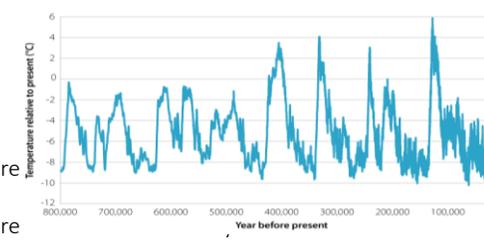
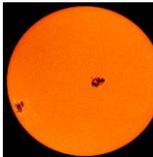
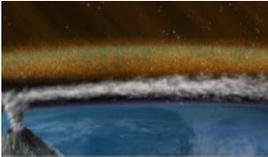
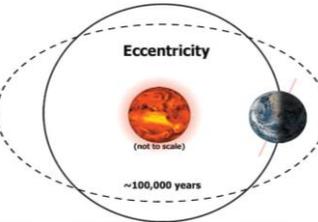
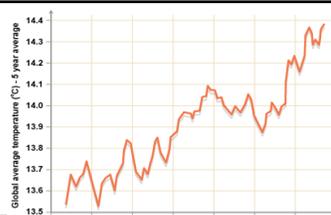


KS3 Geography Knowledge: Climate Change

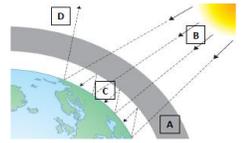
<p>How have global temperatures changed over the past 800,000 years?</p> <p>More specifically.....</p>	<p>Over the past 800,000 years the earth's climate has fluctuated with periods of warm weather and periods of colder weather.</p> <p>300,000 years ago, average global temperatures were warmer than today, where as approximately 420,000 years ago, average global temperatures were</p> 
<p>HISTORICAL RECORDS</p>	<p>Historical documents show that temperature changes have resulted in periods of history where the earth was colder than today (glacials) and warmer than today (interglacials). <i>During the Little Ice Age, Napoleon's army froze to death.</i></p>
<p>PAINTINGS</p>	<p>Paintings from 1677 show that the Thames was previously frozen over!</p>
<p>Geological time scale</p>	<p>Is a calendar of rocks through time. It can be used to identify time periods or climate patterns from a rock or fossils.</p>

NATURAL CAUSES OF CLIMATE CHANGE

<p>Solar output</p>	<p>A sunspot is dark patch on the sun that appears from time to time. Every 11 years the number of sunspots changes from very few to lots to very few again.</p> <p><i>Lots of sunspots = warmer Very few sunspots = cooler</i></p> <ul style="list-style-type: none"> <i>During 1645–1715 there were very few sunspots. During this time, there was a very cold period known as the 'Little Ice Age'.</i> 
<p>Volcanic Activity</p>	<p>Violent volcanic eruptions blast lots of ash, gases (e.g. sulphur dioxide) and liquids into the atmosphere. Major volcanic eruptions lead to a brief period of global cooling. This is because the ash, gases and liquids can block out the sun's rays, reducing the temperature.</p> <ul style="list-style-type: none"> <i>Pinatubo 1991 eruption = world temperatures fell by 0.5°C for a year.</i> 
<p>Orbital Change</p>	<p>Orbital change refers to changes in how the earth moves round the sun. It affects how close the earth is to the sun and therefore how much energy we get from the sun. When the earth is very close to the sun, it is warmer. When the earth is further away from the sun, it is cooler.</p> <ul style="list-style-type: none"> <i>Eccentricity: how the earth orbits the sun. Every 100,000 years the orbit changes from circular to elliptical (egg-shaped). This affected how earth is to the sun.</i> 

<p>How has global temperature changed since 1860?</p> <p>More specifically...</p>	<p>More recently the earth's temperature has shown a rapidly warming trend, with average temperatures continuing to grow.</p> <p><i>In 1883, the average temperature was 13.5°C, whereas in 1960 the average temperature had risen to 14.0°C. By 1985, the average temperature had risen to almost 14.4°C.</i></p> 
<p>THERMOMETER RECORDS</p>	<ul style="list-style-type: none"> Average global temperatures have risen by 0.8°C in the last 100 years. Most of the warming has occurred recently. In the last 35 years, average temperatures have risen by 0.5°C. The 20 warmest years on record have all come since 1995. The five warmest years on record have come since 2010, with 2016 being the warmest year yet.
<p>SATELLITE IMAGES</p>	<p>Arctic ice cover has decreased since the 1970s. It has reduced by approximately 4% and has halved in thickness in many places.</p>
<p>SEA LEVEL RISE</p>	<p>Rises in temperature and melting ice sheets has resulted in a rise in sea levels.</p>

HUMAN CAUSES OF CLIMATE CHANGE

<p>The Greenhouse Effect</p>	<ol style="list-style-type: none"> Humans produce greenhouse gases, which create a blanket around the earth. Sunlight travels to earth as shortwave radiation. Sunlight bounces off the earth's surface as long-wave radiation. This reflected sunlight is trapped in the earth's atmosphere by the greenhouse gases = earth heats up. <p>A) Some heat does manage to escape.</p> 
<p>How does human activity = greenhouse gases?</p> <p>Methane</p> <p>Humans are to blame because....</p>	<p>Cows produce a methane when they fart, belch and poo. Methane is a GHG that traps longwave radiation in the earth's atmosphere.</p> <p><i>The world's population is rising and countries are becoming more developed = there are more people and more families that have money to spend on food (e.g. meat) = rising demand for meat = more animals farmed = more methane produced.</i></p>
<p>Carbon dioxide CO₂</p> <p>Humans are to blame because....</p>	<p>CO₂ is the GHG that people are most worried about. CO₂ adding to the atmosphere fastest.</p> <ul style="list-style-type: none"> ➤ Fossil fuels (coal, gas, oil) are burnt to make energy = carbon dioxide is released into the atmosphere. ➤ Humans drive cars, which release carbon dioxide, nitrous oxide and methane into the atmosphere. <p><i>Rising population and more developed countries = increased demand for electricity = more carbon dioxide produced.</i></p>

EFFECTS OF CLIMATE CHANGE

<p>Sea level rise due to melting ice sheets = flooding in low lying countries (Bangladesh). 80% of people exposed to river flooding live in developing countries.</p>	<p>Extreme weather (drought) = crops will die = famine. A famine occurred in Somalia (2008-9) where 258,000 died due to a lack of food.</p>	<p>Pests & diseases: mosquitoes love hot weather. Global warming will = 90 million people will be exposed to malaria by 2030.</p>	<p>Extreme weather events = increase in refugees as people are forced to leave their homes due to famine or flooding.</p>	<p>Habitats will be lost due to extreme weather associated with climate change.</p>	<p>Pests & diseases: an increase of 2°C will mean more pests = more crops will die. <i>E.g. wheat yields losses will increase by 46% in countries such as China.</i></p>	<p>Extreme weather (hurricanes). In 2017 there were 83 storms and 42 hurricanes. This was above average. Climate change will result in more hurricanes in the future.</p>
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KS3 Geography Knowledge: Climate Change

CASE STUDY OF HOW CLIMATE CHANGE AFFECTS LICs: BANGLADESH FLOODS	
Location:	Southern Asia, along the Tropic of Cancer. It neighbours Burma, India and the Indian Ocean.
How has climate change increased flooding?	<ul style="list-style-type: none"> It's low altitude (<10m above sea level) and long coastline (580km) makes it vulnerable to sea level rise. The Himalayas lie to the north of Bangladesh. The ice and snow melts in the summer, which then rushes down into the rivers in Bangladesh. This occurs more due to increased temperatures. Bangladesh is prone to cyclones and monsoonal rains which bring a huge amount of rain. Due to climate change, these storms will occur more often.
Primary effects	<ul style="list-style-type: none"> 1000s of homes were destroyed Rice fields were underwater, crops died. In 2020, 0.15 million hectares crop lands were damaged in two successive floods Salt water got into the ground water, which meant drinking water was contaminated. Storm surges contaminated drinking water Land lost to the sea, due to sea level rise. Predicted that by 2050 over 17% of Bangladesh will be lost Roads and transport links are destroyed
Secondary effects	<ul style="list-style-type: none"> 1000s of people were evacuated Farmers lost their livelihood and land Waterbourne diseases such as cholera spread. 5000 people in the 2020 floods suffered from diarrhoea and water-borne disease. Mass migration. People leave the area and move to the near by cities. In 2020 it was recorded that in Bangladesh, 4.4 million people have been displaced due to disasters such as flooding) Trade was reduced = less income/GDP

CASE STUDY OF HOW CLIMATE CHANGE AFFECTS THE UK	
Where is the UK located?	The UK is located in the west of Europe. It is made up of England, Scotland, Wales and Northern Ireland.
How has climate change increased flooding?	<ul style="list-style-type: none"> Extreme weather will be more common – floods, droughts, heatwaves...etc. Sea level will cause coastal flooding
Negative effects	<ul style="list-style-type: none"> Flooding due to extreme weather (precipitation and storms) and sea level rise. The number of people at risk of flooding is likely to double to 1.9 million by 2050. Current flooding costs the UK £1.9 million. Sea level rise and storms = more coastal erosion. It is expected that sea levels will rise by 1 – 2m by 2080. The most at risk areas will be soft rock coastlines, such as South Wales, North-West Scotland, Yorkshire and the Thames Estuary. Water shortages due to extreme weather (lack of precipitation). Many places will have a lack of water. Increases in temperature can lead to heatwaves, such as the 2003 heatwave, during which temperatures reached 38.5° C = 2045 deaths. This will become normal summer weather by the 2040s. Climate change in other countries (Kenya, Peru, Indonesia) will affect crop yields in these countries. The UK will suffer as it will be more difficult to import food from these countries.
Positive effects	<ul style="list-style-type: none"> A warmer, wetter climate will increase crop yields in the UK. Tourism will increase due to warmer weather = more jobs and income for the UK.

What has the UK pledged to do about climate change under the Paris agreement?	
The Paris Agreement	<ul style="list-style-type: none"> The Paris Agreement – an international agreement to tackle climate change and it's effects. 196 countries are involved. Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in line with Article 4 of the Paris Agreement. The UK = pledged to Reduce their emissions by 68% by 2030 compared to 1990 levels To keep the global temperature increase below 2 degrees above pre-industrial levels. At best max 1.5 degrees below. Implemented a Climate Change Act in 2008 to make it law that Climate Change is combatted. The UK = target of 'Net Zero by 2050. (doesn't mean no carbon emissions but, the UK should offset what it does produce.

How is the UK responding climate change?	
Improving public transport	<p>The UK government has invested £840million in public transport across 10 UK cities.</p> <p>London have improved buses = more people use the bus & less drive = less greenhouse gases.</p> <ul style="list-style-type: none"> ➤ Live information boards at bus stops tell bus users when their bus will arrive making it easier. ➤ Bus lanes give buses priority on the roads = shorter journey times. <p>Cycle hire schemes in UK cities encourage people to cycle rather than drive = less greenhouse gas emissions.</p>
National Parks	Planting trees and preventing deforestation = more trees = more photosynthesis = more carbon dioxide removed from the atmosphere = less global warming. Many governments have created national parks to protect trees. <i>The Gola Forest (Sierra Leone - Africa) is a national park that protects 71,000 hectares of trees.</i>
Renewable energies	Generating energy from natural renewable sources (<i>solar panels, hydro-electric power, wind turbines</i>). They do not produce greenhouse gases.

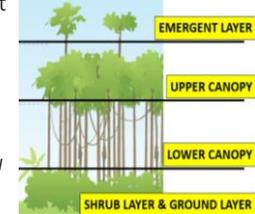
How can you make a difference?	
Making a difference	<ul style="list-style-type: none"> Speak up - Make your voice heard, share your opinions on climate change. Share your climate change knowledge so that people understand their impact. Join a charity, action group, school project to bring about change locally/globally - Take action and join a group that has a larger audience to get your voices heard. Join in community events – safely and peacefully. Join marches or protests (safely with permission) and take a stand against climate change Lobby the government. Contact your local MP or government representative asking them to act on climate change Make changes to your lifestyle Small changes can make a difference and reduce your impact. <p>In your Academy consider how you can improve the following:</p> <p>The type of lighting – Waste and Recycling –Energy usage and type of energy used- Type of windows</p> <p>What improvements could be made to reduce your academy's carbon emissions and contribution to climate change</p>

International agreements	<p>Many of the governments around the world meet to discuss climate change and how they can work together to reduce global carbon emissions. <i>In 2016 world leaders met at the Paris Climate Summit where 196 countries signed a climate agreement, where they promised to:</i></p> <ul style="list-style-type: none"> ➤ Reduce greenhouse gas emissions and keep global temperature increase below 2°C. ➤ HICs to support LICs by providing \$100 billion per year
Local Responses	<ul style="list-style-type: none"> ➤ Solar panels: <i>Using the sun to create energy, therefore less fossil fuels are burned.</i> ➤ Insulation and double-glazed windows Traps heat in the house = less heating is needed = less energy used = less fossil fuels burned. ➤ A shower instead of a bath: Less water is used = less heating is needed for water = less energy used = less fossil fuels burned ➤ Switch off electrical goods: Prevents the overuse of energy. . ➤ Turn down heating: Less energy is used = less fossil fuels are burned. ➤ Use low energy light bulbs: Less energy is used = less fossil fuels are burned.

KS3 Geography Module: Ecosystems

An ecosystem is an area, within which plants and animals interact with each other and their non-living environment (rock, soil, climate). They can be as small as a hedgerow or pond. Larger ecosystems are known as biomes (tropical rainforest, the desert).

Rainforest <ul style="list-style-type: none"> • Location • Climate • Vegetation 	<ul style="list-style-type: none"> • Along the equator in central Africa (Nigeria, Congo), south-east Asia (Malaysia, Indonesia), north Australia and South America (Brazil, Peru). • Humid (hot & wet). The average daily temperature is 28°C. It t never goes below 20°C. and rarely above 35°C. It receives at least 2000mm of rain each year. There are no real seasons. • Very dense vegetation. There are over 1,000 different types of trees including hardwoods such as mahogany and greenheart. There are four layers of vegetation in the tropical rainforest. The vegetation has had to adapt, in order to survive with the constant high temperatures and the heavy rainfall.
	<ul style="list-style-type: none"> ➢ <i>The trees grow over 40 metres tall to get sunlight. Large buttress roots anchor the tall trees and prevent them falling over.</i> ➢ <i>The leaves have drip tips to shed the heavy rainfall.</i> ➢ <i>Lianas are vine like plants. They use large trees as support to climb up to the canopy.</i> ➢ <i>The forest floor is dark as the leaves block out the sunlight. As a result, the leaves in this lower level are very large as they try to catch as much sunlight as possible.</i>
<ul style="list-style-type: none"> • Animals 	<ul style="list-style-type: none"> • Millions of species (e.g. jaguar, alligator, monkeys, apes). It is believed that in the Amazon Rainforest there are over 2,000 species of birds and 1,500 species of fish. There is also thought to be 50,000 kinds of insects in a single square mile. Animals have to adapt to survive in the rainforest (see adaptations section).



Producer	Organisms that get their food from the natural environment (<i>photosynthesis</i>) e.g. vegetation
Consumer	Organisms that feed on other organisms (producers and consumers). <ul style="list-style-type: none"> • herbivores (only eats plants) • carnivores (eat only animals) • omnivores (eats animals and plants)
Decomposer	Decomposers (fungi, bacteria) feed on dead producers & consumers. This dead material is known as litter. They break down the litter and recycle the nutrients back to the soil.
Food Chain	A food chain is a single line of linkages between producers and consumers. It shows what eats what.
Nutrient Cycle	The movement of nutrients around an ecosystem. <i>e.g. when dead material is decomposed, nutrients are released into the soil. The nutrients are then taken up from the soil by plants. The nutrients are then passed to consumers when they eat the plants. When the consumers die, decomposers return the nutrients to the soil.</i>

Savannah <ul style="list-style-type: none"> • Location • Climate • Vegetation 	<ul style="list-style-type: none"> • The savannah ecosystems is located between the rainforests found at the equator and deserts found along the tropic lines. More precisely, they are located between 23.5° north and 23.5° south of the equator. The largest expanses of savannah are in Africa, for example Kenya and Tanzania, consists of tropical grassland. They are also located in South America, Africa, Asia and Australia. • The savannah has two seasons: a wet season and dry season. Its annual precipitation is between 100-150cm of rain, however most of this falls in the wet season. The temperature is warm throughout the year, with a temperature range between 25°C to 30°C across the year. • The main type of vegetation is grass, which grows very tall. There are also occasional scattered trees such as the Baobab tree and Acacia tree. These have adapted to survive in the savannah. <ul style="list-style-type: none"> ➢ <i>The Baobab Tree: it only produces leaves in the wet season and their leaves are very small. These both reduce the rate of transpiration = less water lost. They are also able to store water in their tree trunk to help it survive in the dry season.</i> ➢ <i>The Acacia Tree it has long roots that travel deep underground to search for groundwater. To avoid water loss they have small waxy leaves which prevents transpiration. To protect against predators, it has sharp thorns and a chemical defence system where it secretes a poisonous fluid into its leaves. This prevents it being eaten by giraffes.</i>
<ul style="list-style-type: none"> • Animals 	<ul style="list-style-type: none"> • Lots. Most are fast with strong legs (zebra, giraffe). There are many herbivores due to the high amount of grass, however carnivores (lions, cheetahs) are also found in the savannah due to the high number of herbivores.

Animals adapt to survive in the ecosystem they live in. Adaptation = changing to suit the surrounding environment.

Camel (desert)	<ul style="list-style-type: none"> • Long eyelashes which keep sand out of their eyes. • Camouflage - their colour helps them blend in. • They store fat in their hump which can be used for energy. Therefore they can go months with no food.
Giraffe (savannah)	<ul style="list-style-type: none"> • Long necks help them to reach tall trees for food. • Long legs help them run very fast. • Camouflage: their colour helps them blend in.
Cheetah (savannah)	<ul style="list-style-type: none"> • Spots help them stay camouflaged. • Paws help them to run quietly so they are able to sneak up on their prey. • Large nostrils and enlarged hearts and lungs help them to circulate oxygen efficiently = they can run fast.
Spider monkey (rainforest)	<ul style="list-style-type: none"> • Their long limbs (arms and legs) allow spider monkeys to swing through the trees with ease. • Their strong tails allow them to hang suspended up in the trees and aids their swinging. • 90% of their diet comes from nuts, seeds, fruit and insects.
Poison Dart Frog (rainforest)	<ul style="list-style-type: none"> • Is very small to prevent being eaten • Has skin that releases poison when touched

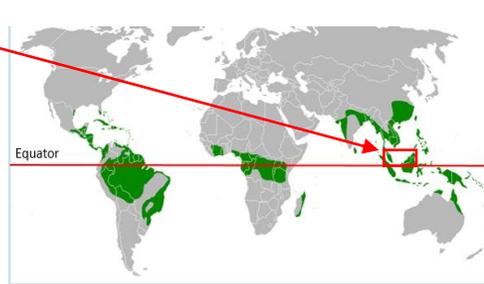
Desert <ul style="list-style-type: none"> • Location • Climate • Vegetation • Animals 	<ul style="list-style-type: none"> • Near the Tropic of Cancer and Tropic of Capricorn at 23. 5°C north and 23. 5° south of the equator • Arid (hot with very little rain). The average temperature is 40°C in the day and average annual rainfall is 250mm. • Sparse (e.g. cactus, Joshua tree) • Very few. Scorpions have adapted
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Tundra <ul style="list-style-type: none"> • Location • Climate • Vegetation • Animals 	<ul style="list-style-type: none"> • North (arctic circle) and south poles • Very cold, very dry, soil is permanently frozen (permafrost). Winters are cold, dark and long, with an average temperature is -30°C. In mid-December it is dark all day. In the summer temperatures vary between 0-10°C. • Sparse – usually small bushes and flowers. The top layer of soil only thaws during 2-3 months in the summer. • Few (e.g. penguin, polar bear).
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Polar Bear (tundra)	<ul style="list-style-type: none"> • Thick white fur to help camouflage help them keep warm. • Layer of fat under their skin helping them stay warm. • Large feet help to spread their weight over a larger surface area. This prevents the ice breaking beneath them.
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Malaysia is a country in South East Asia. It is made up of Peninsular Malaysia and East Malaysia. 67% of Malaysia is covered in tropical rainforest.

Humans use the tropical rainforest in Malaysia for a number of economic industries = more jobs, income and taxes which the government can spend on improving the country (*education, healthcare, transportation*). Unfortunately it also causes deforestation. The rate of deforestation in Malaysia is increasing faster than in any tropical country in the world. Between 1990 and 2010, Malaysia lost over 1.9 million hectares of rainforest, which has a number of further impacts (see below).



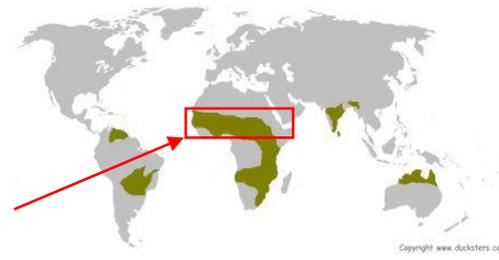
ECONOMIC DEVELOPMENT IN THE RAINFOREST & ITS IMPACT

Cattle Farming	Large areas of the rainforest are cleared for cattle ranches. In 2017, 744,000 cows were sold for their meat. <i>Good: jobs, better income, government gets more taxes = money for development (improve healthcare, education...etc.)</i> <i>Bad: deforestation, habitat loss, less photosynthesis = more global warming</i>
Palm Oil Production	In the 1970s large areas of the rainforest were cleared and made into massive palm oil plantations (farms). Their fruit gives palm oil which we use in cooking oil, bread, cake, chocolate & candles. <i>Good: jobs, better income, government gets more taxes = money for development (improve healthcare, education...etc.)</i> <i>Bad: deforestation, habitat loss, less photosynthesis = more global warming</i>
Logging	In 1980, Malaysia became the world's largest exporter of tropical wood (ebony and mahogany). <i>Good: jobs, better income, government gets more taxes = money for development (improve healthcare, education...etc.)</i> <i>Bad: deforestation, habitat loss, less photosynthesis = more global warming, trees can take 100s of years to regrow.</i>
Mining	There are huge deposits of minerals (copper, tin) in the Malaysian rainforest. Land is cleared and mined to access these minerals which are then sold to other countries. Roads are created to improve access to the mines. <i>Good: jobs, better income, government gets more taxes = money for development, better transport routes.</i> <i>Bad: deforestation, habitat loss, less photosynthesis = more global warming, pollution from machinery, chemicals used in mining poison ecosystem.</i>
Hydro-electric power	The high quantity of water in the rainforest can be used to create cheap energy in hydro-electric power stations. The Bakun Dam is a dam in Malaysia that generates electricity for its people. It is the highest dam outside of China (205m). <i>Good: jobs, income, money for development, provide sustainable clean energy to locals and industries.</i> <i>Bad: when you build a dam, a massive reservoir (lake) is created behind it, which floods large areas of land = loss of habitats/settlements. Tribes lose their homes, land and culture. The Bakun Dam flooded over 700km2 of forest.</i>

SUSTAINABILITY IN THE RAINFOREST. Sustainability: meeting the needs of today without harming the environment in the future.

Selective logging	Only some trees that have been selected are cut down rather than cutting down all the trees in an area. Malaysia implemented a Selective Management System in 1977 which identifies which trees are to be cut down and implements strict fines for illegal logging.
Afforestation	Afforestation is when new trees are planted as others are cut down. Trees stabilize the soil, replenish lost nutrients and provide habitats for wildlife.
National parks	Areas are protected from development and deforestation. There are more than 30 national parks in Malaysia, including Taman Negara National Park, which protects 4344km2 from development and deforestation.
Coppicing	Coppicing is when you only cut trees down halfway. This means you get the wood you need to make furniture, fuel or paper, however the trees can regrow quickly. This means there is a constant supply of wood.
Raising awareness & education	Educate people and companies on how they are harming the rainforest and provide ideas of how they can make money in the rainforest, however in a more sustainable way. The World Wildlife Fund (WWF) works with governments to better create and protect National Parks. It also helps to identify the most suitable areas to build dams or roads to have minimal impact on the rainforest and its people.

The savannah ecosystem is located between the Tropic of Cancer and Tropic of Capricorn, in South America, Africa, Asia and Australia. Almost 65% of Africa is covered by savannah grasslands, in countries such as Tanzania, Nigeria, Uganda and Kenya. Humans use the rainforest for a number of economic activities, including safaris (tourism), cattle farming and growing crops. These activities bring a lot of economic advantages with jobs and money for development, however they are also causing desertification. **This is happening today in the Sahel – the area covering Africa's northern savannah, just south of the Sahara Desert.**



Desertification: the process where land gradually turns into a desert. It becomes drier, less fertile and vulnerable to erosion.

CAUSES OF DESERTIFICATION IN THE SAHEL

Climate change	Climate change results in extreme weather, such as droughts. Lack of rainfall = not enough rain for the soils to have moisture and stay healthy. Also plants die due to lack of water = roots no longer hold the soil together = vulnerable to erosion. High temperatures = any water is immediately evaporated leaving the soil very dry. Also salts in the water are left on the soil after the water is evaporated = salty, dry soil that is vulnerable to erosion.
Over-grazing	Animals remove vegetation cover, when they eat. This leaves the ground bare and unprotected. Wind and rain can then easily carry off the loose soil. It also reduces the soil's ability to carry moisture, making it dry and vulnerable to desertification.
Over-cultivation	Population growth in the Sahel = more demand for food. As a result land is being over-farmed. This uses up all the nutrients in the soil, leaving it dry and exposed to erosion. Often people in the Sahel cannot afford fertilisers to replace the removed nutrients.
Deforestation	Population growth = increased demand for fuel wood = increased deforestation. The roots of trees previously would bind the soil together, preventing soil erosion. Therefore, without any trees the soil is more vulnerable to erosion. Furthermore, if the trees are removed their nutrients are not returned to the soil by decomposers = soil becomes less fertile.

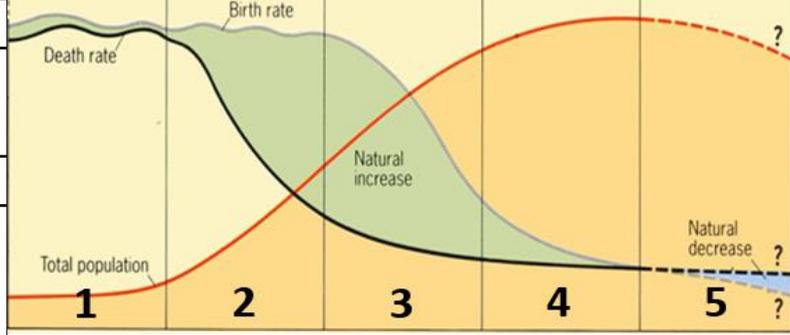
RESPONDING TO DESERTIFICATION: how can we reduce the risk of desertification in the Sahel?

Afforestation (planting trees)	<ul style="list-style-type: none"> The roots also help to hold the soil together and prevent erosion. When the plants/leaves die, their nutrients are giving back to their soil. They act as windbreakers and therefore reduce wind erosion.
Crop Rotation	When farmers allow a field to rest between farming. This allows the soil time to repair and get their nutrients back. This prevents over-cultivation.
Grazing Rotation	Move the animals from place to place to reduce the amount of vegetation eaten or reduce the number of farm animals. This prevents over-grazing.
Coppicing	Coppicing is when you only cut trees down halfway. This means you get the wood you need to make furniture, fuel or paper, however the trees can regrow quickly. This means there is a constant supply of wood.
Plant hedges	Hedges trap dry soil from being blown away by the wind. This stops the land turning into a desert.
Store water for irrigation	Earth Dams: collect and store water in the wet season. The stored water is then used to irrigate crops in the dry season.

KS3 Geography Knowledge: Population and Urbanisation

Global populations are	Rising.
The global population is... In 2050 it will be.... In 2100 its will be.....	7.7 billion 9.8 billion 11.2 billion
Population Distribution	Where people are located.
Population density	The number of people living in a certain area (ppl per km ₂)
Dense population	Lots of people live in an area.
Sparse population	Very few people live in an area.
Factors that affect population density are called...	Push and pull factors
Pull factors are.....	Factors that attract people to an area.
Examples of pull factors:	<ul style="list-style-type: none"> • Flat land • Good access to services and lots of employment • Mild climates with lots of natural resources (oil, wood, coal) • Fertile soil • Peace
Push factors are.....	Factors that push people out of an area.
Examples of push factors	<ul style="list-style-type: none"> • Steep slopes • Lack of services and lack of employment • Extreme temperatures • Few natural resources • Unfertile soil • Dense forest • War and conflict

Demographic Transition Model	Shows how populations will change as countries move through 5 stages of development.
Population pyramid	A graph that shows the population structure of an area, The population is divided up into 5 year gaps. It tells you the number of men/women alive in each 5 year gap. It shows a snapshot of the population at the time it was created.
Birth Rate	Number of births per 1000 babies born
Death Rate	Number of deaths per 1000 people
Natural increase	The increase in population when birth rate is higher than death rate.
Life Expectancy	The number of years a person is expected to live for,



Traditional rainforest tribes	Afghanistan, Ethiopia	India, China, Brazil	UK, France, USA	Japan, Italy, Germany
High birth rate <ul style="list-style-type: none"> • Lack of birth control • Women marry young • Children needed to work on land High death rate <ul style="list-style-type: none"> • Disease • Famine, • Lack of clean water • Lack of medical care 	High birth rate <ul style="list-style-type: none"> • Same as in stage 1 Decreasing death rate <ul style="list-style-type: none"> • Improved medical care • Cleaner water • More and better food • Improved sanitation 	Decreasing birth rate <ul style="list-style-type: none"> • Birth control more available. • Fewer children die • Women stay in education longer and marry later Slowly decreasing death rate <ul style="list-style-type: none"> • Same as stage 2 	Low birth rate <ul style="list-style-type: none"> • Birth control widely used. Low death rate <ul style="list-style-type: none"> • Continued improvement to medical care, sanitation and food/clean water availability. 	Very low birth rate <ul style="list-style-type: none"> • Status of women and equal rights. Women have fewer children and far later in life. Slightly increasing death rate <ul style="list-style-type: none"> • There are more old people = more deaths.

If the bars are very short at the top there is a low life expectancy and few elderly people.

If the bars get shorter quickly there is a high death rate and fewer elderly people.

If the base is wide there is a high birth rate and lots of young people.

China is located	In east Asia, next to the East China Sea. Neighbouring countries include Mongolia, India and Vietnam.
China's capital city is	Beijing
China's population size is	1.4 billion
China's is split into	Provinces
China's eastern provinces are....	Densely populated due to its flat, fertile land, good transport routes and cities which offer jobs and services.
Chinas' western provinces are....	Sparsely populated due to its steep slopes, mountains, lack of transport routes and lack of cities.



Population growth is affected by:	Natural increase and migration.
Natural increase is caused when...	the number of babies being born (birth rate) is greater than the number of people dying (death rate).
This is common in	Countries in stages 2 and 3 of the DTM: <i>Bangladesh, India, Brazil, Mexico</i>
Migration is.....	The movement of people from one place to another, both domestically (within a country) & internationally (between countries)
<ul style="list-style-type: none"> • Emigrants are.... • Immigrants are.... • A migrant is.... • Voluntary migrants are.... • Forced migrants are..... 	<ul style="list-style-type: none"> • <i>The people choosing to leave a countries.</i> • <i>The people arriving in a new country.</i> • <i>The person doing the moving.</i> • <i>People who choose to move for work or family.</i> • <i>People who have no choice, due to war or natural disasters.</i>
Number of international migrants in 2017	The number of international migrants (people living in a country they were not born in) worldwide was 258 million in 2017. If all the world's international immigrants lived in a single country, it would have the world's fifth largest population.
International migrants in the UK	Today there are 9.3 million international migrants in the UK. <i>They mainly come from Africa, India, Pakistan, West Indies, Eastern Europe.</i>

KS3 Geography Knowledge: Population and Urbanisation

Urban	A built up area (e.g. town or city)
Rural	A sparsely populated area
Urbanisation	The movement of people from rural to urban areas.
Urban growth	The increase in land area covered by towns and cities.
Urbanisation in HICs occurred in... It was caused due to....	The 18 th and 19 th Centuries Industrialisation – the growth of manufacturing and factories. The factories are located in towns and cities = people move from the countryside to cities for work = urbanisation.
Start of UK's industrial revolution: Start of USA's industrial revolution:	1750s 1800s
Urbanisation in LICs and NEEs is occurring..... It is happening because....	Today. 1. Many LICs and NEEs are currently going through their Industrial Revolution. For example China's industrial revolution began in 1980. 2. Poor quality of life in rural areas (push factors)
Megacity	A city with a population of more than 10 million.



Urban growth has created a number of opportunities in Mumbai	
Jobs	<ul style="list-style-type: none"> Over 3 million people commute each day to work in Mumbai. Mumbai generates 6.16% of India's GDP
Jobs in a variety of industries	<ul style="list-style-type: none"> Jobs in factories producing electronic items, jewellery, textiles. Jobs in high-tech industries: call centres, online banking and software development. Many TNCs have their headquarters in Mumbai: Bank of America, Volkswagen, Walt Disney.
Higher & reliable wages	<ul style="list-style-type: none"> The highly skilled jobs = higher wages. The high number of jobs means there are more reliable wages.
Access to services	<ul style="list-style-type: none"> There is much better access to education and healthcare. Mumbai has the highest percentage of internet access of any Indian city (12 million in 2013)
Entertainment	<ul style="list-style-type: none"> Restaurants, clubs, bars, theatres, festivals, shops...etc.
Transport	<ul style="list-style-type: none"> Train, airplanes, boats, buses...etc. Mumbai has links to all the major industrial cities in India as well as connections to globally important cities.
Cultures	<ul style="list-style-type: none"> People live in Mumbai from different ethnic backgrounds (people from different races and religions). This enriches the city's culture with different cuisines, places of worship and cultural festivals.

MUMBAI FACT FILE:

- It is the wealthiest city in India.
- It is located in the Maharashtra state on the western coast of India, facing the Arabian Sea.
- Mumbai's population has grown rapidly in the last 50 years to reach over 23 million today.
- Mumbai's population density is 44,500 ppl per km². This is 8 times higher than London!

The growth of Mumbai has been caused due to rural to urban migration and natural increase.

- **Rural to urban migration:** nearly 1 person arrives to Mumbai per minute. 70% of all migrants were from the state of Maharashtra and the average age of migrants was 20-21 years and 64% were male.
- **Natural increase:** Mumbai's birth rates are higher than their death rate = natural increase in population.

Urban growth has created a number of challenges in Mumbai

Squatter settlements	<ul style="list-style-type: none"> 40% of the population in Mumbai live in poor quality housing or on the streets. The poorest live in squatter settlements on the outskirts of the city. People arriving to Mumbai cannot afford rent so build a house using whatever they can find, close to the city centre. Overtime squatter settlements are formed. <ul style="list-style-type: none"> ➤ <i>Homes are very small and made out of wood, cardboard, metal and plastic sheeting</i> ➤ <i>They are overcrowded and lack services (healthcare, clean water) = diseases are common.</i> ➤ <i>Pollution (air, water, waste)</i> An example of a squatter settlement in Mumbai is Dharavi which is home to over 1 million people.
Lack of services	<ul style="list-style-type: none"> As populations rise rapidly it is very difficult to supply services to the population. They cannot develop the necessary infrastructure (water pipes, electricity lines, sewage pipes) fast enough to support the rising population size. Challenges include: <ul style="list-style-type: none"> ➤ Education ➤ Sanitation ➤ Hospitals Lack of teachers and schools = lack of education. Around 24 % of children are illiterate. Lack of sewage pipes = people dispose of sewage into nearby rivers and streams. These are used by locals to clean clothes and for drinking = waterborne diseases (typhoid, cholera and dysentery). 83% diseases in Mumbai are waterborne. Everyday in Dharavi, 4000 people are affected by waterborne diseases. Lack of hospitals = lack of healthcare.
Water pollution	<p>Sewage and industrial waste from factories is poured into rivers. The Mithi River in Mumbai is very polluted because:</p> <ul style="list-style-type: none"> Large companies dump industrial waste straight into the river and the airport uses it to dump untreated oil. 800 litres of sewage goes straight into the river every day. <p>This results in waterborne diseases, death of wildlife and destruction of ecosystems.</p>
Air pollution	<p>Vehicles and factories pollute the air. In 2018</p> <ul style="list-style-type: none"> The World Health Organisation ranked Mumbai as the 4th most polluted megacity in the world. 89.6% of deaths in slums are due to respiratory diseases.
Waste pollution	<p>100,000s of tons of waste is produced every day in Mumbai. This is often left on the streets because they do not have the infrastructure (roads, lorries) to collect the rubbish and they do not have the money to build this infrastructure.</p>

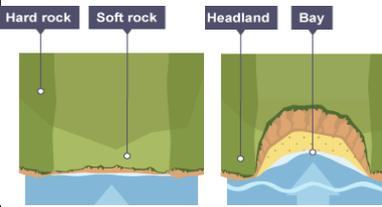
Urban planning to improve the quality of lives for the urban poor in Mumbai

Sanitation project	<p>Problem: hundreds of people share a single toilet and 1 in 20 people are forced to use the street as a toilet.</p> <p>Solution: so far over 300 community toilet blocks have been built, housing more than 5100 individual toilets, with separate facilities for men and women. This will improve living standards for more than 1 million people.</p>
Electrification project	<p>Problem: lack of electricity. People rely on bottled gas for cooking and heating, which is expensive and dangerous.</p> <p>Solution: aid projects are providing 10,000 people living in slums with new or upgraded electricity connections.</p>
Resettlement scheme	<p>Problem: poor quality housing, lack of services...etc.</p> <p>Solution: people from poor quality slums are being relocated to new areas. This improves living standards by providing:</p> <ul style="list-style-type: none"> ➤ <i>Good quality homes with strong walls and beds.</i> ➤ <i>Access to water supply with sanitation systems = less risk typhoid, stomach problems and other infections.</i> ➤ <i>Access to shops and businesses = more job opportunities.</i> ➤ <i>Access to electricity.</i>

Coastline	The outline of the land, where the land meets the sea.
Social uses of the coastline	Plymouth – sightseeing, beaches, yacht clubs, marinas, fishing, sailing Brighton – beaches, theme park on Brighton Pier, windsurfing, sailing, Portsmouth – Spinnaker Tower has a viewing platform for tourists.
Economic uses of the coastline	Plymouth – shipping port (import, export), ferry and Royal Navy shipbuilding yard = jobs. Portsmouth – Royal Navy port, tourism industry, transport (ferry) industry Brighton – tourism industry, fishing industry.
Environmental uses of the coastline	Plymouth – nature reserves. Portsmouth – 7 wildlife conservation areas where they look after habitats
Erosion	The wearing away or breakdown of rocks by wind, water or ice.
Hydraulic Action	The power of the waves forces water and air into cracks in the cliff. The increase in pressure and force causes cracks to get bigger.
Abrasion	Waves pick up rocks in the sea and throw them against the cliff face. This acts like sandpaper and removes material.
Corrosion	Chemicals in the water dissolve the rocks, such as limestone
Attrition	Rocks in the sea hit into each other. This makes them smaller, smoother and rounder.
Weathering	The breakdown of rocks caused by the day-to-day changes in the atmosphere.
Freeze-thaw	<ul style="list-style-type: none"> Water collects in cracks. At night this water freezes and expands. The cracks get larger. In the day the temperature rises and the ice melts (thaws) = the pressure on rocks is reduced. This process is repeated. The repeated freezing and thawing weakens the rock = breaks apart.
Chemical weathering	Chemicals in the rain (acid rain) dissolve rocks.
Biological weathering	Plant roots grow in cracks in the rocks and break them apart. Animals burrow into weak rocks and break it apart.
Longshore drift	The transportation of material along the coast in a zig zag pattern.
Swash	Breaking waves rush water and sediment up the beach.
Backwash	The water that rushes flows back to the sea.
Deposition	The dropping of material due to a loss in energy.
Infiltration	The process when a liquid enters a rock.
Saturation	A rock that is full of liquid.
Impermeable rock	Rocks that do not allow liquid to pass through
Permeable rock	Rocks that allow liquid to pass through
Slip plane	A line of weakness along which movement occurs.

LANDFORMS FORMED BY WEATHERING AND EROSION

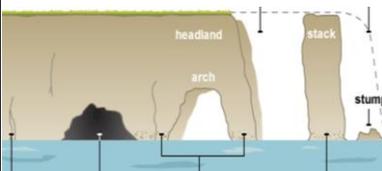
HEADLAND AND BAY



Headland and bays occur along coastlines that have different types of rock, as the rocks erode at different speeds.

- The **hard rock** (granite) erodes more slowly than the soft rock, creating **headlands** that jut out to sea.
- The **soft rock** (clay) will erode more quickly than the hard rock, creating **bays**.
- Bays are sheltered = deposition = beaches are formed.

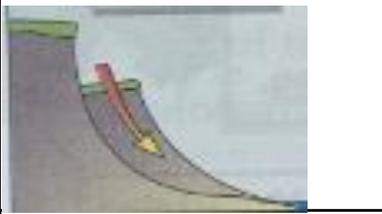
CAVE, ARCH, STACK



- Erosion (hydraulic action, abrasion) attacks a line of weakness in the cliff. This makes the line of weakness bigger, creating a cave.
- Continued erosion, erodes the back of the cave = arch.
- Weathering (freeze-thaw, animals) weakens the top of the arch, making it unstable. It eventually collapses = stack.
- Erosion and weathering erode the stack to form a stump.

MASS MOVEMENT

ROTATIONAL SLUMP



Mass movement is the downhill movement of material caused by gravity.

A rotational slump is the downhill movement of material along a curved line of weakness. It occurs where permeable rock overlies impermeable rock.

- Heavy rain infiltrates the permeable rock, making it heavier. The cliff becomes unstable.
- Waves erode the base of the cliff, making the cliff more unstable.
- Eventually a curved line of weakness (slip plane) is formed.
- The rocks slide down the curved line of weakness.

LANDFORMS FORMED BY TRANSPORTATION AND DEPOSITION

SPIT



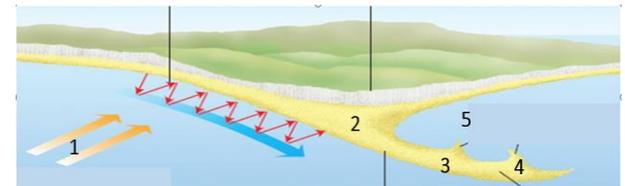
BAR



TOMBOLO

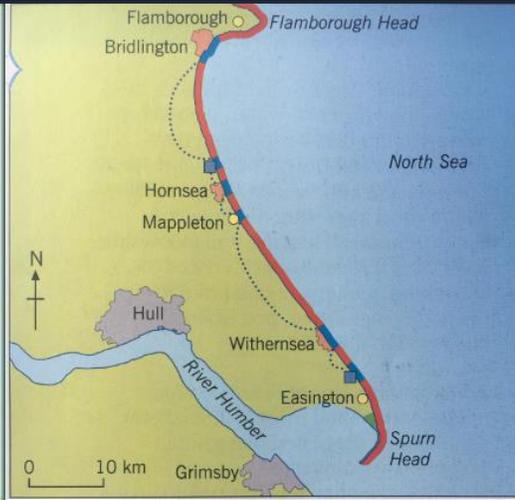


- LONGSHORE DRIFT** transports material along the coastline in a zigzag pattern.
- Where there is a sudden **BEND** in the coastline, the waves lose energy = material is deposited.
- REPEAT:** Continued longshore drift and deposition, deposits material out to sea.
- Strong winds and waves curve the end of the spit = **RECURVED END**.
- The area behind the spit is sheltered from waves = low energy = deposition. **SALTMARSHES** and mud flats are common here. They attract lots of wildlife.



A **BAR** is formed when a spit joins two headlands together. A lagoon forms behind the bar.

A **TOMBOLO** is formed when a spit joins to an island.



The Holderness coast is located...	In Yorkshire.
The Holderness has a population of...	312,000 people
Coastal towns along the Holderness coast are	Hornsea, Withernsea and Bridlington which have industries such as tourism, fishing and retail.
Coastal villages along the Holderness coast are	Coastal villages include: Mableton, Skipsea and Easington
Spurn Head is...	A spit and considered an area of environmental importance. It needs to receive a constant supply of sediment from along the coast .
The Holderness is eroding at a rate of...	2 metre per year.
Evidence of erosion along the Holderness coastline:	<ul style="list-style-type: none"> 32 villages have been lost since the Roman times. It is estimated that the coastline has retreated by 3½ miles since the Roman times. More than 200 homes are predicted to fall into the sea along the Holderness coast in the next 100 years.
Shoreline management plan	A plan to decide how the coast will be protected. There are three strategies: hold the line, managed retreat, do nothing.
Hold the line	Maintain current position of coastline using hard and soft engineering.
Managed retreat	A deliberate decision to allow the sea to floor an area of low-value land to protect areas of higher value land.
Do nothing	Do nothing to protect the coastline: allow it to flood and erode.

Hard engineering

Using manmade, artificial structures to prevent erosion and flooding..
 ➤ More effective, long lasting and need less maintaining than soft engineering, however more expensive and less natural/environmentally friendly.

Sea Wall

A strong concrete wall built in front of the cliff/settlement that absorbs the wave's energy. A curved sea wall reflects the wave back to sea.
 • They absorb the power of the wave = less erosion. Tourists also like to walk along it.
 • It can, however, be expensive and ugly.

Rock Armour

Large rocks placed in front of the cliff or settlement, that absorb the wave's energy.
 • They absorb the power of the wave = less erosion. They look quite natural.
 • It can, however, be expensive and make access to the beach difficult.

Gabions

A wire cage filled with rocks that are placed in front of the cliff or seaside settlement, that absorb the wave's energy.
 • They absorb the power of the wave = less erosion. They are cheaper than rock armour.
 • The sea can corrode the metal cages = broken gabions which can be dangerous to tourists..

Groynes

Wood or rock fences built out into the sea. They trap sediment transported by longshore drift and make the beach larger.
 • Groynes - Beach becomes wider = waves lose energy as they rush up the beach = less erosion. Big beaches boosts tourism.
 • They prevent sediment reaching beaches further along the coastline = problem is shifted and not solved. More expensive than soft engineering.

Soft engineering

Using natural, environmentally friendly methods to prevent flooding.
 ➤ Often cheaper than hard engineering however need more maintaining and have a shorter lifespan

Beach Nourishment

Adds sediment to the beach to make it wider = acts as a barrier from the waves = reduces erosion and flooding.
 • Cheap and easy to maintain, natural looking, bigger beaches = more tourism
 • Short lifespan, constant maintenance, beach is closed due it is being done.

Dune Regeneration

Sand dunes are repaired and made larger using fences or marram grass = barrier from the waves.
 • Cheap, very natural, popular with wildlife (creates habitats).
 • While being repaired, dunes are closed = less tourists, constant maintenance as dunes are constantly changing.

Managed retreat

Allowing erosion to take place naturally and move settlements when necessary.
 • It is very environmentally friendly. Nature is allowed to takes it course.
 • It forces people from their homes and lots of compensation must be paid to help them buy a new home in a safer place.

KS3 Geography Knowledge: Natural Resources

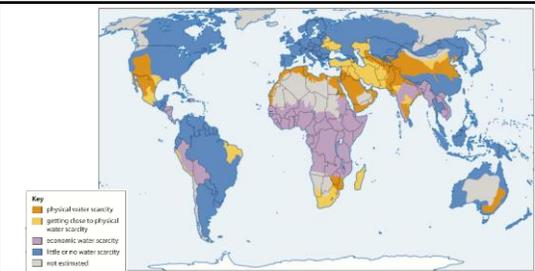
A NATURAL RESOURCE is something that occurs naturally and we can make use of.

A Renewable resources is one that will not run out.

A Non-renewable resource is finite and will run out.

Resource	Renewable/Non-renewable	Uses	Problems
Coal	Non-Renewable	heating our homes (open fires), creating electricity and steel production.	Very dirty and pollutes the atmosphere
Oil	Non-Renewable	We use it in lots of ways such as; to run cars, ships, planes and create electricity. It is also used to produce plastics, such as plastic bottles and in fertilizers for farmers	One day it will run out and there will be none left When we burn it greenhouses gas are released.
Gas	Non-Renewable	We can't see natural gas because it is a gas, but we use it in lots of ways such as; cooking in gas ovens, central heating in our homes and also to power vehicles instead of petrol.	One day it will run out and there will be none left When we burn it greenhouses gas are released.
Water	Renewable	ludes water for washing clothes and personal washing, cooking, drinking, washing up and outdoor use. wave energy from the oceans (waves making turbines spin)., this helps to produce electricity.	Whilst we have lots of water, fresh water is limited and this freshwater can be polluted by humans
Geothermal	Renewable	Geothermal Energy is used to heat homes, water and create electricity.	This only occurs in places that have volcanic activity such as Iceland.
Soil	Renewable	Growing food Soil is very precious because without it we cannot grow any crops for food as soil provides the nutrients needs to grow plants.	Soil is not a renewable resource as there is only so much of it on the earth. It is also not equally shared as some places have lots of good quality soil and others have landscapes that does not allow this..

Water as a Resource

Physical scarcity	Where there is not enough water to meet the needs of everyone there.	
Economic scarcity	People cannot afford the infrastructure such as pumps and pipes to bring fresh water to the people living in that area	
Water facts and location	<ul style="list-style-type: none"> ✓ water and it is our basic need. ✓ 97% of the earth's water is salty so we cannot use it (for drinking, agriculture or industry) ✓ 3% of the earth's water is fresh water ✓ 2/3 of this is frozen in ice sheets and glaciers, ✓ Less than 1% of the fresh water we can use ✓ most of this is underground, so we must pump it out it use it. 	

The problems with water

Water disease and pollution	<ul style="list-style-type: none"> • In some countries that experience economic water scarcity they have little sanitation facilities (clean water and toilets). • This might mean human waste is dumped into rivers and contaminate drinking water which can cause diseases such as Cholera.
Water conflict	<ul style="list-style-type: none"> • Water is shared between countries this is because some rivers flow through several countries such as the Nile and Danube rivers. • This means that some countries are able to take more water than others and this can lead to conflicts over water and physical water scarcity.
Food production	<ul style="list-style-type: none"> • Agriculture (farming) uses 70% of the global amount of water. • Areas where not a lot of rain falls are at risk because if there is water scarcity it means that food may not be able to grow and we won't be able to feed a growing population. • Some countries such as the USA provide 30% of the world's wheat (makes bread and cereals), so this would have a huge negative impact on food production.

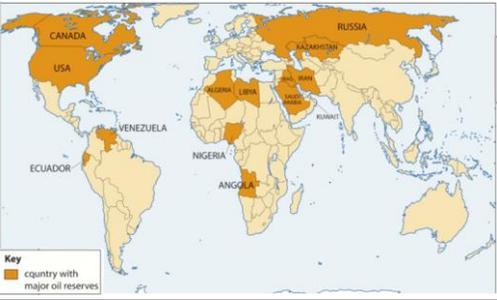
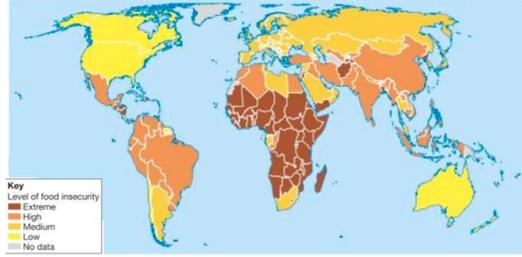
Solutions to the water challenge

Water Transfer	<ul style="list-style-type: none"> ✓ Some areas have more water than is needed (surplus) and this can be transferred by pipes to areas where there is less water (deficit). ✓ This is done through pipelines and canals.. ✓ In China, there is a huge project that aims to bring water from the South to the dry North.
Desalination	<ul style="list-style-type: none"> ✓ Salt can be removed from ocean water ✓ It is only used if there is a severe shortage or water. ✓ There are some major environmental concerns, such as salt being dumped back into the sea. ✓ Not everyone can uses this method but an example of somewhere that does this is Saudi Arabia
Recycling water	<ul style="list-style-type: none"> ✓ People can think more wisely about water use and can use less to save more water. ✓ We can also recycle water, by using grey water (<i>water already used in baths and showers</i>) to flush toilets and water plants and garden.
Dams and reservoirs	<ul style="list-style-type: none"> ✓ A dam is a large structure that holds water and a reservoir is an area where water is stored. ✓ When there is lots of rainfall, the rain can be collected and stored and released into the rivers when there is little rainfall. ✓ Water can then be used for many different reasons including watering of crops (irrigation).

Chambamontera – Micro-Hydro Scheme Case Study

Why	<ul style="list-style-type: none"> ✓ Rural village, high in Andes Mountains (Peru) ✓ No access to electricity ✓ Very underdeveloped 	
How it works	<ul style="list-style-type: none"> ✓ Water is used to create electricity (Practical Action, a charity implemented this scheme) ✓ Steep slopes and high rainfall make this an ideal location 	
Benefits to people	<ul style="list-style-type: none"> • Healthcare has improved because refrigeration allows storage of medicines • Street lights allow people to go outside after dark 	<ul style="list-style-type: none"> • Electricity is available when heating demands are high. • Improved school facilities and the possibility of doing schoolwork at home after dark

KS3 Geography Knowledge: Natural Resources

Oil as a Resource		Food as a Resource	
Oil reserves	The proven amount of oil a country has.	Food insecurity	<i>Not enough access to safe, affordable and nutritious food.</i>
Oil facts and location	<ul style="list-style-type: none"> ✓ Oil is a fossil fuel which means it's formed from fossils of tiny oceans creatures millions of years ago. ✓ This becomes oil and is then extracted from the ground (this is known as crude oil) and brought to an oil refinery. ✓ It is then separated into refined oil and other raw materials. ✓ Oil is used to fuel cars, ships, planes and to generate electricity. ✓ It is also used to produce plastics, fertilizers and even clothes. ✓ Oil is a very valuable resource 	Food facts and location	<ul style="list-style-type: none"> ✓ Food consumption (how much people eat) varies across the world. ✓ The recommended daily calories intake is 2000-2400 per day. ✓ This is met and exceeded in continents such as North America and Europe, but in much of Africa is well below this level. ✓ Whilst global food consumption is increasing due to increasing development (people are becoming richer), population is increasing and developments in transport and storage of food there are still many countries that face FOOD INSECURITY
			
The Problems with Oil		Reasons for Food Insecurity	
Climate Change:	<ul style="list-style-type: none"> ➤ When oil burns it releases carbon dioxide (GHG) into the atmosphere adding to global warming leading to climate change. ➤ Increased temperatures can cause glaciers and ice sheets to melt leading to sea level rise and loss of polar habitats. ➤ Many species of plants and animals becoming extinct and their habitats are damaged or altered by climate change. 	Climate Change	<ul style="list-style-type: none"> ➤ Extreme temperatures and low rainfall due to climate change = struggle to produce food ➤ Climate change affects global farming patterns and productivity (how much) ➤ Weeds and pests such as locusts = consume whole crops
Oil Conflict:	<ul style="list-style-type: none"> ➤ Some oil producing countries are politically unstable so we may not want to or be able to buy oil from them. ➤ Conflicts can happen between those who have oil and those that want oil. ➤ An example of this is conflict in the Niger Delta (Nigeria) between big oil companies (such as Shell Oil) and minority ethnic groups who feel that they are being exploited by these big oil companies. 	Access to technology	<ul style="list-style-type: none"> ➤ Food production can be increased by investing in new technology and machinery. ➤ Poorest people cannot afford any form of technology, irrigation or fertilisers. ➤ Unskilled use of technology e.g. poor use of irrigation = damage the land, meaning its harder to grow food in the future.
Environmental Disaster	<ul style="list-style-type: none"> ➤ Oil spills can happen on oil platforms, oil tankers or as oil is transported from one place to another. ➤ In April 2010 a large oil spill happened due to an explosion at an oil rig in the Gulf of Mexico, known as the Deepwater Horizon Oil Spill. ➤ More than 200 million gallons of crude oil was spilled into the Gulf of Mexico during accident. ➤ Over 16,000 miles of coastline was affected ➤ over 8,000 animals were reported dead 6 months after the spill. 	Wars and conflicts	<ul style="list-style-type: none"> ➤ Conflicts can lead to the destruction of land, crops and livestock ➤ Food can be used as a weapon, with enemies cutting off food supplies in order to gain ground = famine/death. ➤ During war transport links can be destroyed e.g. ports = imported food is not able to reach the people in that country.
Solutions to Using Oil (Renewable Energies)		Increasing Food Supply	
HEP (Hydro-Electric Power)	This uses fast flowing water to turn generators to produce electricity. <i>Good: This type of energy makes little pollution.</i> <i>Bad: Dams are needed and can be very expensive, flood farmland and people's homes.</i>	GM Foods	Certain crops can be modified to increase the amount of food that is produced. <ul style="list-style-type: none"> ✓ By genetically modifying foods it means they can grow bigger, they can produce higher yields (more food) ✓ In the Philippines maize (corn) has given a 24% increase in yields. This is used in many of the foods we eat today (bread, cereal, popcorn)
Solar Power	Solar power is the conversion of the sun's energy into electricity through a solar cell. <i>Good: instant electricity and no harmful gases are produced so there is no pollution</i> <i>Bad: less effective in areas that have lots of cloudy days. In some places such as the UK there are large fields of solar panels that take up lots of space. It can be very expensive as the cells cost lots to make.</i>	Appropriate Technology	Using skills or materials that are cheap and easily available to increase output without putting people out of work. <ul style="list-style-type: none"> ✓ This can involve small scale water harvesting equipment, irrigation methods or farming techniques, this works especially well for farmers in poorer parts of the world.
Biomass	Biomass burns plants, trees and organic matter to heat steam to drive turbines. <i>Good: sources are always available, It is a much cheaper source of energy compared to fossil fuels and whilst it does release Carbon Dioxide, it produces less than fossil fuels.</i> <i>Bad: As it uses trees it can lead to deforestation.</i>	Irrigation	Irrigation is the artificial watering of land. <ul style="list-style-type: none"> ✓ This is needed especially when there has not been much rain to help the crops grow. ✓ Can increase global food supply especially for commercial farming.
Wind power	Wind turns large turbine blades to generate electricity <i>Good: Electricity produced is cheap in the long run, produced clean energy, can be very effective in places with high winds</i> <i>Bad: Negative visual impact on the landscape and can create nuisance (noise and light) for people living near them. Birds can also fly into the blades and die. Wind farms can be very expensive to build</i>	Pesticides and fertilisers	A fertiliser is: a chemical or natural substance added to soil or land to increase its fertility. A pesticide is: Pesticides are substances that are meant to control pests, including weeds. <ul style="list-style-type: none"> ✓ Fertilizer is added to soil to make sure that crops get the nutrients that they need to grow. ✓ This ensures that farmers are able to continue growing food without using up all the nutrients in soil.
Reducing the environmental impact of our use of resources		Reducing the environmental impact of our use of resources	
		Problem: Global Warming = burning fossil fuels = Greenhouse Gases released.	Solution: turn heat down, buy local food, plant more trees.
		Problem: Plastic Pollution – 12.7m tonnes of plastic in oceans each year	Solution: buy less single use plastic, more reusable. Government laws
		Problem: Destroying Habitats – cut down forests for palm oil production	Solution: Consider what we buy, adopt a species, set aside land.

KS3 Geography Knowledge: Russia

Russia Key Facts



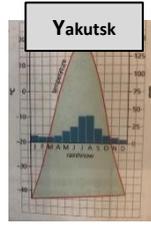
- Russia (The Russian Federation) is the largest country in the world. It covers 1/10th of ALL the land on the earth.
- Russia is twice the size of Canada (2nd biggest country in the world) and is 70 times the size of the UK.
- Russia is so large that it spans across two continents (Asia and Europe). It is mostly in Asia, but most people live in the European part.
- The Ural Mountains physically separate Asia and Europe.
- Russia spans across 11 time zones.
- It has 14 neighbouring countries and a coastline on two oceans (35,000km of coastline).
- It is also home to Lake Baikal, the world's oldest and deepest lake. It is the largest freshwater lake by volume, containing about one-fifth of the fresh water on Earth's surface.

Russia's Climate

Continental Climate

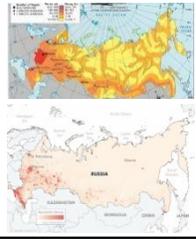
Russia experiences a continental climate, this means two main seasons.

- (1) Long dark cold winters with (2) brief warm summers
- Precipitation is low throughout the year



Yakutsk is the coldest city in Russia and on Earth. Temperatures can reach -45C. Yakutsk is built on permafrost (frozen ground, in fact 65% of Russia is land).

Russia's Population



- 144 million people live in Russia, but they are not evenly spread out, they are **unevenly distributed**.
- Russia is the largest country in the world, BUT, it is ranked 9th in terms of population size.
- Most people in Russia live in areas where it is easier to live (good soils, good communication, good weather conditions)
- 77% of the Russian population live on the European part of the country (West to the Ural Mountains)
- Russia is one of the most sparsely populated countries in the world.
- But even in an extreme climate people decide to live there if there is an economic gain (Yakutsk) or a strong culture and way of life such as the Nenets in Siberia.

Russia and The Arctic

- ✓ The Arctic is a region surrounding the North Pole that is made up of a large ocean.
- ✓ It is the Northernmost region of Earth.
- ✓ There are many natural resources located here.
- ✓ Taking these resources can have social and environmental impacts.



Environmental Impacts

- Greenpeace are concerned about the damage to the environment.
- A campaign 'Save the Arctic' wants to make people aware of the issues.
- An oil spill under these icy waters would have a catastrophic impact on animals and the pristine water.
- Russia produces 12% of the world oil it is responsible for roughly half of the world's oil spills.

Social Impacts

- Nenets herders have always moved seasonally with their reindeer.
- The Yamal Megaproject was developed to extract the large gas reserves of the region.
- The Nenets migration routes are now affected by the gas and oil pipelines, making it difficult to move the reindeer herds.
- If they cannot migrate, their people, their way of life might disappear forever and culture lost.

Russia's Ecosystems

There are four biomes distributed across Russia.

- **Temperate forest (Red)**
- **Taiga (Green)**
- **Steppe (Orange)**
- **Tundra (Yellow)**

Most of Russia is dominated by Taiga and Tundra



Taiga

- ✓ Coniferous forest
- ✓ Made up of pines, larch's, spruce
- ✓ The largest biome in the world (apart from oceans)
- ✓ The largest biome in Russia
- ✓ Contains 55% of the world's conifers
- ✓ The largest forested area on the earth (larger than the Amazon)

Tundra

- ✓ The coldest of all biomes
- ✓ It is too cold for trees to grow
- ✓ Located in the north-eastern Russia 60-80N
- ✓ Winters are long and summers are short
- ✓ Soil forms very slowly
- ✓ Much of the land is permafrost (permanently frozen)

Animals adapt to survive in the ecosystem they live in. *Adaptation = changing to suit the surrounding environment.*

Arctic Fox (Tundra)

- Thick camouflaged seasonal fur to help keep it warm in the freezing conditions. When the seasons change, the fox's coat turns as well, adopting a brown or grey appearance that provides cover among the summer tundra's rocks and plants.
- Thick fur on the tail, thick fur on the paws, which helps to protect it from the freezing conditions.
- A very keen sense of hearing.

Larch Tree (Taiga)

- Long thin needles to reduce moisture loss.
- Down sloping branches so that snowfall can fall off easily.
- Evergreen and has thick bark and cones to protect it during the harsh conditions.

Russia's Major European Cities

1. **Moscow** is Russia's capital city with about 12 million people. It is visited by many tourists and also has the Kremlin, which is where the president lives.
2. **St Petersburg** is Russia's second largest city (and used to be the capital). 5 million people live here. It has a port and lots of industry such as ship building.
3. **The North Caucasus** is mostly a farming region. This is where Mt Elbrus (a dormant volcano) is found, it is the highest mountain in Europe (5,642 m).
4. **Sochi** is located next to the Black Sea. It is Russia's top holiday resort with warm summers. In 2014 the Winter Olympics took place here.
5. **Kaliningrad** is an enclave (area surrounded by other countries) and surrounded by Poland and Lithuania. It has a port on the Baltic Sea and has lots of manufacturing jobs (e.g. cars)
6. **Murmansk** is the Kola Peninsula's (far north) main city and is also a port. It is important for fishing. It is the biggest city in the Arctic.
7. **Crimea** is a Peninsula south of Ukraine, it belongs to Ukraine, but Russia controls it.

Russia's Natural Resources

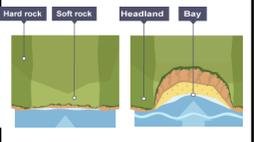
Natural Resource

- A natural resource is something that occurs naturally that we can make use of.
- There is an abundance of natural resources in Russia.
- It produces 20% of the world's natural gas and the world's leading producer of oil
- Russia is self-sufficient in all major raw materials (e.g. Iron, Bauxite)



The problem

1. Many resources are in Siberia, which has very harsh weather and extreme cold temperatures.
2. It is very hard to work in these areas as steel becomes brittle at these low temperatures
3. The roads are in poor condition due to the weather, this is not good when they are trying to export goods

COASTS		ECOSYSTEMS		ECONOMIC DEVELOPMENT IN THE RAINFOREST	
<p>HEADLAND AND BAY</p>  <p>Headland and bays occur along coastlines that have different types of rock, as the rocks erode at different speeds.</p> <ul style="list-style-type: none"> The hard rock (granite) erodes more slowly than the soft rock, creating headlands that jut out to sea. The soft rock (clay) will erode more quickly than the hard rock, creating bays. Bays are sheltered = deposition = beaches are formed. 		<p>Producer</p> <p>Organisms that get their food from the natural environment (<i>photosynthesis</i>) e.g. vegetation</p>	<p>Consumer</p> <p>Organisms that feed on other organisms (producers and consumers).</p> <ul style="list-style-type: none"> herbivores (only eats plants) carnivores (eat only animals) omnivores (eats animals and plants) 	Cattle Farming	<p>Large areas of the rainforest are cleared for cattle ranches. In 2017, 744,000 cows were sold for their meat.</p> <ul style="list-style-type: none"> Good: jobs, better income, government gets more taxes = money for development (improve healthcare, education...etc.) Bad: deforestation, habitat loss, less photosynthesis = more global warming
<p>MASS MOVEMENT</p> <p>Mass movement is the downhill movement of material caused by gravity.</p>		<p>Decomposer</p> <p>Decomposers (fungi, bacteria) feed on dead producers & consumers. This dead material is known as litter. They break down the litter and recycle the nutrients back to the soil.</p>	<p>Food Chain</p> <p>A food chain is a single line of linkages between producers and consumers. It shows what eats what.</p>		Palm Oil Production
<p>Hard engineering</p>	<p>Using manmade, artificial structures to prevent erosion and flooding..</p> <ul style="list-style-type: none"> More effective, long lasting and need less maintaining than soft engineering, however more expensive and less natural/environmentally friendly. 	<p>Nutrient Cycle</p> <p>The movement of nutrients around an ecosystem. e.g. when dead material is decomposed, nutrients are released into the soil. The nutrients are then taken up from the soil by plants. The nutrients are then passed to consumers when they eat the plants. When the consumers die, decomposers return the nutrients to the soil.</p>	<p>Animals adapt to survive in the ecosystem they live in. Adaptation = changing to suit the surrounding environment.</p>		
<p>Sea Wall</p>	<p>A strong concrete wall built in front of the cliff/settlement that absorbs the wave's energy. A curved sea wall reflects the wave back to sea.</p> <ul style="list-style-type: none"> They absorb the power of the wave = less erosion. Tourists also like to walk along it. It can, however, be expensive and ugly. 	<p>Camel (desert)</p> <ul style="list-style-type: none"> Long eyelashes which keep sand out of their eyes. Camouflage - their colour helps them blend in. They store fat in their hump which can be used for energy. Therefore they can go months with no food. 	<p>In 1980, Malaysia became the world's largest exporter of tropical wood (ebony and mahogany).</p> <ul style="list-style-type: none"> Good: jobs, better income, government gets more taxes = money for development (improve healthcare, education...etc.) Bad: deforestation, habitat loss, less photosynthesis = more global warming, trees can take 100s of years to regrow. 		
<p>Rock Armour</p>	<p>Large rocks placed in front of the cliff or settlement, that absorb the wave's energy.</p> <ul style="list-style-type: none"> They absorb the power of the wave = less erosion. They look quite natural. It can, however, be expensive and make access to the beach difficult. 	<p>Giraffe (savannah)</p> <ul style="list-style-type: none"> Long necks help them to reach tall trees for food. Long legs help them run very fast. Camouflage: their colour helps them blend in. 	<p>Logging</p>		
<p>Gabions</p>	<p>A wire cage filled with rocks that are placed in front of the cliff or seaside settlement, that absorb the wave's energy.</p> <ul style="list-style-type: none"> They absorb the power of the wave = less erosion. They are cheaper than rock armour. The sea can corrode the metal cages = broken gabions which can be dangerous to tourists.. 	<p>Cheetah (savannah)</p> <ul style="list-style-type: none"> Spots help them stay camouflaged. Paws help them to run quietly so they are able to sneak up on their prey. Large nostrils and enlarged hearts and lungs help them to circulate oxygen efficiently = they can run fast. 	<p>Mining</p>		
<p>Groynes</p>	<p>Wood or rock fences built out into the sea. They trap sediment transported by longshore drift and make the beach larger.</p> <ul style="list-style-type: none"> Groynes - Beach becomes wider = waves lose energy as they rush up the beach = less erosion. Big beaches boost tourism. They prevent sediment reaching beaches further along the coastline = problem is shifted and not solved. More expensive than soft engineering. 	<p>Spider monkey (rainforest)</p> <ul style="list-style-type: none"> Their long limbs (arms and legs) allow spider monkeys to swing through the trees with ease. Their strong tails allow them to hang suspended up in the trees and aids their swinging. 90% of their diet comes from nuts, seeds, fruit and insects. 	<p>Hydro-electric power</p>		
		<p>Poison Dart Frog (rainforest)</p> <ul style="list-style-type: none"> Is very small to prevent being eaten Has skin that releases poison when touched 	<p>The high quantity of water in the rainforest can be used to create cheap energy in hydro-electric power stations. The Bakun Dam is a dam in Malaysia that generates electricity for its people. It is the highest dam outside of China (205m).</p> <ul style="list-style-type: none"> Good: jobs, income, money for development, provide sustainable clean energy to locals and industries. Bad: when you build a dam, a massive reservoir (lake) is created behind it, which floods large areas of land = loss of habitats/settlements. Tribes lose their homes, land and culture. The Bakun Dam flooded over 700km² of forest. 		
		<p>Polar Bear (tundra)</p> <ul style="list-style-type: none"> Thick white fur to help camouflage help them keep warm. Layer of fat under their skin helping them stay warm. Large feet help to spread their weight over a larger surface area. This prevents the ice breaking beneath them. 			

CAUSES OF CLIMATE CHANGE		RESOURCES		POPULATION AND URBANISATION		
Methane Humans are to blame because...	<p>Cows produce a methane when they fart, belch and poo. Methane is a greenhouse gas that traps longwave radiation in the earth's atmosphere.</p> <p><i>The world's population is rising and countries are becoming more developed = there are more people and more families that have money to spend on food (e.g. meat) = rising demand for meat = more animals farmed = more methane produced.</i></p>	Solutions to Using Oil (Renewable Energies)		Urban growth has created a number of opportunities in Mumbai		
	Carbon dioxide Humans are to blame because...	<p>Carbon dioxide is the greenhouse gas that people are most worried about, as it is the one we are adding to the atmosphere fastest.</p> <ul style="list-style-type: none"> Fossil fuels (coal, gas, oil) are burnt to make energy = carbon dioxide is released into the atmosphere. Humans drive cars, which release carbon dioxide, nitrous oxide and methane into the atmosphere. <p><i>Rising population and more developed countries = increased demand for electricity = more carbon dioxide produced.</i></p>	HEP (Hydro-Electric Power)	<p>This uses fast flowing water to turn generators to produce electricity.</p> <p><i>Good: This type of energy makes little pollution.</i></p> <p><i>Bad: Dams are needed and can be very expensive, flood farmland and people's homes.</i></p>	Jobs	<ul style="list-style-type: none"> Over 3 million people commute each day to work in Mumbai. Mumbai generates 6.16% of India's GDP
CASE STUDY OF HOW CLIMATE CHANGE AFFECTS LICs: BANGLADESH FLOODS		Locati on:	Southern Asia, along the Tropic of Cancer. It neighbours Burma, India and the Indian Ocean.		Higher & reliable wages	Jobs in a variety of industries
	How has climate change increased flooding?		Biomass	<p>Solar power is the conversion of the sun's energy into electricity through a solar cell.</p> <p><i>Good: instant electricity and no harmful gases are produced so there is no pollution</i></p> <p><i>Bad: less effective in areas that have lots of cloudy days. In some places such as the UK there are large fields of solar panels that take up lots of space. It can be very expensive as the cells cost lots to make.</i></p>		Access to services
Primary effects		Wind power		<p>Biomass burns plants, trees and organic matter to heat steam to drive turbines.</p> <p><i>Good: sources are always available, it is a much cheaper source of energy compared to fossil fuels and whilst it does release Carbon Dioxide, it produces less than fossil fuels.</i></p> <p><i>Bad: As it uses trees it can lead to deforestation.</i></p>	Entertainment	<ul style="list-style-type: none"> Restaurants, clubs, bars, theatres, festivals, shops...etc.
	Secondary effects		Nuclear Power	<p>Wind turns large turbine blades to generate electricity</p> <p><i>Good: Electricity produced is cheap in the long run, produced clean energy, can be very effective in places with high winds</i></p> <p><i>Bad: Negative visual impact on the landscape and can create nuisance (noise and light) for people living near them. Birds can also fly into the blades and die. Wind farms can be very expensive to build</i></p>	Transport	<ul style="list-style-type: none"> Train, airplanes, boats, buses...etc. Mumbai has links to all the major industrial cities in India as well as connections to globally important cities.
Urban growth has created a number of challenges in Mumbai		Cultures		<ul style="list-style-type: none"> People live in Mumbai from different ethnic backgrounds (people from different races and religions). This enriches the city's culture with different cuisines, places of worship and cultural festivals. 		
Squatter settlements	<ul style="list-style-type: none"> 40% of the population in Mumbai live in poor quality housing or on the streets. The poorest live in squatter settlements on the outskirts of the city. People arriving to Mumbai cannot afford rent so build a house using whatever they can find, close to the city centre. Overtime squatter settlements are formed. <i>Homes are very small and made out of wood, cardboard, metal and plastic sheeting</i> <i>They are overcrowded and lack services (healthcare, clean water) = diseases are common.</i> <i>Pollution (air, water, waste)</i> 		Lack of services	<ul style="list-style-type: none"> As populations rise rapidly it is very difficult to supply services to the population. They cannot develop the necessary infrastructure (water pipes, electricity lines, sewage pipes) fast enough to support the rising population Lack of teachers and schools = lack of education. Around 24 % of children are illiterate. Lack of sewage pipes = people dispose of sewage into nearby rivers and streams. These are used by locals to clean clothes and for drinking = waterborne diseases (typhoid, cholera and dysentery). 83% diseases in Mumbai are waterborne. Everyday in Dharavi, 4000 people are affected by waterborne diseases. Lack of hospitals = lack of healthcare. 		
	Water pollution	Air pollution			Waste pollution	<p>Sewage and industrial waste from factories is poured into rivers. The Mithi River in Mumbai is very polluted because:</p> <ul style="list-style-type: none"> Large companies dump industrial waste straight into the river and the airport uses it to dump untreated oil. 800 litres of sewage goes straight into the river every day. <p>This results in waterborne diseases, death of wildlife and destruction of ecosystems.</p>
<p>Vehicles and factories pollute the air. In 2018</p> <ul style="list-style-type: none"> The World Health Organisation ranked Mumbai as the 4th most polluted megacity in the world. 89.6% of deaths in slums are due to respiratory diseases. 						
<p>100,000s of tons of waste is produced every day in Mumbai. This is often left on the streets because they do not have the infrastructure (roads, lorries) to collect the rubbish and they do not have the money to build this infrastructure.</p>						