LANDSCAPE AND PHYSICAL PROCESSES
Paper 1

Relief of the UK

The **relief** (height of the land) of the UK can be divided into uplands and lowlands; each have their own characteristics.

Key

Lowlands

Uplands

Highland (**upland**) areas, often over 600 metres above sea level; e.g. the Scottish Highlands (glaciated mountains).

Lowland areas, under 200 metres above sea level, largely flat or low hills; e.g. the Fens in eastern England.

The landscape will be affected by four main factors; geology/ vegetation/ land use and culture.
Many of these areas in the UK can be considered an Area of Outstanding Natural Beauty such as the Lake District and Dartmoor.

Rock Type

IGNEOUS: This is formed from molten rock often linked to volcanoes. The molten rock may cool slowly, allowing time for minerals to form large crystals, which lock together. Granite and basalt are types of igneous rock. Igneous rocks are very hard and durable. In the UK they form mountainous areas.

SEDIMENTARY: Most of these types of rocks are formed under the sea. On the sea bed they were buried by newer sediment, squeezed and cemented together over thousands of years to form new rock. These rocks also include the fossilised remains of sea creatures. Chalk and limestone are examples of sedimentary rocks.

METAMORPHIC: Existing rocks that are transformed by great heat or pressure. These changes lead to the existing minerals melting and forming new minerals. Marble and slate are examples of metamorphic rocks.

Physical and Human Causes of Flooding.

Physical: Prolonged/heavy rainfall
This causes the soil to become saturated, stopping infiltration and causing surface runoff which increase peak discharge.

Physical: Geology
Impermeable rocks prevent infiltration, causing surface runoff which decrease lag time.

Human: Deforestation
Clearing trees reduces interception and evapotranspiration, increasing peak discharge.

Human: Urbanisation
Tarmac and concrete are impermeable, preventing infiltration and causing surface runoff.

2015 Cumbria Flood

Causes of the flood:
- The storm Desmond brought record high rainfall – 348mm fell in a 24hr period (this still continues in some parts).
- Steep hill slopes meant that it flowed into rivers quickly.
- Cockermouth is a small town that lies on the confluence of 2 rivers (the Cocker and the Derwent)

Effects:
- In Cumbria and Lancashire more than 43,000 homes are suffering from power cuts.
- 40 schools closed
- 2 deaths
- Shops shut before Christmas
- Insurance company increased staff
- Sewage leaked into surrounding fields
- Bridges collapsed

Responses:
- More than 100 flood warnings
- The Government mobilised a full national emergency response. This included 200 military personnel.
- The government's announced the 5,000 households and businesses affected would be given council tax and business rate relief.
- Evacuation of local residents to higher/ safer ground.
- Improved flood defences, The Environment Agency

Processes

Transportation - The movement of sediment along the coast

- **Traction** - large material is rolled along the sea floor.
- **Saltation** - beach material is bounced along the sea floor.
- **Suspension** - beach material is suspended and carried by the waves.
- **Solution** - material is dissolved and carried by the water.

Erosion - The breakdown of sediment into smaller fragments

Hydraulic Action – The force of water into cracks helps to break it up.

Abrasion – Waves fling sand and pebbles against the rock. These wear away like sandpaper.

Attrition - Chunks of rock get knocked together and worn into smaller bits

Solution – Water dissolves the soluble material from the rock.

Deposition - When waves loose energy they leave behind the smaller pieces.

Managing Distinctive Landscapes:

Brecon Beacons:
- Establish fixed point photography of key viewpoints and animals
- Improve sinage by renewing or replacing finger posts to encourage people to stick to the routes.
- Designated footpaths and Monitoring of footpath erosion
- Work with local planning and housing authorities to promote affordable housing schemes using local rock
- Strict control over visitors

Flood management schemes

Soft Engineering (enhancing natural processes)

Afforestation – plant trees in the upper course to increase interception to lengthen lag time, and increase evapotranspiration to reduce discharge.

River restoration and managed flooding – restoring a river and wetlands to their natural state allows a river to flood there to decrease discharge downstream.

Floodplain zoning – allow land uses such as parks in areas that are regularly flooded and restrict housing to areas that are infrequently flooded.

Hard Engineering (building control structures)

Artificial Levees – increase the height of the river banks to increase channel capacity.

Deepening/widening the river channel – increase the channel capacity.

Dam - reduces discharge by storing water in a reservoir.

Flood diversion/relief channel – reduces discharge by diverting a proportion of discharge away from a city via a flow control structure on the river e.g. the Jubilee River (Thames).

Hydrographs

Hydrographs show how the discharge of a river (the volume of water that is flowing in it, measured in cumecs – cubic metres per second) changes over time.
A 'flashy' hydrograph has a short lag time and a high peak discharge, caused by lots of surface runoff.

- **Peak discharge** is the highest discharge.
- **Lag time** is the delay between peak rainfall and peak discharge.
- **Rising limb** is the increase in discharge.
- **Falling limb** is the decrease in discharge
- **Baseflow** is the discharge of the river fed by groundwater flow.

Drainage Basin

Drainage Basin	The area of land that is drained by the river and its tributaries.
Watershed	The area of high land forming the edge of the river basin
Precipitation	Moisture falling from clouds as rain, snow or hail.
Interception	Vegetation prevents water from reaching the ground.
Infiltration	Water absorbed into the soil .
Surface runoff	Water flowing quickly over the surface of the land into rivers.
Throughflow	Water flowing more slowly through the soil to the river.
Groundwater flow	Water flowing very slowly through rocks deep underground.
Transpiration	Water lost through the leaves of plants.

How a river's cross profile changes downstream.

The **long profile** of a river shows the change in height of the river's bed from its source to its mouth. It is typically concave, decreasing in gradient downstream.
The **cross profile** shows the shape of the river valley.

Upper Course of a River

Near the source, the river flows over a steep gradient but has limited energy.
The river erodes vertically, producing **V-shaped valleys**, **interlocking spurs**, and **waterfalls**.

Waterfall formation:

1. River flows over layers of more resistant and less resistant rock
2. Hydraulic action and abrasion causes a plunge pool in the less resistant rock
3. The more resistant rock is undercut, leaving the rock unsupported
4. The overhanging rock collapses and the waterfall retreats upstream, forming a gorge.

Middle Course of a River

The river now flows over a more gentle gradient, but has more energy (more water flowing, more quickly). The river erodes **laterally**, creating a **u-shaped valley**, **meanders**, and **ox bow lakes**.

Formation of a meander and ox-bow lake:

1. The fastest flowing water erodes the outer bank forming a **river cliff**; slower water causes deposition on the inner bank, forming a **slip off slope**.

2. Further erosion causes the two outside bends to move towards each other, **narrowing the neck of the meander**.

3. Erosion eventually cuts through the neck of the meander, and the fastest flow is redirected.

4. Deposition separates the old meander loop from the new main channel, forming an **ox-bow lake**.

Lower Course of a River

Near the river's mouth, the river flows over a very gentle gradient. The river is transporting a large load of sediment which it deposits. There is a wide **floodplain** with **levees**, and **ox-bow lakes**. An estuary with mudflats is formed where the river meets the sea (e.g. at Middlesbrough on the River Tees).

Weathering

Weathering is when rocks are broken down. There are 3 types of weathering;

Mechanical (physical) – When rocks break up due to water entering the cracks and freezing and thawing, making the rock weak.

1. Rainwater seeps into joints and fractures in the rock
2. When the water freezes its volume expands by 9% exerting pressure on the surrounding rock
3. With repeated freeze-thaw and angular block of the rock breaks away (scree)

Chemical – Caused by chemical changes. Slightly acidic rainwater slowly dissolves certain rock types

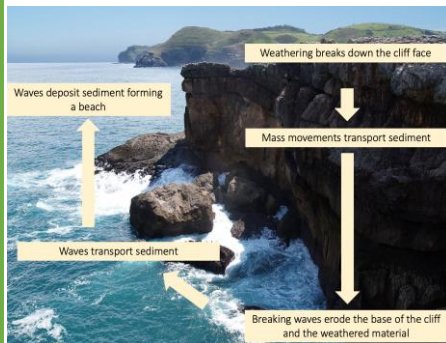**Biological** – Plant roots grow causing cracks in the rocks and animals burrow into weak rocks like sand.

Formation of caves, arches, stacks and stumps by erosion
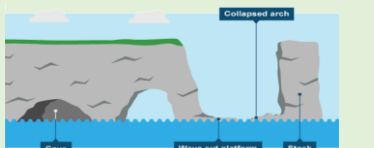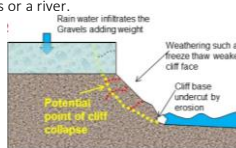
The Old Harry Rocks are located off Ballard Point, Dorset.

1) Hydraulic action and abrasion erodes the **joints and other lines of weakness** (cracks) in the cliff face
2) These are enlarged to form a **sea cave**
3) Wave refraction focuses energy on both sides of the headland; caves from both sides of the headland join together to form an **arch**
4) Weathering (e.g. freeze-thaw) and erosion (e.g. abrasion) causes the arch to collapse forming a **stack**
5) Further weathering and erosion forms a **stump**
6) Eventually the stump is eroded, leaving a **wave-cut platform**

Joint > Cave > Arch > Stack > Stump

Formation of Spits by longshore drift and deposition

1) **Swash** moves sand up the beach at the angle of the **prevailing wind**
2) **Backwash** moves sand down the beach at 90° to the coastline, due to gravity
3) This zig-zag movement of sand is called **longshore drift** and it transports sand along the beach
4) When the coastline changes direction, longshore drift deposits sand in the sea
5) This deposition causes the beach to extend out from the coastline, forming a **spit**
6) A change in the prevailing wind direction or ocean currents can form a hooked (or recurved) spit
7) In the sheltered area behind the spit, waves and rivers deposit silt and sand forming **mudflats and a saltmarsh**

**e**.g. Spurn Head, Yorkshire

Mass Movement

Mass movement happens when the force of gravity acting on a slope is greater than the force supporting it. This process causes the cliff to retreat (move back). There are 4 types of mass movement;
- **Rockfall** – fragments of rock breaking away from the cliff face
- **Landslide** – blocks of rock sliding downhill
- **Mudflow** – saturated soil and weak rock flows down a slope
- **Slumping** – slump of saturated soil and weak rock along a curved surface this forms by:

1. Rain saturates the permeable rock above the Impermeable rock, increasing its weight.
2. Waves or a river erode the base of the slope making it unstable.
3. Eventually the weight of the permeable rock is greater than the strength of the underlying rock and the slope collapses along a curved plane; on the coast the cliff retreats inland.
4. The loose material at the base of the slope is then removed and transported by waves or a river.

Headland and Bay- Erosional Landform

- Waves erode the coastline. The **softer (less-resistant)** rock is eroded more quickly, forming a **bay**; e.g. the clay of Swanage Bay. Deposition in the sheltered bay forms a **beach**.
- The **more resistant rock is** eroded more slowly and is left jutting out in to the sea forming a **headland**; e.g. the **chalk** of Ballard Point.

Beach – Deposition
A beach is a build up of sand and shingle and pebbles deposited by waves.
The swash needs to be stronger
Than the backwash.

Wave cut platform - Erosional Landform

Waves through hydraulic action cause erosion at the foot of the cliff. This erosion of a cliff at the base forms a wave cut notch. As the notch grows the rock above it becomes unstable and eventually collapses. The collapsed material is washed away and a new notch starts to form. Repeated collapsing causes the cliff to retreat. A wave cut platform is left behind as the cliff retreat
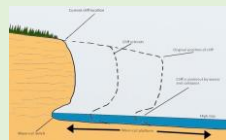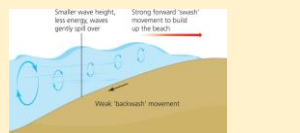
Waves
A wave is a movement of energy through water, not a movement of water. The size of the waves depend on 3 factors;

- The FETCH (the distance the wind blows over the water) – The greater the fetch, the more powerful the waves will be.

- The STRENGTH of the wind

- How LONG the wind blows for

Constructive Waves	Destructive Waves
Swell formed from distant storms. Low wave height in proportion to wavelength. The swash is stronger than the backwash. Sediment is deposited, building-up the beach, forming a steep beach profile and berms.	Formed by local storms. High wave height in proportion to wavelength. The backwash is stronger than the swash. Sediment is eroded from the beach, forming a less steep beach profile and an offshore bar.
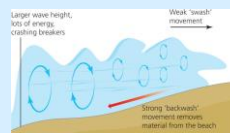
What factors effect landform change?

Geology, Climate and human use are methods that will effect the rate of change in both coastal and river landforms.
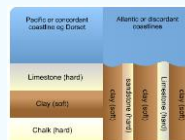
|		Coasts	River
Geology	The type of rock that is being eroded and the way in which the rock types are laid down will affect the rate of change.	**Concordant coastline**: where layers of the rock run parallel to the coastline. So ratees of erosion are even along the coastline. EG: Llyn Peninsula **Discordant coastline**: Where bands of rock run at a 90° angle to the coast. This means erosion rates very. EG: Abersoch Bay	EG: The Bishopston river is formed of limestone which is easily eroded. As a result large caverns and sink holes allow the river to run underground. The river channel on the the surface is dry for the majority of the time and the majority of erosions occur underground.
Climate	Will effect the rate of change. This includes extreme weather events.	The prevailing wind affects the angle at which the waves break along the coastline and therefore the direction of erosion and transportation. The waves break on the beach at this angle, pushing material up and across the beach. Therefore it effects where depositional landforms form.	The more water flowing into the river the higher the erosion rates will be. The highest erosion rates in the UK are found in during the winter when there is the most rainfall.
Human use	Intended human activity includes management strategies to reduce the impact of erosion.	Management of beaches where the coastline is left exposed to erosion as the process of longshore drift. EG: Groynes at Criccieth beach absorb wave energy as well as prevent longshore drift.	The River Thames is protected as it runs through urbanised areas. To prevent erosion on the outside banks of meanders, gabions are put in place to absorb the power of the water.

Sand dunes – Depositional Landform

Sand dunes are mounds of sand that are found behind sandy beaches. To form they require a large flat beach, a good supply of sand, strong wind and obstacles.
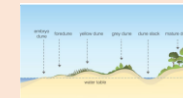
Eg: Ynyslas sand dunes are located on the west coast of Wales. Erosion of the cliffs in Aberystwyth, longshore drift then transports material along the coast. Onshore Wind then deposits the sand into sand dunes.

Longshore drift
A form of transportation that moves sediment from one end of the coast to the other.
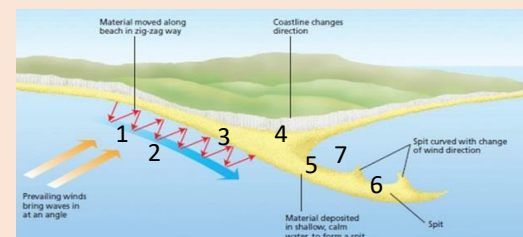
1. Waves approach the beach in the direction of the prevailing wind.
2. When waves break, swash pushes sediment diagonally up the beach.
3. Gravity pulls the water and sediment straight down the beach as backwash.
4. Over time, sediment is moved along the coast.
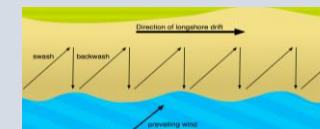
TEST YOURSELF:
- For a distinctive landscape you have studied, discuss whether the impacts of human activity are largely positive or negative (8)
- Explain why footpaths are eroded at honeypot sites (4)
- Explain the formation of a waterfall (6)
- Explain why rivers deposit sediment on the inside bend of a meander (4)
- Give two factors that influence which method of transportation a rivers bed load is moved by (2)
- For a located coastal environment in the UK, explain the processes that have created the landforms specific to that environment (6)
- Explain how climate influences the rate of erosion in river landscapes (4)
- Explain how reduced infiltration in an area may result in flooding (4)
- Explain how the process of longshore drift effects the coastal landscape (6)
- Explain the impact on the rest of the drainage basin system of cutting down a large areas of trees (6)
- Evaluate the costs and benefits of a dam as a flood management strategy (8)
- List three factors which may affect flooding in the UK (3)
- Describe how porous rocks will influence the shape of a hydrograph (4)
- Evaluate the effectiveness of soft engineering as a strategy for managing UK floodplains in the future (8)
- Give one reason why some people do not want money spent on river flood management. [2]
- River Flooding is a natural phenomenon. "To what extent do you consider this statement to be correct (8)
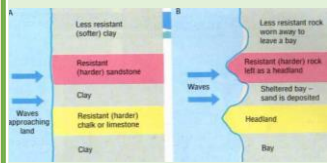- Explain how a change in the hydrological cycle in an area may result in flooding (6)

Command Words:

Analyse - Take apart an idea, concept or statement and criticise it.
Assess - Come to a conclusion about the overall value or significance of something; discuss its positive and negative aspects to show balance.
Compare - Identify similarities and differences.
Define - State the meaning of an idea or concept.
Describe - Set out the main characteristics of something; DON'T EXPLAIN.
Discuss -Set out both sides of an argument (for and against) and come to a conclusion; there should be some evidence of balance.
Evaluate - Make a judgement about the effectiveness of something; discuss its strengths **and** weaknesses and come to a conclusion about its overall success or importance.
Explain - Give reasons why something happens.
Give - Produce an answer from recall.
Justify - Support an idea or argument with evidence; for the outcome chosen, the positives must outweigh the negatives.
State = name
To what extent - Discuss and conclude how far you agree or disagree with a statement or view.

bug it!

Box = command word
Underline = key words
Glance = back

Population in the UK:

Population Density is the amount of people that live in a certain space.
8 out of 10 people live in urban areas.
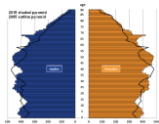**Population Distribution** – How the people are spread out
This can be even or uneven.
Since 1964 the population of the UK has grown by over 10 million. The population is now around 65 million and is slowly increasing.

KEY
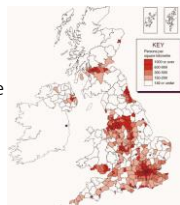
Post reproductive years (44-85+)

Reproductive years (15-44)

Pre-reproductive years (0-14)

Urbanisation:

'A process where an increasing proportion of the population lives in towns and cities resulting in their growth.'
- Natural Increase
- Rural to Urban migration

Push Factors	Pull factors
• War • Poverty • Drought • Natural Disaster • Lack of jobs	• Employment • Better access to services • Friends and family.

Whilst there has been a large increase in urbanisation in developing countries (LIC's and NEE's), the opposite is occurring in most HIC's. This is because of counter urbanisation

Counter urbanisation:
When large numbers of people move from urban areas into surrounding countryside or rural areas.

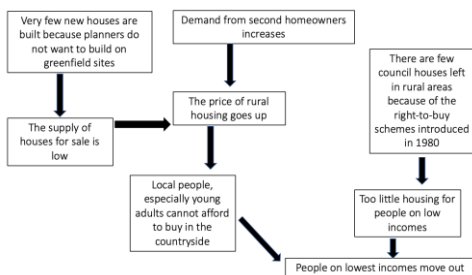Counter-urbanisation impacts the communities in many ways:
- An increase in house prices due to higher demand
- Fewer people in the village during the day
- An increase in the number of people attending rural schools
- Increased amounts of traffic and pollution in rural areas
- Loss of villager 'identity' as the majority of residents do not work in the village.

How are rural areas changing?
Counter-urbanisation, sphere of influence and technological change has led to changes in rural areas.
- Reduction or change in employment opportunities in rural areas
- Closure of rural services
- Increased 'second home ownership'.
- Reduction in bus services as less people use them.
Some of the 'deep green' rural areas have experienced negative change. Such as depopulation and deprivation (characterised by lack of public transport, healthcare and education).

Very few new houses are built because planners do not want to build on greenfield sites

Demand from second homeowners increases

There are few council houses left in rural areas because of the right-to-buy schemes introduced in 1980

The price of rural housing goes up

The supply of houses for sale is low

Local people, especially young adults cannot afford to buy in the countryside

Too little housing for people on low incomes

People on lowest incomes move out

Types of Rural Environments:

Deep Green = Remote, isolated places with poor road networks. They have lots of open space and very sparse populations.

Rapid Change = Less densely populated areas and include some larger towns. Many people living here are commuters who work in urban environments.

Leisure and amenity = Some of the UK's most beautiful scenery and National Parks are located here. They are in remote parts of the UK.

Coastal retirement = The population of these seaside towns include significant proportion of people who moved here when they retired.

The Issue of Second Homes:
Around 1.6 million people in England and Wales own a second home In the countryside that they use at weekends or holidays.

Urban Spheres of Influence:
A complex web that links a city to its surrounding rural region. The city will often provide important social and economic benefits to the local area. This influence is stronger in places closest to the city and gets weaker with increasing distance.

Sphere of influence of large town A
Sphere of influence of small town B
Sphere of influence of village C
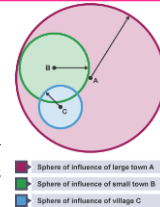
Rising demand for houses in the UK? 🏠

Cause -increased immigration, longer life expectancy and an increase in single-occupancy households all lead to an increase in the amount of home required. The government set a target to build a million new homes by 2020. In August 2016, the government admitted that it was going to miss that target by 266,000 homes.

Issue - In not building homes and missing targets it is likely to cause an increase in house prices due to supply and demand problems.

Out of Town Shopping –
Traditional shopping centres have come under threat due to out of town shopping centres. Such as Merry Hill.

Advantages	Disadvantages
•Large free parking areas •Less congestion •Quick and easy access •Often room for expansion •Near suburban housing	•Causes a decline in city centre shopping •Can increase congestion out of town •Often has chain stores so does not support small independent shops

Mega-city:
Cities with more than 10 million residents are known as mega-cities. In 2015 there were 28 mega-cities. 16 in Asia, 3 in Europe.

Tokyo (Japan) is currently the largest 'megacity' in the world with 37.4 million inhabitants
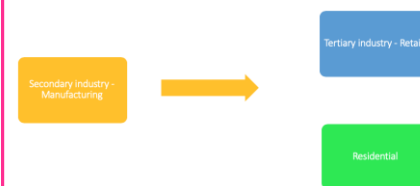
RURAL-URBAN LINKS
Paper 1

eduqas
Part of WJEC

Rural sustainability -
Reliability and frequency of transport – ensure the public have access to transport
Economic investment in tourism – Attract visitors to the area to create jobs and bring money.
Availability of jobs – secure investment from companies
Internet connections – reliable
Education – ensure village schools remain open and there is a wide range of subjects taught
Healthcare – Ensure doctors and hospitals can be accessible
Village services – Encourage local post offices, pubs to remain open for people to use.
Green technologies – Promote the use of renewable energy

Urban Regeneration:

Urban renewal is a program of land redevelopment often used to address urban decay in cities. Urban renewal is the clearing out of blighted areas in inner cities to clear out slums and create opportunities for higher class housing

Secondary industry - Manufacturing → Tertiary industry - Retail

Residential

Urban Sustainability –
About ensuring that cities and towns have a minimal environmental footprint

Egan's wheel suggests that sustainable communities must meet 'the diverse needs of existing and future residents, their children and other users' by offering choice. Communities must:
- Make effective use of natural resources
- Enhance the environment
- Promote social cohesion and inclusion
- Strengthen economic prosperity.

Sustainable communities

Changes in Commuting patterns:
An increase in counter-urbanisation in HIC's has meant that more people are commuting long distances to work.

Factors leading to increased commuting	Pull factors
• Cities have more jobs than rural areas • Rural housing is often cheaper • Better road and rail have cut journeys in half • Improvement in car safety has encouraged people to drive longer distances.	• People can work away from central office due to better internet and mobile coverage • Skype has meant people do not have to travel to meetings

Case study – Ipswich:
The site was formerly an industrial dock area with warehouses and factories. Since the 1970's this area had become derelict leaving it to be an area of crime and increased the levels of poverty in the area.

Old warehouses are now restaurants, shops and flats. A range of new buildings have been constructed for homes, leisure and education.

✓ Prevents urban sprawl which prevents more transport issues

✗ Some derelict sites were contaminated by waste from their formal industrial use. For example, the Orwell Gasworks Quay was the site of a town gasworks where coal had been converted to gas. The land was polluted, and it cost £270,000 per hectare to remove the water and make it safe.

✗ Buildings of historical interest, such as old warehouses had to be protected. This was more expensive than building new homes and offices.

Case study – Cardiff:
Half the population of Wales, 1.49 million people live within 32km of Cardiff city centre. Almost 78,000 people commute into Cardiff and about 39,000 commute out of Cardiff each day. Cardiff commuters are often stuck in ques on the A470 from the north and A48 to the east. This causes traffic and can cause delays of up to an hour.

Solutions to the congestion problem - Cardiff has three park and ride schemes, cycle routes, bus lanes, flexi hours so that businesses start and finish at different times as well as water taxi to take passengers from Cardiff Bay to the city centre.

Greenfield Site vs Brownfield Site

In British town planning, the green belt is a policy for controlling urban growth. The idea is for a ring of countryside where urbanisation will be resisted for the foreseeable future, maintaining an area where agriculture, forestry and outdoor leisure can be expected to prevail.

Greenfield sites	Brownfield sites
• Encourages urban sprawl, so are not favoured by environmentalists • Reduces area of countryside • Cheaper to build on • Encourage commuting and therefore traffic (causing pollution)	• Valuable, since old building can be split up into new homes • Use unsightly areas and redevelop them, therefore improves the urban environment • Reduces urban sprawl because the site has previously been developed • Found in urban areas, so reduces demand on car use

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Case study – Mumbai:

Facts:
- Mumbai is India's largest city with a population of 18.4 million in 2015
- Growth is due to natural increase and rural-urban migration

How is Mumbai a global city?
Political – Location of India's government buildings.
Communication – Mumbai airport carried over 36million passengers to 45 different countries in 2015.
Demographics – migrants constitute about 37 per cent of Mumbai population.
Finance and Trade – location of India's stock exchange as well as hosting the headquarters of MNC's such as Cadbury India, Volkswagen, and Tata steel

☐ Free education with more than 1000 schools
☐ More people have electrical supply .
☐ Literacy rates are high (89.7%). Even in the slums, the literacy rate is estimated to be more than 69%.

✗ Water pipes run close to the sewers causing leaks
✗ Crime rates are high – 1/3 of population have been victims of crime
✗ 62%. Of the population lives in sums today
Solutions – upgrade street toilets, give residents new homes, upgrade street drains.

Housing in Mumbai – Pavement Dwellers/ Slum/ Chawls

Bhendi Bazaar is a mixed area of chawls and 1,250 shops and stalls. It is estimated that 20,000 people live here. The chawls are old and overcrowded. There is no proper waste disposal system and water is only supplied for a few hours each day. An ambitious plan will demolish 250 buildings and replace them with 17 high rise tower blocks.

Push:
- Poor standard of housing
- New farming techniques meant there were less farming jobs
- Poor sanitation

Pull:
- Cheap rail – costs about £2.50 to travel from one side of India to the other
- More variety of jobs – transnational corporations
- Better wages
- Better education opportunities
- More access to healthcare

UK Ageing Population –

By 2025, more than a third of the UK's population will be over 55.
There are two reasons for this; an increase in life expectancy and a decline in the fertility rate.

Impacts:
- There are a growing number of wealthy older people
- The proportion of people of working age is shrinking while the proportion of people who are retired is growing
- The number of older people who live alone is increasing
- The number of older people who have complex or long term health issues is growing

Responses:
- Encourage people to take up regular exercise
- Encourage migration of younger people
- Encourage young people to start saving to pension scheme sooner
- Discourage smoking, alcohol and overeating
- Raise the age people can access their old age pension.

Burgees Model –

This leads to high-rise, high-density buildings being found near the **Central Business District (CBD)**, with low-density, sparse developments on the edge of the town or city.

✗ The model is now quite old and was developed before the advent of mass car ownership.
✗ New working and housing trends have emerged since the model was developed. Many people now choose to live and work outside the city on the urban fringe - a phenomenon that is not reflected in the Burgess model.
✗ Every city is different - there is no such thing as a typical city.

Countries categorisation –

HIC = High Income Country- A country that has a GNI per capita of $12,746 or above according to the World Bank.

LIC = Low Income Country - Countries that have a GNI per capita of $1,045 according to the World Bank

NIC = Newly Industrialised Country - Have a large percentage of countries working in the secondary sector

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Global city

How well connected they are to the rest of the world and the global economy.

🚆 *Transport hubs* – good access by rail and air
       - developed road
📞 *Information* – state of the art communication
👥 *Demographics* – large population
       - Ethnic diverse with high tolerance
       - high proportion of educated population
👏 *Culture* – centre of excellence of arts
       - rich heritage
💰 *Finance and trade* – major hubs of international banking
       - headquarters of multinational companies
⚖ *Governance* – national seat of government

Case study – London:

London is a global city as it is home to some of the world's top universities. There are around 300 languages spoken. 37% of the population was born outside the UK. There are endless opportunities for entertainment such as the West End. It has 3 international airports. Houses of Parliament and Canary Warf.

Case study – Cardiff:

Facts:
- Largest city in Wales – 350,000 population
- 1850 = urbanisation → 1930 = counter-urbanisation → 2000 = re-urbanisation

How is Cardiff a global city?
Political – Location of Wales government buildings
Communication – International airport, widespread internet access
Demographics – multicultural city with 8% of people are ethnic minorities with people settled from over 50 countries.
Finance and Trade – location to MNC's such as BBC, Admiral insurance, Glassdoors.

Housing in Cardiff - Zones of wealth and poverty.
Somali population live in a small neighbourhood in the inner-city area of Riverside. In this area there are halal shops, mosques and a large community. Pontcanna is an area with a higher standard of living and less deprivation.

TEST YOURSELF:

- Explain why a large urban area would have a sphere of influence over a neighbourhood rural area (4 marks)
- What do you understand by the term. 'remote rural area' (2 marks)
- For an example you have studied, describe the pattern of commuting (4 marks)
- What do you understand by the phrase 'rural poverty and deprivation' (2 marks)
- Discuss the challenges that are faced in creating sustainable. Rural communities. (8 marks)
- Describe any two Egan's wheel part (4 marks)
- Evaluating the various options available to alleviate the current housing crisis in the UK (8 marks)
- Describe why cities in NIC are growing at the fastest rate (4 marks)
- Describe the characteristics that cities need to become classified as a global city (4 marks)
- For two global cities that you have studied, describe the connections that they have to the rest of the world and decide which connection is most important to the city (8 marks)

Online Shopping –

In 2014 almost ¾ of adults reported buying goods online which is more than double that of 2003.
About 50% of online shopping in 2015 was made on a mobile device.

Advantages	Disadvantages
•Convenience - shop from any computer or mobile phone with an internet connection any time, while avoiding the need to travel, pay for parking and queueing. •Greater variety - more shops online than any high street or retail park. •Cheaper goods - increased competition between retailers •Accessibility - those with a disability that limits their mobility Comparability - using the internet makes it easy to research products or services	•Security concerns surrounding payment by credit card over the internet. •Not being able to physically inspect the goods before purchase. •Goods getting damaged during transport. •Goods not arriving in time or at all. •Concerns over what information retailers are storing about customers, eg buying habits. •Fewer people visiting the CBD, high street and retail parks.

Command Words:

Analyse - Take apart an idea, concept or statement and criticise it.
Assess - Come to a conclusion about the overall value or significance of something; discuss its positive and negative aspects to show balance.
Compare - Identify similarities and differences.
Define - State the meaning of an idea or concept.
Describe - Set out the main characteristics of something; DON'T EXPLAIN.
Discuss -Set out both sides of an argument (for and against) and come to a conclusion; there should be some evidence of balance.
Evaluate - Make a judgement about the effectiveness of something; discuss its strengths **and** weaknesses and come to a conclusion about its overall success or importance.
Explain - Give reasons why something happens.
Give - Produce an answer from recall.
Justify - Support an idea or argument with evidence; for the outcome chosen, the positives must outweigh the negatives.
State = name
To what extent - Discuss and conclude how far you agree or disagree with a statement or view.

Box = command word
Underline = key words
Glance = back

Weather, Climate and Ecosystems
Paper 2

eduqas

Causes of Climate Change:
Climate change is not new the world has been through a series of ice ages separated by periods of warming, called interglacial. Today, 97 per cent of scientists believe that human activity is to blame for this rise.

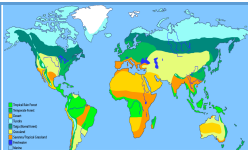| Physical Causes	Human Causes
• Milankovitch Cycles - The Earth's orbit can vary between being circular or more of an oval (elliptical) shape. These changes imapct how much sunlight the Earth receives and can increase or decrease temperatures. • Volcanic Eruptions - The ash and gases reach high up into the stratosphere and prevent some sunlight from reaching the Earth's surface. This means that the sunlight is reflected back into space which cools the Earth and lowers global temperatures. • Ocean Currents - The changes in the patterns of these currents can lead to periods of warming (El Nino) and cooling (La Nina) around the Pacific Ocean	• Deforestation - World-wide deforestation involves rainforest burning as well as clearing, which emits large amounts of CO2 into the atmosphere as well as reducing the amount of trees to absorb CO2. • Agriculture - The amount of land needed for crop production has increased due to world population growth. • Use of fossil fuels - The use of fossil fuels such as coal, oil and gas has been increasing as the world's population grows. The burning of these fuels for industry, transport and energy has led to a significant increase in CO2 levels across the globe.

Evidence for Climate Change:
- 20 warmest years on record since 1995
- Ice core carbon concentration is 40% higher than it was before industrial revolution.
- Increase in global rainfall as increase in evaporation
- Global sea level has risen between 10 cm and 20 cm in the past 100 years.
- Tree rings show the difference in climate each year.
- Arctic sea ice has been declining since the late 1970s, reducing by about 4 per cent,

Keelings Curve – shows the increase in carbon measured in Hawaii

Cyclone:
Seasonal Events caused by the ITCZ being overhead.
LOW PRESSURE SYSTEEM
You need three things for a cyclone to form:
- Warm ocean temperatures (27°C or more)
- Deep water (50m or more)
- Trade winds

Formation of Tropical Storms:
1 Warm, moist, unstable air above the ocean rises, creating an area of low pressure below.
2 Surrounding cooler air is drawn into the area of low pressure, causing winds.
3 The cool drawn-in air now warms up and takes on moisture, causing it to rise.
4 The large mass of rising, warm air cools and condenses, forming large cumulonimbus clouds and heavy rain.
5 Latent heat released during condensation helps to power the storm.
6 As more air is drawn into the area of low pressure, the Earth's rotation causes wind to spiral into the storm's centre, or eye.
7 Colder, drier air sinks in the centre (eye) of the storm, creating calm conditions. Prevailing winds that push the storm towards land.
8 The storm continues to get bigger and stronger until it reaches land or colder seas. Landfall and friction slow the storm down.

Cyclone Pam:
Date: Friday 13th March 2015
Location: Vanuatu, Australia
Impacts:
- 90% homes destroyed
- 11 killed
- 80% of coffee trees destroyed
- Habitats lost as vegetation flooded
- $2.5 billion damage
- Tourism declined for over 2 years

Responses:
Australia, Fiji, France, New Zealand, Tonga and the UK all sent emergency aid..
- 21,000 safe drinking water
- 20 foreign medical teams
- 67,000 temporary homes
- 153 temporary schools

Tropical rainforest –
Centred along the Equator between the Tropic of Cancer and Capricorn. They have huge amounts of biodiversity (1 in 10 species in the world lives).

Amazon Rainforest:
Causes of deforestation:
- Logging
- Farming
- Mineral Extraction
- HEP
- Population growth

Impacts of deforestation:
- Soil erosion
- Loss of biodiversity
- Climate change contribution
- Economic development
- Conflict

Solutions:
- Selective logging
- Conservation
- Eco-tourism
- International Agreements

Biomes:
A biome is a large geographical area of distinctive plant and animal groups, which are adapted to that particular environment.

Biome	Key Characteristics
Tropical Rainforests	•Along equator (Asia, Africa / South America). •6% of earth's surface. •25°C – 30°C and over 250mm rain per month.
Tropical Grasslands (Savanna)	•Between equator and tropics. •20 – 30°C and between 500 - 1500 mm of rain per year. •Wet and dry seasons.
Deserts	•Tropics (Sahara and Australia). •Over 30°C and less than 300 mm per year rain. •20% of land's surface.
Deciduous forests	•Higher latitudes (W Europe, N America, New Zealand). •5 – 20°C and between 500 – 1500 mm rain per year. •4 distinct seasons. •Lose leaves in the winter to cope with the cold.
Coniferous forest (Taiga)	•60°N (Scandinavia / Canada). •Cone bearing evergreen trees. •No sunlight for part of the year.
Tundra	•Above 60°N (Arctic Circle). •Less than 10°C and less than 500mm per year rain. •Cold, icy and dry means 2 month growing season.

Ecosystem:
A system made up living (biotic e.g. plants and animals) and non-living (abiotic e.g. soil and water)).

Monsoon:
A seasonal change in the direction of prevailing wind in the region of South and SE Asia during July as ITCZ moves north. LOW PRESSURE System pulls air from Indian Ocean.
1. The ground is heated by solar radiation
2. The air rises creating low pressure
3. Moist air from above the Indian Ocean is drawn into low pressure
4. The moisture condenses forming clouds.

Global Circulation Model:
1. Warm air rises from the Equator creating low pressure.
2. Condensation creates clouds and rain
3. At 30°c north and south of the equator, the cold dry air sinks, creating high pressure and clear skies.
4. When the sinking air reaches the earths surface, it moves either to the equator or towards the poles.
5. At 60°c north and south of the equator, the surface air meets colder air from the poles, which causes it to rise. This creates a band of low pressure
6. The air rises and cools and moves back to the Equator or towards the poles.
7. At the poles, the cool air sinks to the earths surface creating high pressure. The air then moves back towards the Equator.

Desertification:
Where land is gradually turned into desert, usually on the edge of a desert.
Causes:
- Overgrazing
- Deforestation
- Population growth
- Climate change

Impacts:
- Soil erosion
- Changes in nutrient cycle as soil is infertile
- Lack of water

Solution: **The Great Green Wall**
11 countries signed an agreement to plant a 15km wide strip of land across Africa to prevent soil erosion in the Sahel and improve incomes. This has been successful in Niger where 11mill trees have been planted.

How can we use an ecosystem to create energy?
Marine ecosystem can be used to create wind/ tidal and wave power.

Swansea Tidal Bay Lagoon –The world's first tidal lagoon power plant. It will comprise 16 hydro turbines, a 9.5km wall.

Create electricity for 155,000 homes each year
Location international sports.
Education
Tourism of 100,000 visitors per year

Cost £1.3 billion
Impact biodiversity at the mouth of two estuaries
Increase in traffic

Semi-Arid Grassland (Savanna)

The semi-arid grassland biome is located between the Tropic of Cancer and Tropic of Capricorn

Serengeti National Park:

Human uses:
- Tourism
- Poaching
- Food production

Impacts:
- Land degradation by vehicles
- Impacts on biodiversity
- Demands on water
- Demands on food supply

Solutions:
- Ecotourism
- Drought resistant crops
- Education
- Conservation

Nutrient Cycle: The soil will store the nutrients. Plants take them in and herbivores eat the plants. Primary consumers then eat the herbivores and will produce dung. This then decomposes. Once animals die they will also decompose and add nutrients back to the soil.
Adaptation - Baobab can be found in the Savanna. They are adapted to the Environment as they have; Large barrel trunk stores up to 500 litres of water, shallow roots to collect water and few leaves.
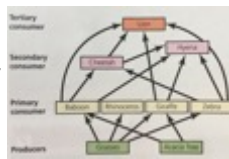
Small scale ecosystem - Chasewater

Located in Burntwood, England. It is a reservoir created to feed canals. and has a wide range of flora (plants) and fauna (animals). It is a Site of Special Scientific Interest (SSSI). There is an innovation centre for education. The reservoir is also managed by natural grazing, Building boardwalks and keeping footpaths in good repair and pond management.

Drought resistant crops:

Crops that can grow when rainfall levels are low. Chickpea/ pigeonpea/ groundnut/ millet and sorghum are all examples.

Ghana-

A tropical country in West Africa. It has a drought season that can last up to 8 months. Trees are used as firewood and over-grazing occurs. Climate change is causing more crop failures.
- 37% children malnourished
- 1 in 5 children stunted growth due to malnutrition Ghanaian government is encouraging drought resistant crops. However at the moment these are too expensive for local farmers.

UK Uplands

Uplands have been adapted to graze sheet, different variety of grass sown and ditches dug **across the** waterlogged peaty soils to improve drainage.
To manage uplands:

Pumlumon Project: Help local farmers, foresters and tourism businesses to do things a little differently, to restore land back to its original state.

Greenhouse Effect

GG make up 1% of the atmosphere. They let the Sun's light shine onto the Earth's surface, and trap the heat that reflects back up into the atmosphere. **Without the greenhouse effect, the average temperature of the Earth would drop from 15°C to as low as – 18°C.**

What factors affect the weather in the UK?

Latitude — Locations that are further north receive less concentrated energy from the Sun.

Jet Stream — A strong ribbon of wind that circles the globe. It separates the cold polar air masses to the north and the warmer, tropical air masses to the south.
North of the UK = High pressure (anticyclones)
South of the UK = Low pressure (depressions)

Ocean Currents — Ocean currents, transfer heat from warm latitudes to cooler ones.

Altitude and Aspect — Altitude - Temperatures decrease with altitude.
Aspect - South facing slopes tend to be warmer than north facing slopes

Air Masses — Air masses bring different kinds if weather.

UK Weather:

Low Pressure = Depression: A depression forms as a result of the warm air mixing and rising above surrounding cold air. This mixing of air often leads to unsettled weather
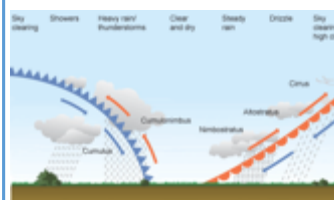
High Pressure = Anticyclone: The air is sinking so there are few clouds. As the air sinks, it warms and therefore condensation doesn't take place. No condensation means no clouds and therefore no rain.

How can intensive farming affect water cycles and climate?

Lake Chad - Sahel region of Africa.
In the last 50yrs the lake has shrunk dramatically.
Causes:
- Over-abstraction
- Overgrazing
- Deforestation

Impacts:
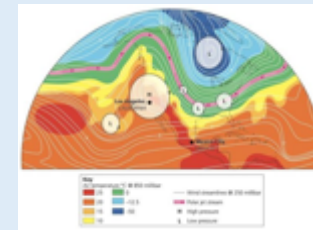- Biodiversity reduced
- Poverty increased
- Salinization of soils

Solution: Transaqua Project will transfer water from DDRC to bring water to the countries near Lake Chad.

Heatwave and Drought: California.

Causes of the heatwave: The weather system, being nicknamed the reluctant ridge, has seen the Jet stream position itself in the eastern Pacific. Bringing an area of intense high pressure.
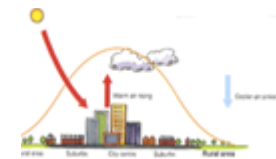
Effects of heatwave:
- Most HEP dams stopped producing electricity
- One firefighter died
- 31,000 acres of habitat destroyed
- Salmon and trout died in the river
- The state government paid $687m as compensation
- Food prices increased by 6%

Responses: California has to erect controversial overland pipelines to meet the demand for water.

Urban Microclimate:

The small scale, local climate of a city which is influenced by its building and traffic.

- 5-15% lower sunshine
- 1-2 degrees warmer
- 5-30% more rain
- 10x more dust particles

TEST YOURSELF:
- Explain why it is unlikely the UK would experience cyclones (4)
- Justify that climate change is not just the result of human actions (8)
- Explain how the vegetation in the savanna has adapted to the climate (4)
- Use a case study of a tropical rainforest to assess the impact of deforestation (8)
- Explain why human activities lea to damage of ecosystems (6)
- Describe how one piece of evidence, other than rising temperatures, suggests that climate is changing (4)
- To what extent do tropical storms need immediate and long-term responses. Use evidence from a case study (8)
- Climate varies in different parts of the UK. Explain why (6)
- Give one reason why low-pressure systems cause high wind speeds (2)
- Explain why development is important in the development of the savanna (6)
- Give two ways the rainforest can be used sustainably (2)
- Explain how temperatures and rainfall totals differ in urban areas compared to rural areas (4)
- Describe the distribution of areas of the world that are affected by tropical storms (4)
- Explain why tropical, low pressure systems are describes as the most destructive weather hazard (6)
- Suggest how climate change may affect tropical storms (3)
- Explain why deforestation in tropical rainforests has an impact on both climate and the nutrient cycle (6)

Command Words:

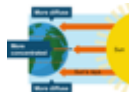**Analyse -** Take apart an idea, concept or statement and criticise it.
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bug it!

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