

4 hours per two weeks

	Autumn		Spring 1	Spring 2	Summer
Masterclass provision: <i>given during morning meeting to the full yr11 cohort</i>	Autumn 1 Hazards revision	Autumn 2 Living world (new content)	Resource management revision	Changing economic world – revision of Nigeria case study, new content – the UK economy	The physical landscape of the UK revision
	Paper 2 – Urban Issues and Challenges		(1) Mocks – students will sit exams in all three papers (2) Changing economic world: UK economy	Revision: Living World & Physical landscape of the UK	Pre-release preparation
Overview of Scheme of Learning	Students will study a range of urban environments, with a focus on Rio de Janeiro and Bristol as major case studies, representing a city in a Newly Emerging Economy (Rio) and a city in a High-Income Country (Bristol). The content will focus on challenges (problems of urban growth) and opportunities presented by urban growth.		Students will study changes to the UK economy as part of the changing economic world unit. Topics covered will include the north-south divide, deindustrialisation and strategies to increase economic activity such as science parks, business parks and enterprise zones.	Students will identify gaps in their learning and focus on key content and skills that need revisiting before the final examinations. Structured revision tasks will assist in closing these gaps.	Students will study the pre-release provided by the exam board for the paper 3 exam. The pre-release consists of a booklet of information on a particular geographic issue. In the paper 3 exam, students will be required to use the knowledge gained to answer a series of questions on the issue and ultimately make a decision about what the outcome should be.
Assessment Overview	Pre-assessments on the following: Evaluate to what extent economic development has improved the quality of people's lives in Nigeria. [6 marks]		Assessments: Will include mock exams on all three papers, followed by DIRT activities to help students	Pre-assessments on the following human geography topics, plus one physical geography topic to assist	Final examinations – Paper 1, 2 and 3

	<p>Explain how Nigeria's rapid economic growth can have harmful impacts on the environment. [6 marks]</p> <p>Explain how an urban planning scheme in an LIC or NEE has aimed to improve the quality of life for people in squatter settlements (6)</p> <p>For one of your geography enquiries, to what extent were results of this enquiry helpful in reaching a reliable conclusion(s)? 9 marks (+3 SPaG marks)</p>	<p>close knowledge gaps and practise exam technique.</p> <p>Urban end of topic assessment, including a range of lower and higher tariff GCSE questions.</p>	<p>students in preparing for the final exams:</p> <ul style="list-style-type: none"> • Urban environments • Changing economic world – the UK economy • Coasts (process question) 	
Cultural capital	<p>Read – How Population Change will Transform our World, by Sarah Harper.</p> <p>Rio –</p> <p>Watch - Inside Rio's favelas video</p> <p>Read – Brazil, by Michael Palin.</p> <p>Watch – Welcome to Rio</p> <p>Read - Rio de Janeiro: Extreme City, by Luiz Eduardo Soares</p> <p>Read - https://www.bbc.co.uk/news/world-latin-america-27635554</p> <p>Bristol –</p> <p>Read - How is Bristol's population structure changing? https://thebristolcable.org/2016/04/booming-bristol/</p>	<p>Explore The Global Food security index</p> <p>Select a country, change the graph axis to compare GDP. What can you learn about the UK and Nigeria?</p> <p>Explore The Global Economy Select countries and indicators to create your own graphs. What can you learn about the UK and Nigeria?</p> <p>Read "Global Economy as You've Never Seen it, The 99 Ingenious Infographics That Put It All Together" by Tomas Ramge.</p>	<p>Ecosystems</p> <p>Visit a local ecosystem e.g. river, pond, hedge, garden, woodland. Which animals do you see? Can you create a food web? How is this ecosystem threatened and how is it managed?</p> <p>Grow or plant seeds/sapplings.</p> <p>Watch and sketch an animal in your garden/local park. How does it interact with its surroundings?</p> <p>Tropical rainforests</p> <p>Research deforestation on the BBC News</p>	<p>This will depend upon the topic of the pre-release.</p> <p>Watch video clips on the topic covered by the pre-release.</p> <p>Read newspaper articles on the topic covered by the pre-release.</p> <p>Your teacher can suggest some materials for you once the pre-release has been issued.</p>

	<p>Explore this interactive choropleth map showing deprivation levels in the UK. Can you find Bristol? http://dclgapps.communities.gov.uk/iod/iod_index.html</p> <p>Explore – explore the data about Filwood. https://www.bristol.gov.uk/documents/20182/436737/Filwood.pdf/d2f649ea-424e-4f36-a739-f93c79d6c40a And compare to Stoke Bishop. https://www.bristol.gov.uk/documents/20182/436737/Stoke+Bishop.pdf/0be3a2c1-4235-4db8-abe2-b457c8da63b2</p>	<p>Read The Economy of the United Kingdom</p>	<p>Watch “Our World. Selling the Amazon.” On iPlayer</p> <p>Watch – Planet Earth 2, Episode 3 – Jungles on iPlayer</p> <p>Read The man who planted a tree article.</p> <p>Hot deserts Research desertification on the BBC News</p> <p>Watch – Planet Earth, Episode 5 – Deserts on iPlayer</p> <p>Read – about the Great Green Wall https://news.globallandscapeforum.org/46781/the-great-green-wall-is-officially-4-and-unofficially-18-complete/ https://www.smithsonianmag.com/science-nature/great-green-wall-stop-desertification-not-so-much-180960171/</p>	
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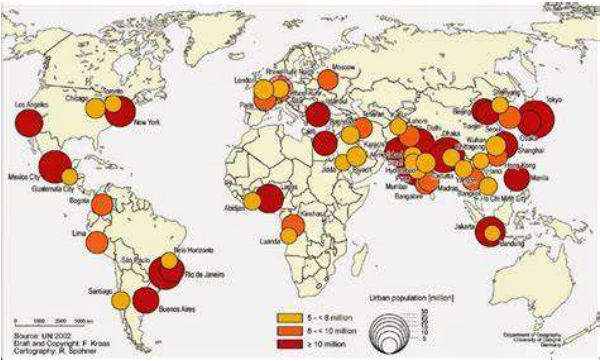
				<p>Watch – Planet Earth 2, Episode 4 – Deserts on iPlayer</p> <p><u>Coasts</u></p> <p>Visit a local beach, for example, Cromer, Southwold or Great Yarmouth. What landforms can you see? Is there any evidence of management?</p> <p>Watch an episode of “Coast” on iPlayer</p> <p>Watch “Blue Planet” on iPlayer</p> <p>Explore and read articles by The Natural History Museum - https://www.nhm.ac.uk/disc-over/oceans.html</p>	
Link to detailed content	<p><i>Knowledge organiser</i></p> <p>1. Urban</p>	<p><i>Knowledge organiser</i></p> <p>1. Urban</p>	<p><i>Knowledge organiser</i></p> <p>2. Changing economic world</p>	<p><i>Knowledge organiser</i></p> <p>3. Living world</p> <p>4. Rivers and coasts</p>	<p><i>OUP - GCSE 9-1 Geography AQA Revision Guide</i></p> <p>ISBN - 0198423462</p>

KEY IDEA: A growing percentage of the world's population lives in urban areas.

What is urbanisation?

This is an increase in the proportion of people living in urban areas such as towns or cities. Today, 55% of the world's total population live in urban areas.

A **megacity** is a city with 10 million+ people. In 2015 there were 28. By 2050 there are expected to be 50. There are three types of mega-city: slow-growing, e.g. Los Angeles; growing, e.g. Rio de Janeiro; and rapid growing, e.g. Mumbai.



Cities grow in two ways, by **migration**, the permanent movement of people into or out of the city, or by **natural increase**, the difference between the number of births and the number of deaths.

Urbanisation is happening more quickly in **NEEs** and **LICs** than HICs. This is mostly because of the rapid economic growth NEEs and LICs are experiencing.

Rural-urban migration is the movement of people from rural to urban areas. They move because of **push factors**, which encourage people to leave an area (e.g. war, drought, lack of employment) and **pull factors**, which attract people to an area (e.g. more jobs, better education and healthcare).

KEY IDEA: Urban growth creates opportunities and challenges for cities in LICs and NEEs

Urban change in a major NEE city: Lagos



Lagos has **international importance**, e.g. it has two major ports and an international airport. It is also the financial centre for West Africa. It has **national importance**, e.g. it has 60% of Nigeria's industry; and it has **regional importance**, e.g. it

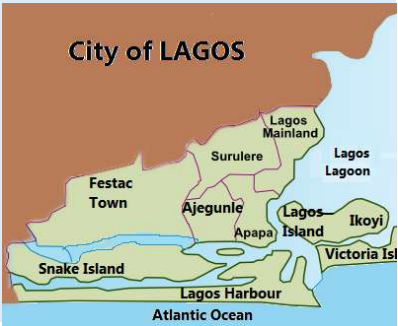
provides employment in service, finance and manufacturing industries.

**Challenges in the Human Environment:
Urban issues and challenges**

Lagos has **grown** to become a major industrial and commercial centre. These economic activities have attracted migrants from the rural northern parts of Nigeria and other countries to increase the city's population. Migrants largely come from neighbouring countries of Chad and Niger.

Lagos is a coastal city and much of its growth is around the lagoon area, which is where the largest squatter settlement of Makoko is found. The lagoon's coastal location is desired by developers who would like to create wealthy developments in this area.

However, the lagoon is very close to sea level and is at risk of sea level rise due to climate change. It is also very swampy and suffers from pests. Drainage of waste is a problem as the city is so close to sea level.



Urban growth has created opportunities, and its industrial area created economic growth. But, there are challenges.

The authorities have tried solving the **social challenges**: **Slums and squatter settlements** – home construction cannot keep up with Lagos' growth and as a result 66% of people live in squatter settlements such as Makoko.

Access to clean water, sanitation and energy – only about 40% of the city is connected to the state water supply. Most people rely on shared public taps or street sellers, who sell bottled water at inflated prices. Lagos doesn't have enough energy to power the whole city at once, so neighbourhoods are shut off in turns.

Access to health and education – there aren't enough healthcare facilities for everyone, and many people can't afford treatment, which is not free.

Unemployment and crime – there aren't enough formal jobs for the whole population and about 60% of the people work in informal jobs, which have no legal protection and don't contribute to taxes. There are high levels of crime, and many squatter settlements, such as Makoko, are patrolled by gangs called the "area boys".

However, despite the social challenges, there are **social opportunities**. Access to healthcare, education, water supply and energy are better in Lagos than in rural areas of Nigeria, where people may walk miles every day to collect water.

Development indicator	Lagos	Nigeria as a whole
GDP per capita* (US \$)	4,333	1,968
Infant mortality (2013)	24	64
Primary school enrolment	60-70%	39%
Fertility rate	4.1	5.8

Lagos has many **economic opportunities**, which act as pull factors encouraging rural-urban migration to Lagos. For example, rapid growth means that there are many construction jobs, such as building the planned Eko Atlantic development. Lagos is home to many of the country's banks, government departments and manufacturing industries. There are two major ports and a growing fishing industry. Lagos also has a thriving film and music industry – “Nollywood” films are very popular. This contributes to making Lagos very culturally diverse. The **Eko Atlantic** development is a new coastal city that will be a financial hub for West Africa. It is planned to be home for a quarter of a million people and employ 150,000 more.



Lagos' rapid urban growth creates **environmental issues**. The huge population produces over 9,000 tonnes of waste a day. Only about 40% of rubbish is officially collected, and there are large rubbish dumps such as the Olusun dump, which contain dangerous chemicals.

Olusun has become an important source of informal employment, as many people work as scavengers, collecting items to sell.



Other **environmental issues** include waste disposal and emissions from factories, which are not controlled or regulated, leading to air and water pollution. Traffic congestion is very bad – many workers face two-hour commutes in rush hours. Limited public transport and poor links to the city centre worsen this problem. The severe congestion leads to further air pollution.

The Lagos Metropolitan Area Transport Authority was set up in 2003 to improve transport in the city. It created the Bus Rapid Transit system, which has routes running north-south through the city.



The BRT has dedicated bus lanes, and 200,000 people use it every day. Bus waiting times are down to ten minutes. However, the BRT does not serve all areas of the city, and its capacity is not enough for all residents. The BRT is supplemented by “Danfos”, a fleet of minibus taxis.



Water pollution is a big problem in Lagos. Little of the city has a sanitation system, and due to the shallow water table, pollutants quickly drain into groundwater.

Some of the population have access to public taps, which are pumped from groundwater via boreholes. However, these boreholes also increase the water pollution problems, as the pumping pulls in salty seawater from the lagoon. As a result, Lagos has a lively informal industry of street water sellers. Water is often sold at inflated prices.

Urban planning is improving the quality of life for the urban poor.

The poorest people in urban areas are often most affected by urban growth problems. Urban planning schemes can reduce the social impacts of these problems. In 2013, the first Makoko Floating School was built by NLÉ Works to give some of the poorest children in Lagos access to free education.

The school had **social benefits** as up to 100 students could be educated free. The school was built by unskilled local workers, and the skills they learned helped them repair their homes. The school was also used for community meetings.

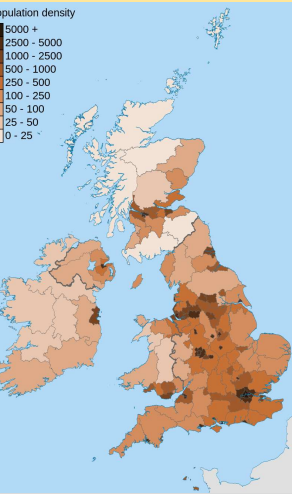
The school also had **economic benefits** as it improved local children's job prospects and provided jobs for local teachers.

Environmental benefits included the use of locally sourced materials, including 250 floating barrels. This had a low environmental impact and meant easier repairs. The school was floating to allow it to adjust to different water levels – this meant that it would be future-proofed against sea level change. The school ran on renewable solar power, so its energy needs were met sustainably, and it collected rainwater to meet its water needs.



Unfortunately, the original floating school collapsed after a storm in 2016, but the residents vowed to rebuild it. The school's architect unveiled plans for a newer stronger version of the school later in 2016.

KEY IDEA: Urban change in cities in the UK leads to a variety of social, economic and environmental opportunities and challenges



UK population in 2015 was 64.6 million, with 82% living in urban areas. The UK's **urban areas** reflect its industrial past, so major urban areas are located near to supplies of coal and raw materials. In modern UK, more people live in south-east England and London; a financial, business and cultural centre. Since 1997 annual immigration to the UK has been greater than emigration. Migrants usually settle in cities for the job opportunities.

However, there is also movement away from urban areas as people choose to live in coastal / rural areas.

Urban change in the UK: Bristol

Bristol is the largest city in the south west of England. It has **international, national and regional** importance. Bristol's importance is due



to two universities, high-tech industry; tourism; culture; and two cathedrals. Recently, immigration accounts for about half of Bristol's population growth. Migrants bring many benefits, e.g. a larger workforce and skilled workers who contribute to the local and national economy, and bringing proportionally more young people into the city. However, migrants also bring challenges, such as pressures on housing and employment; education; and integration into the community.

Urban change in Bristol has created **social opportunities**, including cultural and sporting opportunities. **Cabot Circus**, a £500 million development, opened in 2008 with shops, leisure facilities, and 250 apartments. **Bristol's Harbourside** is part of a project to regenerate the centre of the city; where former warehouses have been converted into cultural venues.

Urban change in Bristol has created **economic opportunities**. Recent developments have been in the **tertiary** (services) and **quaternary** (high tech and knowledge based) **sectors**. A number of factors attract high-tech businesses to Bristol: a government grant of £100 million for high tech development; broadband speeds of at least 80Mbps; close links between the council and university; an educated and skilled workforce; and a clean and pleasant environment to attract workers.

Companies based in Bristol include Aardman, makers of Wallace and Gromit.



In 2015 Bristol became the first UK city to become a European Green Capital. It has an **Integrated Transport System (ITS)**, which connects different methods of transport to encourage public transport use. Over a third of Bristol is open space, and 90%+ of the population live within 350m of parkland.

Environmental challenges in Bristol include the **dereliction** of disused industrial buildings, and urban sprawl due to demand for housing. **Stokes Croft** is a former industrial inner city area, which has been successfully improved. **Gentrification** is now a risk in this area, meaning that people may no longer be able to afford to live there. **Urban sprawl** has occurred as families move to new housing estates on the outskirts of the city, particularly to the north-west. Bristol is prioritising the development of **brownfield sites** to address urban sprawl, such as Finzels Reach.

Bristol produces the lowest amount of **waste** per person of any UK city, but the city still produces over half a million tonnes of waste a year. Bristol's household waste has reduced by 18% since 2000. This has been done by education; increasing kerbside collections of recyclables; and technological improvements in recycling. Some of the waste is used to generate electricity.

Vehicle emissions are the main source of air pollution in Bristol; and Bristol is the most congested city in England. Steps being taken to reduce air pollution include the ITS; reducing speed limits; and electrical vehicle charging points. Bristol's "Poo Bus" will run on bio-methane gas from human and food waste!



In some areas of Bristol there are significant **social inequalities**. For example, **Filwood** is in the top 10% of

the most socially deprived areas in the country. In Filwood, life expectancy is 78 years. By contrast, **Stoke Bishop** is an affluent suburb, where life expectancy is 83 years.

Significant **housing pressure** and Government policy have led to building on greenfield sites, for example the new town of **Harry Stoke**, which has around 3,200 new homes. However, Bristol does have a good record for building on brownfield sites; between 2006 and 2013 94% of new housing was built on brownfield sites, including **Bristol Harbourside**.

The **Temple Quarter** area was a former industrial area from the 18th century. Its **urban regeneration** included improvements to Temple Meads Station; development of Brunel's Engine Shed for high-tech and creative businesses; and the Glass Wharf, a new office development.

KEY IDEA: Urban sustainability requires management of resources and transport.

Sustainable development is widely defined as “development that meets the needs of the people today without compromising the ability of future generations to meet their own needs”.

Sustainable urban planning: Freiburg

Freiburg, Germany, is one of the world’s most sustainable cities after the city set a goal of **urban sustainability** in 1970.

Social planning takes into account people’s needs. In Freiburg, local people are involved in urban planning.

Economic planning is to provide employment, and 10,000+ people in Freiburg are employed in 1,500 environmental businesses.



Environmental planning ensures that resources are not wasted and are protected for the future. Waste is reduced by re-using and recycling materials. Freiburg has reduced annual waste disposal from 140,000 to 50,000 tonnes in 12 years.



Vauban is an inner city district built on a former army barracks. It houses 5,500 people in low-energy buildings, and green roofs collect and reuse rainwater.

Sustainable water supply in Freiburg is maintained by collecting and recycling water. There are financial incentives for people to use water sustainably; and unpaved areas, including some tramways, are used to allow rainwater to seep back into the ground.



Freiburg’s energy policy is intended to achieve a **sustainable energy supply**, and Freiburg plans to achieve 100% renewable energy by 2050. There are around 400 solar panel installations in the city, producing around 10 million kilowatts per year from solar energy. Freiburg also takes renewable energy from biomass using waste wood and rapeseed oil. Biogas is also produced from organic waste (e.g. food waste). However, in 2015 only 3.7% of Freiburg’s electricity was from locally generated, renewable resources.

Green spaces help keep air pollution down and also protect the city from flooding. Flood retention basins provide flood storage within the Black Forest, and the excess water can be used in the city. In total 40% of Freiburg is forested.

Sustainable traffic management

Freiburg has an integrated traffic plan (ITP) updated every 10 years. A key part is the tram network, which provides cheap and accessible public transport, e.g. 70% of the population live within 500m of a tram stop. There are also 500 km of cycle paths with 9,000 bike parking spaces; and restrictions on car parking spaces. As a result, tram journeys have increased by over 25,000 in a year, while car journeys decreased by nearly 30,000.



Singapore, in southeast Asia, is a small island state. Traffic policies include: high petrol prices; financial incentives for using cars only at weekends; and development of an overhead railway system and efficient bus network. There is now 45% less traffic, and 25% fewer accidents.



Beijing is China’s capital, with about 5 million cars. Strategies to reduce congestion include: improved public transport; increased parking fees; and restrictions on car use. The strategies have led to a 20% drop in car use.

What is development?

Development is an improvement in living standards through better use of resources.

Economic	This is progress in economic growth through levels of industrialisation and use of technology.
Social	This is an improvement in people's standard of living. For example, clean water and electricity.
Environmental	This involves advances in the management and protection of the environment.

Measuring development

These are used to compare and understand a country's level of development.

Economic indicators examples

Employment type	The proportion of the population working in primary, secondary, tertiary and quaternary industries.
Gross Domestic Product per capita	This is the total value of goods and services produced in a country per person, per year.
Gross National Income per capita	An average of gross national income per person, per year in US dollars.

Social indicators examples

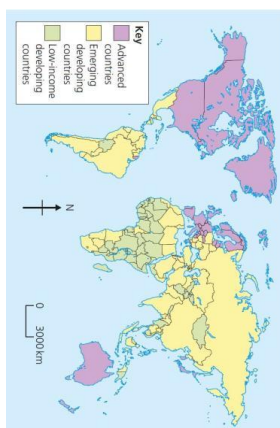
Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
Literacy rate	The percentage of population over the age of 15 who can read and write.
Life expectancy	The average lifespan of someone born in that country.

Mixed indicators

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

LICs	Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.
NEEs	These countries are getting richer as their economy is progressing from the primary industry to the secondary industry. Greater exports leads to better wages.
HICs	These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.



Causes of uneven development

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

Unit 2b

The Changing Economic World



Physical factors affecting uneven development

Natural Resources <ul style="list-style-type: none"> Fuel sources such as oil. Minerals and metals for fuel. Availability for timber. Access to safe water. 	Natural Hazards <ul style="list-style-type: none"> Risk of tectonic hazards. Benefits from volcanic material and floodwater. Frequent hazards undermines redevelopment.
Climate <ul style="list-style-type: none"> Reliability of rainfall to benefit farming. Extreme climates limit industry and affects health. Climate can attract tourists. 	Location/Terrain <ul style="list-style-type: none"> Landlocked countries may find trade difficulties. Mountainous terrain makes farming difficult. Scenery attracts tourists.

Human factors affecting uneven development

Aid <ul style="list-style-type: none"> Aid can help some countries develop key projects for infrastructure faster. Aid can improve services such as schools, hospitals and roads. Too much reliance on aid might stop other trade links becoming established. 	Trade <ul style="list-style-type: none"> Countries that export more than they import have a trade surplus. This can improve the national economy. Having good trade relationships. Trading goods and services is more profitable than raw materials.
Education <ul style="list-style-type: none"> Education creates a skilled workforce meaning more goods and services are produced. Educated people earn more money, meaning they also pay more taxes. This money can help develop the country in the future. 	Health <ul style="list-style-type: none"> Lack of clean water and poor healthcare means a large number of people suffer from diseases. People who are ill cannot work so there is little contribution to the economy. More money on healthcare means less spent on development.
Politics <ul style="list-style-type: none"> Corruption in local and national governments. The stability of the government can effect the country's ability to trade. Ability of the country to invest into services and infrastructure. 	History <ul style="list-style-type: none"> Colonialism has helped Europe develop, but slowed down development in many other countries. Countries that went through industrialisation a while ago, have now develop further.

Consequences of Uneven Development

Levels of development are different in different countries. This uneven development has consequences for countries, especially in wealth, health and migration.

Wealth	People in more developed countries have higher incomes than less developed countries.
Health	Better healthcare means that people in more developed countries live longer than those in less developed countries.
Migration	If nearby countries have higher levels of development or are secure, people will move to seek better opportunities and standard of living.

The Demographic Transition Model

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



STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
High DR High BR Steady	BR Low Declining DR Very High	Rapidly falling DR Low BR High	Low DR Low BR Zero	Slowly Falling DR Low BR Negative
e.g. Tribes	e.g. Kenya	e.g. India	e.g. UK	e.g. Japan

Reducing the Global Development Gap

Microfinance Loans



This involves people in LICs receiving smalls loans from traditional banks.

+ Loans enable people to begin their own businesses

- Its not clear they can reduce poverty at a large scale.

Foreign-direct investment



This is when one country buys property or infrastructure in another country.

+ Leads to better access to finance, technology & expertise.

- Investment can come with strings attached that country's will need to comply with.

Debt Relief



This is when a country's debt is cancelled or interest rates are lowered.

+ Means more money can be spent on development.

- Locals might not always get a say. Some aid can be tied under condition from donor country.

Aid



This is given by one country to another as money or resources.

+ Improve literacy rates, building dams, improving agriculture.

- Can be wasted by corrupt governments or they can become too reliant on aid.

Fair trade



This is a movement where farmers get a fair price for the goods produced.

+ Paid fairly so they can develop schools & health centres.

-Only a tiny proportion of the extra money reaches producers.

Technology



Includes tools, machines and affordable equipment that improve quality of life.

+ Renewable energy is less expensive and polluting.

- Requires initial investment and skills in operating technology

CS: Reducing the Development Gap In Jamaica



Location and Background



Jamaica is a LIC island nation part of the Caribbean. Location makes Jamaica an attractive place for visitors to explore the tropical blue seas, skies and palm filled sandy beaches

Tourist economy



Multiplier effect

-In 2015, 2.12 million visited.
-Tourism contributes 27% of GDP and will increase to 38% by 2025.
-130,000 jobs rely on tourism.
-Global recession 2008 caused a decline in tourism. Now tourism is beginning to recover.

-Jobs from tourism have meant more money has been spent in shops and other businesses.
-Government has invested in infrastructure to support tourism.
-New sewage treatment plants have reduced pollution.

Development Problems

- Tourists do not always spend much money outside their resorts.
- Infrastructure improvements have not spread to the whole island.
- Many people in Jamaica still live in poor quality housing and lack basic services such as healthcare.

Case Study: Economic Development in Nigeria



Location & Importance

Nigeria is a NEE in West Africa. Nigeria is just north of the Equator and experiences a range of environments.

Nigeria is the most populous and economically powerful country in Africa. Economic growth has been base on oil exports.



Influences upon Nigeria's development

Political

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

Cultural

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

Social

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

Industrial Structures

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

The role of TNCs

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



Changing Relationships

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

Environmental Impacts

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

Aid & Debt relief

+ Receives \$5billion per year in aid.
+ Aid groups (ActionAid) have improved health centres, provided anti-mosquito nets and helped to protect people against AIDS/HIV.
- Some aid fails to reach the people who need it due to corruption.

Effects of Economic Development

Life expectancy has increased from 46 to 53 years. 64% have access to safe water. Typical schooling years has increased from 7 to 9.

Case Study: Economic Change in the UK



UK in the Wider World

The UK has one of the largest economies in the world. The UK has huge political, economic and cultural influences. The UK is highly regarded for its fairness and tolerance. The UK has global transport links i.e. Heathrow and the Eurostar.



Causes of Economic Change

De-industrialisation and the decline of the UK's industrial base. Globalisation has meant many industries have moved overseas, where labour costs are lower. Government investing in supporting vital businesses.

Towards Post-Industrial

The quaternary industry has increased, whilst secondary has decreased. Numbers in primary and tertiary industry has stayed the steady. Big increase in professional and technical jobs.

Developments of Science Parks

Science Parks are groups of scientific and technical knowledge based businesses on a single site.

- Access to transport routes.
- Highly educated workers.
- Staff benefit from attractive working conditions.
- Attracts clusters of related high-tech businesses.

CS: UK Car Industry



Every year the UK makes 1.5 million cars. These factories are owned by large TNCs. i.e. Nissan.

- 7% of energy used there factories is from wind energy.
- New cars are more energy efficient and lighter.
- Nissan produces electric and hybrid cars.

Change to a Rural Landscape

Social

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

Economic

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

Improvements to Transport



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

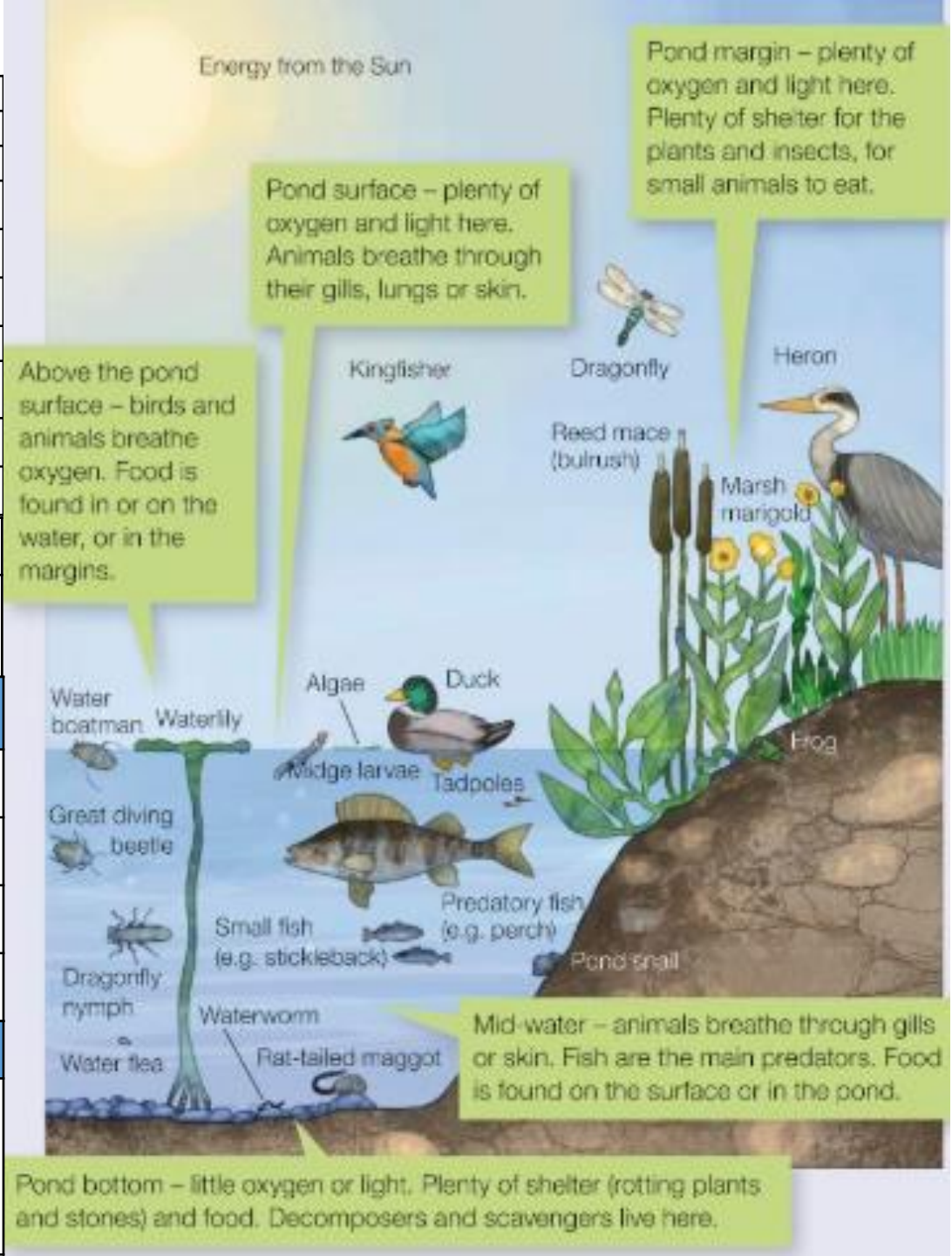
UK North/South Divide

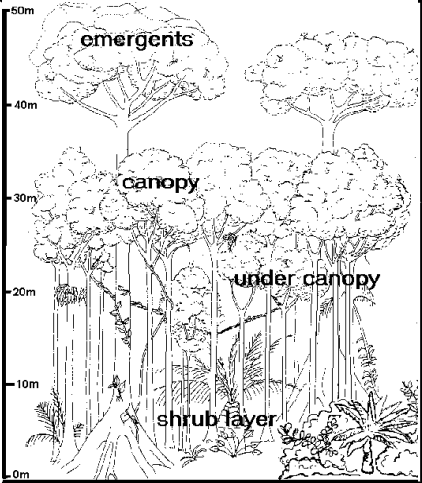



- Wages are lower in the North.
- Health is better in the South.
- Education is worse in the North.
+ The government is aiming to support a Northern Powerhouse project to resolve regional differences.
+ More devolving of powers to disadvantaged regions.



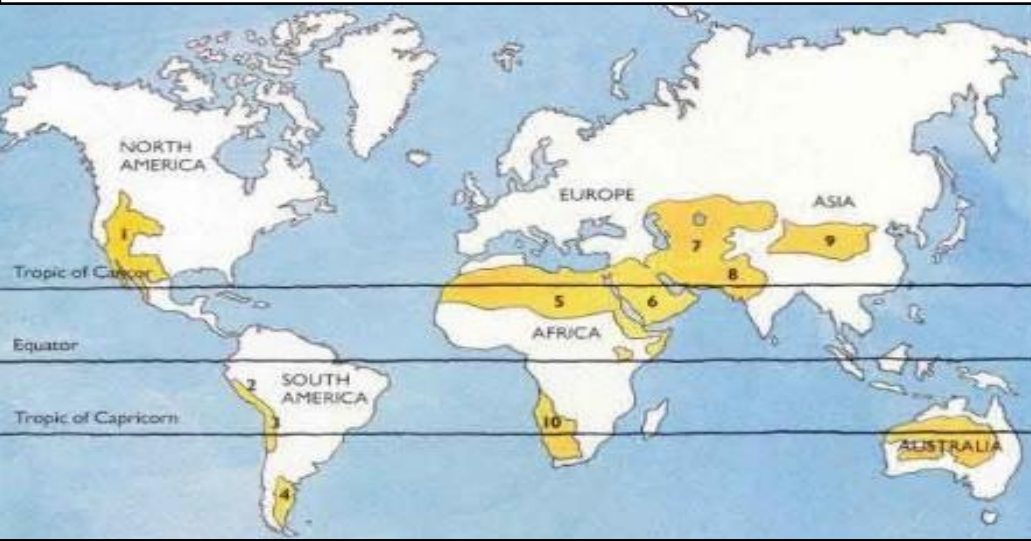

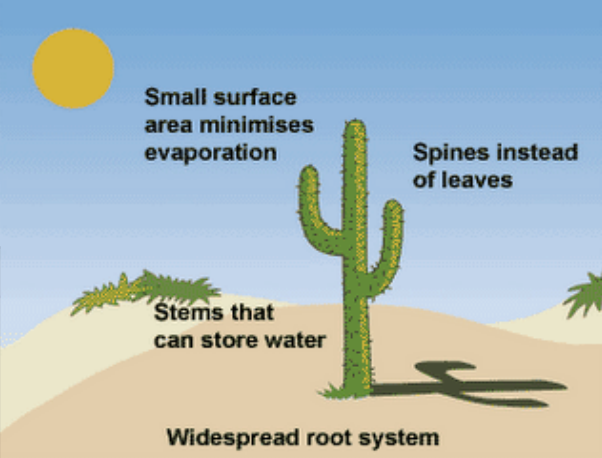

Knowledge organiser: GCSE – The Living World - Ecosystems

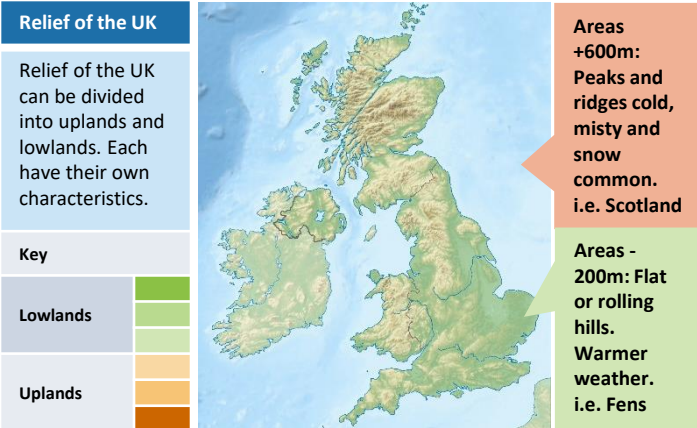
Abiotic	Relating to non living things
Biotic	Relating to living things
Consumer	Creature that wats herbivores and / or plant matter
Decomposer	An organism that breaks down dead tissue which is then recycled to the environment
Ecosystem	A community of plants and animals that interact with each other and the physical environment
Food chain	The connections between different organisms that rely on one another as their food source
Food web	A complex hierarchy of plants and animals relying on each other for food
Nutrient cycling	A set of processes whereby organisms extract minerals necessary for growth from soil and water before passing them on though the food chain
Global ecosystem	Large biomes with flora and fauna adapting to their environment
Producer	An organism or plant that is able to absorb energy from the sun through photosynthesis

ECOSYSTEM	Key Characteristics	Biodiversity	The way of life in the world or a particular habitat
Tropical Rainforests	<ul style="list-style-type: none">Along equator (Asia, Africa / South America)6% earth’s surface25°C – 30°C and over 250mm rain per year	Convectional rainfall	Warm air at the surface heats up, rises, cools and condenses forming clouds. This leads to heavy daily rainfall
Temperate Grassland	<ul style="list-style-type: none">40º - 60º N of the equator (N America and E Europe)Centre of continents away from the seaShort grassesWet and dry seasons	Factors affecting an ecosystem	How it affects it
Coniferous Forest	<ul style="list-style-type: none">60ºN (Scandinavia / Canada)Cone bearing evergreenNo sunlight for part of the year	Natural changes	Droughts can affect ponds and lakes.
Deciduous forests	<ul style="list-style-type: none">Higher latitudes (W Europe, N America, New Zealand)5 – 20°C and between 500 – 1500 mm rain per year4 distinct seasonsLose leaves in the winter to cope with the cold	Human activity	Agricultural fertilisers – leads to eutrophication.
Tundra	<ul style="list-style-type: none">Above 60ºN (Arctic Circle)Less than 10°C and less than 500mm per year rainCold, icy and dry means 2 month growing season		Woods cut down – destroys habitats and affects nutrient cycle
Mediterranean	<ul style="list-style-type: none">30- 40ºN and S on west coast of continentsDrought resistant small trees and evergreen shrubs		Conversion of ponds to farm land – kills fish and other pond life.
Tropical Grasslands	<ul style="list-style-type: none">Between equator and tropics20 – 30°C and between 500- 1500 mm of rain per yearWet and dry seasons	Example – Yellowstone National Park	
Deserts	<ul style="list-style-type: none">Tropics (Sahara and Australia)Over 30°C and less than 300 mmm per year rain20% of land’s surface	In 1995 wolves were introduced into the area. They killed the deer which meant that the trees grew back. This had many other knock on effects such as birds and beavers returning. The rivers banks were also stabilised due to the trees roots stabilising the banks.	



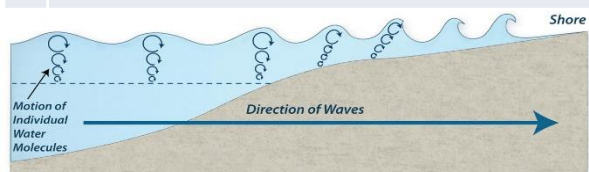
Knowledge organiser: GCSE – The Living World – Tropical Rainforest		Cause of deforestation	Definition and facts		Sustainability	Actions and forms of progress that meets the needs of the present without reducing the ability of future generations to meet their own needs			
 <ul style="list-style-type: none">Average temperature 27°CMore than 2000 mm rain per yearWet season (December to May)Infertile soilsShallow roots4 layers of vegetationTrees lose leaves all year <p>PLANT ADAPTATIONS</p> <ul style="list-style-type: none">Tall and straight to reach the sunButtress roots to support the tall treesLianas use trees to reach the sunDrip tips so leaves don't rotThick waxy eavesSmooth thin barkEpiphytes grow on trees and get nutrients from air and waterShade tolerant ferns <p>ANIMAL ADAPTATIONS :</p> <ul style="list-style-type: none">Sloths – hook to grip branchesParrots – sharp beak for nuts and fruit; 4 toes per foot to clamberLong limbed spider monkey – sharp nails to peel bark to get to sapFlying frog – web like feet to glide through the airTitan beetle – flies and lives on decaying materialAnteaters – long tongues; good smell and hearing; sharp claws to open ant hillsHarpy eagle – short pointy wings to manoeuvre <p>INTERDEPENDENCE OF CLIMATE, WATER, SOILS, PLANTS, ANIMALS AND PEOPLE</p> <ul style="list-style-type: none">Small changes to biotic and abiotic factors can have serious knock on effectsBiomass is the largest nutrient store and the biggest transfer is from soil to biomassFertility s quickly lost from the soil if trees are cut downPoor soils due to leaching (the washing away of nutrients)Thick litter layer. Rapidly breaks down due to climateWarm humid climate means rapid plant growth <p>ISSUES RELATED TO BIODIVERSITY</p> <ul style="list-style-type: none">More than half the world's species are found in rainforestsHuman exploitation is a major threatMany extinct and endangered species are leading to a decrease in ecosystem productivity <p>Goods and services</p> <table><tr><td>GOODS from rainforest :Food; Building materials; HEP; Water; Medicines (1/4 of drugs use products found in the rainforest</td><td>SERVOCES from rainforest : Air purification; Water and nutrient cycling; Protection from soil erosion; Habitats; Biodiversity; Employment.</td></tr></table> <p>The Main Range, Peninsular Malaysia – has over 600 species. 25% of all plant species found in Malaysia are here. There are many undiscovered medical plants.</p>		GOODS from rainforest :Food; Building materials; HEP; Water; Medicines (1/4 of drugs use products found in the rainforest	SERVOCES from rainforest : Air purification; Water and nutrient cycling; Protection from soil erosion; Habitats; Biodiversity; Employment.	Commercial farming	Farming on a large scale Malaysia is the largest exporter of palm oil in the world.				
		GOODS from rainforest :Food; Building materials; HEP; Water; Medicines (1/4 of drugs use products found in the rainforest	SERVOCES from rainforest : Air purification; Water and nutrient cycling; Protection from soil erosion; Habitats; Biodiversity; Employment.						
		Deforestation	The chopping down and removal of trees to clear an area of forest			STRATEGY	KEY FACTS		
		Logging	The business of cutting down trees and transporting the logs to sawmills. Selective logging and clear felling. Teak and Mahogany worth the most. In the 1980's Malaysia became the world's largest exporter of highly valued tropical wood.			Selective logging and replanting	<ul style="list-style-type: none">The cutting down of trees which are mature or inferior to encourage the growth of the remaining treesOnly fell fully grown trees on 30 – 40 year cycleReplanting – collect seeds from primary forest; grow in nurseries and replantForest Stewardship Council – mark sustainably sourced timber		
		Subsistence farming	A type of agriculture producing food and materials for the benefit only of the farmer and his family. Slash and burn fires can grow out of control destroying large areas of forests.			Conservation and education	<ul style="list-style-type: none">Education of locals keyWWF (NGO) – education; train conservation workers; provide practical help; buy threatened areas and set up nature reserves 		
		Other uses	<ul style="list-style-type: none">Road building – provide access to logging and mining areasSettlement – Government resettled poor and gave them landEnergy development – HEP projects boost Malaysia's electricity supplies, e.g. The Baku Dam which opened in 2011.Mineral extraction – tin mining and drilling for oil and gas.			Ecotourism	<ul style="list-style-type: none">Responsible travel to natural areas that conserve the environment, sustains the well being of local people and may involve educationMinimises damage to environment and benefits localsSmall visitor numbersWaste and litter disposed of properlyLocals employed so incentive to preserve environment		
Impact of deforestation in Malaysia				International agreements about use of tropical hardwoods	<ul style="list-style-type: none">International Tropical Trade Agreement 2006 and 2011 – restricts trade in hardwood from rainforestsNeeds to be felled from sustainably managed areas and stamped with registration numbersUN Sustainable development goals include protection of forestsThe FSC promotes sustainably managed forestry through education programmes and its FSC labelled products.				
				Debt reduction	<ul style="list-style-type: none">Countries are relieved of some of their debt in return for protecting their rainforestsDebt for nature swaps – in 2010 USA converted debt of \$13.5 million from Brazil and used the funds to protect the rainforestHICs wipe off debts of debts of LICs				
				The Achuar Tribe – 11, 000 people in the Peruvian Amazon, rely on the rainforest for food, fuel and buildings. There is oil in their region. The Achuar are resistant to oil exploration and in 2012 the oil company Talisman Energy started oil exploration in the region. 					

Knowledge organiser: GCSE – Hot deserts		Hot Desert: Case Study Thar Desert – India/Pakistan		Strategies to reduce Desertification
Characteristics		The Thar Desert is located on the border between India and Pakistan in Southern Asia. With India soon becoming the most populated country in the world in the next five years. With this, more people will plan to live in the desert.		<ul style="list-style-type: none">• Water management - growing crops that don't need much water.• Tree Planting - trees can act as windbreakers to protect the soil from wind and soil erosion.• Soil Management - leaving areas of land to rest and recover lost nutrients.• Technology – using less expensive, sustainable materials for people to maintain. i.e. sand fences, terraces to stabilise soil and solar cookers to reduce deforestation.• Creation of National Parks – The Desert National Park in the Thar desert – created in 1992 to protect 3000km2 of desert. <p>Examples</p> <p>The Tal Rimah Rangeland Rehabilitation prject – local people have build stone walls. Water is used to water the Atriplex shrubs. The shrubs hold the soil together and provide grazing for sheep and goats.</p> <p>Jammi tree – used in the Thar desert. It provides foliage and seeds for animals to eat, fire wood, building materials, shade and the roots stabilise the sand dunes.</p>  <p>Magic Stones in Burkino Faso – Lines of stones have been used. Basic tools and trucks are used to transport the stones and locals build walls between 0.5-1.5m high along the contours. This stops any rainwater from washing down the slope.</p> 
		Opportunities and challenges in the Hot desert		
		Opportunities	Challenges	
		<ul style="list-style-type: none">• There are valuable minerals for industries and construction, such as gypsum and stone.• Energy resources such as coal and oil can be found in the Thar desert.• Great opportunities for renewable energy such as The Jaisalmer Wind Park.• Thar desert has attracted tourists, especially during festivals.	<ul style="list-style-type: none">• The extreme heat makes it difficult to work outside for very long.• High evaporation rates from irrigation canals and farmland. <p>The Indira Gandhi Canal is the main form of irrigation in the desert. It was constructed in 1958 and has a total length of 650km.</p> <ul style="list-style-type: none">• Water supplies are limited, creating problems for the increasing number of people moving into area.• Access through the desert is tricky as roads are difficult to build and maintain.	
		Hot Deserts inhabitants		
Distribution		Causes of Desertification		
Most of the world's hot deserts are found in the subtropics between 20 degrees and 30 degrees north & south of the Equator. The Tropics of Cancer and Capricorn run through most of the worlds major deserts.		Desertification means the turning of semi-arid areas (or drylands) into deserts. It is caused by both human and physical factors and it affects both poor and rich countries.		
Climate of hot deserts	Plant adaptations	Fuel Wood People rely on wood for fuel. This removal of trees causes the soil to be exposed.	Overgrazing Too many animals mean plants are eaten faster than they can grow back. Causing soil erosion.	
<ul style="list-style-type: none">• Very little rainfall with less than 250 mm per year.• It might only rain once every two to three years.• Temperate are hot in the day (45 °C) but are cold at night due to little cloud cover (5 °C).• In winter, deserts can sometimes receive occasional frost and snow.		Over-Cultivation If crops are grown in the same areas too often, nutrients in the soil will be used up causing soil erosion.	Population Growth A growing population puts pressure on the land leading to more deforestation, overgrazing and over-cultivation.	
		Climate Change Reduce rainfall and rising temperatures have meant less water for plants.	Soil erosion Where vegetation is destroyed, soil is exposed which cracks and breaks up. It can then be eroded by wind/rain.	
		Example – Desertification in the Badia, Jordan The Badia is located in Jordan. Physical causes of desertification - less than 150mm of rainfall per year - Temperatures exceed 40 degrees Human causes of desertification - 1991 Gulf War – sheep came in with people which led to overgrazing. Desertification has made the land unproductive and people have moved away from the area.		
Animal adaptation				
Many rodents, such as the jerboa are nocturnal and survive the heat by burrowing underground. Snakes and lizards retain water by having a waterproof skin and producing only small amounts of urine.				



Types of Weathering	
Weathering is the breakdown of rocks where they are.	
Chemical	Breakdown of rock by changing its chemical composition, e.g. acidic rainwater
Mechanical	Breakdown of rock without changing its chemical composition, e.g. freeze-thaw weathering
Biological weathering	This occurs due to the actions of plants and animals. E.g plant roots break rocks, animals burrow into weak rocks.

How do waves form?	
Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.	
Why do waves break?	
1	Waves start out at sea.
2	As waves approaches the shore, friction slows the base.
3	This causes the orbit to become elliptical.
4	Until the top of the wave breaks over.

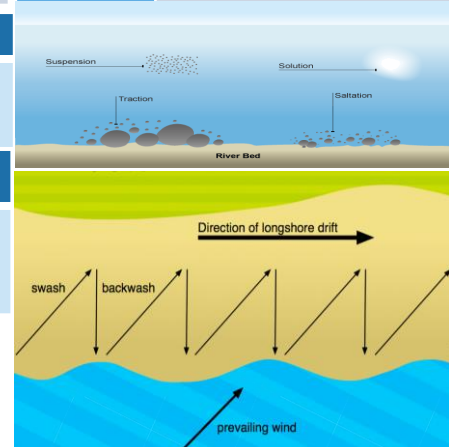


Types of Erosion	
The break down and transport of rocks – smooth, round and sorted.	
Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolves rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

What is Deposition?	
When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.	
What is longshore drift?	
The movement of material along the beach. When the waves approach at an angle, sediment will be moved along in a zig-zag pattern.	

Physical Landscapes in the UK

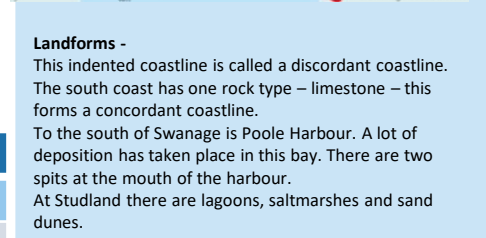
Types of Transportation	
A natural process by which eroded material is carried/transported.	
Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.



Mass Movement	
A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.	
1	Rain saturates the permeable rock above the impermeable rock making it heavy.
2	Waves or a river will erode the base of the slope making it unstable.
3	Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
4	The debris at the base of the cliff is then removed and transported by waves or river.



Coastal landforms at Swanage	
Where? Dorset, south coast of England. It has many erosional and depositional landforms. It is also known as the Jurassic Coast.	



Mechanical Weathering Example: Freeze-thaw weathering			
Stage One Water seeps into cracks and fractures in the rock.		Stage Two When the water freezes, it expands about 9%. This wedges apart the rock.	
Stage Three With repeated freeze-thaw cycles, the rock breaks off.			
Size of waves	Types of Waves		
<ul style="list-style-type: none"> Fetch how far the wave has travelled Strength of the wind. How long the wind has been blowing for. 	Constructive Waves		Destructive Waves
	This wave has a swash that is stronger than the backwash. This therefore builds up the coast. They form gentle beaches		This wave has a backwash that is stronger than the swash. This therefore erodes the coast. They form more steep beaches

Coastal Defences - Hard Engineering Defences

Groynes	Wood barriers prevent longshore drift, so the beach can build up.	£150,000 each, at 200m intervals	<div>✓ Beach still accessible.</div> <div>✗ No deposition further down coast = erodes faster.</div>
Sea Walls	Concrete walls break up the energy of the wave . Has a lip to stop waves going over.	£5000-100000 per metre	<div>✓ Long life span</div> <div>✓ Protects from flooding</div> <div>✗ Curved shape encourages erosion of beach deposits.</div>
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	Up to £50,000 per 100m.	<div>✓ Cheap</div> <div>✓ Local material can be used to look less strange.</div> <div>✗ Will need replacing.</div>

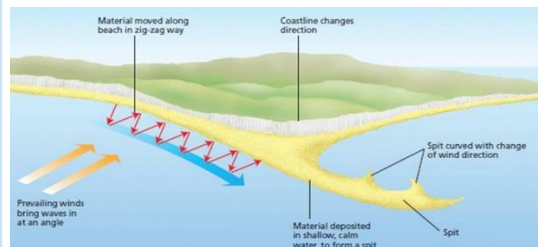
Coastal Defences - Soft Engineering Defences

Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	up to £5000,000 per 100m	<div>✓ Cheap</div> <div>✓ Beach for tourists.</div> <div>✗ Storms = need replacing.</div> <div>✗ Offshore dredging damages seabed.</div>
Dune regeneration	Grasses planted to stabilise dunes and help them develop. Fences used to keep people off sand dunes.	£200-1000 per 100m	<div>✓ Cheap</div> <div>✓ Maintains a natural coastline, popular with people and wildlife.</div> <div>✗ Time consuming to plant grasses and fence areas off.</div> <div>✗ Can be damaged by storms.</div>
Managed Retreat	Low value areas of the coast are left to flood & erode. Medmerry Managed retreat, West Sussex – the flat, low lying coast is mainly used for farming and caravan parks. It was protected by a sea wall, but this now need repairing. Due to the low value of the land, it was decided to allow the sea to breach the wall.		<div>✓ Reduce flood risk</div> <div>✓ Creates wildlife habitats.</div> <div>✓ Most sustainable option</div> <div>✗ Compensation for land.</div>

Formation of Coastal Spits and Bars- Deposition

Example: Spurn Head, Holderness Coast.

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



Physical Landscapes in the UK

Formation of Bays and Headlands

1. A coastline faces the wave attack with DISCORDANT beds of sediment

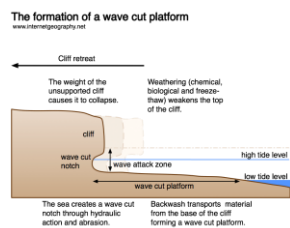
2. Wave attack causes hydraulic Action and Attrition which causes the cliff to RETREAT

3. Less resistant rocks are eroded at a faster rate to create bays, more resistant rocks stick out to sea as headlands

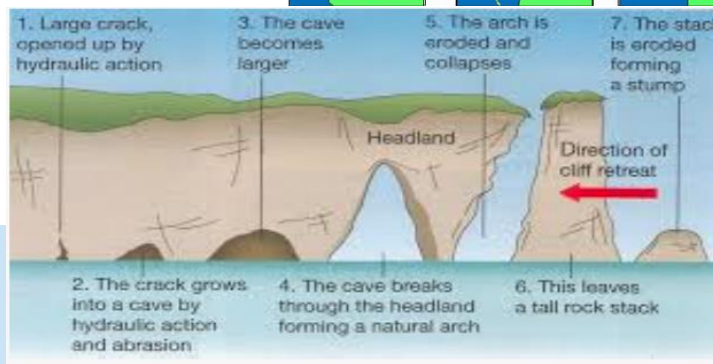
4. During calm periods the sheltered bays allow deposition of beaches

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

Formation of cliffs and wave-cut platforms.



- When a wave breaks against a cliff, erosion will wear away at the bottom on a cliff, forming a wave-cut notch.
- Over a long period of time, the notch will get deeper and deeper, undercutting the cliff.
- Eventually, the cliff above collapses.
- Over time the cliff will retreat
- In its place will be a gentle sloping rocky platform called a wave-cut platform.

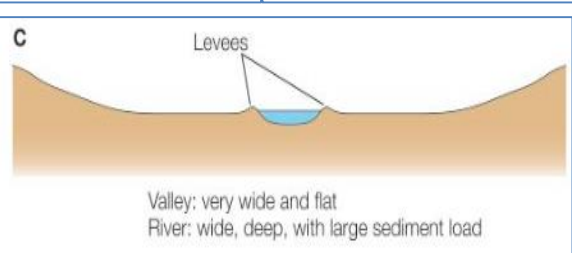
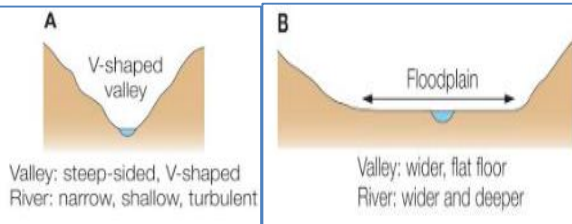


Formation of Coastal Stack

Example: Old Harry Rocks, Dorset

- Hydraulic action widens cracks in the cliff face over time.
- Abrasion forms a wave cut notch between HT and LT.
- Further abrasion widens the wave cut notch to from a cave.
- Caves from both sides of the headland break through to form an arch.
- Weather above/erosion below –arch collapses leaving stack.
- Further weathering and erosion eaves a stump.

Drainage basin Key Terms	
Drainage basin	An area of land drained by a river and its tributaries.
Source	The start of the river
Tributary	A small stream that joins a larger river
Confluence	Where a tributary joins a larger river
Mouth	Where the river meets the sea
Watershed	The edge of a river basin.



Water Cycle Key Terms	
Precipitation	Moisture falling from clouds as rain, snow or hail.
Interception	Vegetation prevent water reaching the ground.
Surface Runoff	Water flowing over surface of the land into rivers
Infiltration	Water absorbed into the soil from the ground.
Transpiration	Water lost through leaves of plants.

Case Study: The River Tees

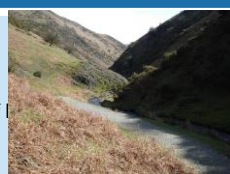
Location and Background
Located in the North of England and flows 137km from the Pennines to the North Sea at Red Car.

Geomorphic Processes and landforms
Upper – Features include V-Shaped valley, rapids and waterfalls. High Force waterfall drops 21m and is made from harder Whinstone and softer limestone rocks. Gradually a gorge has been formed.
Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town.
Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.

Physical and Human Causes of Flooding.	
Physical: Prolong & heavy rainfall Long periods of rain causes soil to become saturated leading runoff.	Physical: Geology Impermeable rocks causes surface runoff to increase river discharge.
Physical: Relief Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.	Human: Land Use Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.

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

Features of the upper course - Interlocking spurs
The river cuts down into the valley. If there are areas of hard rock which are harder to erode, the river will bend around it. This creates **interlocking spurs** of land which link together like the teeth of a zip.



Features of the upper course - Formation of a Waterfall

- 1) River flows over alternative types of rocks.
- 2) River erodes soft rock faster creating a step.
- 3) Further hydraulic action and abrasion form a plunge pool beneath.
- 4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.
- 5) Waterfall retreats leaving steep sided gorge.

Middle Course of a River
Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

Formation of Ox-bow Lakes

Step 1	Step 2
Erosion of outer bank forms river cliff. Deposition inner bank forms slip off slope.	Further hydraulic action and abrasion of outer banks, neck gets smaller.
Step 3	Step 4
Erosion breaks through neck, so river takes the fastest route, redirecting flow	Evaporation and deposition cuts off main channel leaving an oxbow lake.

Lower Course of a River
Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.

Formation of Floodplains and levees
When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials build up to form natural levees.

✓ Nutrient rich soil makes it ideal for farming.
✓ Flat land for building houses.

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

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

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

Managing floods at Banbury.

Location and Background
Located in the Cotswold Hills, 50km north of Oxford. Much of the town is on a floodplain of the River Cherwell.

How has Banbury been affected by flooding?
1988 – the towns railway station and local roads weere closed. Led to £12.5 million damage.150 homes and business affected.
2007 – floods affected many more homes and businesses.

What has been done to reduce the risk of flooding?
In 2012 the flood defence scheme was completed.

- A 2.9km embankment built next to M40 to create a flood storage area.
- A361 was raised – improvements to drainage.
- New pumping station
- Creation of a new Biodiversity Action Plan – with ponds, trees and hedgerows to absorb and store water.

Costs and benefits

- The raised A361 can now be open during times of flooding.
- Quality of life for people improved – reduced stress and anxiety for people
- 100 million tonnes of earth required to build the embankment. This created a small reservoir.
- 441 houses and 73 commercial properties protected. Benefits at over £100 million.
- Cost £18.5 million
- Part of the floodplain will be deliberated flooded if river levels are too high.