



Pearson
Edexcel

GCSE (9-1) Geography A

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Knowledge Organiser

Paper 2: The Human Environment

Issue 2





Key ideas and key content: a student guide

This guide is designed to support students on the key content of the GCSE Geography A specification for Paper 2 The Human Environment. It covers:

- Topic 4: Changing cities
- Topic 5: Global development
- Topic 6: Resource management

It can be used to identify gaps in learning, as a personalised checklist to aid revision or as a knowledge organiser.

Paper 2: The Human Environment

This is assessed by Paper 2 (90 minutes). It contains three sections. You must answer all questions from Section A and B. In Section C (Topic 6), you must answer one from two optional questions (Energy resource management or Water resource management).

Topic 4: Changing cities	
Specification key ideas	Key content
4.1 Urbanisation is a global process.	More than half of the world's population now lives in towns and cities as a result of urbanisation. Since 1950, urbanisation has occurred at different rates and in different ways in developed, emerging, and developing countries. Africa and Asia are presently seeing the greatest increase.
	<p>In emerging and developing countries, recent rapid urbanisation has been caused by:</p> <ul style="list-style-type: none">• rural to urban migration – people move from rural areas for a better quality of life• natural increase – birth rates in the countries are higher than death rates caused by improvements in healthcare. <p>In developed countries, the main cause of urbanisation is industrialisation. In the UK in the 1800s and 1900s, the mechanisation of farming and the rise of factories meant that people moved from rural areas to cities.</p> <p>The effects of urbanisation are listed below.</p> <ul style="list-style-type: none">• Air, noise, and water pollution are increasing.• Investment increases, leading to more economic opportunities (jobs).• In developing countries, spontaneous, unplanned settlements often develop.• In developing and emerging economies, the gap between the rich and poor often widens.
	The population distribution in the UK is uneven. Generally, it is lower in the north and higher in the south. Important urban areas have the highest population density, with London having the



<p>4.2 The degree of urbanisation varies across the UK.</p>	<p>highest in the UK. Other major cities such as Birmingham, Manchester and Liverpool also have high population densities.</p> <p>Population density varies between different regions in the UK for several reasons, listed below.</p> <ul style="list-style-type: none"> • There tends to be a lower population density in the north as there are fewer cities owing to higher relief (mountains). • Population density is also lower where the climate makes living more difficult, such as northern Scotland. • Higher urban populations tend to be located around ports. London and Liverpool are both densely populated because of their historic ports, which provided jobs in the shipping industry.
<p>4.3 The context of the chosen UK city influences its functions and structure.</p>	<p>Birmingham – context</p> <ul style="list-style-type: none"> • Site – Began as a small village on a dry point site plateau in the Midlands. • Situation – Located centrally, it has excellent links to the rest of England. • Connectivity – Accessible motorways, New Street railway station and Birmingham International Airport mean that Birmingham is well connected. • Cultural – It is a multicultural city with nearly a quarter of residents born outside of the UK. • Environmental – Birmingham has many parks and was ranked 15th in the UK as a sustainable city. <p>Birmingham – structure</p> <ul style="list-style-type: none"> • The Central Business District (CBD) is the main financial centre of the city. It contains offices, shops, theatres and hotels. Redevelopment in the last 25 years has introduced the Bullring (a shopping centre), and has transformed the Mailbox (a former Postal Sorting Office) and the canal.’ • The inner city surrounds the CBD and comprises of rows and rows of terraced housing. • The suburbs consist of mostly semi-detached housing built between the 1930s and 1960s as the city grew. • The rural-urban fringe is made up of a mixture of newer modern housing, out-of-town shopping centres and industrial units.
<p>4.4 The chosen UK city is being changed by movements of people, employment and services.</p>	<p>The processes listed below have changed Birmingham.</p> <ul style="list-style-type: none"> • Urbanisation – Influenced by manufacturing (such as jewellery), small houses were built for workers in what is now the inner city. • Suburbanisation – A growing population meant building houses on the outskirts (new estates, mainly detached housing). • Counter-urbanisation – Developments in the inner city have forced people out to places like Redditch.



	<ul style="list-style-type: none"> • Re-urbanisation – People want to live close to work and facilities – modern flats and apartments near the canal have been developed. <p>The main causes of national migration in Birmingham are:</p> <ul style="list-style-type: none"> • people moving out to coastal areas to retire • people moving in as the CBD has employment opportunities. <p>The impacts of migration in Birmingham are:</p> <ul style="list-style-type: none"> • a youthful population of migrants settling for employment opportunities • a multicultural society • ethnic communities establishing shops and places of worship • a demand for housing • pressure on services such as school and the NHS.
<p>4.5 Globalisation and economic change create challenges for the chosen UK city that require long-term solutions.</p>	<p>Birmingham has a youthful population and a low number of people of pensionable age. Of the 1.1 million people (2011 census), nearly a quarter are children. The main reasons for Birmingham’s population growth are natural increase, in migration and increased life expectancy.</p> <p>During the 1970s, deindustrialisation changed Birmingham. Car factories closed as there was an increased demand for foreign cars, causing mass unemployment. Globalisation meant goods could be made cheaper in developing countries and technological advancements reduced the need for labour. Today, old factories have been redeveloped or demolished to make way for housing.</p> <p>Recent deindustrialisation and population growth have changed Birmingham’s economic structure. Lack of investment in some areas has led to deprivation.</p> <ul style="list-style-type: none"> • 40% of the population are amongst the most deprived in England. • Deprivation is high in inner city areas but also exists in the suburbs. • Sutton Four Oaks is in the top 5% of least deprived of Super Output Areas (SOAs) in the UK. <p>Lack of investment has led to differences in quality of life. Population growth has put a strain on health services, schools and housing. Migrants don’t often have the skills or qualifications for the jobs that are available.</p> <p>Listed below are some recent changes in retailing.</p>



	<ul style="list-style-type: none"> • Birmingham’s CBD has declined, as well as its retail sector. The council supported redevelopment projects that included the Bullring and Grand Central shopping centres. • New out-of-town shopping centres (such as The Fort) were also developed. They offer free and easy parking for consumers, all under one roof. • Internet shopping, offering greater choice and competitive prices all from the comfort of your own home, has also reduced the number of consumers in the CBD. . <p>In order to improve Birmingham’s sustainability health and employment, the Birmingham City Council have encouraged people to use public transport, car share, walk or cycle around the city. The council has also improved its recycling system, reducing the amount of waste going to landfill.</p> <p>Other sustainable strategies include:</p> <ul style="list-style-type: none"> • education – education partnerships to recruit and retain teachers • housing (energy) efficiency – improvements to insulation and new windows • affordable housing – new affordable housing for residents.
<p>4.6 The context of the chosen developing country or city with an emerging country influences its functions and structure.</p>	<p>Mexico City – context</p> <ul style="list-style-type: none"> • Site – Mexico City began as a settlement on an island in Lake Texcoco in Aztec times. • Situation – It is located on a plateau surrounded by mountains and volcanoes. • Connectivity – Major highways link it between North and South America. • Culture – It is the largest Spanish-speaking city in the world. <p>Mexico City – structure</p> <ul style="list-style-type: none"> • CBD – This consists of financial centre with office blocks, government buildings and the Mexican Stock Exchange. • Inner city – This consists of older unplanned settlements and abandoned multi-storey colonial mansions that have been converted into cheap flats. • Suburbs – These contain mostly middle-class housing with heavy security. • Rural-urban fringe – Consists of land that is dominated by newer unplanned settlements.
<p>4.7 The character of the chosen developing country or emerging</p>	<p>Mexico City’s population grew from 2 million to 19 million between 1950 and 2010. Population growth has been caused by different factors including those listed below.</p> <ul style="list-style-type: none"> • Natural increase – During the 1950s, a high birth rate and a falling death rate saw the population grow rapidly.



<p>country city is influenced by its fast rate of growth.</p>	<ul style="list-style-type: none"> • Migration – Rural-urban migration (national) and international migration have both contributed to the growth of Mexico City. • Investment – The construction of factories and offices has created job opportunities. <p>The biggest flow of migrants into Mexico City is from rural areas as people look for job opportunities, better housing and services. Some international migrants arrive from the USA, France and Germany and live in the wealthier suburbs. Migration impacts Mexico City in several ways, including:</p> <ul style="list-style-type: none"> • young migrants arrive in the city bringing new skills and looking for employment, • businesses in the city benefit from low-income labour, • a housing shortage leading to unplanned settlements on the edge of the city, • higher levels of air pollution owing to more cars on the road leading to respiratory problems. <p>Rapid growth has led to inequalities in Mexico City – extreme wealth vs. extreme poverty (see the statistics below).</p> <ul style="list-style-type: none"> • One in three workers are paid less than the minimum wage of US\$4 per day. • The bottom 20% earn 13 times less than the top 20%. • The poorest 10% average only two years of schooling compared to 12 years for the wealthiest 10%. • Those living in unplanned settlements have no running water, electricity and lack sanitation (services), compared with wealthy residents who have large houses with gardens and swimming pools.
<p>4.8 Rapid growth within the chosen developing country or emerging country city results in a number of challenges that need to be managed.</p>	<p>Below are some effects resulting from Mexico’s rapid urbanisation.</p> <ul style="list-style-type: none"> • Housing shortages – Some migrants are forced to live on waste dumps and collect waste for recycling to make money. • Unplanned settlements – housing that is built on land that the occupants don’t own and doesn’t meet housing or building regulations. • Under-employment – When a person is qualified to do a particular job, but there is not enough demand for this type of job, i.e. a lack of paid work. • Pollution – Air pollution is trapped by the surrounding mountains, causing respiratory illnesses. • Inadequate services – Rubbish is often dumped on the streets as the city struggles to cope with waste management.



	<p>Top-down development projects are large-scale projects funded by the government. Mexico City has provided some affordable housing and sustainable transport schemes.</p> <p>Bottom-up development projects are small-scale projects funded by charities (Non-governmental organisations (NGOs)) or community projects.</p>	
	<p>Social</p> <p>Cultiva is a community-based project in Mexico City that works with children to educate them about gardening. Managing rooftop gardens allows residents to grow healthy food.</p> <p>Local people also work together to raise money to help build schools and health centres.</p>	<p>Economic</p> <p>Affordable housing (\$8,000) has been developed to try and solve the housing shortage.</p> <p>The government has also introduced a trash-for-food trading system.</p> <p>Environmental</p> <p>A Metrobus system has been introduced by the government, reducing journey times and CO₂ emissions, and moving more people per day.</p>

Topic 5: Global development	
Specification key ideas	Key content
5.1 Definitions of development vary, as do attempts to measure it.	<p>Development can be measured using economic indicators (for example, Gross Domestic Product (GDP)), social indicators (for example, life expectancy) and political indicators (for example, the Corruption Perception Index).</p>
	<p>Factors contributing to the human development of a country are:</p> <ul style="list-style-type: none"> • economic – income, economic growth, types of industry, cost of living and employment rates. • social – access to healthcare, education, housing, leisure and recreation • cultural – democracy and work-life balance • technological – internet access, mechanisation and electricity • food and water security – physical and economic access to food and water.
	<p>Development indicators include:</p> <ul style="list-style-type: none"> • Gross Domestic Product (GDP) – the total value of goods and services produced by a country in a year; often divided by the population of that country to give GDP per capita (per person)



	<ul style="list-style-type: none"> • Human Development Index (HDI) – puts together a country’s Gross National Income (like GDP per capita), life expectancy, average length of schooling and expected years of schooling to produce an indicator of the country’s development level • political corruption – the Corruption Perception Index grades the quality of governments from ‘highly corrupt’ to ‘very clean’. 		
<p>5.2 The level of Development varies globally.</p>	<p>Globally, development is uneven. Levels of development tend to be higher in the northern hemisphere and Australia (above the Brandt Line). Levels of development tend to be lower on the continents of South America and Africa (below the Brandt Line). These are generalisations, and something like the Brandt Line is an over-simplistic model compared with reality. The idea of the Development Continuum is a better way of understanding global variations in development.</p> <p>Levels of development vary within the UK. In the South East and London, wages and standards of living are generally higher than the rest of the UK. However, even London has a homeless population.</p> <table border="0" data-bbox="430 1021 1441 1599"> <tr> <td data-bbox="430 1021 909 1599"> <p>Factors affecting levels of development globally include:</p> <ul style="list-style-type: none"> • physical factors – availability of natural resources, natural hazards, landlocked, climate • historical factors – colonial links and trading relationships • economic factors – type of economy and debt • social factors – investment in health and education. </td> <td data-bbox="909 1021 1441 1599"> <p>Factors affecting levels of development in the UK include:</p> <ul style="list-style-type: none"> • physical factors – remoteness or accessibility and industrial potential • historical factors – impacts of deindustrialisation • economic factors – employment rates and salaries, house prices and infrastructure. </td> </tr> </table>	<p>Factors affecting levels of development globally include:</p> <ul style="list-style-type: none"> • physical factors – availability of natural resources, natural hazards, landlocked, climate • historical factors – colonial links and trading relationships • economic factors – type of economy and debt • social factors – investment in health and education. 	<p>Factors affecting levels of development in the UK include:</p> <ul style="list-style-type: none"> • physical factors – remoteness or accessibility and industrial potential • historical factors – impacts of deindustrialisation • economic factors – employment rates and salaries, house prices and infrastructure.
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<p>5.3 Uneven global development has had a range of consequences.</p>	<p>Listed below are consequences of uneven development.</p> <ul style="list-style-type: none"> • Health – Healthcare is limited in the developed world where there are fewer doctors per person and poor facilities. • Education – Not all children attend school, which leads to lower literacy rates, earlier marriage and larger families. • Employment – Wages in developing countries are lower and more labour intensive – many jobs exist in the informal sector (for example, street stalls). • Food and water security – A lack of clean water means that people struggle to grow food, leading to malnutrition and dehydration. 		



	<ul style="list-style-type: none"> • Housing – Many people in the developing world cannot afford housing and are forced to live in unplanned settlements where a lack of sanitation causes diseases to spread. • Technology – Few people have the skills to use technology so appropriate technology can be more effective. 		
<p>5.4 A range of strategies has been used to try to address uneven development.</p>	<p>International aid is one strategy to reduce uneven development. It involves one country voluntarily providing resources to another, such as machinery or oil, or money to invest in infrastructure and industry.</p> <p>Trade agreements such as removing tariffs (tax barriers) can reduce uneven development by helping countries increase trade.</p> <p>Fair trade producers work more directly with retailers, getting a better price for their goods.</p> <p>Foreign direct investment (FDI) is when a company (Transnational Corporation (TNC)) invests in another country, potentially pushing up wages and bringing in investment to the developing country. However, the big brands can outsell local produce and there is often a lack of regulation.</p> <table border="1" data-bbox="430 981 1439 1518"> <tr> <td data-bbox="430 981 922 1518"> <p>Top-down development involves government and TNCs. These large-scale projects are expensive and require expertise.</p> <ul style="list-style-type: none"> • Positively, they open investment and can benefit large numbers of people. • Negatively, local people may not benefit and TNC wages are often low. </td> <td data-bbox="922 981 1439 1518"> <p>Bottom-up development involves NGOs working with communities. These are local-scale projects, cheap and appropriate to the needs of local people.</p> <ul style="list-style-type: none"> • Positively, they target specific needs of local people, such as a wells providing clean water. • Negatively, development is slow and small-scale, and reliant on NGO support and solutions. </td> </tr> </table>	<p>Top-down development involves government and TNCs. These large-scale projects are expensive and require expertise.</p> <ul style="list-style-type: none"> • Positively, they open investment and can benefit large numbers of people. • Negatively, local people may not benefit and TNC wages are often low. 	<p>Bottom-up development involves NGOs working with communities. These are local-scale projects, cheap and appropriate to the needs of local people.</p> <ul style="list-style-type: none"> • Positively, they target specific needs of local people, such as a wells providing clean water. • Negatively, development is slow and small-scale, and reliant on NGO support and solutions.
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<p>5.5 The level of development of the chosen developing or emerging country is influenced by its location and context in the world.</p>	<p>India is in the northern hemisphere and is found on the continent of Asia. It is one of the largest countries in the world with a huge coastline on the Indian Ocean. It shares borders with Bangladesh, Burma, Bhutan, Nepal, and Pakistan.</p> <p>Social context – Regionally, the population is divided into over 29 states. The population is divided into social ranks called ‘castes’. Globally, 20 million Indian diasporas are in 100 countries and often earn money to send home as remittances.</p> <p>Political context – Regionally, it is the largest country in the Indian subcontinent. Most of the population live in six states. Globally, it is the second most populated country in the world and the seventh largest in the world.</p> <p>Cultural context – Regionally, 80% of the population are Hindu. Other religions include Islam, Sikhism and Buddhism. Globally, India</p>		



	<p>has the third-largest Muslim population. It also has a huge film industry, Bollywood, making 1600 films a year.</p> <p>Environmental context – India experiences two monsoon seasons. Regionally, the north-east monsoon occurs during the cooler months and the south-west monsoon during the warmer months.</p> <p>Development is uneven across India. It has developed a core (more economically advanced) and a periphery (lower levels of development).</p> <ul style="list-style-type: none"> Goa is a core region where investment in industries has created exports and brought jobs and wealth to the region. Rural-urban migration is putting pressure on services in core region cities. Bihar is a peripheral region whereby people still rely on agriculture. Little investment in infrastructure and industry means development is slow. Lack of clean water and unreliable rainfall makes life very difficult.
<p>5.6 The interactions of economic, social and demographic processes influence the development of the chosen developing or emerging country.</p>	<p>Since India gained its independence in 1947 and since a shift in policy since the 1980s encouraging FDI, there have been significant changes in its economic sectors.</p> <ul style="list-style-type: none"> Primary – Agriculture has halved to a quarter of its GDP owing to mechanisation as people migrate from rural areas to cities in search of work. Secondary – Industrialisation is increasing. However, it is causing air pollution and increasing the population density in cities (unplanned settlements). Tertiary – Services have doubled to over 50% of GDP owing to increased job opportunities. Quaternary – India has developed one of the fastest growing telecommunication markets in the world, creating over 1 million ICT jobs. <p>Changes to India’s trading policy have led to a rapid rise in imports and exports. India’s key imports are oil, gold, silver, and electrical goods. India’s key exports are oil products, gems and jewellery. As India has developed, international aid has decreased. It now sends aid to poorer countries such as Nepal.</p> <p>Public investment – The public sector is very big in India – it invests in education, healthcare, transport and housing reducing the gap between public and private sectors.</p> <p>Private investment – TNCs are key to India’s economic development.</p> <p>India’s population increased to 1.3 billion in 2015. As a result, its population structure has changed. It has:</p> <ul style="list-style-type: none"> a smaller proportion of people under 15 because the infant mortality rate has fallen so as a result birth rate has declined a large proportion of people between 15 and 64.



	<ul style="list-style-type: none"> more people over the age of 65+ as life expectancy has improved. 						
	<p>Changing social factors include:</p> <ul style="list-style-type: none"> increased inequality – a widening gap between the rich and poor, and women continue to have a lower social status improved education – greater investment in school has allowed the literacy rate to improve a growing middle-class – improved literacy rates and urbanisation has led to a rise of the middle class and a growing consumer market. 						
5.7 Changing geopolitics and technology impact on the chosen developing or emerging country.	<p>Geopolitics is the impact of a country’s human and physical geography on its international politics and relations. Listed below are impacts of India’s relationships.</p>						
	<table border="0"> <tr> <td> <p>Foreign policy – India is building links with France and Canada to encourage defence, energy and infrastructure.</p> <p>Military pacts – India is building links with Russia to supply them with missiles and jets.</p> </td> <td> <p>Defence – India is building links with the USA to provide warships and planes for assistance and disaster relief.</p> <p>Territorial disputes – India is in dispute with China. Dams limit each other’s water supply.</p> </td> </tr> </table>	<p>Foreign policy – India is building links with France and Canada to encourage defence, energy and infrastructure.</p> <p>Military pacts – India is building links with Russia to supply them with missiles and jets.</p>	<p>Defence – India is building links with the USA to provide warships and planes for assistance and disaster relief.</p> <p>Territorial disputes – India is in dispute with China. Dams limit each other’s water supply.</p>				
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<p>India’s technology has expanded rapidly with its own ICT industry and huge wireless network. However, there is a digital divide between the core (urban) and periphery (rural).</p>							
5.8 There are positive and negative impacts of rapid development for the people and environment of the chosen developing or emerging country.	<p>There are several positive and negative impacts of rapid development (India).</p> <table border="0"> <thead> <tr> <th>Environmental</th> <th>Social</th> <th>Economic</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Potential to invest in renewables Deforestation and desertification Increased CO₂ emissions </td> <td> <ul style="list-style-type: none"> Better jobs, income and healthcare Lack of housing – shanty towns Younger men benefit from jobs </td> <td> <ul style="list-style-type: none"> Larger workforce, stronger economy Increase in tourism – jobs and income Cost of new infrastructure </td> </tr> </tbody> </table>	Environmental	Social	Economic	<ul style="list-style-type: none"> Potential to invest in renewables Deforestation and desertification Increased CO₂ emissions 	<ul style="list-style-type: none"> Better jobs, income and healthcare Lack of housing – shanty towns Younger men benefit from jobs 	<ul style="list-style-type: none"> Larger workforce, stronger economy Increase in tourism – jobs and income Cost of new infrastructure
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	<p>One of the biggest negative impacts is the growing gap between core and periphery.</p>						
<p>India has agreed to invest in renewable energy such as solar power and plant more forest to absorb carbon emissions. India is also a member of the G20, having a greater influence in global politics.</p>							

Topic 6: Resource management



Specification key ideas	Key content
<p>6.1 A natural resource is any feature or part of the environment that can be used to meet human needs.</p>	<p>Listed below are types of natural resources.</p> <ul style="list-style-type: none"> • Biotic (living) resources are obtained from the biosphere – they are capable of reproduction (for example, animals and plants). • Abiotic (non-living) resources are obtained from the lithosphere, atmosphere and hydrosphere (for example, soil, sunlight and water). • Non-renewable resources take millions of years to form and cannot be ‘remade’ (for example, coal, oil and gas). • Renewable resources can be naturally replenished and last forever (for example, wind, solar and hydro-electric power). <p>Impacts from human exploitation are listed below.</p> <ul style="list-style-type: none"> • Deforestation – threatens biodiversity and causes soil erosion. Palm oil plantations destroy habitats such as those in the Amazon. • Overfishing – fishing provides a source of protein and jobs, but cod numbers have fallen in the North Sea. • Oil extraction – toxic water pollutes rivers that indigenous peoples rely on for washing, cooking and fishing. • Farming – intensive farming reduces biodiversity.
<p>6.2 The patterns of the distribution and consumption of natural resources varies on a global and a national scale.</p>	<p>Natural resources are not evenly distributed. Fossil fuels like coal are found in sedimentary rock regions such as the USA and Canada. Gold is often found in past tectonically-active areas such as Australia. South America has huge reserves of copper along with South Africa.</p> <p>In the UK, high precipitation in the north and west along with upland areas mean that hill sheep farming is common. Warm summers and flatter land, along with fertile soils, make East Anglia perfect for arable farming. Oil and gas are extracted from the North Sea.</p> <p>Usage and consumption are not evenly distributed around the world.</p> <ul style="list-style-type: none"> • Energy usage is higher in more developed countries, is rising in China and India, and is low in less developed countries. • Food consumption is higher in developed countries like the USA and lower in many African countries. • Water usage – water consumption is greater in more developed countries and lower in less developed countries.
<p>Optional subtopic 6A: Energy resource management</p>	
<p>6.3 Renewable and</p>	<p>Non-renewable resources take millions of years to form and cannot be ‘remade’ (for example, coal, oil and gas).</p>



<p>non-renewable energy resources can be developed.</p>	<p>Renewable resources can be naturally replenished and last forever (for example, wind, solar and hydro-electric power).</p> <hr/> <p>Using non-renewable resources such as coal:</p> <ul style="list-style-type: none"> • generates large amounts of energy (and there are still large reserves remaining) • releases CO₂ into the atmosphere • is dangerous • is expensive. <p>Using renewable resources such as the wind (the cheapest form of renewable energy):</p> <ul style="list-style-type: none"> • doesn't pollute the atmosphere • only produces energy if there is wind • is expensive to develop and wind farms can be considered ugly. 		
<p>6.4 To meet demand, countries use energy resources in different proportions. This is called the energy mix.</p>	<p>The UK uses different energy resources called the 'energy mix' to meet demand. This includes coal, oil, gas, bioenergy and renewables. Fossil fuel consumption is decreasing, and renewables are on the increase.</p> <hr/> <p>Global variations in the energy mix are dependent on several factors, listed below.</p> <ul style="list-style-type: none"> • Population – China has a huge population and therefore relies on the energy mix, whereas Iceland has a small population using hydroelectricity and geothermal energy. Some parts of the world are experiencing rapid population growth. • Wealth – The USA can afford to invest in a range of energy types whereas poorer countries cannot afford renewable energy types. • Availability – Iceland has a high percentage of geothermal energy in its energy mix due to its location. Other countries must import coal and oil. 		
<p>6.5 There is increasing demand for energy that is being met by renewable and non-renewable resources.</p>	<p>There are three key reasons why demand and supply have changed in the past 100 years.</p> <ol style="list-style-type: none"> 1. Rapid population growth (For example, in Brazil and China.) 2. Rising wealth – People are more able to afford goods that require fuel, such as cars. 3. Advances in technology – More electrical goods (for example, mobile phones), more efficient renewable energy and new energy sources. <hr/> <p>Coal, oil, natural gas and uranium have both positive and negative impacts on people and the environment.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">People</td> <td style="width: 50%; border: none;">Environment</td> </tr> </table>	People	Environment
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	<ul style="list-style-type: none"> • Coal – Mining is dangerous and can cause subsidence. • Oil – Creates jobs but chemicals are harmful to people. • Natural gas – Safer than coal and oil. • Uranium – Expensive and contains the risk of exposure to radiation. <ul style="list-style-type: none"> • Coal – Causes air and water pollution. • Oil – Land clearance and spills pollute groundwater. • Natural gas – Has fewer emissions but contributes to global warming. • Uranium – Produces less CO₂ but waste is highly radioactive. <p>Listed below are impacts of renewable energy resources.</p> <ul style="list-style-type: none"> • Hydroelectric power (HEP) provides jobs and encourages tourism but can displace people during construction. Environmentally, it is non-polluting, but deforestation often takes place during construction. • Wind power from wind farms can power homes, but they can be considered ugly. Environmentally, they do not produce CO₂ but they affect bird migration. • Solar power – Government investment in solar power is creating jobs but solar panels require large amounts of land (farmland). Environmentally, the construction uses toxic metals that can harm the environment. <p>The development of fracking using new technology could provide the UK with shale gas, reducing the need to import natural gas. Water mixed with sand and chemicals are injected into a well which releases shale gas. The chemicals are polluting, and it uses a lot of water.</p>
<p>6.6 Meeting the demands for energy resources can involve interventions by different interest groups.</p>	<p>Different attitudes:</p> <ul style="list-style-type: none"> • An example is fracking in the UK. • Some individuals protest against the exploitation of shale gas due to the impacts on the environment. • However, the UK government and some businesses see fracking as a financial benefit, generating money for industry and services. • Environmental pressure groups such as Greenpeace are against the burning of fossil fuels, fracking and nuclear energy, preferring the use of renewables.
<p>6.7 Management and sustainable use of energy resources are</p>	<p>Sustainable management is ensuring that present needs are met without compromising resources in the future.</p> <p>According to scientists, dependency on fossil fuels could have permanent impacts from climate change. Growing populations and rapid economic development must encourage governments to increase the use of renewable energy sources.</p>



<p>required at a range of spatial scales from local to international.</p>	<p>There are different views on meeting energy demands.</p> <p>Individuals – More people are using energy efficient products and solar panels, but many people believe they are still too expensive and can be considered ugly.</p> <p>Organisations – Businesses see using renewables as good for public relations, but they are expensive for smaller companies. McDonald’s reuse cooking oil as fuel for their lorries and use LED bulbs in their restaurants.</p> <p>Governments – There are shared targets and pledges by world leaders to reduce global warming (UN Climate Change Summit), using ways such as the adoption of sustainable transport, bicycle schemes and congestion charging in cities.</p>	
	<p>Sustainable China</p> <p>China burns more coal than the USA, Europe and Japan combined, producing 29% of global carbon emissions. Strategies to manage energy resources include:</p> <ul style="list-style-type: none"> • HEP (such as the Three Gorges Dam) • solar power – China is the leading solar power producer • coal restrictions (laws restricting the use of coal). 	<p>Sustainable Germany</p> <p>One third of Germany’s electricity comes from renewable resources. People are paid for the renewable energy they produce for electricity. Further strategies include create massive solar parks and offshore wind farms that will reduce CO₂ emissions further, reducing the impact of global warming.</p>
<p>Optional subtopic 6B: Water resource management</p>		
<p>6.8 The supply of fresh water supply varies globally.</p>	<p>97% of water on Earth is salty and 2% is locked up as ice, leaving only 1% for over 7 billion people! The availability of freshwater varies globally. Canada and Iceland have the greatest availability of freshwater per person, whereas North Africa is lacking.</p> <p>The uneven distribution of water is because of the different amounts of rainfall that countries receive and the different rates of evaporation and transpiration. Tropical rainforests and mountainous areas receive more than they lose, whereas North Africa (the Sahel region) receive very little rainfall and have high rates of evaporation, causing a water deficit. In the UK, southern England has less water per person than the north, and less water person than Spain.</p> <p>Water consumption has risen the most in Asia over the last 50 years. In North America and Europe consumption has increased at a slower rate, and in Africa and South America increase in consumption has been more gradual. Oceania and Australia have the lowest increase in water consumption.</p>	



	<p>Factors contributing to the global increase in water consumption include:</p> <ul style="list-style-type: none"> • greater water usage in machinery as mechanisation increases • labour saving technology such as dishwashers • watering gardens and luxuries such as hot tubs and swimming pools • regular use of showers (showering society) • increased leisure and tourism – spas, waterparks, and golf courses.
<p>6.9 There are differences between the water consumption patterns of developing countries and developed countries.</p>	<p>Bangladesh has a HDI rank of 142. As a developing country, 88% of its water is used in agriculture, only 2% is used in industry and 10% is used domestically. China has an emerging economy. However, it uses 65% of its water in agriculture but 23% in industry, and 12% domestically. Japan, a developed country uses 64% of its water in agriculture, 17% in industry but 19% domestically.</p> <p>Listed below are reasons for differences in water usage.</p> <ul style="list-style-type: none"> • Agriculture – In developed countries such as Japan, irrigation tends to be more efficient, with less waste through evaporation because of sprinklers and drip irrigation that water crops with the correct amount of water. • Industry – As TNCs move their factories to emerging countries such as China, water usage increases rapidly. Developed countries also use millions of litres of water in manufacturing industries. Developing countries use very little water as industry is small-scale. • Domestic – Developed countries have piped water to supply baths, showers, toilets, washing machines and dishwashers. Many homes in developing countries don't have piped water and in some parts of countries water is collected by women and children at communal taps.
<p>6.10 Countries at different levels of development have water supply problems.</p>	<p>There are three main reasons why the UK sometimes has water supply problems.</p> <ol style="list-style-type: none"> 1. Supply and demand are uneven. Most rainfall falls in the mountains of Scotland and Wales, but demand is higher in south and east of England where there are more people. 2. A seasonal imbalance – Water is needed in the summer months for irrigation but rainfall is usually greater in the winter. However, dry winters can lead to reservoir levels falling and drought the following summer. 3. Ageing infrastructure – The UK has thousands of km of pipes that bring us water from reservoirs and groundwater supplies. However, they are now old, and leaks mean losing water. <p>There are three main reasons why emerging and developing countries have water supply problems.</p>



	<ol style="list-style-type: none"> 1. Untreated water – Over 2 billion people do not have access to adequate sanitation meaning water sources are polluted by human waste causing diseases such as cholera and typhoid. 2. Water pollution – The use of fertilisers and pesticides pollute water, making it unsafe to drink. Mining also pollutes water supplies. In 2006, a copper mine in Zambia caused serious health problems and was shut down. 3. Low annual rainfall – The Sahel region frequently suffers from drought. The countries of Burkina Faso, Chad, Mali, Mauritania, Niger and Senegal cannot store water because of high rates of evaporation causing water scarcity. 								
<p>6.11 Meeting the demands for water resources could involve technology and interventions by different interest groups.</p>	<p>Large scale technological solutions to water stress and water scarcity (for example, desalination) involve significant investment, usually from governments, but have major environmental impacts. Creating reliable supplies of water for growing populations is popular to those it benefits. However, there is often opposition to these schemes from local, national and international organisations owing to cost and environmental impact.</p> <p>Desalination is one way to meet rising demand. This involves removing salt from seawater supplying over 100 countries with water for drinking, washing, agriculture and industry. However, some of its disadvantages are listed below.</p> <ul style="list-style-type: none"> • It is not very efficient, converting only half of what comes in. • The waste product is very salty water. • Sea life can be killed by the desalination plants. • Desalination plants use a lot of energy. • It is very expensive to develop desalination plants. 								
<p>6.12 Management and sustainable use of water resources are required at a range of spatial scales from local to international.</p>	<p>Technological solutions to water stress are possible but not without their problems – complications, conflict and environmental impacts are issues. A lasting solution can only be reached if it is managed sustainably. This means more efficient, less wasteful use of water by everyone – from individuals at a local level to global organisations.</p> <table border="1" data-bbox="451 1556 1437 2087"> <thead> <tr> <th data-bbox="451 1556 778 1601">Individuals</th> <th data-bbox="786 1556 1102 1601">Organisations</th> <th data-bbox="1110 1556 1437 1601">Governments</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 1608 778 2087"> <p>Some people in Nevada are changing personal consumption. For example, by xeriscaping (replacing grass with rocky soils and planting desert plants like cactus that require less water) whilst others still want to keep grass.</p> </td> <td data-bbox="786 1608 1102 2087"> <p>Some organisations operating casinos in Las Vegas, Nevada (for example, the Bellagio Hotel and Casino) have sustainable practices, including recycling wastewater.</p> </td> <td data-bbox="1110 1608 1437 2087"> <p>The Las Vegas government is proactively pursuing sustainable water management, focusing on reducing domestic use by paying residents to replace lawns with desert gardens.</p> </td> </tr> </tbody> </table>			Individuals	Organisations	Governments	<p>Some people in Nevada are changing personal consumption. For example, by xeriscaping (replacing grass with rocky soils and planting desert plants like cactus that require less water) whilst others still want to keep grass.</p>	<p>Some organisations operating casinos in Las Vegas, Nevada (for example, the Bellagio Hotel and Casino) have sustainable practices, including recycling wastewater.</p>	<p>The Las Vegas government is proactively pursuing sustainable water management, focusing on reducing domestic use by paying residents to replace lawns with desert gardens.</p>
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The UK (Environment Agency) is trying to manage water sustainably in several ways.

- Building new reservoirs to hold more water. However, these are expensive and flood large areas of arable land.
- Recycling water – Treating wastewater so it can be used again. People may not like the idea of ‘toilet to tap’ though.
- Installing water meters that charge for what water is used. Large families would find this expensive.
- Educating people about ways to use less water.

China is trying to manage water sustainably in several ways.

- Transferring water from the wetter south to the drier north. This is very expensive and uses large amounts of energy (not very sustainable).
- Lining irrigation channels so that water is not lost into the soil.
- Using micro-sprinklers that deliver water directly to plants.
- Using drop-resistant crops.