

Year 7 – Geography – Knowledge Map

Year 7 Knowledge Concepts:

Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk

TOPIC 3 (Yr7)	Topic(s): How do we use our planet as a resource?	Key Concepts Explored: Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability	
	<p>Explicit Knowledge (Working knowledge to be explicitly taught within the topic)</p> <p>1. How do we use our planet as a natural resource?</p> <ul style="list-style-type: none"> • These are materials found in nature that we need to live e.g., clean drinking water, fuel for energy and fertile soil. • What do we need to live? - Clean drinking water, a food supply, Fertile soil, fuel for energy, wood and rocks for building, minerals. • Earth's 4 spheres are: Atmosphere, Lithosphere, Hydrosphere and Biosphere • They are the "lithosphere" (land), "hydrosphere" (water), "biosphere" (living things), and "atmosphere" (air). • All 4 spheres are interconnected, working together to make the planet function properly. • Abiotic components are – Non-Living e.g., Air, sunlight and Biotic components are – Living e.g. flora (plants) and fauna (animals) • A renewable resource is one that is replaced by natural processes in the Earth's spheres, which take place in less time than an average human life. E.g. Air, water, wind, sunlight and other living things. A non-renewable resource takes millions of years to be replaced naturally. E.g. Coal, oil and natural gas. <p>2. What are rocks and how are they a natural resource?</p> <ul style="list-style-type: none"> • Geologists collect evidence like this to work out when a volcano is likely to erupt. Geologists also study layers of rock around the world, looking at fossils and minerals in them to understand the Earth's history • Rocks are natural material made of grains of one or more minerals. Geologists classify rocks into three groups - Igneous, Sedimentary and Metamorphic 	<p>Remembered Knowledge (knowledge that must be retained and remembered over time)</p> <p>We need clean drinking water, fuel for energy and fertile soil to grow food to survive. The earth is made up of 4 spheres – Lithosphere, hydrosphere, atmosphere and the biosphere. They are all connected.</p> <p>There are three types of rocks: sedimentary, igneous and metamorphic rock Sedimentary rocks are formed from sediments that have settled at the bottom of a lake, sea or ocean, and have been compressed over millions of years. Examples of sedimentary rocks include sandstone, limestone, chalk and clay.</p>	<p>Ref.</p>

- Sedimentary rocks are formed from sediments that have settled at the bottom of a lake, sea or ocean, and have been compressed over millions of years. Examples of sedimentary rocks include sandstone, limestone, chalk and clay.
- Igneous rocks are formed by magma from the molten interior of the Earth. When magma erupts it cools to form volcanic landforms. Examples of igneous rocks include basalt and granite.
- Metamorphic rocks have been subjected to tremendous heat and/or pressure, causing them to change into another type of rock. They are usually resistant to weathering and erosion and are therefore very hard-wearing. Examples of metamorphic rocks include marble, slate, and schists
- Weathering is when rocks are broken down by mechanical and chemical processes caused by the weather. Weathering allows erosion to happen more easily. Mechanical weathering - is when exposed rocks get broken down by a physical process. Chemical weathering - is when exposed rocks get break up due to a chemical reaction. Biological weathering - is when exposed rocks get broken down by something living
- Rocks can be used as a natural resource e.g., Roads, pavements, statues, worktops, bridges, construction. Rocks are used for shelter in the following ways: roof tiles, walls, chimneys, guttering, cement, and mortar. Rocks provide fuel for energy.
- Coal was formed millions of years ago from dead plants, which decayed in swamps. For hundreds of years, we have used coal for energy production.

Why are soils the root of life?

- Soil is a layer of minerals, water, and organic matter that forms from the weathered rock below, and decaying vegetation above.
- There are many different types of soil. It is usually 1-3 metres deep. It can take between 100 and 1,000 years for just 1cm of soil to build up.
- If you dug down through any soil you would create a soil profile. The 5 layers are: Humus - This is a layer of organic matter that is about 2-3cm thick and is made up of dead plant material, such as leaves and twigs. Topsoil - This layer is 5-20 cm thick. It consists of organic matter and minerals This is the soil layer where most plants and organisms live. Subsoil - This layer has minerals as well as organic matter, which has been washed down by rainwater. It has little humus. Tree roots reach down to this layer. Weathered rock - This layer contains rock from the lowest layer, weathered and broken into chunks. The upper soil layers have developed from this. Bedrock - This layer is made up of solid mass of underlying rock.

How does the biosphere provide natural resources?

Igneous rocks are formed by magma from the molten interior of the Earth. When magma erupts it cools to form volcanic landforms. Examples of igneous rocks include basalt and granite.

Metamorphic rocks have been subjected to tremendous heat and/or pressure, causing them to change into another type of rock. They are usually resistant to weathering and erosion and are therefore very hard-wearing. Examples of metamorphic rocks include marble, slate, and schists

Soil is a layer of minerals, water, and organic matter that forms from the weathered rock below, and decaying vegetation above. Soil is made up of 5 layers

<ul style="list-style-type: none"> • Supply – availability • Demand – it's use • Water scarcity occurs in many parts of the world. It is when the demand for water exceeds supply. • Water is unevenly shared globally. • Reasons why many countries in the world water demand exceeds supply – drought, population pressure, lack of rainfall. Some places have enough water but can't access it due to poverty. • Case study – South Sudan • What are the conditions like for local people? - wants and needs • How would their lives be different to your own? • How charities and aircraft help • How people, crops and animals be impacted by the lack of clean water • Why is the world so dependent on oil resources? Crude oil is the term used to describe the oil extracted from the ground. Oil is a fossil fuel that has been formed from a large amount tiny plants and animals such as algae and zooplankton. These organisms fall to the bottom of the sea once they die and over time, get trapped under multiple layers of sand and mud. • We use petroleum products in vehicles, to heat buildings, and to produce electricity. In the industrial sector the petrochemical industry uses petroleum as a raw material to make products such as plastics. • oil-based products are used in our everyday lives. • There are 6 operating oil refineries in the UK allocated on the coast. • Students use 6 figure grid references to identify these refineries on an OS map. <p>What natural resources can be used to generate electricity?</p> <ul style="list-style-type: none"> • Electricity plays a huge part of our everyday lives – heat, light, cooking. We expect instant energy • The National Grid is the system operator of Great Britain's electricity and gas supply. • The different ways energy can be generated – nuclear, wind, geothermal, biomass, tidal, hydroelectric, solar, fossil fuels. • A renewable resource is one that is replaced by natural processes in the Earth's spheres, which take place in less time than an average human life.e.g. air, water wind sunlight • A non-renewable resource takes millions of years to replaced naturally. E.g. coal, oil and natural gas. • How electricity is generated: Hydroelectric - This uses fast-flowing water to turn generators to produce electricity. Biomass - Biomass burns plants, trees, and organic matter to heat steam to drive turbines. Geothermal energy - This uses heat produced continuously inside the Earth's 	<p>Electricity can be created by both renewable and non-renewable energy sources. Fossil fuels are coal, oil and gas. These will run out. Examples of renewable energy sources include solar, wind, nuclear, geothermal.</p>	
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<p>crust. Solar energy - is the conversion of the Sun's energy into electricity. Wind power - The wind turns the large turbine blades to generate electricity. Nuclear power - nuclear reactions releases energy. Atoms of the mineral uranium are split creating heat energy, which turns water to steam and drives huge turbines to create electricity. Tidal energy - This uses the rise and fall of tides to convert incoming and outgoing tides into electrical energy.</p> <ul style="list-style-type: none"> • Fossil fuels - The process involves burning the fuel to produce steam that drives the turbines. This unfortunately pollutes the atmosphere. <p>How can we use natural resources sustainably?</p> <ul style="list-style-type: none"> • Sustainability - meeting the needs of today's population without compromising the needs of future generations. • Sustainability encourages us to think more carefully about different types of natural resources, the ways they are formed and the speed at which they are being used. • Distribution and size of the world's oil reserves e.g. Middle East (largest) 746 billion barrels remaining, and 299 years left of production. Europe (smallest) 14 billion barrels left, and 2 years left of production. • Actions to improve sustainability can operate at three different levels: Local – recycling, homes, and schools, National – Government targets and International - International agreements (COP26) 	<p>Sustainability - meeting the needs of today's population without compromising the needs of future generations.</p> <p>Sustainability encourages us to think more carefully about different types of natural resources, the ways they are formed and the speed at which they are being used.</p>	
<p>Big Questions How do we use our planet as a resource?</p>		
<p>Key Vocabulary (that must be explicitly taught to help students to <i>understand</i>) Natural resource, Raw materials, Earth's spheres, Atmosphere, Biosphere, Geosphere (lithosphere), Hydrosphere, interrelationship, renewable, non-renewable, geological timescale, geologists, minerals, igneous rock, sedimentary rock, metamorphic rock, weathering, chemical weathering, biological weathering, mechanical weathering, freeze thaw, Industrial revolution, Soil, humus, topsoil, subsoil, Weathered rock, Bedrock, environmentalists, biome, emergent layer, canopy layer, under canopy layer, shrub layer, drip tips, buttress roots, lianas, epiphytes, Water management, water scarcity, uneven distribution, salt water, fresh water, ground water, surface water, domestic, commercial, Oil, Fossil fuel, crude oil, coal, petrochemical, petroleum, plastic, fertiliser, solar power, wind power, hydroelectric, nuclear, geothermal, tidal, biomass, national grid, energy generation, sustainability, local, national, international, International agreements, reserve.</p>		

Year 8 – Geography – Knowledge Map

Year 8 Knowledge Concepts:

Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk

Topic 1 Y8	Topic(s): How does water shape the land?	Key Concepts Explored: Geographical Skills, Population and culture, Risk, Physical process and landscapes, sustainability, Space and place		
	<p>Explicit Knowledge (Working knowledge to be explicitly taught within the topic)</p> <p>What is the drainage basin?</p> <ul style="list-style-type: none"> A drainage basin is an area of land which feeds a river. All the precipitation that falls in drainage basin will flow into the river through surface runoff, throughflow and groundwater flow. Features of a drainage basin include tributary (smaller river joining a main river) a confluence (the point where two rivers meet) the source (where the river starts) the mouth (where the river ends), and the watershed (the boundary between one drainage basin and the next). <p>How and why do rivers change?</p> <ul style="list-style-type: none"> The river has three courses: upper, middle, and lower course. In the upper course the river is shallow and narrow. The gradient is steep, and the velocity is slow. Features include V-shaped valleys, interlocking spurs and waterfalls. In the middle course the valley starts to flatten, it gets wider and deeper and increasing in speed. There are meanders and oxbow lakes. The lower course is the widest, deepest, and fastest. Features include floodplains. How to draw a long profile of a river. <p>How do rivers shape the land?</p> <ul style="list-style-type: none"> Rivers do three jobs: erosion, transportation, and deposition. Erosion – Two directions – Lateral (side to side) and vertical (downwards). Abrasion materials carried by the river hit rocks and wear them away. Attrition materials carried by the river hit each other and wear each other away, becoming smaller and rounder. Hydraulic action water flows against a rock surface wearing it away. Solution rock breaking down due to a chemical reaction. 	<p>Remembered Knowledge (knowledge that must be retained and remembered over time)</p> <p>The drainage basin is an area of land drained by a river and its tributaries. It has key components that make up the drainage basin.</p> <p>Rivers are divided into three different courses. Each course is different.</p> <p>Rivers have three main jobs: erosion, transportation, and deposition. Each of these physical processes change and shape the land creating distinct features.</p>	Ref.	

<ul style="list-style-type: none"> • Transportation – Traction – Rocks rolling across the riverbed at high discharge. Saltation rocks bouncing along the riverbed. Suspension Rocks held in suspension by the river water. Solution Tiny particles being carried as a dissolved load. • Deposition – Material being dropped by the river at times of lower discharge. The largest material is dropped first. • A waterfall forms at a steep drop in the long profile of a river. This is usually where a river crosses over a band of soft and hard rock. As the river flows over the steep drop, it undercuts the hard rock by erosion (HA and abrasion) creating an overhang. As the water drops over the steep cliff it creates a plunge pool at the base of the waterfall. Eventually the overhang of hard rock collapses due to gravity, the large boulders further erode the plunge pool. The waterfall retreats. The entire process repeats creating a steep sided gorge. <p>What are the causes of flooding?</p> <ul style="list-style-type: none"> • A flood occurs when a river has too much water in its channel and overflows its banks and spreads out onto the surrounding area. • There are human and physical causes of flooding. • Human – deforestation, urbanisation, • Physical – Heavy rainfall, snowmelt, steep slopes, tributaries • Flooding in York was called by both human and physical factors. <p>How are waves formed?</p> <p>A wave is created when wind is blown over the surface of the sea/ocean. Waves form through the transfer of energy. The wind, blowing over the surface of the sea, creates friction between the two, and the water begins to move in a circular motion. When a wave reaches shore, it loses some of its energy. The wave gaining energy and height moves quickly towards the shore as swash. When it hits the coast and loses energy, it moves back at a lower height as backwash. Constructive waves form in calm conditions with light winds, Waves are long and not very high, Swash is stronger than backwash and have a frequency of 6-9 per minute. Destructive waves form in storm conditions with high winds, they are high waves, Backwash is stronger than swash and they are frequent, 11-15 per minute. Waves do three jobs – erode, deposit and transport.</p>	<p>The ability to describe and explain, with the aid of a diagram, the main features of waterfalls and how they are formed.</p> <p>Flooding is caused by both human and physical factors. It creates social, economic, and environmental impacts.</p> <p>Waves are caused by the wind. There are two types of waves constructive and destructive. Each shape the coastline in different ways. Swash is movement up the beach Backwash is movement down the beach</p>
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<p>The fetch of the wave is the length of the water that the wind has blown over The swash is when water that moves up the beach The backwash is when water that moves back down the beach</p> <p>What processes occur at the coast? Rocks are natural material made of grains of one or more minerals. A mineral is a natural compound that usually exists in rocks as crystals. Geologists classify rocks into three groups according to how they were formed- sedimentary, metamorphic and igneous (Link back to year 7) Erosion is the wearing away of land by wind, water, or ice. There are 4 types of erosion at the coast and they create different features. Hydraulic Action -This process involves the force of water against the cliff. Abrasion - The wave throws pebbles against the cliff, sometimes at high velocity. Attrition - Rocks bump into each other and so are smoothed and broken down into smaller pebbles. Solution - This is the chemical action of water. Acids in the water slowly dissolve the cliff.</p> <p>What coastal landforms are created by forces of erosion? Headland and bays are created when there are bands of more and less resistant rock. The less resistant rock erodes more quickly leaving the more resistant rock standing out as a headland. Over time the process begins again. Caves, arches, stacks and stumps form when Waves attack a weakness in the headland. Over time this creates a cave. Eventually the cave erodes through the headland to form an arch. Again, over time, the Roof of the arch collapses leaving a column of rock called a stack. Eventually, the stack collapses leaving a stump</p> <p>How do human’s manage the physical landscape?</p> <ul style="list-style-type: none"> • Rivers can be managed by hard and soft engineering • Hard Engineering – These involve the construction of artificial structures. Tend to be more expensive and have a greater impact on the river and local surroundings – Dams, floodwalls, rerouting rivers, levees and dredging. • Soft Engineering – More environmentally friendly. Usually more aesthetically pleasing as it uses natural products - Tree planting, floodplain zoning 	<p>There are 4 types of erosion – abrasion, hydraulic action Solution and attrition. The rate of erosion is affected by the geology of the rock</p> <p>2 key features of erosion found at the coat are headlands and bays and caves, arches, stacks and stumps.</p> <p>Floods can be managed by both hard and soft engineering.</p>
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	Big Questions How does water shape the land?
	Key Vocabulary (that must be explicitly taught to help students to <i>understand</i>) Abrasion, Attrition, , Channel, Condensation, deposition, evaporation, Groundwater flow, Gorge, Hydraulic action, hydrological cycle, Infiltrating, Intercepted, Lateral erosion, Long profile, Mouth, plunge pool, Precipitation, run off, Source, Stored, Surface run off, Throughflow, Transportation, Saltation, Traction, Solution Suspension, Velocity waterfall, watershed, drainage basin, confluence, tributary.

Year 9 – Geography – Knowledge Map

Year 9 Knowledge Concepts: Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk
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TOPIC 1 Y9	Topic(s): Why is Earth so dangerous?	Key Concepts Explored: Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk		
	Explicit Knowledge (Working knowledge to be explicitly taught within the topic) What is a disaster and how are they classified? <ul style="list-style-type: none"> A natural hazard is a natural event that can cause loss of life, extreme damage to property and disrupt human activities. The number of natural disasters from 2000 have increased. Floods make up the majority of disasters that occur. Disasters can be classified into human and natural disasters. Examples of natural disasters include hurricanes, tsunamis, earthquakes, and volcanoes. Examples of human disasters include terrorism, accidents, and explosions 	Remembered Knowledge (knowledge that must be retained and remembered over time) A natural hazard is a natural event that can cause loss of life, extreme damage to property and disrupt human activities. They can be human or natural	Ref.	

<ul style="list-style-type: none"> • We judge the severity of a disaster by how many deaths and injuries, the number of buildings destroyed, the economic impact, the scale of the disaster (global or local) and how long the impacts last for. <p>What is the structure of the Earth?</p> <ul style="list-style-type: none"> • The earth is divided into 4 main layers: crust, mantle, outer core, and inner core. • The inner core is 5,500°C - extremely hot. It is a very dense solid made from iron and nickel. • The outer core is 2,000 km thick and is a liquid. • The mantle is semi-molten and about 3,000 km thick. • The crust is the rocky outer layer. It is thin compared to the other sections, approximately 5 to 70 km thick. If the Earth was scaled down to the size of an apple, the crust would be about the thickness of the apple skin. The crust is made up of pieces called plates. There are two types of crust: oceanic and continental crust. The oceanic crust is found under the sea, is thinner, and denser than the continental crust. <p>Why do the continents fit together like a jigsaw puzzle?</p> <ul style="list-style-type: none"> • In 1912, Alfred Wegener, a German scientist put forward evidence to support the idea of continental drift. <u>CONTINENTAL DRIFT</u> – This is the idea that the continents move and used to all be stuck together. • <u>CONVECTION CURRENTS</u> – Circular movements of heat in the mantle which cause the plates to move about. • Evidence of continental drift include Similar animal and plant fossils (Cynognathus, lystrosaurus and Mesosaurus, glossopteris) and rock types found on different continents (West coast of Africa and east coast of South America). The animals could not swim or fly. This means that that at some point in history the continents were once joined. Evidence of an ice age at the same time in the past across parts of the continents, even the hottest ones. This suggests that areas that now have hot climates must previously have been in areas that had cold climates. A pattern in the formation of some of the old mountain ranges. This means that when the mountains were originally formed, they were located close to each other. <p>What happens at plate boundaries?</p> <ul style="list-style-type: none"> • Tectonic plates are sections into which the lithosphere is cracked. The surface of the Earth is divided into 7 major and 8 minor plates. The largest plates are the Antarctic, Eurasian, and North American plates. • There are several different types of plate boundary. 	<p>The Earth is divided into four distinct layers, crust, mantle, inner core, and outer core. There two types of crust oceanic and continental.</p> <p>Continental drift is the idea that the continents move and at one point were all stuck together. They are moved by convection currents; slab pull and ridge push.</p> <p>Tectonic plates are sections into which the lithosphere is cracked. The surface of the Earth is divided into 7 major and 8 minor plates. There are 4 types of plate boundary 1. Constructive – Plates move apart</p>
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<ul style="list-style-type: none"> • Destructive plate boundary - This occurs when oceanic and continental plates move together. The oceanic plate is forced under the lighter continental plate. Friction causes melting of the oceanic plate and may trigger earthquakes. Magma rises up through cracks and erupts onto the surface. An example of a destructive plate boundary is where the Nazca plate is forced under the South American Plate. • Collision zones - Collision zones form when two continental plates collide. Neither plate is forced under the other, and so both are forced up and form fold mountains. • Constructive plate boundary - A constructive plate boundary, sometimes called a divergent plate margin, occurs when plates move apart. Volcanoes are formed as magma wells up to fill the gap, and eventually new crust is formed. An example of a constructive plate boundary is the mid-Atlantic Ridge. • Conservative plate boundary - A conservative plate boundary, sometimes called a transform plate margin, occurs where plates slide past each other in opposite directions, or in the same direction but at different speeds. Friction is eventually overcome, and the plates slip past in a sudden movement. The shockwaves created produce an earthquake. This occurs at the San Andreas Fault in California. • Earthquakes and volcanoes are distributed along or near to the plate boundaries. There are clusters of volcanoes located on the east coast of the Eurasian plate and the west coast of the South American plate. <p>What causes an earthquake and how are they measured?</p> <ul style="list-style-type: none"> • An earthquake is a sudden violent movement of the Earth's surface. It occurs when two plates suddenly move past each other. The area where they slip is called a fault. • Focus – The point at which the rocks move underground, and the earthquake starts. • Epicentre – The area directly above the focus on the earth's surface. • Seismic waves are the waves of energy caused by the sudden movement of the plates. • Large earthquakes are usually connected with plate boundaries. Earthquakes happen often but most are too small for us to notice. <u>Seismometers</u> record earth movements. • Effects can be categorised into immediate or primary, eg injuries from falling buildings. or secondary effects those that happen because of the primary effects e.g. cholera outbreaks. • Nepal is located in the continent of Asia. It is a landlocked country which is bordered by India to the south and China to the North. The capital city is Kathmandu. On the 25th April 2015 a 7.8 magnitude earthquake occurred on a collision plate boundary. The Indo-Australian plate collided with the Eurasian plate. The earthquake was shallow just 15km below the surface. 	<p>2. Destructive - Oceanic and continental plates move together. Oceanic subducts</p> <p>3. Collision – Continental and continental plates collide</p> <p>4. Constructive – Plates slide past each other.</p> <p>Earthquakes and volcanoes occur on or near to plate boundaries.</p> <p>An earthquake is when the ground shakes violently. Key characteristics include focus, epicentre, and seismic waves</p> <p>Effects can be both primary and secondary and classified into social, economic, and environmental.</p>	
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<ul style="list-style-type: none"> • Primary effects of the earthquake include 9000 people died, 22,000 were injured, roads and bridges were destroyed, 800000 building were destroyed or damaged. • Secondary effects include outbreaks of typhus, avalanche that killed 18 people, 2 million people without access to clean water, roads blocked. • The responses included digging through rubble of collapsed buildings, providing food, shelter and medicine. <p>Can people manage the risk of living in earthquake zones?</p> <ul style="list-style-type: none"> • There are many ways that people can manage the risks of living in earthquake risk areas. This includes the 3PS – Planning, preparation and protection. • Adaptation of building structures – Retrofitting, fixing of loose objects to the wall. • Building design, cross bracing, shock absorber foundations • Education – Stop, drop and cover, survival kits • Alerts – text messages, radio, TV • Development levels have big role to play with how well-prepared people can be for an earthquake. Places such as Nepal would be less prepared than a country such as America as they will have more resources, better levels of education and more money to spend on improving infrastructure. <p>What are volcanoes and is it worth the risk of living near them?</p> <ul style="list-style-type: none"> • A volcano is an opening or vent in the earth’s surface(lithosphere) through which molten material erupts and solidifies as lava. • Volcanoes have specific features including a magma chamber, vent, a crater • They can produce lava, ash, steam, gas volcanic bombs, pyroclastic flows • Not all volcanoes erupt. They can be classified in three ways active volcanoes; these are erupting or has erupted recently. Dormant, these are also known as sleeping volcanoes that have not erupted for a long time, but it is expected to erupt again in the future and finally extinct volcano which has not erupted for many thousands or millions of years. • Volcanoes occur at both constructive and destructive plate boundaries. • There are two main types of volcanoes – shield and composite • Shield volcanoes erupt frequently, are less violent, erupt runny lava, found at constructive plate boundaries, have a wide base and gentle sides, made up of solidified lava • Composite volcanoes erupt less frequently, tall with steep sides made from alternate layers of ash and lava, found at destructive plate boundaries, erupt ash, lava bombs and pyroclastic flows, are more dangerous. 	<p>A volcano is an opening or vent in the earth’s surface(lithosphere) through which molten material erupts and solidifies as lava. Volcanoes have specific features including a magma chamber, vent, a crater They can produce lava, ash, steam, gas volcanic bombs, pyroclastic flows Not all volcanoes erupt. They can be classified in three ways active volcanoes; active, dormant and extinct. Volcanoes occur at both constructive and destructive plate boundaries. There are two main types of volcanoes – shield and composite There are lots of advantages of living near volcanoes</p>
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<ul style="list-style-type: none"> • Despite the risks of living near volcanoes they do have benefits including geothermal energy, tourism, fertile soil, minerals. Other people may live near them through no alternative such as unable to afford land elsewhere. • Globally around 800 million people live within 100km and 29 million people live within 10 km of active volcanoes • Volcanoes are safe for long periods of time between eruptions and are much more predictable than earthquakes. The 3ps again can be used to help manage an eruption <p>What happened during the 2010 eruption in Iceland?</p> <ul style="list-style-type: none"> • Iceland is an island in the NW of Europe, it is south of the Arctic Circle and SW of the Norwegian Sea. Iceland is N of the Atlantic Ocean and its capital city of Iceland is Reykjavik. The Mid-Atlantic Ridge goes through Iceland located in between the North American Plate and the Eurasian Plate boundary. Its latitude: 63° and 68° N and Longitude: 25° and 13°W. <p>What caused the disaster in Japan, 2011 and what were the effects?</p> <ul style="list-style-type: none"> • Tsunamis are huge wave or series of waves, usually caused by an earthquake on the ocean floor. • Case Study Japan - The earthquake and tsunami happened on the 11th March 2011 at 2.45pm. The earthquake occurred 250 miles off the North East Coast of Japan's main island Honshu. The initial earthquake lasted approximately 5 minutes and over 2 years later Japan was still recovering from the disaster. The magnitude of the earthquake was a massive 9.0 making it one of the most severe earthquakes ever and the worst to hit Japan. • Causes - Japan is located on the eastern edge of the Eurasian Plate. The Pacific plate (which is an oceanic plate) sinks under the Eurasian Plate (which is a continental plate.) The earthquake occurred at a shallow depth of just 20 miles below the surface of the Pacific Ocean when the Pacific plate slipped down, and the Eurasian plate bounced up • Effects - The government has estimated damage from the earthquake and tsunami at 16-25 trillion yen making it the costliest natural disaster ever. People could not get access to clean water or food. The Japanese government have reported that there were 15,883 deaths, 6,149 people injured and 2,663 people still missing. Over 190,000 homes were left without clean running water or electricity. Thousands of schools, offices and businesses were so severely damaged that they did not manage to re-open for up to a year after the earthquake. Hospitals were damaged so injured people could not be treated properly. 163,000 people were in shelters around the country due to the tsunami destroying their homes and a further 70,000 had to be evacuated due to the disruption at the nuclear power plant. The biggest problem was the nuclear generators being shut down and governments fearing radiation had got into the ground and water supplies. 	<p>Iceland experienced a volcanic eruption that caused widespread effects</p> <p>Tsunamis are huge wave or series of waves, usually caused by an earthquake on the ocean floor. They cause social, economic and environmental effects.</p>
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<ul style="list-style-type: none"> • Responses - Flood defences were in place along the coast however the tsunami waves were too high, and it flooded over the top. New higher Tsunami walls have been constructed the new ones are 25-30 metres high. 116 countries and 28 international organizations helped. Japan relied on aid raised by people across the world. 2.5 years later Japan was still suffering from the devastating effects of the tsunami. Millions of homes and businesses were still to be rebuilt. Recovery has been much more complicated due to the radiation leaks and the problems at the Fukushima Nuclear Power Plant. The un-safe areas had to be evacuated for up to 5 months at a time. In March 2013 Japan revealed its new <u>high-tech tsunami warning system which will warn of future problems</u>. This system has cost £25 million. <p>What are tropical storms?</p> <ul style="list-style-type: none"> • Tropical storms are given different names in different parts of the world • A tropical storm is a hazard that brings heavy rainfall, strong winds and other related hazards such as mudslides and floods. • Tropical storms usually form between approximately 5° and 30° latitude and move westward due to easterly winds. The <u>Coriolis force</u> sends them spinning towards the poles. • In most areas, tropical storms are given names. The names are alphabetical and alternate between male and female. This makes storms easier to identify, especially when they are close together. • It is hard to predict the path of a tropical storm, and therefore difficult to manage an adequate <u>evacuation</u> of an area if needed. • Hurricanes need a lot of heat to form, which is why they usually occur over tropical seas (at least 26°C). The sun is close to the equator, providing energy to heat the ocean. The warm ocean heats the air above it causing it to rise rapidly. Water <u>evaporates</u> quickly from the hot surface of the ocean, so the rising air contains great amounts of water vapour. The rising air starts to spin (anti-clockwise in the northern hemisphere) The centre of the storm - the eye - is calm. • As the air rises it cools, condenses and forms towering <u>cumulonimbus clouds</u>. The rapidly rising air creates an area of intense low pressure. The low-pressure sucks in air, causing very strong winds. Once the storm moves over land it starts to lose energy and fades. 	<p>A tropical storm is a hazard that brings heavy rainfall, strong winds and other related hazards such as mudslides and floods. They need sea temperatures of 27 degrees Celsius, spin of the earth between 5 -30 North and south of the equator, thunderstorms, or disturbance of air.</p>	
<p>Big Questions Why is Earth so dangerous?</p>		
<p>Key Vocabulary (that must be explicitly taught to help students to <i>understand</i>) Plate tectonics, Continental drift, oceanic crust, continental crust, magma, inner core, outer core, mantle, crust, natural disaster, ridge push, slab pull, convection current, geological evidence, fossils, plate boundary, constructive, destructive, conservative, collision, subduction zone, earthquakes, volcanoes, seismograph,</p>		

Richter scale, focus, epicentre, seismic waves, composite volcanoes, shield volcanoes, magma chamber, pyroclastic flow, lava bombs, ash, primary effects, secondary effects, responses, hurricanes, tropical storms, cyclones, typhoons, evaporation, low pressure, evacuation, Saffir Simpson scale, tsunamis, flooding.

Year 10 – Geography – Knowledge Map

Year 10 Knowledge Concepts:

Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk

TOPIC 1	Topic(s): Living World	Key Concepts Explored: Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk	
	<p>Explicit Knowledge (Working knowledge to be explicitly taught within the topic)</p> <p>How do ecosystems operate?</p> <ul style="list-style-type: none"> • An ecosystem is an area that includes all the biotic (living organisms) parts such as plants and animals and the abiotic (non-living) such as soil, rocks and climate sharing an environment. • Organisms within an ecosystem are classed as producers, consumers, or decomposers. Energy flows through these organisms within the ecosystem. • Producers, such as trees, produce food and begin this cycle. Then, using energy from the sun, they produce food. They do this by photosynthesis. Most producers are plants, but some small organisms produce food through photosynthesis as well. • Producers are eaten by primary consumers that cannot produce food themselves, such as a giraffe. Primary consumers are herbivores which means they only eat plants. Secondary consumers are carnivores such as lions. In a simple food chain, secondary consumers eat primary consumers. • Decomposers break down dead plants and animals. They also break down the waste of other organisms. Examples of decomposers include bacteria and fungi. Decomposers get their energy from breaking down dead material, e.g. dead producers, dead consumers or fallen leaves. When dead material is decomposed, nutrients are released into the soil. These nutrients are then taken up from the earth by plants. Decomposers are very important for any ecosystem. If they weren't in the ecosystem, the plants would not get essential nutrients, and dead matter and waste would gather. • A food chain shows the relationships between feeding groups, illustrating energy flow from producer to tertiary consumer. 	<p>Remembered Knowledge (knowledge that must be retained and remembered over time)</p> <ul style="list-style-type: none"> • An ecosystem is an area that includes all the biotic (living organisms) parts such as plants and animals and the abiotic (non-living) such as soil, rocks and climate sharing an environment. • Organisms within an ecosystem are classed as producers, consumers, or decomposers. Energy flows through these organisms within the ecosystem. • Producers, such as trees, produce food and begin this cycle. Then, using energy from the sun, they produce food. They do this by photosynthesis. Most producers are plants, but some small organisms produce food through photosynthesis as well. • A food chain shows the relationships between feeding groups, illustrating energy flow from producer to tertiary consumer. 	<p>Ref.</p>

<ul style="list-style-type: none"> • A food web shows lots of food chains and how they overlap. They are much more complex. The transfer of nutrients through the ecosystem is known as the nutrient cycle. • The nutrient cycle shows pathways through which nutrients flow. All plants and animals depend on nutrients in food for their survival. <p><u>Epping Forest Case Study -</u></p> <ul style="list-style-type: none"> • Most native woodlands in the UK are deciduous, which means the trees lose their leaves in the Autumn. Examples of native trees to the UK include oak, ash and beech. • Deciduous trees typically have fertile soils. Leaves decompose adding nutrients to the deep, brown soil. Smaller plants such as bluebells, moss and lichens thrive in the nutrient-rich soil. • Epping forest is an ancient, deciduous woodland to the north-east of London. It is all that remains of a more extensive forest that colonised England at the end of the last ice age. The forest is approximately 19 kilometres (12 miles) long from north to south, but no more than 4 kilometres (2.5 mi) from east to west at its widest point. • The forest, managed for over 1000 years, has been used for hunting and timber resources. Recreation is the leading role of the forest now. • The forest is designated as a Site of Special Scientific Interest (SSSI) which means it is a protected environment. • Epping Forest has a complex food web, composed of thousands of species, due to its careful management. • The forest has: a wide variety of native tree species that include beech, elm, oak and ash; • a shrub layer consisting of hazel and holly, along with grasses, brambles, fern, bracken and flowering plants; 177 species of lichen and moss, many primary consumers including insects and small mammals and deer, along with 38 species of birds, secondary consumers such as owls, adders and foxes; 700 species of fungi, important decomposers, which are common due to a large amount of deadwood; over 100 lakes and ponds provide important habitats for numerous fauna species (animals) and flora (plants). • Sustainable management of Epping Forest - Recreation is controlled within the forest including having designated car parking areas, a visitor centre, provision of rubbish bins and leaflets on how to use the forest to protect the environment. Paths for walking and riding are open to public use. Additionally, there are currently nine Forest Keepers, three Senior Forest Keepers and one Head Keeper employed to protect the forest environment. These strategies are sustainable because they protect the forest for future generations. • Along the roads' side, vegetation is cut back so that deer are aware of traffic and reduce the risk of collision with motor vehicles. Maintaining the vegetation protects the native deer population 	<ul style="list-style-type: none"> • A food web shows lots of food chains and how they overlap. They are much more complex. The transfer of nutrients through the ecosystem is known as the nutrient cycle. • The nutrient cycle shows pathways through which nutrients flow. All plants and animals depend on nutrients in food for their survival. • Epping forest is an example of an ecosystem
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from road traffic accidents. This is a form of **sustainable management** as it helps protect current and future deer populations.

- Cattle have been reintroduced in some areas as grazing supports the growth of some flora.
- Epping forest conservation volunteers undertake tasks every Sunday to support the biodiversity of the forest. Duties include cutting back vegetation, rubbish and scrub clearance, removing silt and maintaining ponds and bogs.

What is a biome?

- The largest ecosystems are called biomes. Biomes are very large ecological areas e.g. tropical rainforest. The distribution of ecosystems is affected by local factors including: climate, altitude and soil type
- Climate (rainfall, temperature and sunshine hours) is the main factor that influences the distribution of ecosystems. On a smaller scale, altitude and soil type become more important.
- Altitude, height above sea level, affects the growth of vegetation. Higher altitudes are colder so fewer plants grow. This also limits the number of animal species that can thrive.
- Soil types also affect the diversity of plants and animals. Nutrient-rich soils can support more vegetation. The acidity, drainage and thickness of soils also affect whether plants can grow.
- *Biomes* contain fauna and flora (animals and plants) that have adapted to the environment. *Biomes* are often defined by abiotic (non-living) factors such as climate, relief, geology, soils and vegetation.

Features and distribution

Tropical rainforest

- 23.5° north – 23.5° south of the equator.
- Hot and wet all year.
- Around 12 hours of sunshine all year round.
- Rich in plants and animals.
- Almost all plants are evergreen (they don't drop their leaves in a particular season).
- Plants grow quickly and are adapted to take in maximum light.
- Dense vegetation provides food and habitats for many species of animals.
- Poor soils as nutrients are rapidly recycled as leaves decompose quickly, providing a constant supply of nutrients to the soil.

Tropical grassland or savanna

- Within the tropics. Mainly between 5° and 15° north and south of the equator.
- Lots of sunshine throughout the year.

The largest ecosystems are called biomes *Biomes* contain fauna and flora (animals and plants) that have adapted to the environment. *Biomes* are often defined by abiotic (non-living) factors such as climate, relief, geology, soils and vegetation.

Characteristics of 5 biomes across the globe

- Relatively low rainfall (800-900mm).
- Hot with a wet and dry season.
- Fires are common in the dry season.
- Temperatures are highest (around 35°C) just before the wet season and lowest (around 15°C) just after it.
- Mainly grass, scrub, small plants and a few specially adapted trees e.g. acacia. These plants are adapted to recover quickly after a fire.
- Many species of insects.
- Large mammals such as lions, elephants, giraffe and zebras.
- Thin, nutrient-rich soil formed as the grass dies back or burned during the dry season.
- Nutrients are washed out (leached) during the wet season.

Desert

- 15-30° north and south of the equator.
- Located in a belt of high pressure (sinking air) and low rainfall.
- Low rainfall (less than 250 mm per year).
- It might only rain once every two or three years.
- Very hot and dry.
- High range in temperatures between very cold night temperatures (0°C) and hot day time temperatures (e.g. 45°C)
- Hot deserts get more daylight during the summer than the winter.
- There is little cloud cover because they get lots of sunshine hours during the day.
- Plant growth is sparse due to limited rainfall.
- Vegetation includes cacti and thornbushes.
- Many plants have a short life-cycle and appear only when it rains.
- Limited plants.
- Relatively few animals species, those that do exist have adapted to the harsh climate including scorpions, lizards, snakes and insects.
- Sparse vegetation means there is little leaf litter and high temperatures mean it is slow to decompose, leading to soils being thin and nutrient-poor.

Mediterranean

- 30-40° north and south of the equator.
- West coasts.
- Hot, dry summers and warm, wet winters.

- Mainly scrub vegetation – plants adapted to summer drought.

Mixed and Deciduous forest / Temperate forests

- 40-60° north and south of the equator.
- High rainfall and mild-temperatures in the mid-latitudes.
- Four distinct seasons.
- Warm summers and cool winters.
- Rain throughout the year, up to 1500 mm per year.
- Days are shorter in winter and longer in summer.
- Hours of sunshine vary throughout the year.
- Fewer plant species than tropical rainforests.
- Rich deciduous woodlands.
- Forests are made up of broad-leaved trees that drop their leaves in autumn e.g. oak, shrubs and undergrowth.
- Mild climate and range of plants provide food and habitats for mammals such as foxes, squirrels and mice, birds and insects.
- Plants lose their leaves in autumn, and leaf litter decomposes quickly, so soils are nutrient-rich and relatively thick.

Temperate grassland

- 40-60° north and south of the equator (higher altitude and latitudes than tropical grasslands).
- 250-500mm of rainfall each year, mainly in late spring, early summer.
- Hot summers (up to 40°C) and very cold winters (down to -40°).
- Light varies throughout the year.
- Quite low rainfall.
- Mainly grassland vegetation.
- Rainfall is too low to support large plants, so there are few trees.
- Home to fewer species of animals than tropical grasslands.
- Mammals include bison and wild horses and rodents such as mole rats.
- Decomposition happens quickly in summer due to high temperatures. So soils are relatively thick and nutrient-rich.

Coniferous forest (Taiga) / Boreal Forest

- High latitudes, 60° north of the equator and on mountains.
- Long, cold winters (-20°C)
- Short, mild summer (-10°C)

- Limited precipitation (less than 500mm per year). Most of this falls as snow.
- Lots of daylight during the summer months, little or none during the winter.
- Clear skies so plenty of sunshine during daylight hours.
- Most trees are evergreen, so they can grow whenever there is enough sunlight.
- Coniferous trees such as pine and fir are common, as are low-growing lichen and mosses.
- Relatively few animals species because of the lack of food available.
- Animals include black bears, wolves and elk.
- Needles decompose slowly due to cold temperatures, so soils are thin, nutrient-poor and acidic.
- The soil is frozen for most of the year due to cold temperatures.

Tundra

- Far north, above 60°N in Northern Europe, Alaska and Russia.
- Below freezing for most of the year.
- Summer 5-10°C, winter -30°C.
- Low precipitation – less than 250mm per year, most of which falls as snow.
- Near-continuous sunlight during the summer, and little or no sunlight during the winter.
- There is more cloud cover in the summer.
- Few trees due to lack of light in the winter. Vegetation includes mosses, grasses and low shrubs.
- Relatively few species of animals. Examples include Arctic hares, Arctic foxes and birds.
- Some animals migrate south during the winter.
- Sparse vegetation produces little leaf litter and organic matter decomposes slowly due to the cold temperatures.
- Soil is thin and nutrient-poor.
- Below the soil surface, there is a layer of permanently frozen land (permafrost).
- Light snow.

Polar

- Very cold all year round.
- A permanent or semi-permanent layer of ice.
- Mainly found in the Arctic and Antarctic.

Tropical Rainforests

- The Tropical Rainforest is a forest occurring in tropical areas of heavy rainfall. It is abundant with many species of wildlife and vegetation. Rainforests cover less than two percent of the Earth's surface. They are home to some 50 to 70 percent of all life forms on our planet. Rainforests are the most productive and most complex ecosystems on Earth.

<ul style="list-style-type: none"> • Tropical rainforests are located between 10°N and 10°S of the Equator where temperatures stay near 28°C throughout the year. Rainforests typically receive over 2000mm of rain each year. The largest rainforests are in the Amazon in Brazil (South America), Democratic Republic of Congo (Africa) and Indonesia (South East Asia). Tropical rainforests are also found in Hawaii and the islands of the Pacific & Caribbean. • Climate of TRFs - As tropical rainforests are located on or close to the Equator, the climate is typically warm and wet. The high rainfall and year-round high temperatures are ideal conditions for vegetation growth. The wide range of plants encourages a huge variety of insects, birds and animals. Temperatures in the tropical rainforest are high throughout the year. Annual temperatures usually average around 28°C and show little variation from day to day. The range in temperature throughout the year is low. The temperature never drops below 20°C and rarely exceeds 35°C. Rainfall levels are high, typically over 2000mm per year. This significant amount of rainfall supplies huge rivers such as the Amazon in Brazil and the Congo in Central Africa. Most afternoons experience a heavy downpour, which helps to keep the rainforest moist. The atmosphere in the tropical rainforest is hot and humid as the result of high temperatures and abundance of water. • The majority of nutrients in the tropical rainforest are stored in the biomass. The biomass is all the living things in an ecosystem, including plants and animals. • Nutrients are rapidly recycled in the tropical rainforest biome. The warm, moist climate provides ideal conditions for decomposers to break down organic material in the litter layer very quickly. The litter layer is all the dead organic material such as fallen leaves, dead wood or dead animals on the surface of the soil. Vegetation takes up nutrients which are dissolved in the soil. • The soil is formed by the mixing of dead organic material with weathered bedrock. Soils in the rainforest are mainly thin and poor. Nutrient levels in the soil are low due to the leaching (washing away of nutrients) by the heavy equatorial rain. This leaching means that the lower layers of the soils lack the nutrients and minerals needed by the lush vegetation. Also, rainforest vegetation rapidly absorbs nutrients from the soil. Soils are often red in colour as they are rich in iron. • The nutrient cycle is interdependent - Decomposers rely on fallen leaves, branches and dead animals to thrive. In turn, nutrients from decomposed matter enter the soil providing nutrients to support the growth of vegetation that is consumed by primary consumers • The nutrient cycle in the rainforest is very fragile. If a nutrient flow changes this can have a negative impact on the ecosystem. For example, when deforestation occurs the litter layer no 	<p>Tropical Rainforests are located on the equator in an area of low pressure.</p> <p>They have high temperature and high rainfall.</p> <p>Tropical rainforest ecosystems have a range of distinctive characteristics. Plants and animals adapt to these characteristics.</p>
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longer receives organic matter and the soil quickly becomes infertile. Because there is no vegetation cover to protect the soil nutrients are rapidly leached by heavy equatorial rainfall.

Biodiversity and Tropical Rainforests

- Biodiversity is the variety of life on Earth, in all its forms and all its interactions. We do not know how many species of plants and animals live in the rainforest, however, we do know it is the most biodiverse ecosystem in the world. For example, rainforests contain 170,000 of the world's 250,000 known plant species. In the Indonesian rainforest, there are over 30,000 species of plants and 1,600 species of birds.
- There are a number of reasons for biodiversity in the tropical rainforest including: the hot and wet climate provides ideal conditions for many species of plants and animals to thrive, nutrients are rapidly recycled speeding up plant growth, providing producers with food, which in turn are consumed by primary consumers, large areas of rainforest are untouched by humans, allowing nature to thrive.

How has rainforest vegetation adapted to the climate?

- Vegetation in the tropical rainforest has adapted to thrive in its hot, wet climate in a range of ways.
- The rainforest has four distinct layers of plants with different adaptations. For example, plants in the highest layer (emergent) only have branches at their crown (where the most light reaches them), and plants in the under-canopy have large leaves to absorb as much light as possible to support photosynthesis.
- There are clear layers in the rainforest (stratified). Each layer has animals and plants which have adapted to the conditions found there.
- Emergent are the tallest trees and are usually over 50 metres tall. The Kapok tree is an example of an emergent.
- The sea of leaves blocking out the sun from the lower layers is called the canopy. The canopy contains over 50% of the rainforest wildlife. This includes birds, snakes and monkeys. Lianas (vines) climb to the canopy to reach sunlight. Epiphytes, or air plants, are also found in this layer. An epiphyte is an organism that grows on the surface of a plant and gets its moisture and nutrients from the air, rain, water or from debris gathering around it.
- The under canopy mainly contains bare tree trunks and lianas. Lianas are vines that climb the vegetation in a bid to reach sunlight.
- The shrub layer has the densest plant growth. It contains shrubs and ferns and other plants needing less light. Saplings of emergents and canopy trees can also be found here.

- The forest floor is usually dark and damp. It contains a layer of rotting leaves and dead animals called litter. This decomposes rapidly (within 6 weeks) to form a thin humus, rich in nutrients. Below the rich top soil the soil lacks nutrients. This is because nutrients are rapidly absorbed by vegetation.
- In the tropical rainforest, most trees in the rainforest have wide buttress roots to support them as they grow incredibly tall (over 20-40m in some cases) as there is considerable competition for sunlight. In addition, roots grow wide rather than deep because nutrients exist in the top layer of soil.
- Epiphytes are plants that grow on the surface of another plant. They get their moisture and nutrients from the air, rain, water or debris accumulating around it. Lianas (vines) grow around trees as they climb to reach sunlight.
- Tree bark in the tropical rainforest is typically thin. This is because the temperature throughout the year is typically between 26-28°C. Therefore, they do not need protection from the cold.
- Plants drop their leaves gradually throughout the year, meaning they can go on growing all year round.
- Many trees have smooth, thin bark as there is no need to protect the trunk from cold temperatures. The smooth surface also allows water to run off efficiently to the soil so the tree can absorb the water.
- Additionally, smooth trunks reduce the risk of epiphytes growing on a tree as they have nothing to attach themselves. This helps protect the tree from the risk of collapse under the weight of epiphytes.
- Plants have thick, waxy leaves with pointed tips. The pointed tips (called drip-tips) channel the water to a point, so it runs off – that way the weight of the water doesn't damage the plant, and there's no standing water for fungi and bacteria to grow in. The waxy coating of the leaves also helps repel the rain.

How have animals adapted to the rainforest environment?

- Not only does vegetation adapt to the rainforest environment, but many animals have adapted to the unique conditions of this ecosystem.
- The poison dart frog is known for its bright colour; however, in the animal world, this signifies dangers. The poison dart frog excretes poison through its skin and its bright colour warns potential predators against eating it. Some of the frogs in this family are not poisonous. However, they have adapted to their environment by copying the appearance of the poisonous types.

<ul style="list-style-type: none"> • Sloths have adapted to the rainforest ecosystem in several ways. Two-toed sloths are nocturnal which enables them to avoid diurnal (or active during the day) predators, by sleeping during the day. Although three-toed sloths are both diurnal and nocturnal, they're largely inactive during the day. Sloths are built for life in the trees because their arms are longer than their legs and their feet are curved, which helps them grasp branches. Sloths move very slowly, which helps them avoid being seen by predators. • The main physical adaptation of the spider monkey is its prehensile tail. The prehensile tail allows the spider monkey to be able to grasp the branches of trees. The prehensile tail is longer than the monkeys' body and composed of twenty-three vertebra. This gives it suppleness and strength. The monkey can hang by its tail, swing by it, pick fruit with it and even throw things with it. <p>What are the causes of deforestation in the rainforest?</p> <ul style="list-style-type: none"> • Deforestation in the rainforest involves removing trees and using the land for another purpose. The global rates of rainforest deforestation are: 2.47 acres (1 hectare) per second: equivalent to two U.S. football fields; 150 acres (60 hectares) per minute; 214,000 acres (86,000 hectares) per day which is an area larger than New York City; and 78 million acres (31 million hectares) per year which is an area larger than Poland. • Slash and burn - Most clearances are still by the local people and tribes needing land on which to grow crops. They clear the forest by 'slash and burn'. Vegetation is cut down and then burned. The ash acts as a fertiliser adding nutrients to the soil. When the soil begins to turn infertile (usually after 3-5 years) the people move on. This is called shifting cultivation. It is a sustainable method of farming in the rainforest. It ensures the forest will recover. • Logging - Commercial logging is the major cause of primary rainforest destruction in South East Asia and Africa. Worldwide, it is responsible for the destruction of 5 million ha. per year. Cattle Ranching - Ranching is a major cause of deforestation, particularly in Central and South America. In Central America, two-thirds of lowland tropical forests have been turned into pasture since 1950. • Farming – Nutrients in the soil are quickly exhausted as there is no longer a humus layer to provide nutrients. The soil becomes infertile, and nothing will grow. • Mining - The mining of iron ore, bauxite, gold, oil and other minerals have benefited many LEDCs. However, it has also devastated large areas of rainforest e.g. The Amazon. • Hydroelectric Power - An unlimited supply of water and ideal river conditions have led to the development of hydroelectric power stations (HEP Stations). 	<p>Deforestation is the cutting down of trees on a large scale.</p> <p>Causes of deforestation – subsistence and commercial farming, logging, road building, mineral extraction, energy development, settlement, population growth</p>	
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<p>What are the effects of deforestation in the Amazon?</p> <ul style="list-style-type: none"> Deforestation in the Amazon rainforest is causing problems at a range of scales. The local, national, and global issues are explored below. <p>LOCAL</p> <ul style="list-style-type: none"> Water Cycle - Deforestation in the rainforest disrupts several natural cycles. The first is the water cycle. Once trees are felled, evapotranspiration reduces, as does the return of moisture to the atmosphere. This leads to less convection rainfall, drier conditions and the climate becomes warmer, harming activities such as agriculture that the forest is cleared for. Nutrient Cycle - The second is natural cycle affected by deforestation is the nutrient cycle. About 80% of the rainforests nutrients comes from trees and plants. That leaves 20% of the nutrients in the soil. The nutrients from the leaves that fall are instantly recycled back up into the plants and trees. When an area of rainforest is clear-cut, conditions change very quickly. The soil dries up in the sun. When it rains, it washes the soil away. The rainforest never fully recovers. When land is cleared for grazing and plantations, it quickly becomes infertile, leading to further forest clearance. Soil erosion - When vegetation is removed, the soil is left exposed to the heavy equatorial rainfall and is rapidly eroded. The removal of topsoil means little vegetation will grow. Also, soil erosion leads to flooding as the soil becomes deposited on river beds. Water pollution - Activities such as gold mining lead to river pollution. Mercury used to separate the gold from the ground and enters rives poisoning fish, as well as people living in nearby towns. Indigenous people - Estimates suggest that 80% of indigenous people in the Amazon have died since the arrival of Europeans in the sixteenth century. Most have been killed from western diseases such as malaria to which they have no immunity. Those remaining have been forced away by the construction of roads, ranches, mines and reservoirs Conflicts - Conflicts occur between loggers and other developers and indigenous people. This is because they have conflicting opinions on how the rainforest should be used. <p>NATIONAL</p> <ul style="list-style-type: none"> Deforestation can consume a country's only natural resource. If deforestation is not managed sustainably a country's single natural resource could be lost forever. <p>GLOBAL</p> <ul style="list-style-type: none"> Climate change - Rainforest canopies absorb carbon dioxide, which is a gas in the atmosphere. When the rainforests are burned and cleared, carbon dioxide is released. Also, when trees are cut down, they can no longer absorb carbon dioxide. This means more carbon dioxide is in the 	<p>Impacts of deforestation on a variety of scales applied to a case study of the Amazon Rainforest</p> <p>Economic development, soil erosion, contribution to climate change, loss of biodiversity and impact on indigenous population.</p>	
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atmosphere. Carbon dioxide allows heat through the atmosphere (suns rays). However, it will not enable reflected energy to escape from the atmosphere. This is called the enhanced greenhouse effect and causes climate change.

- Loss of biodiversity - Deforestation in the rainforest means individual species will become endangered and biodiversity is reduced.
- Predictions suggest 137 plant, animal and insect species are lost every day due to rainforest deforestation. With the loss of species also comes potential cures for life-threatening diseases. 30-45 per cent of Amazon's species could be lost by 2030.

What are the opportunities in the tropical rainforests?

- The tropical rainforest is a valuable provider of resources and opportunities. These fall into two groups: those resources and opportunities provided by the rainforest in its natural state and those resources and opportunities provided by the land once it is cleared of rainforest cover.
- The second is the driving force behind much of the current deforestation of tropical rainforest, through crops and livestock farming.
- The opportunities and resources offered by the rainforest and other biome or ecosystem are widely known as goods and services. In this case, goods are the things that can be directly obtained from the rainforest. Services are benefits the rainforest can offer to people and the environment.
- Rainforest goods - Building materials (timber), Native food crops, Wild meat and fish, Energy from HEP, Medicine and water

SUSTAINABLE MANAGEMENT OF THE TROPICAL RAINFOREST

- It's important that the future of the rainforest is preserved for a range of reasons. These include: Maintaining the high diversity of plants and animals to protect its biodiversity, Many products are sourced from the rainforest including rubber, tropical hardwood, coffee, chocolate and medicines. Many medicines, including cancer treatments, are sourced from the rainforest. If species become extinct before they are discovered new medicines will not be developed, The rainforest provides many resources to support economic development. If it is not available for future generations then this development will be limited, Tropical rainforests help reduce global warming through CO2 being absorbed. Without these temperatures will increase rapidly leading to a range of problems including rising sea levels and coastal flooding around the world, Tropical rainforests help regulate the water cycle and climate in the local area and, if they no longer exist, will increase the risk of flooding, soil erosion and drought in some area.

Tropical rainforests need to be managed to be sustainable.

Strategies used to manage the rainforest sustainably – selective logging and replanting, conservation and education, ecotourism, and international agreements about the use of tropical hardwoods, debt reduction.

- If development is going to be sustainable (resources will support current economic development but will still be available for future generations to use) then sustainable management of the tropical rainforest is required.
- Sustainable management of the rainforest occurs at a range of levels. International, national, and local solutions can support the future of our tropical rainforests.

INTERNATIONAL APPROACHES TO SUSTAINABLE MANAGEMENT OF THE TROPICAL RAINFOREST

Debt reduction programme

- Many tropical rainforests are in LICs. Many LICs are heavily in debt and often use natural resources such as the rainforest as a way of making money to pay off loans. However, there have been instances when wealthier countries have agreed to write off the debt in return for protecting the rainforest.

International Agreements

- Tropical hardwood, such as mahogany, is in high demand in richer countries to make things like furniture. This high demand is leading to increased rates of illegal deforestation. To overcome these international agreements are in place to restrict wood that is not from a sustainable sourced being imported into countries. An example of this is FSC. The Forest Stewardship council source sustainable timber and mark these products with their logo so people buying the wood know that the wood is sustainably sourced.

National Approaches to sustainable management

- Education – ensuring those involved in the exploitation and management of the forest understand the consequences behind their actions. an example of this is the roll-out of Coffee Sustainability Curriculum through a new app and advanced training courses in Brazil.
- 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.

Local Approaches

- Afforestation – the opposite of deforestation. If trees are cut down, they are replaced to maintain the canopy.
- Shifting Cultivation – Farmers should move on after 2-3 years to allow the rainforest to recover.
- Rubber tapping – More sustainable methods of exploiting the rainforest should be pursued e.g. rubber tapping.
- Selective Logging – Only certain trees (e.g. just the older or inferior ones) are cut down – most trees in the area are left standing. This causes less damage as the trees that remain provide soil cover, avoiding leaching of nutrients and soil erosion and protecting the nutrient cycle. Selective

<p>logging allows young trees a guaranteed life span and the forest will regain full maturity after around 30-50 years. This maintains the health of the forest and ensures it can be used by future generations.</p> <ul style="list-style-type: none"> • Agroforestry – growing trees and crops at the same time. This lets farmers take advantage of shelter from the canopy of trees. It prevents soil erosion and the crops benefit from the nutrients from the dead organic matter. <p>Sustainable management strategies are affected by political and economic factors</p> <ul style="list-style-type: none"> • Governance relates to control of rainforests and who has a say in how rainforests are used. In some areas, rainforests are protected by national and international laws. • Commodity value means assigning a value to different good and services in a rainforest. Sustainable management ensures rainforests are worth more than the value of the timber and other resources that can be extracted, such as gold. An example of this is sustainable forestry, which balances the removal of trees to sell with the conservation of the forest. • Selective logging involves only removing a small number of trees, allowing the forest to regenerate naturally. This saves money in the long run as logging companies do not need to replace felled trees. They also use a range of species so that none are over-exploited. • International agreements try to reduce illegal logging and ensure timber comes from sustainable sources. The Forestry Stewardship Council allows the use of its logo by companies that operate in a sustainable way, so consumers know they are buying sustainable timber. • Ecotourism is a type of tourism that minimises damage to the environment and benefits local people. Tourists are only allowed to visit in small groups, minimising their impact on the environment. Tourists take part in activities that help raise awareness of conservation issues. Entrance fees are paid by the tourists which are invested in conservation and education projects. <p>What are the distinctive characteristics of hot deserts?</p> <ul style="list-style-type: none"> • Hot deserts - areas of the Earth's surface which receive less than 250mm of rainfall every year. • Not all deserts are hot, cold deserts exist as well. The largest hot desert in the world is northern Africa's Sahara, where daytime temperatures can reach up to 50°C (122°F). Hot deserts typically contain little or no vegetation. The main characteristics of hot deserts are: few clouds, little rain, very hot days and very cold nights • The reasons for these characteristics are mainly because of the location of deserts. <p>Desert Soil</p> <ul style="list-style-type: none"> • Soils are usually very shallow. They usually have a rough gravelly texture. The soil isn't very fertile because there is very little vegetation to provide litter and humus. Therefore there is little or no litter layer. Due to lack of organic material and rainfall desert soil is often dry and infertile. 	<p>The physical characteristics of a hot desert.</p> <p>The interdependence of climate, water, soils, plants, animals and people.</p> <p>How plants and animals adapt to the physical conditions.</p> <p>Issues related to biodiversity.</p>
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Where are deserts located?

- Deserts cover more than one-fifth of the Earth's land area, and they are found on every continent. Hot deserts are mainly found around the Tropics of Cancer and Capricorn. The hot deserts of the world are located between 15° and 30° north or south of the equator, where the air is subsiding or sinking air. Air that rises due to the intense heat at the equator divides to flow north and south. Deserts are often found towards the west of continents. Some deserts are found on the western edges of continents. They are caused by cold ocean currents, which run along the coast. They cool the air and make it harder for the air to hold moisture. Most moisture falls as rain before it reaches the land, eg The Namib desert in Africa.
- The Sahara is the largest hot desert on Earth. It covers an area of 9,200,000 square kilometres. It is located in North Africa and crosses many countries including Egypt and Sudan.

Interdependence in the hot desert

- Interdependence between the different components (climate, water, soils, plants, animals and people) of the hot desert is essential for life to thrive. The living components that inhabit the hot desert are connected to each other and the physical environment. For example, people are dependent on their animals for milk and food as well as their use as pack animals. Humans are also dependant on water for their survival.
- Other examples of interdependence include: complex food webs involving energy and nutrients gained from water, soils and vegetation being transferred between different species, the sustainable co-existence of humans, plants and animals in semi-arid environments, the adaptations made by plants and animals to survive the hot desert climate and soils, the damage that human actions, such as overgrazing and over-cultivation, can cause to the natural environment, the impact of climate change on water, soils, plants, animals and people.

Biodiversity in hot deserts

- Biodiversity is low in hot desert ecosystems. There are far fewer species supported by the extreme climate compared to other biomes. This is due to the high temperatures, low rainfall and a lack of available water. However, biodiversity increases close to desert water sources such as seasonal rivers and lakes and near to an oasis.
- The dry conditions are suitable for xerophytes, plants that are able to survive through adaptations such as thick, waxy cuticles and the loss of leaves to reduce water loss through transpiration.
- Some plants have the bulk of their biomass below the surface of the Earth where temperatures are cooler.

- Some areas of desert bloom following short periods of rainfall. Plants with a short life cycle and dormant seeds respond well to these conditions.
- Deserts are very fragile ecosystems. A small change in biotic or abiotic conditions can have a significant impact on the ecosystem. Human activity is the greatest threat to biodiversity in hot deserts.

How has hot desert vegetation adapted to the climate?

- The extreme climate of the desert ecosystem means that plants and animals have had to adapt to survive. Vegetation has had to adapt to the extreme temperatures, lack of water and high rates of evaporation.
- The main adaptations are: Vegetation has leaves that are very small (and only grow after it rains) or have no leaves at all. This helps to reduce water loss, Plants either have long root systems spread out wide or go deep into the ground to absorb water, Plants have short life cycles. They germinate following rainfall, grow, flower and die within a short space of time e.g. one year. This helps them avoid drought, Some plants have spines to discourage animals from eating plants for water and reduce water loss through transpiration, Many plants are slow-growing – this requires less energy. The plants don't have to make as much food and therefore do not lose as much water.
- Some plants are succulents and store the water in their leaves, stems or roots. An example of this is the cactus.
- Cacti also have spines instead of leaves. These minimise surface area and helps reduce moisture loss through transpiration during the day. The spines also protect the cacti from being eaten by animals. They also have a waxy coating on stems to help reduce water loss.
- Cacti have widespread root systems, located close to the surface that can collect water from a large area.
- Other ways plants tolerate the dry conditions include long roots to tap into the water deep underground and short life cycles – a plant or seed could remain dormant until the rains come

How have animals adapted to the desert?

- Few animals have adapted to survive the hottest desert regions besides scorpions and small reptiles. In areas with a greater water supply, the level of biodiversity increases as vegetation such as shrubs, cacti and hardy trees form the foundation of a more extensive food web. As deserts are found in most continents, different consumer species have evolved to survive the harsh desert environment.
- Camels have been domesticated for at least 3500 years and have long been valued as pack animals. They can carry large loads 25 miles a day. Camels have adapted to survive hot deserts

because they: have humps to store fat which a camel can break down into water and energy when nourishment is not available, rarely sweat, even in hot temperatures, so when they do take in fluids, they can conserve them for long periods of time, have large, tough lips enable them to pick at dry and thorny desert vegetation, have broad, flat, leathery feet to spread their weight and provide protection from hot sand; lose little water through urination and perspiration and have slit-like nostril and two rows of eyelashes to protect themselves from the sand.

- The fennec fox is the smallest of all fox species. They are found in the Sahara Desert and elsewhere in North Africa. They are nocturnal, which helps them deal with the heat of the desert environment. They have also made some physical adaptations to help as well. For example, they: have thick fur on feet protecting them from the hot ground, have large, bat-like ears radiate body heat and help keep them cool, have long, thick hair that insulates them during cold nights and protects them from the hot sun during the day, have light coloured fur to reflect sunlight and keep their bodies cool.

Thar Desert Case Study

- The Thar Desert is located in north-west India and stretches into Pakistan. It covers 200,000 square kilometres and is the most densely populated desert in the world.
- Opportunities - Mineral extraction in the Thar Desert - Many minerals are extracted from the ground in the Thar Desert including limestone for producing steel and cement, marble, used in construction, phosphorite used in fertiliser and chemicals, feldspar, used in ceramics and gypsum, used in plaster and cement.
- Energy in the Thar Desert - A range of renewable and non-renewable energy resources are exploited in the Thar Desert. Renewable energy resources include wind and solar energy. At Jaisalmer, 75 wind turbines are generating 60MW of electricity. Solar energy is being used in Bhaleri to power water treatment works. Due to the long hours of sunshine, there is massive potential in the generation of solar energy.
- Farming in the Thar Desert - Most farming in the Thar Desert is subsistence which means farmers produce enough food for them and their families to eat. Rearing animals, growing crops and foraging for fruit and berries are common subsistence farming approaches in the Thar Desert. The Indira Gandhi canal has enabled the irrigation of 3500k² of land for the commercial production of wheat, cotton and maize.
- Tourism in the Thar Desert - Tourism in the Thar Desert has increased recently, mainly from Pakistan. Desert safaris are popular as is ecotourism including camel treks.

Development of hot desert environments creates opportunities and challenges.

Development opportunities in hot desert environments: mineral extraction, energy, farming, tourism

Challenges of developing hot desert environments: extreme temperatures, water supply, inaccessibility.

<ul style="list-style-type: none"> Challenges - Water supply - Precipitation levels are in the Thar Desert are very low, between 120-240mm, and evaporation rates are high. Stable water supplies are essential for economic development. Water is traditionally stored in natural ponds known as tobas and are used by farmers in remote locations. The Indira Gandhi canal was constructed to provide irrigation and drinking water in 1958. Many settlements have formed along rivers due to the availability of fresh water. However, climate change could lead to river levels being lower which will lead to water scarcity. Inaccessibility - Covering 200,000km², The Thar Desert is vast. Despite having the highest desert population density in the world, it has a limited road network. Tarmac can melt in the hot temperatures, and sand can easily blow over roads. Extreme Temperatures - Temperatures can exceed 50°C in the Thar Desert which makes it very challenging to for people, such as farmers, to work outside. High temperatures lead to rapid evaporation and a shortage of water. Deserts are increasing in size daily. This process is known as desertification. Desertification is the process of fertile land turning into desert over time. Areas on the edge of hot deserts are especially at risk of desertification. <p>Causes of desertification There are five main causes of desertification. These are:</p> <ul style="list-style-type: none"> Climate Change – hotter and drier conditions are increasing the risk of land turning to desert; Removal of trees for fuel – cutting down trees to use the wood for fuel leads to roots dying. The soil will no longer be held together by the roots and erosion will occur; Overgrazing – soil becomes bare as the result of vegetation being removed by grazing animals. The soil becomes bare, compacted and prone to drying out and cracking; Over-cultivation – as a population grows there is a greater demand for food. Farming becomes more intensive which means the land has less chance to recover causing it to become infertile, exposed and at risk of erosion; and Population growth – rising population puts a great demand on resources. <p>Impact of Desertification in the Sahel.</p> <ul style="list-style-type: none"> The Sahel region of Africa has been suffering from drought on a regular basis since the early 1980s. The area naturally experiences alternating wet and dry seasons. If the rains fail it can cause drought leading to crop failure, soil erosion, famine and hunger: people are then less able to work when their need is greatest. It becomes a vicious circle and can result in many deaths, especially among infants and the elderly. Managing desertification 	<p>Areas on the fringe of hot deserts are at risk of desertification.</p> <p>Causes of desertification – climate change, population growth, removal of fuel wood, overgrazing, over-cultivation, and soil erosion.</p> <p>Strategies used to reduce the risk of desertification – water and soil management, tree planting and use of appropriate technology.</p> <p>Strategies applied to a specific area of the world.</p>
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- There is a range of management strategies that can be used to reduce the risk of desertification. These include Water and soil management – planting and harvesting appropriate crops ensure the soil can recover. Small-scale irrigation projects, such as catching and storing rainwater and using sprinklers to irrigate the land. Tree planting – This helps reduce soil erosion because tree roots stabilise the soil. Find out about a scheme in the Sahel to combat desertification through afforestation – the Great Green Wall of Africa. Planting pits, simple irrigation systems used to hold more water around the plant. The planting pit a small pit used to grow crops and catch water. They include half-moon water catchments. Water gathers in the depression and helps water the plant over time. Homemade compost is used to provide a fertility boost for the soil. Appropriate technology – this involves the use of technology or techniques that can be easily used or replaced by locals. For example, stone lines along the soil contours keep it in place, prevent erosion and improve crop yields. Projects such as this can involve the whole community and give them a sense of ownership and responsibility.

Reducing the risk of desertification

- There are many different strategies for reducing the risk of desertification. This includes water management, tree planting, soil management and using appropriate technology.
- Water management - Crops can be grown that don't need very much water (e.g. olives and millet). This helps reduce water use. Drip irrigation schemes can be set up which means little erosion happens compared to adding a large amount of water in one go. Planting pits or zai involves digging a hollow in the soil and planting crops in them. They collect rainfall and runoff in the depression which means there is a regular supply of water to the plant.
- Tree Planting - Growing trees in amongst crops ensure the soil remains fertile as there is a regular supply of nutrients through leaf litter. Also, the roots hold the soil together reducing the risk of it being eroded. Trees also protect the soil from wind erosion as they act like windbreaks. Trees also provide shade which reduces evaporation rates from the soil and reduces temperatures. The Great Green Wall is an example of a large-scale tree planting scheme in The Sahel.
- Soil Management - Allowing land to rest between growing crops and grazing allows it nutrients to recover which means it can be used again in the future. Changing the crops (crop rotation) means the same nutrients are not removed from the soil. Local people can produce their own compost and add it to the soil to replace nutrients.
- Appropriate technology - Appropriate technology means using cheap, sustainable, and available materials that local people can use. Stone lines (or bunds) are an example of appropriate technology. This involves building lines of stones along contours (area of land that is the same

	<p>height). These stones trap soil being transported by the wind so that it is isn't eroded. Also, the stone lines reduce the flow of water over the surface of the land which means topsoil, rich in nutrients, is not eroded. Also, by reducing the flow of water, more water enters the soil.</p>		
<p>Big Questions How do ecosystems operate? What are the distinctive characteristics of Tropical Rainforests? What are the environmental and economic impacts of deforestation? How can rainforests be managed sustainably? What are the distinctive characteristics of hot deserts? What are the opportunities and challenges of development in a hot desert? How and why are areas on the desert fringe at risk of desertification?</p>			
<p>Key Vocabulary (that must be explicitly taught to help students to understand) Ecosystem, Producer, consumer, Decomposer, Food chain, Food web, Small scale, Nutrient cycle, Biome, human activity, impact , distribution, Tundra, Coniferous forest, temperate deciduous, Grassland, Mediterranean, Desert, Tropical rainforest, Polar, equator, tropics, latitude, environmental characteristics, climate, precipitation, Temperature, hemisphere soils, leaching, fungi, biodiversity, flora, fauna, biotic, abiotic, adaptations, buttress roots, epiphytes, smooth bark, emergent, shrub layer, canopy, under canopy, lianas, creeper, drip tip, stratified, deforestation, logging, cattle ranching, selective logging, population pressure, mineral extraction, commercial farming, subsistence farming , hydroelectric power, construction, hectares, government, palm oil, soya, reservoirs, felling energy, infrastructure, accessibility, soil erosion, climate change, economic development, carbon source, carbon sink, tourism, medicine, costs, benefits, resources, afforestation, sustainability, ecotourism, education, international agreements, debt reduction, succulents, germinate, tap roots, mineral extraction, overgrazing, hostile, sand dunes, diurnal range, solar energy, wind energy, oil, Coal, Irrigation water shortages, Johads, aquifers, barren, desertification, desert fringe, overcultivation, population growth, national parks, water management, soil management, crop rotation, appropriate technology, Magic stones, green wall.</p>			

Year 11 – Geography – Knowledge Map

Year 11 Knowledge Concepts: Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk

TO PIC	Topic(s): Economic World	Key Concepts Explored: Geographical Skills, Space and place, Development, Globalisation, Population and culture, Physical processes and landscapes, Sustainability, Risk
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	<p>Explicit Knowledge (Working knowledge to be explicitly taught within the topic)</p> <p>What is development?</p> <ul style="list-style-type: none"> • A country's level of development is how far it has grown economically, technologically and the quality of life people typically have. • Economic factors include income (how much money people earn), how secure people's jobs are and standard of living (housing, personal mobility). It also includes physical factors such as diet, nutrition, fresh water supply, climate, environmental quality and hazards. • In terms of quality of life, we consider family/friends, education and health. Also included in this is psychological factors such as people's level of happiness, security and freedom. • Gross national income (GNI) is a common way of calculating a country's level of development. GNI shows the average wealth of the citizens of a country. GNI allows comparisons to be made between countries. To calculate GNI you add together the total value of all the goods and services produced by the people within the country to the income earned from investments that its businesses and people have made in other countries. • As countries have different population sizes a further calculation needs to be made in order to make comparisons. This involves dividing the GNI by the population of the country to arrive at the GNI per capita. Then the value is converted into US dollars to allow comparisons to be made between countries. Finally, each figure must be adjusted based on its income. In low-income countries (LICs) goods and services often cost less than in high-income countries (HICs). • Based on GNI countries are classified into three main groups. These are high-income (developed) countries, newly emerging economies (emerging) and low-income countries (developing). • As of 1 July 2016, low-income economies are defined by the World Bank as those with a GNI per capita of \$1,025 or less in 2015. There are 31 countries classified as LICs. • High-income economies are those with a GNI per capita of \$12,476 or more. 78 countries are considered as being HICs. • NEE countries are those in-between. • There are a number of different ways economic development can be measured. One of the most common is gross national income data or GNP. However, this data can be very misleading in establishing the level of economic development of a country, particularly if it is an LIC. Using the mathematical mean is a crude way of establishing a typical figure. If there is a significant divide between the earnings of rich and poor people the income of the more wealthy will skew the GNP. The value of how hard people work, as is common in LICs and NEEs as many people work in subsistence farming or in the informal sector, is not included in the data. Other shortcomings in 	<p>Remembered Knowledge (knowledge that must be retained and remembered over time)</p> <p>There are global variations in economic development and quality of life.</p> <p>Different ways of classifying parts of the world according to their level of economic development and quality of life.</p> <p>Different economic and social measures of development: gross national income (GNI) per head, birth and death rates, infant mortality, life expectancy, people per doctor, literacy rates,</p>	<p>Ref.</p>

<p>this data is that is may not be accurate and people may not tell the truth about their earnings, conflict or natural disaster can make it very difficult to collect data. Also, large-scale migration makes it difficult to accurately record population and earnings in any one place.</p> <ul style="list-style-type: none"> • Also, GNI data is expressed in US dollars, the value of which changes on a daily basis. Finally, some countries have underestimated their GNI because they did not include earnings from certain sectors. For example, Nigeria did not include revenue from the internet or from entertainment in their calculations until recently leading to the value of its economy being under-estimated. • Given the World Bank’s categorisation of LICs, it is possible that some LICs might really be NEEs, or vice versa. • Literacy Rate – % of people who can read and write <i>Limitations It is difficult to carry out surveys in war zones or squatter settlements in LICs</i> • People per doctor – the number of people who rely on a single doctor to meet their needs <i>Limitations - In rural areas in NEEs people are using their mobile phones to get medical advice and this is not included in official data</i> • Infant mortality rate – the number of babies that die within their first year, per 1000 live births <i>Limitations - Not all births are recorded in poor countries. Also, deaths of children are not always recorded.</i> • Life expectancy – the average age people can expect to live to <i>Limitations Where infant mortality is high the life expectancy for those people who survive childhood is much higher than the average.</i> • Access to safe water – % of people who have access to water that is safe to drink without the risk of contracting waterborne diseases such as cholera <i>Limitations Water quality can change rapidly as the result of flooding. As water becomes more expensive in cities less wealthy people may be forced to use unsafe water.</i> • There is always a strong correlation between social development measures and economic measures like GNI per capita. • The Human Development Index (HDI) consists of three elements. These are: income, life expectancy, education. HDI per capita is used as an estimated measure of wealth. Life expectancy is the average number of years a person can expect to live. The average number of years of schooling is used in an education index. The three parts are processed to produce a number between 0 and 1. <p>What is the demographic transition model?</p>	<p>access to safe water, Human Development Index (HDI).</p> <p>Limitations of economic and social measures.</p>	
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	<ul style="list-style-type: none"> • Birth and death rates are also used as social development indicators. As HICs have developed their birth and death rates have decreased over time. This data has been used to develop a model showing how population changes as a country develops. This is known as the demographic transition model (DTM) • In stage 1 (high stationary) birth rates and death rates are very high. This is largely due to poor health care provision, a lack of contraception and the need for large families as infant mortality rates are very high. Only a few remote communities are at stage 1 of the DTM. • Low-income countries (LICs) are typically at stage 2 of the demographic transition model. Death rates are falling due to global approaches to tackling malnutrition and disease. Birth rates remain high due to high infant mortality rates, some children will not survive so families are large, a lack of contraception and children are needed to earn money working. • Newly emerging economies (NEEs) are mostly found in stage 3 of the demographic transition model. Birth rates are rapidly declining as fewer people live a subsistence lifestyle (growing their own food to survive) so children are not needed to work the land. Contraception is also widely available due to improvements in healthcare. • High-income countries are typically found in stage 4 of the demographic transition model. This is because improvements in healthcare and lifestyle lead to low death rates. The improved status of females means more women have careers and have fewer children. Childcare is also expensive! The most developed countries are in stage 5 where birth rates fall below death rates. Japan and Germany are examples of where this is the case. • Sometimes there are anomalies in these patterns. This is because birth and/or death rates may suddenly increase as the result of a natural disaster or war. Also, some high-income countries are experiencing an increase in death rates due to an ageing population (a greater proportion of elderly people). <p>What are the causes and consequences of uneven development?</p> <p>Historical</p> <ul style="list-style-type: none"> • Colonialism has had a significant impact on development. Colonialism is the policy or practice of taking full or partial political control over another country, occupying it with settlers, and exploiting it economically. • During the 1700s and 1800s, a large proportion of the global south was colonised by European countries including Portugal, Spain, Britain and France. The reasons for colonisation was to access raw materials and labour to compete with other global powers at the time. Many 	<p>Link between stages of the Demographic Transition Model and the level of development.</p> <p>Causes of uneven development: physical, economic and historical.</p>	
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countries that were colonised in South America, Asia and Africa we badly affected. This is especially the case for those that became part of the transatlantic slave trade.

- Many colonised countries gained independence in the twentieth century. For example, India gained independence from the UK in 1947. However, independence brought problems to a number of countries. For example, when the Democratic Republic of Congo gained independence from Belgium in 1960 it is reported that there were only 14 university graduates in its population.
- Many political problems, conflicts and disputes in the world today stem from colonisation. Many areas in Africa, Asia and the Middle East were carved up and re-defined by European countries. However, this resulted in the borders of many countries changing, mixing different ethnic groups. Five million deaths resulted from conflict in the Democratic Republic of Congo, Uganda and Rwanda in the 1990s.
- Over 6 million people in Syria have been made homeless as the result of conflict since 2012. More than 3 million of these people are under 17 and the overwhelming majority are no longer in education.
- During the 1800s European nations took raw materials they needed from colonised countries. Nowadays, transnational corporations (TNCs) buy raw materials from former colonies for relatively low prices. This has a negative impact on economic development in many LICs. Prices are low because not enough has been done by organisations such as the World Trade Organization (WTO) to ensure fair terms exist in the global trade of raw materials and food. In some LICs corrupt officials have personally benefitted from selling resources cheaply. Also, food prices fluctuate depending on supply and demand.
- Newly emerging economies have benefited from global trade. Countries, such as China, have benefitted from developing their manufacturing industries. This has led to significant economic growth.

Physical Factors

- Development can be hindered by physical factors. However, physical factors alone can't be blamed on physical factors. For example, Japan is one of the most developed countries in the world despite it being located in one of the world's most active tectonic zones, resulting in regular earthquakes. The United States of America frequently experiences hurricanes but is highly developed.
- Climate can have a significant impact on development. Countries located in North Africa, in the Sahara and Sahel regions, face significant challenges including high temperatures, desertification and a lack of fresh water. However, these can be overcome with human ingenuity.

<ul style="list-style-type: none"> • Areas prone to natural disasters also face challenges to development. • Countries without a coastline also face challenges to development. With only several exceptions the world’s 45 land-locked countries are LICs or NEEs. Without a port trade with other countries is challenging. <p>Consequences</p> <ul style="list-style-type: none"> • In all societies, the wealth of a nation is not equally distributed. This is the same for the quality of life. In some LICs and NEEs this inequality has worsened. Nigeria has recently moved from LIC to NEE status. This is the result of wealth gained from trading. However, this wealth is not evenly distributed • Another outcome of uneven development is that many LICs are now dependent on HICs and some NEEs for aid. Many LICs are heavily in debt as the result of borrowing money from the World Bank to pay for hospitals and healthcare and large-scale projects such as building dams and reservoirs • Uneven development leads to people migrating. This can be voluntary migration where people search for a better life (pull factors). People who do this known as economic migrants. Others are forced to move as the result of natural disasters or wars. These people are referred to as refugees. • International migration (moving from one country to another) was highest in 2015. This was the result of conflict and poverty. In addition to this as people become more aware of the development gap between LICs and NEEs and HICs people are attracted by the potential economic opportunities available to them. The growth in the use of mobile technologies, particularly in Africa, has led to a greater global awareness amongst the population. • The UK receives migrants from a range of different countries, both within the EU and from outside. Often these migrants are highly educated and/or skilled. This leaves to a brain drain in the country where they were trained and educated. On the other hand, though these migrants send money home to their families (remittances). <p>How can we reduce the development gap?</p> <ul style="list-style-type: none"> • Countries, organisations (e.g. the World Bank) and transnational corporations (TNCs) invest in low-income countries (LICs) to increase profits. Investments lead to improvements in: infrastructure (e.g. road networks and airports), services (water, sanitation and electricity), dams and reservoirs (for hydro-electric power), industrial developments <p>Industrial development and tourism</p>	<p>Consequences of uneven development: disparities in wealth and health, international migration.</p> <p>Various strategies exist for reducing the global development gap.</p>	
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<ul style="list-style-type: none"> • Tourism brings in valuable foreign currency and brings a range of improvements including to the infrastructure, healthcare and education. Tourism brings employment opportunities in the service sector and raises incomes. • Industrial development brings employment opportunities in construction, manufacturing and service industries. Increased individual wealth leads to improvements in health, education and service provision through the payment of more taxes. <p>Aid</p> <ul style="list-style-type: none"> • In this case, aid is usually in the form of financial assistance offered by countries, organisations and TNCs. Long term aid supports development projects such as improving sanitation, water supply and education. Short term aid is often given in response to natural disasters. <p>Intermediate Technology</p> <ul style="list-style-type: none"> • Intermediate technology is often used to support local development projects. These are projects usually aimed at improving water supplies, health and agriculture. The development gap is reduced through improvements at the local level. <p>Fairtrade</p> <ul style="list-style-type: none"> • Fairtrade involves paying farmers a fair price for their products and investing in local communities. Fair-trade also promotes fair wages for farmers and their workforce. <p>Debt Relief</p> <ul style="list-style-type: none"> • In the 1970s and 1980s, many countries borrowed a significant amount of money for large scale development projects. Some of these countries have fallen into considerable debt repaying loans or high rates of interest. Debt relief involves cancelling money owed, allowing more significant investment in development projects such as road building and health care. <p>Microfinance</p> <ul style="list-style-type: none"> • Micro-finance loans offer financial support to community groups or individuals to start a small business. If businesses are successful, they will create jobs and increase people's income. <p>Jamaica Case Study</p> <ul style="list-style-type: none"> • Jamaica is the fourth-largest island country in the Caribbean. It has a tropical climate with high temperatures throughout the year. Jamaica is famed for its beautiful, sandy beaches and rich cultural heritage. It has excellent communications and is a popular destination for cruise ships. Tourism has seen significant growth in Jamaica. There has been an almost exponential growth in the number of visitor arrivals to Jamaica between 1994 and 2016. Although visitor arrivals continued to increase in 2009 the growth was not in line with previous years due to the recession which reduced many people's disposable income. • Total visitor expenditure increased from US\$128,706,000 in 1975 to US\$2,608,798,000 in 2016. 	<p>An overview of the strategies used to reduce the development gap: investment, industrial development and tourism, aid, using intermediate technology, fairtrade, debt relief, microfinance loans.</p> <p>An example of how the growth of tourism in an LIC or NEE helps to reduce the development gap.</p>	
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<ul style="list-style-type: none"> • Tourism is one of Jamaica’s top sources of revenue. The industry contributes over 50% of the country’s total foreign exchange earnings (approx. US\$2b). Thousands of Jamaicans work directly or indirectly in tourism. Tourism employs the second largest number of Jamaicans (approximately 200,000) both directly, in hotels, transport and attractions, and indirectly in trading, manufacturing and banking. • Tourism in Jamaica benefits local farmers through the sale of produce to hotels. For example, Jamaica’s Sandals Resort Farmers Program grew from 10 farmers in 1996 supplying two hotels to 80 farmers in 2004, supplying hotels island-wide. In 2018 the hotel chain provided more than \$25 million in assistance, starting with the up-front purchase and distribution of \$3.5 million worth of Irish potato seeds to five farmers in Manchester, Jamaica. Under the partnership, the five farmers will be the sole providers of Irish potatoes to the entire Sandals group, which comprises 11 resorts in Jamaica. The purpose is to enable the hotel chain to purchase potatoes locally, rather than have to rely on imports. • There have been considerable investments in infrastructure to accommodate tourists. Port facilities have been expanded as have airports and the road infrastructure. However, the development of roads has followed much later as catering for cruise ships has been prioritised. Some hotel owners have not been happy with this. • Many people in key tourist areas such as Montego Bay have benefited from an improved quality of life as the result of tourism. However, pockets of poverty still exist. • The environment has benefited from landscaping projects and the introduction of nature parks. <p>What is Nigeria’s place in the world?</p> <ul style="list-style-type: none"> • Nigeria is located in West Africa, sharing a border with Benin, Niger, Chad and Cameroon. To the south, it borders the Gulf of Guinea, part of the Atlantic Ocean. Nigeria has a range of natural environments, from semi-deserts in the north to tropical rainforest in the south. • Nigeria is almost 4 times the physical size of the UK. Its population, at just over 200,000,000, is three times the size of the UK. • Nigeria is the most populous and economically developed country in Africa. Its recent growth, based on the sale of oil, has led to the country’s transformation from a LIC to a NEE. • According to the World Bank Nigeria had the 31st largest GDP in 2018. It is the world’s 21st largest economy and has experienced recent rapid growth. According to the United Nations, it has the 7th largest population in the world. Nigeria is the 13th largest producer of oil according to the US Energy Information Administration. • Lagos, Nigeria’s largest city, is a thriving ‘world city’, with a strong financial and economic base. 	<p>Some LICs and NEEs are experiencing rapid economic development which leads to significant social, environmental and cultural change.</p> <p>A case study of one LIC or NEE to illustrate: Nigeria</p> <ul style="list-style-type: none"> • the location and importance of the country, regionally and globally 	
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<ul style="list-style-type: none"> • Nigeria has the second-largest film industry in the world, ahead of the United States and behind India. Nigerian cinema is known as “Nollywood”. • Nigeria plays an important role in United Nations peacekeeping. According to the United Nations “Since the 1960s, Nigeria has been a major contributor of troops and police to United Nations peace operations, having served in dozens of missions. Most recently, Nigerian troops were the military backbone of the UN Mission in Liberia (UNMIL). • Nigeria has the fastest growing economy in Africa and the highest GNP on the continent. Nigeria has the largest population on the continent and the third-largest manufacturing sector. The country also has the largest agricultural output and the highest number of cattle. • Nigeria has a rich culture. Nigerian music is enjoyed throughout Africa. It is also a hub for literature boasting a range of popular writers. One of the main founders of the Organisation of African Unity (now the African Union or AU) was the president of Nigeria in 1963. <p>POLITICAL</p> <ul style="list-style-type: none"> • The political map of Africa was drawn up by European colonial powers in 1883. The continent was exploited for natural resources and slavery for many years. • Following its independence from the UK in 1960, Nigeria experienced political instability for several years due to different factions fighting for control. Civil war ravaged the country between 1967 to 1970. • In 1991 the capital moved from Lagos to the newly built city of Abuja. The country, regarded as stable since 1999, experienced free and fair elections in 2011 and 2015 it experienced free and fair elections. The increased confidence in the country has led to considerable economic investment, particularly from China, the USA and South Africa. <p>SOCIAL</p> <ul style="list-style-type: none"> • The population of Nigeria is multi-cultural and multi-faith. It is land of over 500 languages and hundreds of ethnic groups such as the Hausa, Yoruba and Igbo. • Although social diversity is a considerable strength of Nigeria, it has led to some regional conflicts. The fundamentalist group Boko Haram has hindered economic development through conflict. <p>CULTURAL</p> <ul style="list-style-type: none"> • Nigeria has a rich and varied culture as a result of its social diversity. Its film, music and literary sectors are thriving. Nigeria has experienced success within Africa by winning the African Cup of Nations three times. • Nigeria has the second-largest film industry in the world, ahead of the United States and behind India. Nigerian cinema is known as “Nollywood”. 	<ul style="list-style-type: none"> • the wider political, social, cultural and environmental context within which the country is placed • the changing industrial structure. The balance between different sectors of the economy. How manufacturing industry can stimulate economic development • the role of transnational corporations (TNCs) in relation to industrial development. Advantages and disadvantages of TNC(s) to the host country • the changing political and trading relationships with the wider world • international aid: types of aid, impacts of aid on the receiving country • the environmental impacts of economic development • the effects of economic development on quality of life for the population.
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ENVIRONMENTAL

- Nigeria spans several climatic regions. To the south, it experiences a tropical climate, whereas toward the north it is much drier.
- Rainforest thrives in the equatorial climate in southern Nigeria. Tree crops in this area include cocoa, palm oil and rubber.
- To the north, savanna grassland replaces the rainforest. A range of field crops is typical here, including cotton and millet. Cattle also graze the savanna.
- Semi-desert is found in the very north of Nigeria. The nomadic grazing of cattle is the primary type of agriculture in the region.

How is Nigeria's economic and political place in the world changing

- Nigeria has the largest economy in Africa, and one of the fastest-growing economies in the world.
- Despite its rapid growth in GDP, Nigeria is a country with a significant inequality gap. Wealth is typically found in the south, in and around Lagos. However, the north is exceptionally poor. Almost half of Nigeria's population live on less than US\$1 per day.
- The structure of Nigeria's economy has changed significantly. Its economy has transformed from one mainly based on agriculture to manufacturing and services. Around 52% of Nigeria's GDP now comes from manufacturing and services.
- Mechanisation and rural-urban migration have led to a decline in the number of people employed in agriculture. Manufacturing and services have grown as a result of Nigeria's increased political stability. Countries such as China, the USA and South Africa have heavily invested in Nigeria. There has also been considerable growth in the service sector, particularly in IT services.
- The oil and gas industry has been very important to the Nigerian economy. Despite the country having the 11th largest oil reserves in the world and accounting for 90% of Nigeria's international currency coming from oil, inefficiencies at refineries, the large domestic demand for energy and fluctuating prices have created an economic challenge. As a result, oil and gas only contribute around 9% to Nigeria's GDP.
- The fastest-growing sector in Nigeria is manufacturing. Cheap and plentiful labour force along with a huge market, both within and beyond the country has led to rapid economic growth.

What impacts do TNCs have in Nigeria?

- The Niger Delta region, an important wetland and coastal ecosystems, is home to Nigeria's oil and gas industry. Nigeria's oil boom took off during the 1970s. It relied on the expertise of large

transnational corporations, including: Total (France), Exxon-Mobil (USA), Royal Dutch Shell (UK & Netherlands), Chevron (USA) and Agip (Italy)

- These multinational companies constructed oil and gas drilling platforms around the Niger Delta. Pipelines around the Gulf of Guinea, linked to these platforms, transport oil to large tankers that ship the oil to Europe and the USA where it is refined to produce petrol and other oil-based products. Transnational companies make far higher profits from refined oil.
- In an attempt to keep more profits from oil within the country, the Nigerian government has set up the Nigerian National Petroleum Corporation (NNPC) to form joint ventures with TNCs.
- The Niger Delta region has experienced a range of environmental damage caused by the oil industry. Farmland has been damaged by leaking oil pipes meaning crops no longer grow in some areas.
- Oil pollution from tankers and damage pipelines kills fish in the sea and the delta. When gas is burned off from the oil greenhouse gases are released, contributing to climate change. The process also causes respiratory problems for local people.
- In the Niger Delta, the contamination of fish and crops has destroyed livelihoods, destroyed local employment opportunities and pushed many into militancy. Life expectancy in the Niger Delta is ten years below the national average.
- Pipeline corrosion and tanker accidents caused more than 50 per cent of them. Other incidents have been caused by operational error, mechanical failure, and sabotage mostly from militant groups, the study said.
- The government has established laws for the protection of the environment from oil exploration. However, for these to be effective, responsible agencies must effectively implement, enforce and monitor them.

Advantages of TNCs include:

- international links that provide access to markets around the world
- bringing financial investment into the host country's economy
- providing jobs and training to local people
- higher wage levels
- introducing new technology that might otherwise not be available

Disadvantages of TNCs include:

- profits leave the country and benefit shareholders, often in HICs
- paid wages tend to be lower than the home country of the TNC
- causing significant environmental damage, without taking responsibility for cleaning up
- being able to withdraw from a country if circumstances change

- powerful TNCs can exert pressure on governments
- raw materials are exported before being refined which reduces profits in LICs and NEEs

What is the impact of international aid on Nigeria?

- International Aid or ‘aid’ is help given by one country to another. Aid can be given in the form of advice, technology, food and money. Typically, aid is given to low-income countries (LICs) and newly-emerging economics (NEEs) by high-income countries (HICs).
- Aid can be given by national governments, international organisations, charities and non-government organisations (NGOs). The United Nations set HICs a target of committing 0.7% of their GDP to aid.
- One of the main reasons why Nigeria receives a considerable amount of aid is due to the significant inequality of wealth within the country.
- Despite having the largest economy in Africa, around a third of Nigerians (60 million) live below the national poverty line with around another third just above.
- Other issues in Nigeria include: a low life expectancy at 53.87 in 2017 according to the World Bank, high birth rates at 5.5 children per woman, the high infant mortality rate at 100 child deaths under-5 (per 1,000 live births), low literacy rates with only 44% of children attending secondary school, only 42% of children aged 12-23 months being immunised against measles, violence and protests occur in the Niger Delta relating to oil wealth and its impact on the environment, terrorism in the north, by groups such as Boko Haram, the high death rate from Malaria
- Aid isn’t always used effectively in Nigeria because: Corruption in the government and individuals means aid is lost or not given to the right people, There have been claims aid money has been used to supply the Navy, Donors of aid may have political influence over who does and does not benefit. They may use donations to promote themselves.
- Few governments or international agencies now give aid directly to the Nigerian government.
- Aid has benefitted Nigeria in the following ways - Nets for Life project provides education on Malaria and give mosquito nets to households to prevent the spread of the disease, World Bank-funded loans to businesses to help diversify the economy away from being dependent on oil so that new businesses and industries are developed, The UK government has funded health and HIV programme providing health and education in rural areas. This will help to protect people against infection in the future and help them to work and improve their own lives.

How has economic development in Nigeria changed the quality of life?

<ul style="list-style-type: none"> • Although many people remain poor, particularly in Nigeria’s rural north, its Human Development Index (HDI) has increased steadily since 2005 from below 0.47 to 0.532. The country has one of the fastest-growing rates of HDI in the world. • A number of quality-of-life indicators have improved significantly over the last 30 years • Nigeria’s most significant development challenge is overcoming the socio-economic inequality within the country. With over 50% of the population living in poverty, specific challenges need to be met. These include: tackling government corruption to ensure wealth reaches everyone, addressing environmental issues that have resulted from rapid economic development, such as soil erosion, water pollution, desertification and oil spills, oil revenues should be maximised with profits invested in developing other areas of the economy, conflicts between ethnic and religious groups need to be tackled sensitively, basic sanitation provision for all needs to be a priority, further investment in healthcare and education <p>HOW HAS THE INDUSTRIAL STRUCTURE OF THE UK CHANGED?</p> <ul style="list-style-type: none"> • The industrial structure of the UK is always changing. In 1841, at the hight of the industrial revolution, there was a substantial change in the UK’s industrial structure, including: jobs in the primary sector (fishing, agriculture and mining) were declining due to the increase in the use of machinery, jobs in the manufacturing industry increased as factories were built and urbanisation occurred • During the twentieth century, another significant change in the UK’s employment structure happened, including: a decrease in the number of people working in manufacturing as mechanisation (introduction of robots etc.) replaced jobs along with increased competition from abroad, the service sector increased dramatically due to the introduction of public services, the growth of financial services and an increase in leisure time and disposable income, since the 1980s the research and development sector has become increasingly important <p>WHAT IMPACT DOES GLOBALISATION HAVE ON THE UK ECONOMY?</p> <ul style="list-style-type: none"> • The UK economy, like all the others around the world, have been affected by globalisation. Business, ideas, and lifestyles now spread rapidly across the globe due to improvements in travel, the introduction of the internet and the development of trading blocs such as the EU. This has led to more businesses in the UK owned by companies based in other countries. In the same way, UK companies now own more businesses in other countries. For the UK economy to be prosperous, we need to be part of the global economy. • The main impacts of globalisation in the UK include: Migration – Migrants fill jobs where there is a shortage of skilled workers in the UK, such as in healthcare and construction, Less manufacturing – Fewer goods are manufactured in the UK because they can be imported more 	<p>Major changes in the economy of the UK have affected, and will continue to affect, employment patterns and regional growth.</p> <p>Economic futures in the UK: causes of economic change: de-industrialisation and decline of traditional industrial base, globalisation, and government policies moving towards a post-industrial economy: development of information technology, service industries, finance, research, science and business parks</p>	
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cheaply in countries such as China where wages are lower, Inequality – The gap between the best-paid and lowest-paid jobs is increasing, Outsourcing – jobs are outsourced to other countries where wages are lower, such as HSBC call centres to India, Economic growth – in most cases, the UK economy increases by 1-2 per cent each year. This is mainly down to trade with other countries, helping the country to become wealthier over time, Foreign investment – foreign companies invest in the UK, bringing new ways of working and technology. This provides jobs and skills development to people living in the UK, Cheaper goods and services – Wages and production have become more competitive, leading to lower-priced products and services

HOW HAVE GOVERNMENT POLICIES ADDRESSED ECONOMIC CHANGE?

- The government plays an important role in shaping the UK's economy and responding to global trends. There have been three distinct trends in government policy since the Second World War:
- 1945-79 – state-run industries, such as British Steel Corporation, were set up by the government to support declining heavy industries and protect jobs. Outdated working practices and machinery lead to factory closures, unemployment and unrest during the 1970s.
- 1979-2010 – government-run industries were privatised, and many heavy industries closed down, leading to job losses. Private sector and government investment led to the transformation of many former industrial areas, such as London Docklands, into financial centres (such as Canary Warf in London), offices and retail parks as the service sector began to grow rapidly.
- 2010 onwards – the government has attempted to rebalance the economy by encouraging investment in high-tech manufacturing, such as aerospace and computer engineering. Significant investment has been made in transport infrastructure, such as London's Crossrail. HS2 is also being developed to provide high-speed rail links between London and the 'Northern Powerhouse'. The development of small businesses is also being encouraged through low-cost loans and other financial incentives.

HOW HAVE TRADITIONAL INDUSTRIES DECLINED IN THE UK?

- De-industrialisation is the reduction of industrial activity or capacity in a region or economy, especially of heavy industry or manufacturing industry. De-industrialisation is one of the most significant economic processes to occur in the UK. De-industrialisation in the UK has involved the decline of heavy industries such as coal mining, shipbuilding and steel manufacturing.
- During the twentieth century, the UK went from over 3000 coal mines to just 30. The last working deep coal mine in the UK closed in December 2015. The graph below shows the rapid decline in employment in coal mining in the UK due to mechanisation, increasing costs of extraction and growing availability of cheap imports.

<p>WHAT IMPACT HAS DE-INDUSTRIALISATION HAD ON NORTH EAST ENGLAND?</p> <ul style="list-style-type: none"> • Northeast England was one of the first industrialised regions in the UK. Tens of thousands of people were employed in heavy industry including coal mining and shipbuilding. However, it was also one of the first regions to be affected by de-industrialisation with the closure of coal mines and shipyards. • De-industrialisation also led to a negative multiplier effect. Many smaller businesses that supplied and supported heavy industries closed, a knock-on effect affecting thousands of people. • North East England has suffered huge job losses and a rise in unemployment as factories and industrial sites closed. Many of those employed in heavy industries struggled to find new jobs with the skills they have. • The closure of the Easington Colliery has devastated the town of Easington when it closed in 1993. Over one thousand men were made unemployed by the closure of the pit. Unemployment in the area is still high and many people are on low incomes. <p>HOW HAS THE GOVERNMENT RESPONDED TO DE-INDUSTRIALISATION?</p> <ul style="list-style-type: none"> • Successive UK governments have tried a range of strategies to re-energise economic opportunities in North East England, including: investing in new infrastructure such as roads and industrial parks, encouraging foreign investment e.g. Nissan opened a car plant near Sunderland in 1986 which now employs 7000 people, setting up a regional development agency in 1999, which was replaced by a local enterprise partnership in 2012 which supports businesses, plans for economic growth and provides training <p>WHICH TYPES OF INDUSTRY ARE GROWING IN THE UK?</p> <ul style="list-style-type: none"> • A post-industrial economy is one that replaces manufacturing with service industries (also known as tertiary industries). A new sector, the quaternary industry, is now developing in the twenty-first century UK. The quaternary industry is sometimes referred to as the 'knowledge economy' because it involves research and development. This sector includes IT, new creative industries and biotechnology. Estimates suggest 10-15% of the UK workforce is employed in quaternary sectors, though it is hard to determine because it overlaps with the service sector. <p>THE DEVELOPMENT OF INFORMATION TECHNOLOGY</p> <ul style="list-style-type: none"> • The development of information technology has transformed lives in the UK and has encouraged economic growth. • Examples of the impact of information technology on lives and economic development include: 1.3 million people are employed in IT, Homeworking and self-employment due to the development of the internet; The UK is viewed as one of the top IT countries in the world and receives overseas investment as a result. Investment in technology companies totalled £6.3bn 	<p>Impacts of industry on the physical environment. An example of how modern industrial development can be more environmentally sustainable</p>	
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during 2018, Technological developments have led to the growth of specialist manufacturing services along with service and research, Information can be accessed anywhere using mobile devices, The turnover of digital technology companies grew by 4.5% between 2016 and 2017, compared with 1.7% *growth* in UK GDP (this is 2.6 times faster than the overall economy), London-based technology businesses raised £9bn between 2015 and 2018; in second place, Cambridge picked up £583m of funding over the same period.

- Already, the UK represents a global centre of technology talent, accounting for 5 per cent of all high-growth technology workers employed globally. Only Germany, amongst the UK's European rivals, employs more people in the technology sector.

THE DEVELOPMENT OF SERVICE INDUSTRIES

- Services provide support rather than manufacturing products. The service industry is the largest sector in the UK economy both in terms of the number of people employed and economic output.
- Financial services employ over 2 million people and account for 10% of the UK's GDP. The UK is a leading financial centre, with London at its centre.

THE DEVELOPMENT OF RESEARCH

- Research and development is part of the rapidly expanding quaternary sector. It contributes over £3 billion to the UK economy and employs over 60,000 educated people. Research and development involve biomedical, computer and environmental sectors and are linked to UK universities. Research is conducted by the UK government and private companies. Cyber, artificial intelligence and cleantech businesses are now employing substantial numbers. All three sectors are attracting growing amounts of investment, suggesting they may generate even more jobs in the coming months and years.

SCIENCE AND BUSINESS PARKS IN THE UK

- The development and growth of science and business parks have been an important aspect of developing the UK's post-industrial policy.
- Science parks are typically located on the edge of university cities. They can be found in Cambridge, Oxford and Southampton. They have good transport links and usually have attractive environments. Sometimes, science parks are located close to, or within, university grounds. An example of this is the Newlands Science Park at Hull University.
- Graduates are often employed to apply their knowledge and experience to innovative businesses. Businesses often have close links to local universities and tap into their research and development.

- There are over 100 science parks in the UK, employing around 75,000 people. **Business parks**
- Business parks are areas with a small group of businesses in the same area of land. There are many hundreds of business parks across the UK. Business parks are often located on the edge of major urban areas where there are good communications, and the land is cheap.
- Business parks can contain a range of businesses from small-scale manufacturing to research and development. Businesses can benefit from supplying goods and services to each other.

What are the impacts of industry on the physical environment?

- In the past industrial growth has had a significant impact on the environment. Coal mining led to the creation of spoil heaps, vast mounds of waste material removed during extraction. Burning coal, to generate electricity, led to considerable air pollution in cities across the UK. Toxic waste materials from heavy industry have polluted the land and water supplies.
- Due to changing attitudes and strict environmental laws, modern industries must be more considerate of their ecological impacts. The majority of industries nowadays develop based on sustainable principles.

Nissan Car Plant, Sunderland

- Car manufacturing was not sustainable in the past due to inefficient engines producing toxic pollutants, parts that were difficult to recycle and the energy-intensive production processes. However, the situation is very different today.
- Over 7000 people are employed by Nissan at its car manufacturing plant in Sunderland. The factor has become efficient in a number of ways
- The site has 10 wind turbines generating 6.6MW and 19,000 photo-voltaic panels (solar panels) generating 4.75MW of energy. This equates to 7% of the plant's electrical requirements, enough to build 31,374 vehicles.
- Nissan is developing electric and hybrid cars.
- CO2 levels have been reduced by 22.4% since 2005.
- The Skills Academy for Sustainable Manufacturing and Innovation (SASMI) supports the industry's future through specialist training. Based at Nissan's Sunderland plant, SASMI provides a training infrastructure for sustainable manufacturing and the low carbon vehicle industry, and a learning facility for employers, apprentices and students, providing new skills for new jobs.

How are rural areas changing?

- Rural landscapes in the UK are experiencing significant change. Although most people live in urban environments, 19% of the population live in rural areas. Despite rural areas not appearing crowded, the population in most rural areas is growing due to counter-urbanisation. People are migrating from urban to rural areas for a better quality of life. In real terms, the population of

<p>urban environments is growing more rapidly than in rural areas due to natural increase and immigration.</p> <ul style="list-style-type: none"> • Major cities in the UK are surrounded by a greenbelt, an area of green, open space where development is restricted. Within, and just beyond the greenbelt are desirable towns and villages from which commuters can travel to work. Urban areas would have experienced much more significant growth if it was not for the protection of greenbelts. • There is increasing pressure on the UK government to allow development within greenbelts due to the housing shortage the country is facing. • Even rural areas furthest from urban areas are becoming popular with tourists and second homeowners. This is the case in places that are national parks, such as the Lake District, and North Norfolk. • House prices in rural areas have increased significantly due to the increased demand for housing. The rising cost of properties in rural areas has made homes for local people unaffordable in some areas. This has led to more people having to rent or move to another area where they are more likely to afford to buy a property. <p>What is the impact of increasing population in rural areas?</p> <ul style="list-style-type: none"> • Southeast England experiences the most significant pressure on rural areas in England. This is because people with jobs in London want to live in a more attractive environment which brings a range of benefits and problems. • Benefits of population growth in rural areas: An increased population leads to a higher demand for goods and services. This helps ensure the future of rural shops, schools and businesses, It provides balance to rural-urban migration, particularly as young people move away in search for better opportunities, New people are more likely to invest in new, local businesses, New developments in rural areas provide jobs. • Problems of population growth in urban areas; Rural areas can lose shops as commuters buy products in supermarkets in urban areas on their way home from work, The increase in 'outsiders can change the social fabric and rural culture, Older people tend to move to rural areas, which raises the average age, House prices often increase rapidly due to wealthy newcomers, pushing out local people, Car owning commuters do not require public transport, so services may be reduced, affecting local people, Resentment is felt towards new members of the rural community, Modern developments in rural areas cause tensions with the local community, The sale of agricultural land in rural areas can lead to unemployment in the local community. <p>WHAT HAPPENS IN AN AREA OF POPULATION DECLINE? The Outer Hebrides</p>	<p>Social and economic changes in the rural landscape in one area of population growth and one area of population decline</p>
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<ul style="list-style-type: none"> • The Outer Hebrides are a group of islands off the northwest coast of Scotland. Since 1901 it has experienced a 50 per cent decline in its population, mainly due to young people moving away. They have migrated to the mainland in search of jobs. The current community is around 27,000, and most inhabitants live on the islands of Lewis. • Social impacts: School closures could result from fewer children, An ageing population, caused by the migration of young people, will require higher amounts of social care, which will have social and economic impacts, A further decline in the fishing and farming industry due to the ageing population • Economic impacts: Maintaining transport services such as ferries and other services is very costly, There has been a significant decline in traditional fishing for lobsters and prawns, Tourism has become an essential source of income. However, the infrastructure is struggling to cope with this, Shellfish catches have increased, due to more foreign boats <p>Developments in infrastructure in the UK</p> <ul style="list-style-type: none"> • The UK's transport infrastructure is increasingly under pressure as car ownership continues to increase and economic development puts pressure on rail, port and airport capacity. • The UK government launched a £15bn road improvement strategy in 2014. The purpose of the plan was to improve the condition and capacity of the UK's roads. The programme has involved: The introduction of smart motorways on busy stretches of roads to improve the flow of traffic and reduce congestion, Over 100 new road schemes before 2020, Constructing additional lanes on busy motorways and major roads such as the A1. Over 1600km of new lanes will be added. • Not only with these developments improve the capacity of the UK's roads, but they will also bring jobs in construction, boosting local and regional economies. • The government is attempting to improve the UK's ageing rail infrastructure and help encourage economic growth, particularly in the north of England. Developments include Trans-Pennine Rail – Plans are in place to electrify lines between Manchester and York and Liverpool and Newcastle, London's Crossrail, now due for completion in late 2020 or early 2021 (it was planned for completion in 2018), will see a new underground line constructed to improve east-west connections across London. It will also reduce travel time for commuters, High Speed 2 (HS2) – This project involves the construction of a high-speed rail network, linking London to Birmingham and one to northern cities such as Manchester, Leeds and Sheffield. HS2 has been very controversial due to its cost, environmental impact and its likely economic impact. • The future of the United Kingdom's ports is at the centre of a new government program, Maritime 2050, which will create a road map of measures needed to guarantee the country's continued prominence in the global shipping trade. 	<p>Improvements and new developments in road and rail infrastructure, port and airport capacity the north–south divide.</p>	
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<ul style="list-style-type: none"> • While the government works on the details of the Maritime 2050 plan, the country's privatised ports have already started making a series of infrastructure investments, with planned spending totalling £1.7 billion from now to 2020. • Eighteen ports in Great Britain have announced spending on maintenance and development from now to 2020. • One of the most important projects will involve Bristol, where £400 million is being spent to enlarge the docks so that the port can be used by the world's largest container ships. • 3.6 per cent of the UK's GDP comes from airports. They are essential to the UK's economic development. Over 750000 flights depart the UK each year carry 200 million passengers and 2 million tonnes of freight pass through airports. • Heathrow is the UK's largest airport. It handles over 70 million passengers every year. The government proposed a third runway for Heathrow in 2016. The additional runway aims to reduce congestion and increase capacity. The proposal is very controversial due to its social and environmental impact. However, it will create thousands of jobs and boost the local economy. <p>WHAT IS THE NORTH-SOUTH DIVIDE?</p> <ul style="list-style-type: none"> • The north-south divide is a term used to describe the social, economic and cultural disparities between the London and the south-east of England and the rest of the UK. • People living in the south-east typically have a longer life expectancy, higher income, and better standard of living than those living in the north. House prices in the south-east are higher due to high demand. Rates of unemployment are higher in the north as regions continue to adjust to de-industrialisation. <p>WHAT HAS CAUSED THE NORTH-SOUTH DIVIDE?</p> <ul style="list-style-type: none"> • The main cause of the north-south divide is de-industrialisation, as manufacturing industries, traditionally located in the north have closed. As you can see from the data below manufacturing continues to be very important in the north whereas in the south it is ranked 7th. Any changes in manufacturing have a considerable impact on the north. As the northern economy declined the south-east became increasingly prosperous in response to the growth of the financial and service sector and the dominance of London. The growth in incomes led to increased house prices in the south-east. <p>WHAT STRATEGIES ARE BEING USED TO ADDRESS THE NORTH-SOUTH DIVIDE?</p> <ul style="list-style-type: none"> • For several decades the UK government and the EU have attempted to reduce the north-south divide by investing in the north. Assisted area status has been assigned to areas that are less economically advantaged. New businesses setting up on these areas are eligible for financial assistance. Other strategies include: The launch of the Northern Powerhouse concept to 	<p>Strategies used in an attempt to resolve regional differences</p>
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<p>encourage industrial development in northern cities such as Manchester, Leeds and Sheffield, Enterprise Zones, Local Enterprise Partnerships (LEPs), Planned transport improvements e.g. HS2, Government incentive packages to attract TNCs</p> <p>WHAT IS THE PLACE OF THE UK IN THE WIDER WORLD</p> <ul style="list-style-type: none"> • The UK was once one of the world’s most powerful political and trading nations. The British Empire covered almost one-third of the Earth’s land surface, with colonies all over the world. • Many of the former colonial countries gained independence in the twentieth century. • The Commonwealth is one of the world’s oldest political association of states. Its roots go back to the British Empire when some countries were ruled directly or indirectly by Britain. Some of these countries became self-governing while retaining Britain’s monarch as Head of State. They formed the British Commonwealth of Nations. • Commonwealth organisations are involved in diverse activities, from helping countries with trade negotiations to encouraging women’s leadership, building the small business sector, supporting youth participation at all levels of society and providing experts to write laws. • Today, the UK continues to have political, economic and cultural influence through organisations such as: The UN, The UN Security Council, The G8, NATO • The UK remains one of the world’s major economies and is a global financial centre. The UK is also highly regarded for its democratic values, legal system, rich cultural heritage, values and fairness. 	<p>The place of the UK in the wider world. Links through trade, culture, transport, and electronic communication. Economic and political links: the European Union (EU) and Commonwealth.</p>	
<p>Big Questions</p> <ol style="list-style-type: none"> 1. How Does economic development and quality of life vary globally? 2. How can we reduce the development gap? 3. How can rapid economic development lead to significant social, environmental and cultural change in LICs and NEEs? 4. How has changes in the UK economy affected employment patterns and regional growth? 		
<p>Key Vocabulary (that must be explicitly taught to help students to <i>understand</i>)</p> <p>Urbanisation, Migration, distribution, Rural, Urban, Population, Natural Increase, Push Factor, Pull Factor, Megacities, Squatter settlements, sanitation, overcrowding, Industrial, global importance, national importance, regional importance, commercial, Inequalities, healthcare, education, energy, Life expectancy, Infant mortality rate, literacy rate, HIC, LIC, Services, authorities, government, Self help scheme, Opportunity, Challenge, Social, economic, environmental, unemployment, income, informal economy, formal economy, developments , manufacturing, retail, Tourism, destinations, Construction, Pharmaceuticals, Crime, Favelas, Pacifying Police, Air pollution, water pollution, congestion, Waste pollution, Urban poor, Improvements, Infrastructure, Resources, literacy, Sparsely populated, densely populated, Pressure, Olympics, urban regeneration, recreation, High tech industry, urban sprawl, brownfield sites, greenfield sited, deindustrialisation, integrate transport system, Urban greening, sustainability Urban development, sustainable city, sustainable energy, renewable electricity,</p>		

