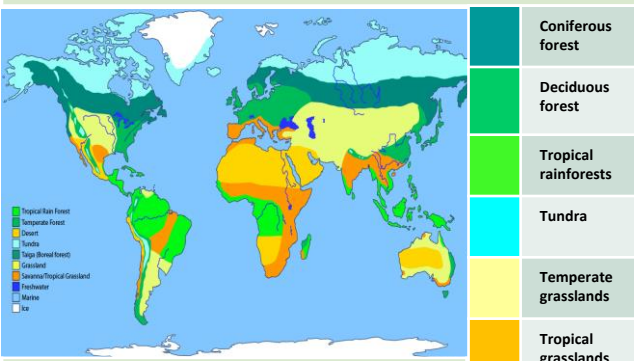
Litter This is the **surface layer** of vegetation, which over time breaks down to become **humus**.

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



5. 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**.

6. 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 hooved 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 (500-1500mm /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.
Polar	Arctic/Antarctic	Winter temps -50°C	Low precipitation	Some lichens and mosses on the edge of the ice	Polar bears in the North, Penguins in the South

7. UK Example small scale Ecosystem: Avington Park Lake, Winchester, Hampshire

Avington Park is a country estate near Winchester in Hampshire. Lack of maintenance in recent years resulted in the accumulation of silt and vegetation.

Components & Interrelationships		Management
Pond margin	Plenty of oxygen and light. Shelter for plants and insects for small animals to eat	<ul style="list-style-type: none"> - The lake is historical and ecological importance -Restoration of the lake was carried out in 2014 -The lake was desilted and redefined -New waterside habitats created to attract nesting birds and waterfowl
Pond surface	Animals breathe through gills, lungs or skin	
Mid water	Fish are main predators. Feed on surface or in pond.	
Pond bottom	Plenty of shelter. Decomposers and scavengers live here.	

Unit 1b The Living World

8. 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**.

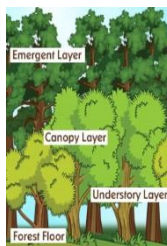
9. Interdependence in the rainforest

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.



10. 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.



12. Layers of the Rainforest

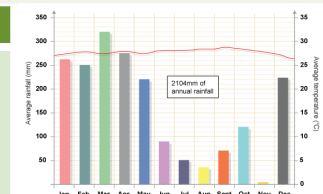
Emergent	Highest layer with trees reaching 50 metres .
Canopy	Most life is found here as it receives 70% of the sunlight and 80% of the life .
U-Canopy	Consists of trees that reach 20 metres high .
Shrub Layer	Lowest layer with small trees that have adapted to living in the shade .

11. 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**.

13. 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.



14. Tropical Rainforests: Case Study of Malaysian rainforest, S E Asia

Malaysia is in S E Asia. It is made up of Peninsular Malaysia and East Malaysia which is part of the island of Borneo. The natural vegetation is tropical rainforest. 67% of land in Malaysia is covered by rainforest.

Adaptations to the rainforest

Howler monkeys	Strong prehensile tails let them grip and hang from branches..
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

What are the causes of deforestation?

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 soy beans provide valuable income for countries.
- Soil is rapidly degraded making farming and cattle ranching unsustainable.

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**.

Logging

- Malaysia was the world's largest exporter of tropical wood in the 1980s
- **Clear felling** – all trees in an area felled – resulted in total destruction of forest habitats.
- **Selective logging** has since replaced clear felling,

Mineral Extraction

- **Mining (mainly tin and smelting)** is common
- Drilling for **oil and gas** has recently started on Borneo
- **Indigenous people** are becoming **displaced** from their land due to roads being built to transport products.

Energy Development

- The **high rainfall** creates ideal conditions for **hydro-electric power (HEP)**.
- The **Bakun Dam** creates energy, but it flooded over 700 km² of forests and farmland.

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 certain 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.
- **Monitoring** - use of satellite technology and photography to check that any activities taking place are legal and follow guidelines for sustainability

Agriculture

- Large scale **'slash and burn'** to provide nutrients for the soil.
- Increases **carbon emissions**. The fires can burn out of control destroying large areas of forest.
- Tribal people are subsistence farmers on a small scale which is sustainable.

Population growth

- **Population growth and migration** are putting pressure on the rainforest.
- Between 1956 and the 1980s poor urban people were encouraged to **migrate** to the countryside. **15 000 hectares of rainforest** was felled for them

Road Building

- **Roads** are needed to bring supplies and **provide access** to new mining areas, settlements and energy projects.
- **Logging** needs roads to bring in machinery and take away logs.

15. Cold Environments: Case Study Svalbard

Svalbard is a Norwegian territory in the Arctic Ocean and is the most northerly permanently inhabited group of islands in the world. It has five major islands, 60% of which are covered in glaciers and the rest of the land is tundra. There are no trees – it's too cold! Most of the population lives in Longyearbyen on Spitzbergen, the largest island.

Distribution of cold environments

Most of the world's old environments (both polar and tundra) are found in high latitude areas and mountainous regions of the world



Major characteristics of cold environments

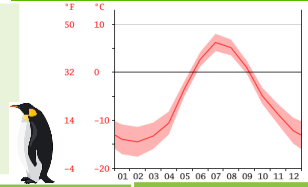
- **Climate** – very cold winter temperatures below -20degC
- **Soils** - permanently frozen
- **Plants** - mosses and lichens in polar regions; some flowering plants and small bushes in tundra regions..

Cold environment inhabitants

- There is a serious risk of frost bite so people have become used to having to wear several layers to make it safe to work outside
-Water and sewage pipes are over ground and heated to prevent them freezing

Climate of cold environments

- At or below zero degrees Celsius for long periods
- The most extreme cold environments e.g. Antarctica, temperatures are below zero all year
- Less extreme environments e.g. Canada and parts of Iceland just have very cold winters.



BEARBERRY ADAPTATIONS

- Silky hairs help keep warm
- Low growing plant helps it stay out of the wind
- Only survives in Tundra because they only grow in dry areas

Adaptations to cold environments

Polar bears

- To retain heat they have **thick fur** and an **insulating layer of fat** with a **black nose and foot pads** to absorb sunlight.

Penguins

- **Huddle together** in large numbers to keep warm
- Lay their eggs on land but **incubate them on their feet** and under their fur

Opportunities and challenges in cold environments

Opportunities

- **There are valuable minerals** e.g. coal for industries and **construction**.
- **The coal mined on Svalbard** is burned to generate electricity for the whole of the island
- **The seas around Svalbard** are one of the richest fishing grounds
- **Tourists** are attracted to Svalbard to explore its extreme natural environment

Challenges

- **The extreme cold** makes it dangerous to work outside
- **Construction can only take place in summer** when its warmer and the ground isn't frozen
- **Most services** e.g. water, sanitation are provided by **overground pipes to prevent them freezing**.
- **Access is difficult and Svalbard can only be reached by plane or ship**. There are few roads on the island and most people use snowmobiles to get around.

Cold Environments under threat

Cold environments are extremely fragile and can easily be damaged by human activities.

Off-road vehicle damage

A popular tourist activity in Alaska that takes place in summer when the snow has melted. Leaves deep tyre tracks and damage which will take years to recover

Minor developments

Such as constructing a footpath can have serious long term effects. The fragile environments take a long time to recover

Economic development

Rich reserves of oil and gas are in high demand as energy sources. To extract the oil and gas, roads are built through forests and buildings constructed. This has a huge impact on the environment.

Managing cold environments

- **Technology** - Monitoring the trans-Alaskan oil pipeline to keep the oil moving
- **Action by governments – Alaska** - Ensures companies extracting oil protect the environment. They also protect fisheries and marine habitats
- **International Agreements – Antarctic Treaty** - protects Antarctica by controlling tourism and preventing development.
- **Conservation groups – WWF** - works with local communities to manage critical ecosystems.

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.

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



The Demographic Transition Model

LICs (Low income country)

Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.

NEEs (Newly Emerging Economy)

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 (High income country)

These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.

Causes of uneven development

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



Unit 2b The Changing Economic World

Physical factors affecting uneven development

Natural Resources

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

Climate

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

Natural Hazards

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

Location/Terrain

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

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.

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 & 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.

Microfinance Loans
 This involves people in LICs receiving small loans from additional banks.
 Loans enable people to begin their own businesses
It's not clear they can reduce poverty at a large scale.



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 goods produced.
 Paid fairly so they can develop schools & health centres.
Only a tiny proportion of the extra money reaches producers.



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

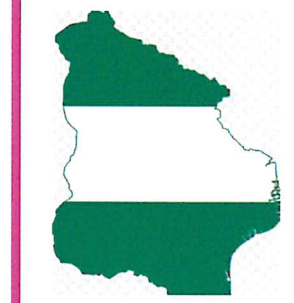


Tourist economy
 In 2015, 2.12 million visited. Tourism contributes 27% of GDP and will increase to 38% by 2025.
 30,000 jobs rely on tourism. Global recession 2008 caused a decline in tourism. Now tourism beginning to recover.

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.

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



Influences upon Nigeria's development

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

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

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

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

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

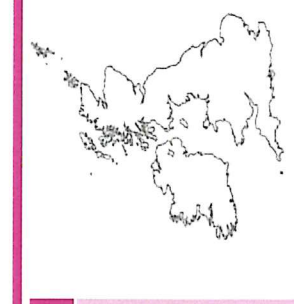
Changing Relationships
 Nigeria plays a leading role with the African Union and UN. Growing links with China with huge investment in infrastructure. Main import includes petrol from the EU, cars from Brazil and phones from China.

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

Aid & Debt relief
 + Receives \$5 billion 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.

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

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

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




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

Resource Challenges

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

Significance of Water

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

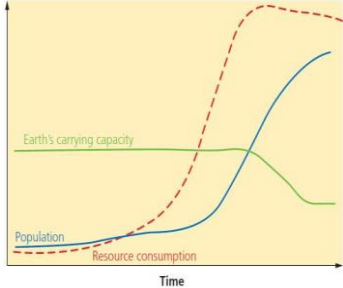
FOOD 	WATER 	ENERGY 
Without enough nutritious food, people can become malnourished . This can make them ill. This can prevent people working or receiving education.	People need a supply of clean and safe water for drinking, cooking and washing. Water is also needed for food, clothes and other products.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

Demand outstripping supply

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

1. Population Growth

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



3. Changing Technology and Employment

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

2. Economic Development

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

Resource Reliance Graph

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

Resource consumption exceeds Earth's ability to provide!

Food in the UK

Growing Demand

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

Impact of Demand

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

Agribusiness

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

Sustainable Foods

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

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

Water in the UK

Growing Demand

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

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

Deficit and Surplus

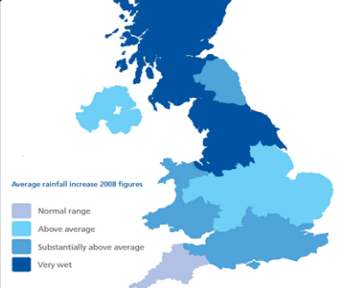
The north and west have a **water surplus** (more water than is required).
 The south and east have a **water deficit** (more water needed than is actually available).
 More than half of England is experiencing **water stress** (where demand exceeds supply).

Pollution and Quality

Cause and effects include:

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

Water stress in the UK



Unit 2c

The Challenge of Resource Management

Energy in the UK

Growing Demand

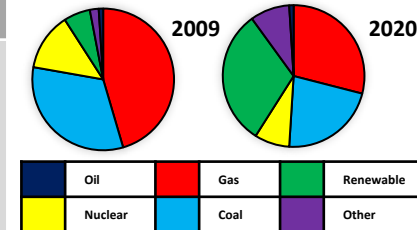
The UK **consumes less energy** than compared to the 1970s despite a smaller population. This is due to the **decline of industry**.

Changes in Energy Mix

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

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**.



Management

UK has **strict laws** that limits the amount of discharge from factories and farms.

Education campaigns to inform what can be disposed of safely.
Waste water treatment plants remove dangerous elements to then be used for safe drinking. Pollution traps catch and filter pollutants.

Water Transfer

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

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

Energy in the UK (continued)

Significance of Renewables

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

Exploitation

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

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

Option 2: WATER



Water security is when people have good access to enough clean water to sustain well-being and good health. Water insecurity is when areas are without sufficient water supplies. Water Stress is when less than 1700m³ is available per person.

Human



- **Pollution caused** from human and industrial waste being dumped into peoples water sources.
- **Poverty prevents** low income families affording water.
- **Limited infrastructure** such as a lack of water pipes and sewers.
- **Over-abstraction** is when more water is taken than is replaced.

Physical



- **Climate** needs to provide enough rainfall to feed lakes and rivers. Droughts affect supply if water.
- **Geology** can affect accessibility to water. Permeable rock means sourcing water from difficult aquifers, whereas impermeable allows water to run-off into easily collected basins.

Impact of Water Insecurity



Food production

The less water available for irrigating crops the less food that will be produced. This could lead to starvation.

Industrial output

Manufacturing industries depend heavily on water. A severe lack of water can impact economic output.

Disease and Water Pollution

Inadequate sanitation systems pollutes drinking water causing diseases such as cholera and typhoid.

Water conflict

Water sources that cross national borders can create tensions and even war between countries.

Increasing Water Supply



C.S. Lesotho Highland Water Project



Water diversion - Involves diverting water to be stored for longer periods. Often water is pumped underground to prevent evaporation.

Dams and Reservoirs - Dams control flow and storage of water. Water is released during times of water deficit.

Water transfer – includes schemes to move water from areas of surplus to areas of deficit.

Desalination – Involves the extraction of salt from sea water to produce fresh drinking water.

Lesotho is a highland country dependent on South Africa. Lesotho has water surplus due to high rainfall.

Advantages

- Provides 75% of Lesotho's GDP.
- Provides water to areas of drought in South Africa.

Disadvantages

- Dams displaced 30,000 people.
- Destruction to key ecosystems.
- 40% lost through pipe leakages.

Sustainable Water Supply



C.S. NEE - The Wakel River Basin



Ensures water supplies don't cause damage to the environment whilst also supporting the local economy.

A project in India that aims to improve water use by encouraging greater use of rainwater harvesting techniques.

Water conservation - Aims to reduce the amount of water wasted.

Groundwater Management - Involves the monitoring of extracting groundwater. Laws can be introduced.

Recycling and 'Grey' Water - Means taking water that has already been used and using it again rather than returning it to a river or the sea.

This includes water taken from bathrooms and washing machines.

How does the project work?

- Provides 'taankas' that store water underground.
- Small dams called 'johed' interrupt water flow and encourages infiltration.
- Villages take turns to irrigate their fields so water is not overused.
- Maintained by farmers so it is entirely sustainable.
- Greater education for awareness.

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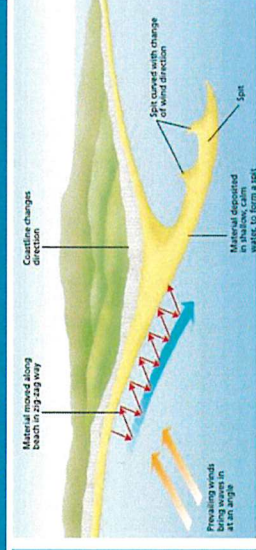
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+600m: Peaks and ridges cold, misty and snowy common. i.e. Scotland
Areas - 200m: Flat or rolling hills. Warmer weather. i.e. Fens

Formation of Coastal Spits - Deposition



Example: Spurn Head, Holderness Coast.

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

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.

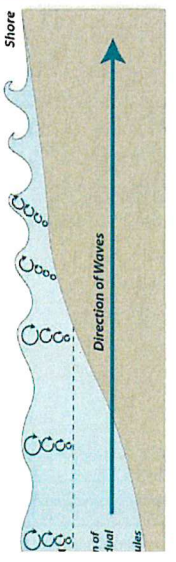
Why do waves break?

Waves start out at sea.

As waves approaches the shore, friction slows the base.

This causes the orbit to become elliptical.

Until the top of the wave breaks over.



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 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.

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.

Unit 1c

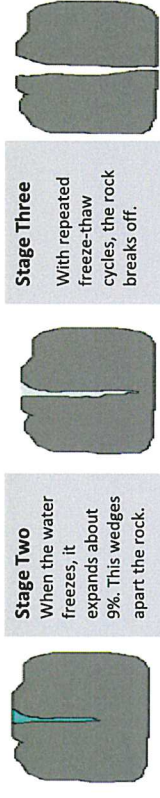


What is Deposition?

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

Physical Landscapes in the UK

Mechanical Weathering Example: Freeze-thaw weathering



Types of Waves

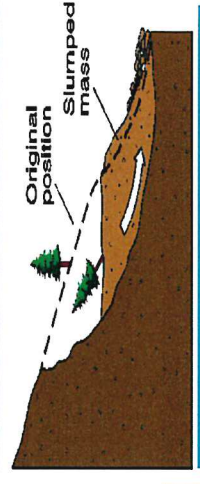
Constructive Waves	This wave has a swash that is stronger than the backwash. This therefore builds up the coast.
Destructive Waves	This wave has a backwash that is stronger than the swash. This therefore erodes the coast.

Size of waves

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

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.

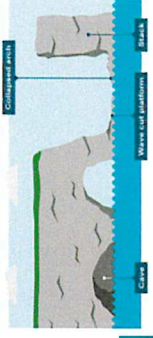


Formation of Bays and Headlands



- 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.

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.

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.
Rock Piles or Riprap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	<ul style="list-style-type: none"> Cheap Local material can be used to look less strange. Will need replacing.

Soft Engineering Defences

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

Case Study: Hunstanton Coast

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

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

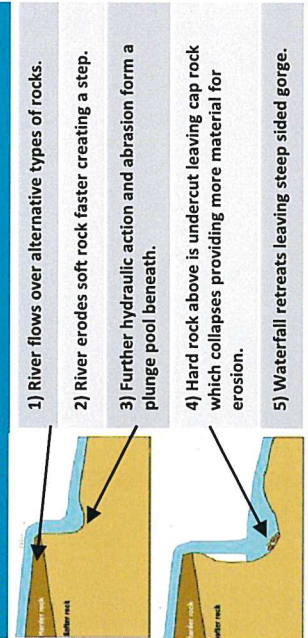
Management
 Hunstanton is protected by a number of groynes. These trap sand to build up the beach for better protection.
 The town is also protected by large sea walls to prevent flooding and deflect the waves energy.
 £5 million has been spent on beach nourishment to add sediment to the beach for increased protection against flooding.

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, Prolong & heavy rainfall	<p>Physical: Geology Impermeable rocks causes surface runoff to increase river discharge.</p> <p>Human: Land Use Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.</p>

Upper Course of a River

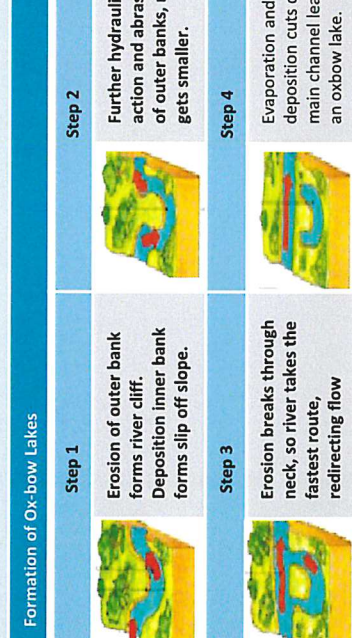
Near the source, the river flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

Formation of a Waterfall

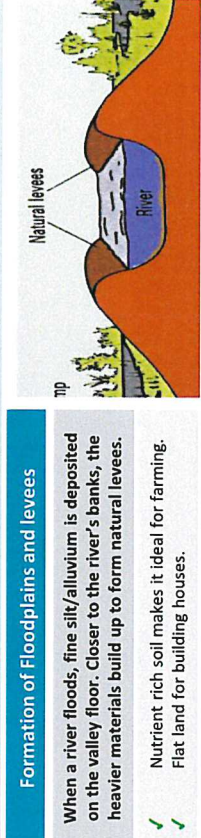


Middle Course of a River

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.



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

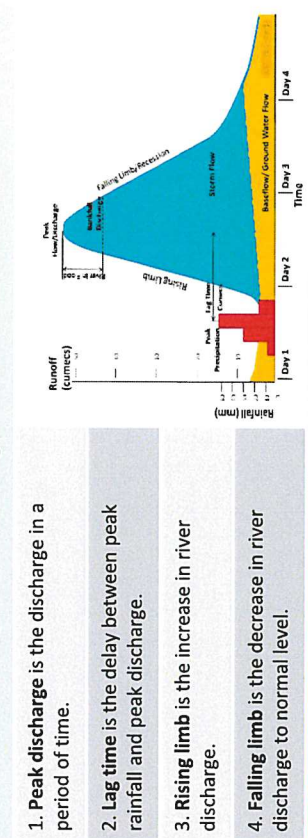


River Management Schemes

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

Hydrographs and River Discharge

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



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.

Geomorphologic 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.