Year 10 into 11 – Geography GCSE Summer revision homework

The purpose of this revision booklet

This Summer Revision Homework Booklet will help you keep your Year 10 Geography knowledge fresh over the holidays. It includes a revision schedule, RAG rating tasks, case study summary tasks, and exam practice questions. Completing it will:

- **Prevent summer learning loss**,
- **Consolidate your understanding of key topics**, and
- **Prepare you confidently for Year 11 and your final GCSE exams**.

Summer revision schedule – An electronic copy of this booklet will be attached to class charts and scheduled emails during the summer break to encourage revision.

RAG stands for **Red, Amber, Green**. Use it to assess your confidence in each topic:

- **Red** – I don't understand this topic and need lots of revision.
- **Amber** – I understand some parts but need to review and practise more.
- **Green** – I feel confident with this topic and can answer questions accurately.

Be honest when you RAG rate each topic. This will help you focus your revision on the areas that need the most improvement.

Week	Topics	Re-visit Work	Suggested Activities	RAG – Rate your knowledge		
				R	A	G
Week 1 starting 30/06/25	**Rivers** **River Tees** **Banbury - Flood Management**	• The water cycle and drainage basin. • Erosion - abrasion, hydraulic action, attrition, solution. • Transportation - traction, saltation, suspension, solution. • Deposition • Upper/middle/ lower course of the river and landforms, e.g. interlocking spurs, waterfalls, meanders, oxbow-lakes, levees, floodplains, estuaries, etc. • **Key details about landforms along your river case study - River Tees** • Causes of flooding – human and physical. • River management - hard and soft engineering. • **Key details about your flood management case study - Banbury.**	Blue oxford AQA GCSE Geography Revision guide pages - River landscapes 79-85 Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet geography (Website)			

Week 2 07/07/25	**Urban issues and challenges NEE case study Rio De Janeiro**	• What is urbanisation? • What are megacities? • Informal (squatter) settlements - Favelas • Growth and importance of the city of Rio De Janeiro. • Social opportunities & challenges within the city of Rio De Janeiro. • Economic opportunities & challenges within the city of Rio De Janeiro. • Managing challenges of urban growth within the city of Rio De Janeiro. • Managing environmental challenges within the city of Rio De Janeiro. • **Key details about your case study to improve life for the urban poor - Favela Bairro project.**	Blue oxford AQA GCSE Geography Revision guide pages - The Urban world – 94-104 Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet geography (Website)			
Week 3 14/07/25	**Urban issues and challenges HIC case study Manchester**	• Growth and importance of the city of Manchester. • How has migration affected the city of Manchester? • Inequality across the city of Manchester. • Urban change creating opportunities in the city of Manchester. • Urban change creating challenges in the city of Manchester. • Urban sprawl - greenfield vs brownfield, rural urban fringe, commuter settlements. • **Key details about a regeneration project – New Islington.**	Case study not found in revision guide – turn to the back pages of this booklet to the Case Study Overview Sheets) Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet geography (Website)			
Week 4 21/07/25	**Urban issues and challenges Sustainability Freiburg**	• What is urban sustainability? • What are the important features? • Sustainable traffic schemes to reduce congestion and pollution – Freiburg. • **Key details about social, economic and environmental sustainability - Freiburg.**	Case study not found in revision guide – turn to the back pages of this booklet to the Case Study Overview Sheets) Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet geography (Website)			

Week 5 04/08/25	**Living world Ecosystems Epping Forest**	• Major biomes across the world, their location and reasons for this. • Small-scale ecosystems processes – nutrient cycle, food chains, food webs, independence etc. • **Key details about a small scale ecosystem – Epping Forest.**	Blue oxford AQA GCSE Geography Revision guide pages - Living world 41-43 Case study not found in revision guide – turn to the back pages of this booklet to the Case Study Overview Sheets) Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet geography (Website)			
Week 6 11/08/25	**Tropical Rainforests Malaysia**	• Structure and characteristics of the rainforest. • Causes of deforestation. • Impacts of deforestation - local and global. • Ways to manage the rainforest sustainably. • **Key details about your TRF rainforest – Malaysia TRF.**	Blue oxford AQA GCSE Geography Revision guide pages - Tropical rainforests 44-50 Case study not found in revision guide – turn to the back pages of this booklet to the Case Study Overview Sheets) Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet Geography (Website)			
Week 7 18/08/26	**Hot deserts The Thar Desert**	• Physical characteristics of hot deserts. • Opportunities and challenges in hot deserts. • Causes and effects of desertification. • Mitigating the risk of desertification. • **Key details about your hot desert Thar Desert.**	Blue oxford AQA GCSE Geography Revision guide pages - Hot deserts 51-56 Case study not found in revision guide – turn to the back pages of this booklet to the Case Study Overview Sheets) Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet Geography (Website)			

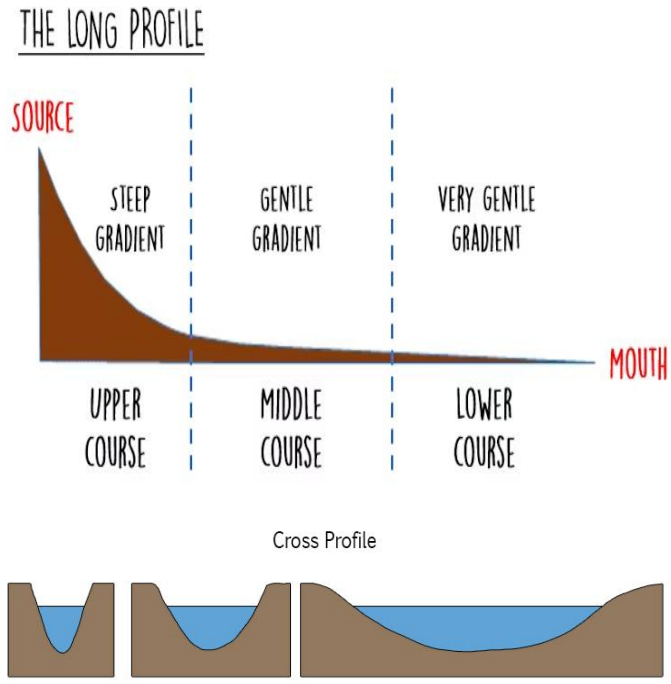
Week 8 25/08/25	**Challenge of resource management**	• Global distribution of resources - inequality of availability and consumption. • Provision of food in the UK - food miles, organic food vs agribusiness. • Provision of water in the UK - water surplus and deficit, water transfer, water quality. • Provision of energy in the UK - energy mix, energy security, environmental impacts.	Blue oxford AQA GCSE Geography Revision guide pages - Resource management 153-160 Tutor 2 U video library: https://www.tutor2u.net/geography/reference/revision-videos GCSE POD – See assigned tasks BBC BITESIZE / Internet Geography (Website)			

Content Page

Paper 1: Section C - River landscapes in the UK

Key idea: The shape of river valleys changes as rivers flow downstream.

1) The figure below shows the long profile and cross profile of a typical river. Using the figure and your own knowledge, compare the width, depth and gradient of the upper and lower courses of a typical river.

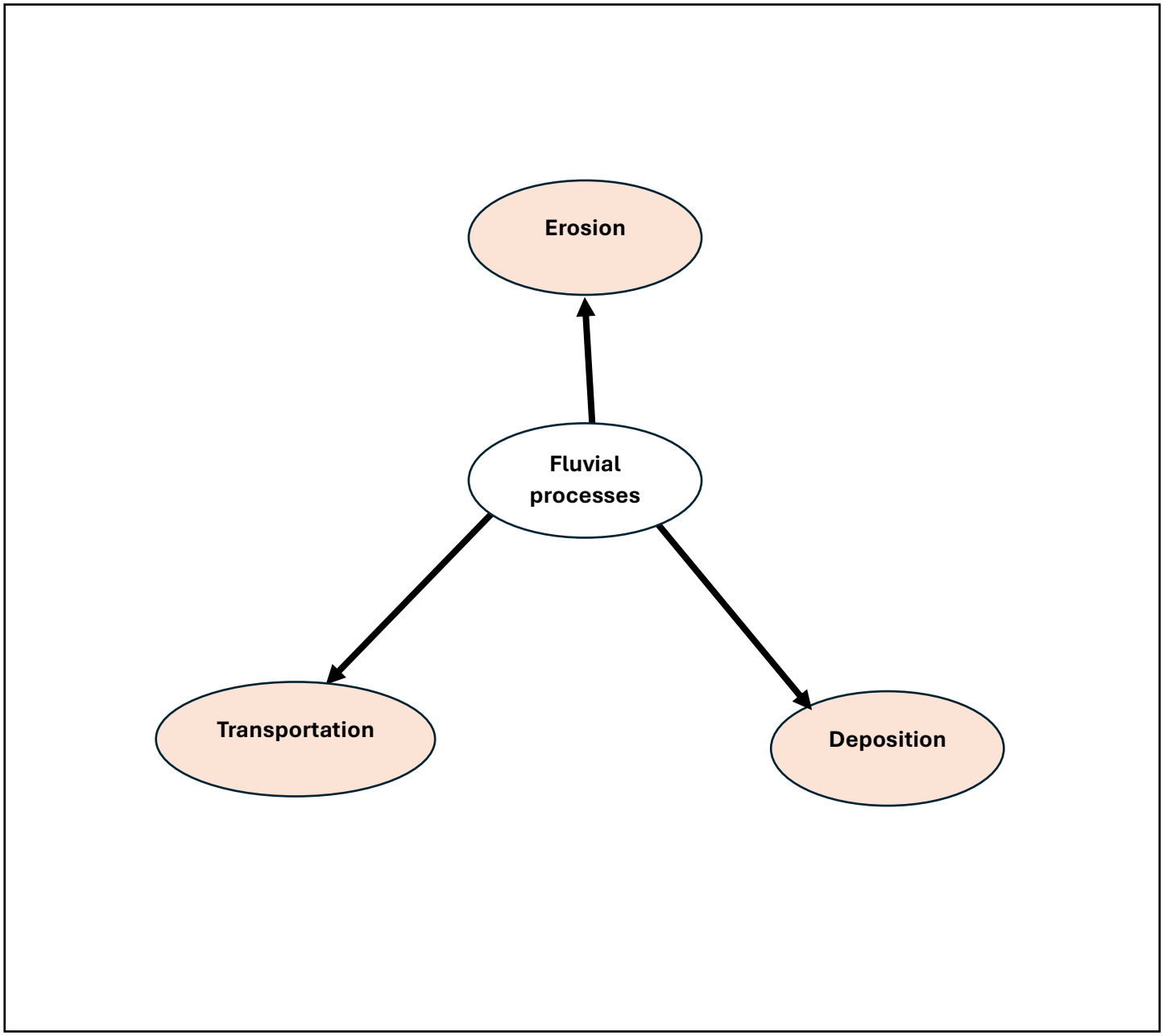


This seems like a complex question because you must do a lot, but it's simple! Break it down into three parts:

*first, compare the **width** of the upper and lower courses,*

*Next, compare the **depth**. Finally, the **gradient** (the steepness). Easy!*

2) Complete the spider diagram below by summarising each of the fluvial (river) processes.



Key idea: Distinctive fluvial landforms result from different physical processes.

3) You need to know a range of river landforms resulting from erosion and deposition (their characteristics and formation). In the tables below, complete the blank columns.

Under **'characteristics'**, you need to identify the features of the landform (e.g. for flood plain you might write *low, flat land on either side of a river in the lower course, fertile soil from alluvium and other deposited sediments, often used for farming*). Under **'formation'** you need to provide a step-by-step explanation of ***how*** it forms, referring to specific processes (e.g. simply saying 'due to erosion' isn't specific enough- say whether it is hydraulic action, abrasion or attrition, and **how** that process creates the landform).

Fluvial landforms created by erosion			
Landform	**Image**	**Characteristics** (and where it is found- upper/middle/lower)	**Formation** (step-by-step explanation)
Interlocking spur			1). 2).
Waterfall			1). 2).
Gorge			1). 2).

Fluvial river Landforms created by erosion and deposition			
Landform	**Image**	**Characteristics** (and where it is found-upper /middle /lower)	**Formation** (step-by-step explanation)
Meander			1). 2).
Oxbow lake			1). 2).

Fluvial river Landforms created by deposition			
Landform	**Image**	**Characteristics** (and where it is found- upper/middle/lower)	**Formation** (step-by-step explanation)
Levees			1). 2).
Floodplains			1). 2).

Estuary			1). 2).

Key idea: OS MAPS

Now you know about river features, are you confident to identify them on an OS map? The following information will help you to do this. Answer the questions at the end.

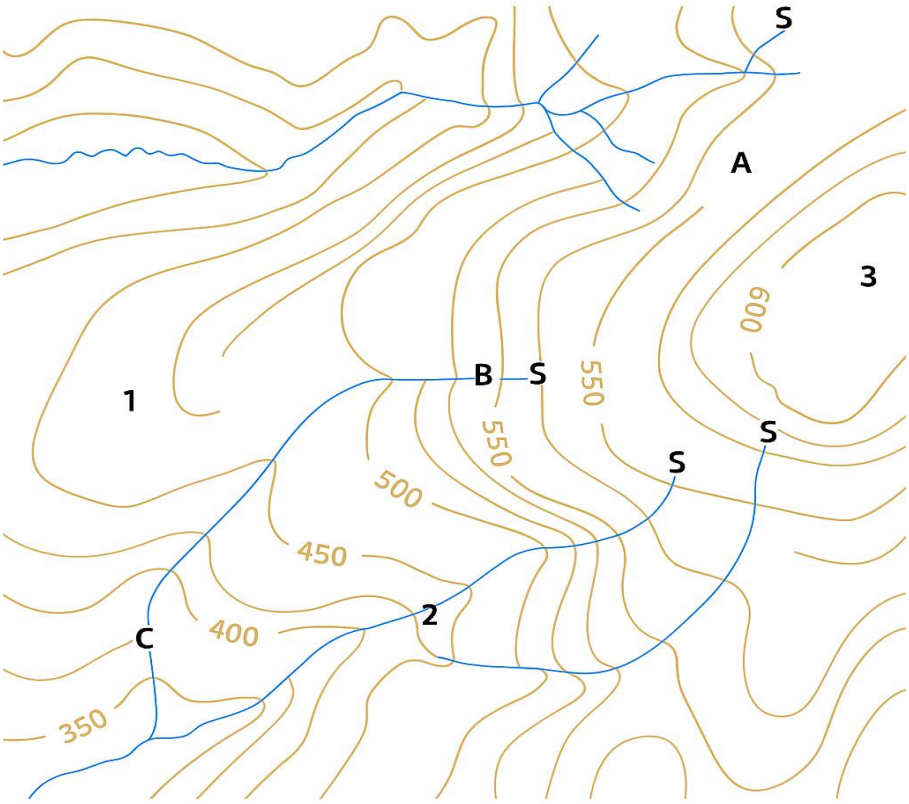
- Contour lines are the orange lines that you see on maps. They show the **height** (or elevation) of the land in metres (at **A** the land is 600m high.)
- The **closer** together the lines are, the **steeper** the land ('steep relief'). If they are **far apart**, this indicates that the land is quite **flat** ('gentle relief'). Based on this, we can see that the map shows an area of steep land. This indicates that the rivers shown are in their **upper course**!
- A **V shape** is formed where the contour lines cross a river. The V shape is pointing **uphill** to where the river came from.
- And of course, you know that water flows **downhill**! You should be able to tell the **direction** that the rivers are flowing in by using the contour lines (the river flows away from **B** where the land is 540m high, towards **C** where the land is 370m high). Also, we know that the source (start) of a river is found inland and flows towards the coast, so we know that where the blue river line begins is the source (e.g. **S**).

To re-cap: the main evidence on the map above to show that these are rivers in the upper course is:

a) the **contour lines are close together** showing that land is steep,

b) the **V-shape** points to where the river came from, and

c) we can see the **sources** of the rivers.



Questions based on the map to the left:

A). How high is the land at point 1?

_____

B). What is the river feature at point 2?

_____

C). What is the difference in land height between points A and B?

_____

D). What is the land like at point C?

_____

_____

_____

_____

The map to the right shows a river in its **lower** course. Evidence for this:

a) the contour lines are **far apart** (indicating flat land) and **the land elevation** is low

b) the river has **large meanders**

c) the river meanders across a **large flat area** (the flood plain), and

d) the river is **wide** (a wide blue line)

The specification says that you need to use an ***'Example of a river valley in the UK'*** *to* identify its major landforms of erosion and deposition.

Complete the template below to help you learn/revise your example.

<table>
<tr><th colspan="2">AN EXAMPLE OF A RIVER VALLEY IN THE UK
My example: <u>The River Tees</u></th></tr>
<tr><td>An example of a landform caused by erosion in the upper course of the river is a waterfall known as <u>High Force Falls</u>.

It is located:

How is this landform created?</td><td>An example of a landform caused by deposition in the lower course of the river is an estuary known as <u>Tees Estuary.</u>

It is located:

How is this landform created?</td></tr>
<tr><td>Draw a labelled diagram of the landform</td><td>Label image of the landform

  </td></tr>
<tr><td>Description of how the landform may change in the future and explanation why.</td><td>Description of how the landform may change in the future and explanation why.</td></tr>
</table>

Key idea: Different management strategies can be used to protect river landscapes from the effects of flooding

PHYSICAL factors that affect flood risk include precipitation (rainfall), geology (rock type), relief (land shape).

5) Explain how each factor affects flood risk, using the key vocabulary provided. An example has been done for you.
***Vocabulary*:** permeable, impermeable, infiltration, steep-sided valley, surface runoff, discharge.

Precipitation: *Prolonged rainfall causes soil to become saturated. This means that infiltration cannot occur, so surface runoff increases, and this causes rivers to fill up quickly. In the case of heavy rainfall, the water arrives too quickly for infiltration to occur, so surface runoff carries water to the river channel. As the river discharge increases, a river may spill over its banks, causing a flood.*

Geology: _____
_____
_____
_____

Relief: _____
_____
_____
_____

HUMAN factor that affects flood risk is land use e.g. building on the flood plain and deforestation.

6) Explain how each factor affects flood risk, using the key vocabulary provided.
***Vocabulary*:** impermeable materials, concrete, tarmac, interception, surface runoff, discharge.

Building on the flood plain: _____
_____
_____
_____

Deforestation: _____
_____
_____
_____

7) Study the storm hydrograph to the right to remind you of the key components of a hydrograph. Below, say what each part of the hydrograph tells us about a river:

1. Peak discharge: _____

_____

_____

2. Lag time: _____

_____

_____

3. Rising limb: _____

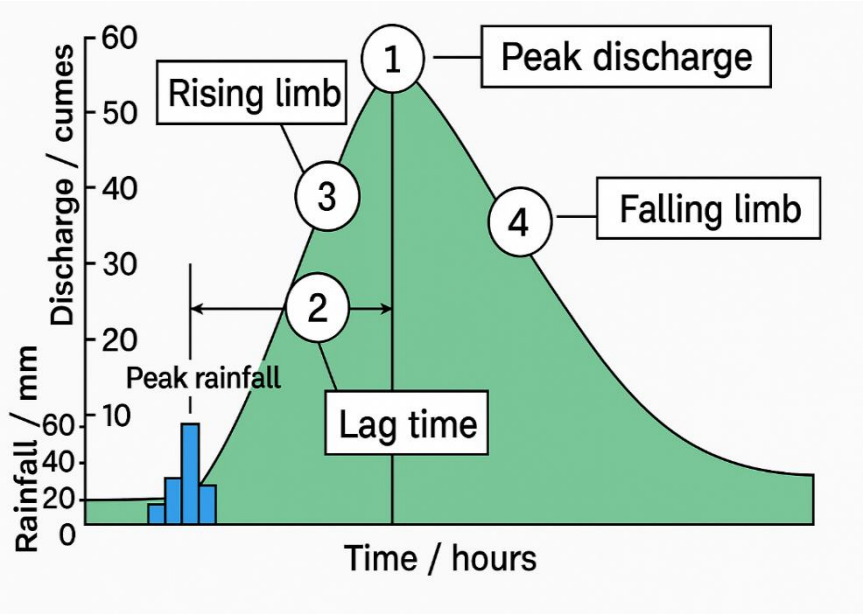
_____

_____

4. Falling limb: _____

_____

_____



8) Using the river discharge data provided, identify the mode, median, mean and range

Sample	1	2	3	4	5	6	7	*Mode: the most common* *Median: the middle value (when values are in order of size)* *Mean: the average* *Range: the difference between the greatest and smallest values*
River discharge (cumecs)	184	90	159	142	64	64	95	

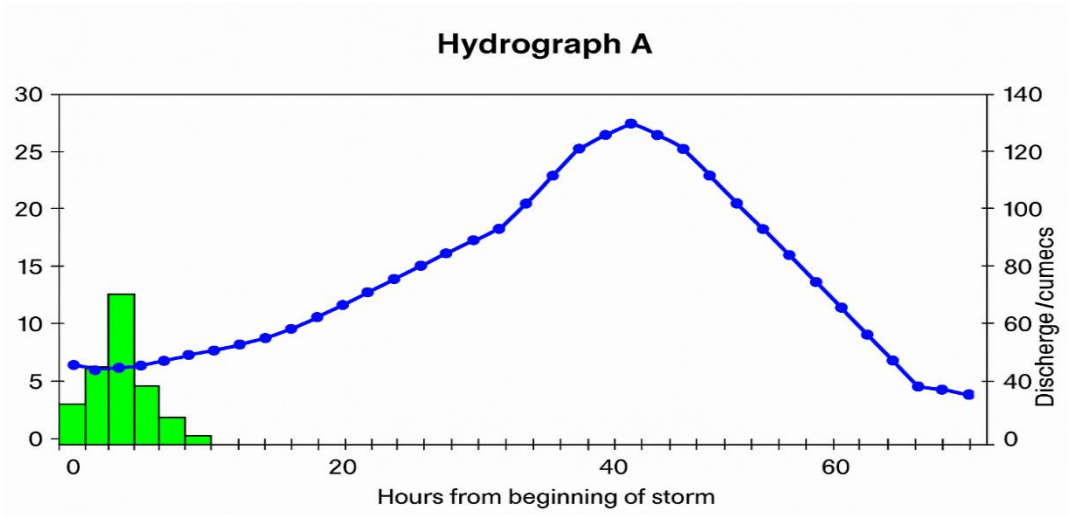
Mode: _____

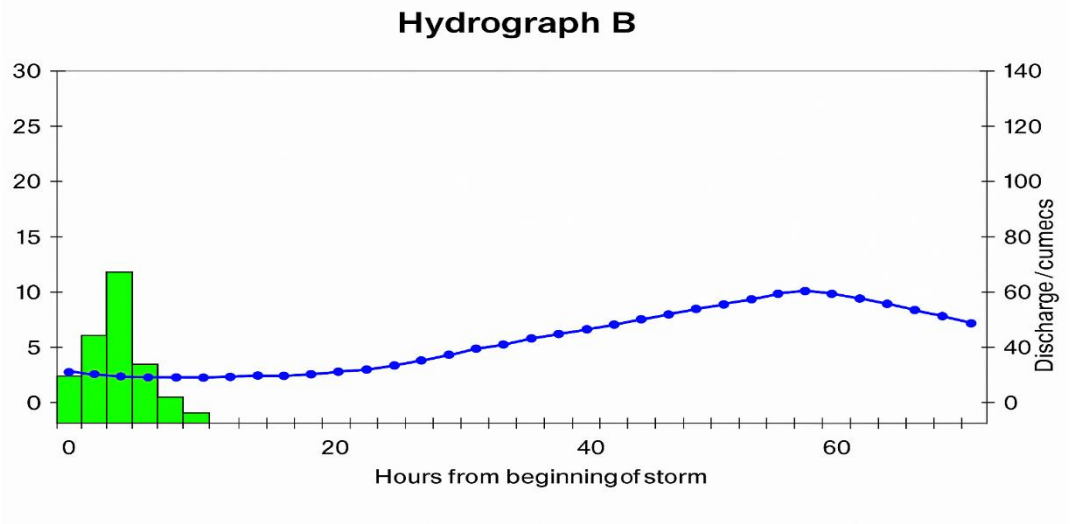
Median: _____

Mean: _____

Range: _____

9) The hydrographs below show two instances where the rainfall data is exactly the same, yet the peak discharge and lag time differ. Suggest and explain reasons for these differences. Try to use data in your response.





10) Give two examples of hard engineering strategies that can be used to manage flood risk other than dams and reservoirs.

a. _____

b. _____

11) Explain how flood warnings can help to reduce the effects of flooding.

MINI ISSUE EVALUATION TASK

There are many engineering strategies to help reduce the risk of flooding or its impacts. To help you revise this topic and to practice the **ISSUE EVALUATION** component of Paper 3, you need to think about the benefits and costs of a range of hard and soft engineering strategies.

Imagine that you are a flooding expert from the Environment Agency (EA) paid to advise the local council on the best strategy to use in Boscastle, a small village in Cornwall in southern England that has experienced several floods in recent years.

Key points to consider:

- **Population: 662**
- **Average house value: £312,000**
- **Key industries: tourism and fishing**
- **Village is located at the confluence of three rivers**
- **Major flood in 2004 where the homes, businesses and cars were swept away.**
- **Boscastle flooded again in 2007 although the impacts were not as serious as in 2004.**

On the lines below, explain which one of the four engineering strategies you recommend that the UK government uses to reduce the risk and/or impacts of flooding in Boscastle. You should explain why this is the best option, identify any problems with your choice, and say why it is a more appropriate choice than the rejected options.

Options:

1) **Building a dam and reservoir upstream.**
2) **Building flood relief channels.**
3) **Afforestation.**
4) **investing in preparation (e.g. education and modifying buildings most at risk)**

Chosen option:

AN EXAMPLE OF A FLOOD MANAGEMENT SCHEME IN THE UK

My example: *Banbury, along the River Cherwell*

Identify the location of your chosen flood management scheme on the map. Be sure to label the place name.

Provide a sketch drawing of your chosen flood management scheme.

Explain the reasons why management scheme was needed.

Describe the management scheme and **explain** how it helps to manage flood risk and its impacts.

Outline the social, economic and environmental issues. Within this section you might also discuss stakeholder opinions and any conflicts.)

Social

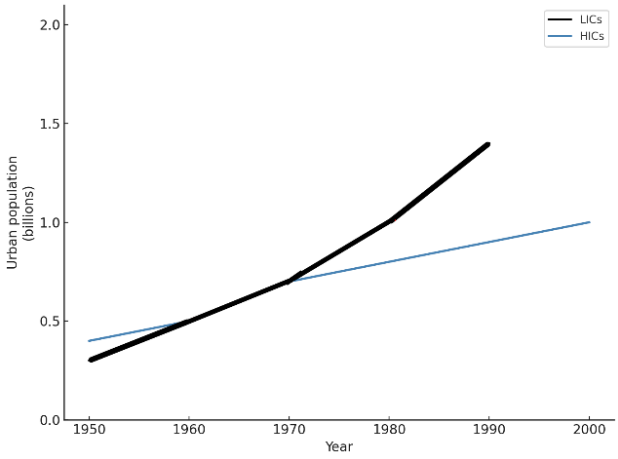
Economic

Environmental

Evaluate the effectiveness of the management scheme.

Paper 2: Section A - Urban Issues and Challenges

Key idea: A growing percentage of the world's population lives in urban areas.



1) Complete the graph to show that the urban population of LICs in 2000 was 2 billion.

***Trend*: the pattern or overall result**.

Aim to use descriptive language (e.g. *increasing/decreasing*, slow, *steady, rapid, exponential, equal, overtake*) and data(numbers).

2) **Describe** the **trends** shown by the graph.

Use T.E.A (Trend / example / anomaly)

_____

_____

_____

_____

_____

_____

3) The paragraph below is about urban growth in HICs and LICs. Using the vocabulary provided, fill in the blank spaces.

Vocabulary: *development, rural, minimally, already, slow, varies, manufacturing, China, Germany, proportion, 50%, Industrial Revolution, World Bank, Ethiopia, highest, trebled.*

Urbanisation refers to the growth in the _____ (percentage) of a country's population living in urban areas. Urbanisation is happening all over the world, and over _____ of the world's population now live in urban areas (and this is increasing). However, urbanisation is happening at different rates in places at different levels of _____. In high-income countries (HICs) like _____, urbanisation happened during the _____ (in the 19th Century) meaning that today, most people _____ live in urban areas. This means that rates of urban growth are _____ in HICs because almost everybody in the country already lives there! (For example, in Germany, between 1960 and 2016 the proportion of people living in urban areas rose _____ from 71% to 76%.) In LICs such as _____, urbanisation is happening more rapidly. LICs are less economically developed, meaning that it is only in recent years that many LICs have begun to develop industries such as _____ in the urban areas, which encourages people to move from _____ areas in search of work. Consequently, urban growth rates are _____ in LICs. (For example, in Ethiopia, between 1960 and 2016 the proportion of people living in urban areas more than _____, from 6% to 20%) (_____ data). Newly emerging economies (NEEs) are countries where economic growth is happening rapidly, e.g. Brazil, _____, and Nigeria. In these countries, urban growth _____.

4) Migration affects the rate of urbanisation, and push-pull theory helps to explain this. For each of the factors below, say whether it is push or pull, and explain how it causes migration. An example has been done for you.

Factor	Push or pull?	How does it cause migration?	Common in HICs, LICs or both?
Natural disasters	**Push / Pull**		**HICs / LICs / BOTH**
Mechanisation of agriculture	**Push / Pull**		**HICs / LICs / BOTH**
Family members living abroad	**Push / Pull**		**HICs / LICs / BOTH**
Better employment opportunities	**Push / Pull**		**HICs / LICs / BOTH**
Desertification	**Push / Pull**		**HICs / LICs / BOTH**
Improved quality of life	**Push / Pull**		**HICs / LICs / BOTH**

Improved health care and education	**Push / Pull**		**HICs / LICs / BOTH**
Conflict or war	**Push / Pull**		**HICs / LICs / BOTH**

5) Define 'natural increase'.

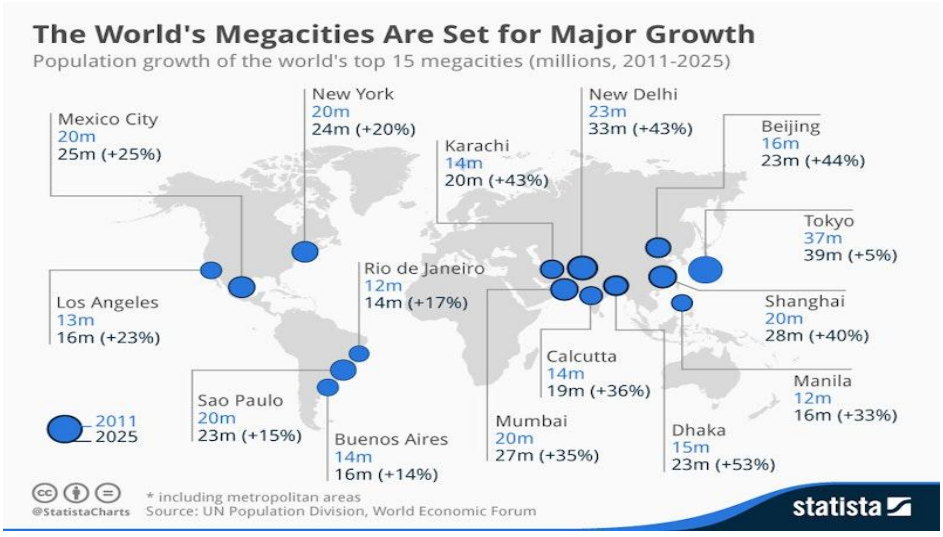
_____

_____

6) What is the minimum population required for a city to be classed as a **megacity**?

_____

Study the map showing the world's largest megacities. Using the map, answer questions below using the map above.



7) Which megacity is predicted to have the greatest **overall** population increase by 2025?

_____

8) Which megacity is predicted to have the greatest **rate** of urban growth of the fifteen megacities shown?

_____

9) Which region is predicted to experience the greatest urban growth by 2025? Shade **one** oval.

i. North America

ii. Europe

iii. Asia

10) **Explain** how natural increase leads to the growth of Megacities.

_____

_____

_____

Key idea: Urban growth creates opportunities and challenges for cities in LICs and NEEs.

The specification says that you need to know '***A case study of a major city in an LIC or NEE***' to illustrate the location & importance of the city, causes of growth, and how urban growth has created opportunities and challenges. As a **case study**, you need to know about many aspects of your chosen city. It is possible that an entire 9-mark question will be based on one key idea, so take the time to research and revise each section.

To help you revise this case study, complete the template below. (You should also do further research to help you remember place specific detail. Looking up YouTube clips about your chosen city is one useful way. Finding relevant images of the city and creating a visual brainstorm with annotations is another.)

<table>
<tr><th colspan="2">A CASE STUDY OF A MAJOR CITY IN AN LIC OR NEE
My example: <u>RIO DE JANEIRO (BRAZIL)</u></th></tr>
<tr><td>Map showing the location of the major city (either a sketch map or printed map)
  </td><td>Why is the city important? (You should discuss its importance within the country and within the world more broadly.)</td></tr>
<tr><td>Which migration factors are contributing to the city's growth? (Push-pull factors; try to include statistics and place-specific detail).</td><td>How is natural increase contributing to the city's growth? (How and why has natural increase changed in recent decades?)</td></tr>
</table>

What are the opportunities resulting from the urban growth? (Social opportunities e.g. access to services & resources + economic opportunities?)	**What are the challenges resulting from the urban growth?** (Managing urban growth, service and resource provision? Economic/social/environmental)

The specification says that you need to u*se '**an example of how urban planning is improving the quality of life for the urban poor**.*' Make sure your example is based in an LIC or NEE.

Complete the template below to help you remember your urban planning example.

AN EXAMPLE OF HOW URBAN PLANNING IS IMPROVING THE QUALITY OF LIFE OF THE URBAN POOR **My example: *Favela Bairro Project***		
What are the problems? (Say why the QOL needs to be addressed in your chosen location. Try to include statistics.)	**Which urban planning strategies are being used?** (Describe them, and say how they address QOL issues.)	**How effective are the strategies?**

Remember- an evaluate/assess element is possible in case study questions… think about which factors are the most significant in causing urban growth, and also about whether the opportunities or challenges are greater…

On the one hand, there are more opportunities than challenges. This is because _____

_____

_____

_____

_____

_____

_____

_____

On the other hand, there are more challenges and opportunities. This is because _____

_____

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Overall, I think (state your opinion and give reasons for it) _____

_____

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EXAM-STYLE QUESTIONS - Don't forget to B.U.G the question.

11. Explain how an urban planning scheme in an LIC or NEE has had a positive effect on people living in the area. (4)

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12. Using a named example of a **city in an LIC or NEE,** discuss the challenges created by urban growth. (9 + 3 SPAG)

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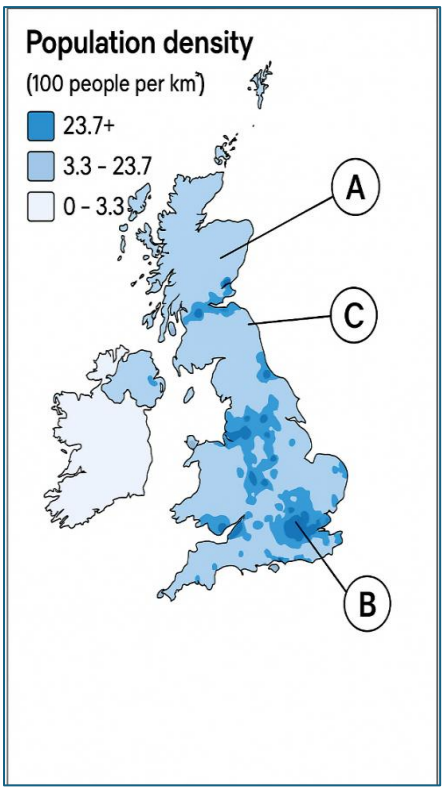
Key idea: Urban change in cities in the UK leads to a variety of social, economic and environmental opportunities and challenges.



Study **Figure 1**, a map showing the population density of the UK.

13. **Describe** population distribution in the UK.

_____

_____

_____

_____

_____

14. Name the cities labelled **A** and **B** on the map, and state which countries each city is located in.

A: The city is _____ and is located in the country of

_____

B: The city is _____ and is located in the country of

_____

15. Suggest why the population density in areas **B** and **C** vary so much.

_____

_____

_____

_____

_____

The specification says that you need to know '***A case study of a major city in the UK***' to illustrate the location & importance of the city, impacts of migration on the city's character and growth, and how urban growth has created opportunities and challenges. As a **case study**, you need to know about many aspects of your chosen city. It is possible that an entire 9-mark question will be based on only one key idea, so take the time to research and revise each section in depth.

To help you revise this case study, complete the template below. (You should also do further research to help you remember place specific detail. Looking up YouTube clips and documentaries about your chosen city is one useful way. Finding relevant images of the city and creating a visual brainstorm with annotations is another. Looking up online articles about the city can help to shed light on the character of the city, *especially if you look at newspapers from the city itself*.)

<table>
<tr><th colspan="2">A CASE STUDY OF A MAJOR CITY THE UK

My example: <u>Manchester</u></th></tr>
<tr><td>Identify the location of the major UK city on the map.
  </td><td>Why is the city important? (You should discuss its importance within the UK and the wider world.)</td></tr>
<tr><td>What are the impacts of national and international migration on the growth of the city? (Try to use statistics.)</td><td>What are the impacts of national and international migration on the character of the city?</td></tr>
<tr><td>What are the opportunities resulting from the urban growth? (e.g. soc/economic opportunities such as cultural mix, recreation and entertainment, employment, integrated transport systems, and environmental opportunities like urban greening?)</td><td>What are the challenges resulting from the urban growth? (soc/economic e.g. urban deprivation & inequalities; environmental e.g. dereliction, waste disposal; and the impact of urban sprawl etc.)</td></tr>
</table>

16. **Outline** some of the problems experienced by the environment because of the growth of commuter settlements.

_____

_____

_____

_____

_____

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EXAM-STYLE QUESTION - Don't forget to B.U.G the question.

17. Using a named example, explain how urban change can cause inequalities in housing. (4)

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The specification says that you need to u*se '**an example of an urban regeneration project**'* to show reasons for regeneration and the features of the project. Make sure your example is based in the UK.

Complete the template below to help you remember your urban regeneration project example.

AN EXAMPLE OF AN URBAN REGENERATION PROJECT **My example: *New Islington, Manchester***	
Why did the area need regeneration? (Try to identify social/economic/environmental issues and include statistics.)	**What did the project involve?**

Key idea: Urban sustainability requires management of resources and transport.

Cramming millions of people into relatively small spaces (cities) can take a huge toll on the environment, but strategies exist to make urban living more sustainable. Before you think about the strategies, you need to ensure that you know what 'sustainable' means!

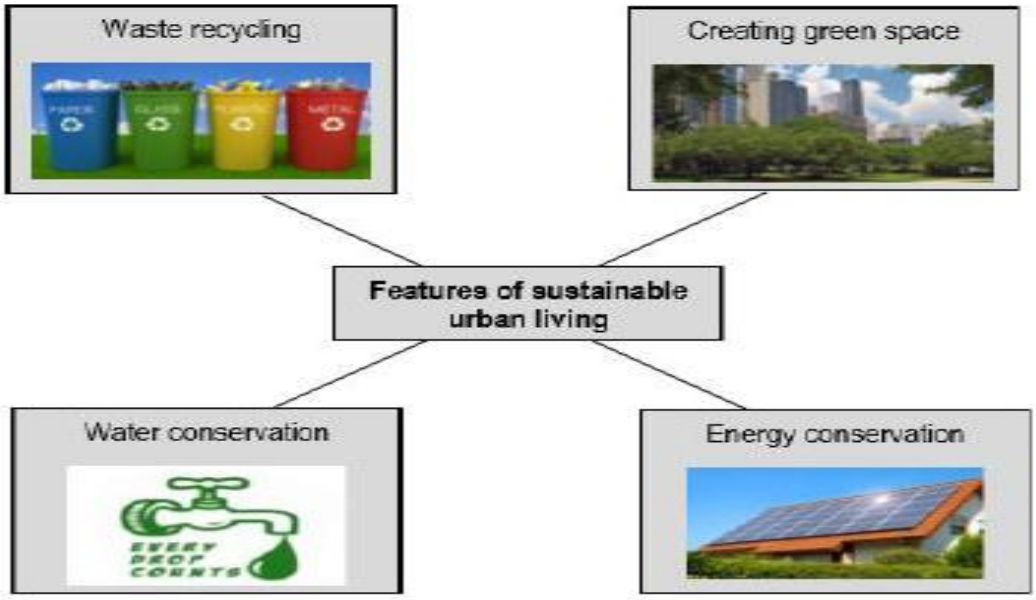
Sustainability refers to a way of doing things that enables a balance of economic, social and environmental concerns, with a view to the long-term 'health' of people, the economy and the environment. If a government prioritises only economic growth at the expense of citizens and the natural environment, its approach is very **un**sustainable. Similarly, if a government only focuses on protecting the environment but does nothing about inequality, this is also **un**sustainable. If something is sustainable, it can **continue well into the future**. In both examples, the approaches could not continue for very long- they cannot be *sustained*.

Decide whether each urban strategy below is sustainable (**S**) or unsustainable (**U**). Write an **S** or **U** next to each and give a reason/s for your decision.

Strategy	Sustainable (S) or Unsustainable (U)	Reason/s
City A has rapidly growing water needs. The government decides to transport water from the sparsely populated farming regions to use in the densely populated south.		
City B has rapidly growing water needs. The government offer subsidies so that people and councils that install rainwater tanks do not have to pay the full cost of installation.		
The population of City C generates a lot of waste. The government decides to build three new recycling		

plants to turn the waste into new products.		
One of the councils in City D has approved the building of a business centre on one of its main parks. It'll generate many jobs, but it will remove children's play areas and habitats for urban wildlife.		

18. Select one of the strategies to the right and **assess** the contribution that it can make towards sustainable urban living.



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19. Describe how traffic congestion can cause **environmental** and **social** problems in urban areas.

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20. **Identify** and **explain** one urban transport strategy to manage traffic congestion.

Strategy: _____

_____

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MINI-ISSUE EVALUATION EXCERCISE: The mayor of London Sadik Khan is faced with a decision to try to minimise the environmental impacts of the rapidly growing population, which suffers the environmental and social impacts of traffic congestion and crammed living. However, he is working to a budget and can only implement one of the following strategies. All of them are worthwhile, but you need to decide which **one** should be chosen and why. Identify your choice below, outline its advantages and briefly say why it is a better option than the other two.

Options:

1. Introduce higher congestion charges for people driving through the city centre during peak times

2. Build park-and-ride facilities in two locations on the outskirts of London

3. Clear three major derelict sites near council flats and turn them into urban green spaces with play areas

Chosen option: _____

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Paper 1: Section B - Living world (ecosystems / tropical rainforests / hot deserts)

Ecosystems

Key idea: Ecosystems exist at a range of scales and involve the interaction between biotic and abiotic components.

Read the paragraphs below to help you revise ecosystems. Highlight or underline key terms and important information.

An **ecosystem** is a unit that includes all the **biotic** (living) parts (e.g. plants and animals) and the **abiotic** (non-living) parts (e.g. soil and climate) in an area. The organisms in an ecosystem can be classed as **producers**, **consumers** or **decomposers**.

A **producer** is an organism that uses sunlight energy to produce food (e.g. a banana tree). A **consumer** is an organism that gets its energy by eating other organisms (e.g. a monkey eats a banana). A **decomposer** is an organism that gets its energy from breaking down dead material, including dead producers, dead consumers or fallen leaves (e.g. bacteria and fungi break down dead monkeys or banana peels).

When dead material is decomposed, **nutrients** are released into the soil. The nutrients are then taken up from the soil into plants. The plants may be eaten by consumers. When the plants or consumers die, the nutrients return to the soil. This transfer of nutrients is called **nutrient cycling**.

Draw a simple food chain and food web in the space provided below. Label each component as either **producer, primary consumer, secondary consumer or decomposer.**

Food chain	**Food web**

1. Using the information above and your own knowledge, explain how changing one component can impact an ecosystem. Try to include some of the bolded **terminology above** and some examples.

_____

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The specification says that you need to know *'**An example of a small-scale UK ecosystem** to illustrate the concept of interrelationships within a natural system, an understanding of producers, consumers, decomposers, food chain, food web and nutrient cycling.'*

Complete the template below to help you learn and revise your example of a small-scale UK ecosystem.

<table>
<tr><th colspan="2">AN EXAMPLE OF A SMALL-SCALE UK ECOSYSTEM

My example: <u>Epping Forest</u></th></tr>
<tr><td>What is the ecosystem like? (Abiotic characteristics such as climate and soils, biotic features such as plant and animal types, location etc.)</td><td>Diagram or picture of the ecosystem</td></tr>
<tr><td>What are some of the producers, consumers and decomposers in the ecosystem?</td><td>Explain how nutrient cycling takes place in the ecosystem.</td></tr>
<tr><td>Diagram of a food chain or food web in the ecosystem</td><td>Explain how changes to one component impacts the ecosystem.</td></tr>
</table>

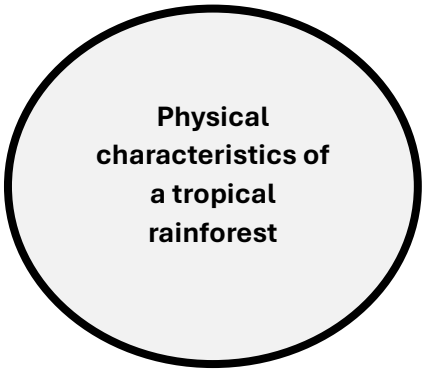
For each of the **major global ecosystems** below, **complete summary notes in the empty boxes.**

ECOSYSTEM	IMAGE	LOCATION/S	BIOTIC FEATURES	ABIOTIC FEATURES
Grassland				
Hot desert				
Temperate deciduous forest				
Tropical rainforest				
Tundra				
Polar				

Tropical rainforests

Key idea: Tropical rainforest ecosystems have a range of distinctive characteristics.

Create a mind map to show the **physical characteristics of a tropical rainforest**. You should refer to features such as the layers of TRFs, the climate (precipitation and temperature), locations around the world etc.



2. Explain how in tropical rainforest ecosystems, climate, water, soils, plants, animals and people are **interdependent**.

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Plants and animals adapt to the physical conditions of tropical rainforests.

3. **Identify** one plant and one animal and **describe** how each has adapted to live in the tropical rainforest.

Chosen plant: _____

_____

_____

_____

_____

Chosen animal: _____

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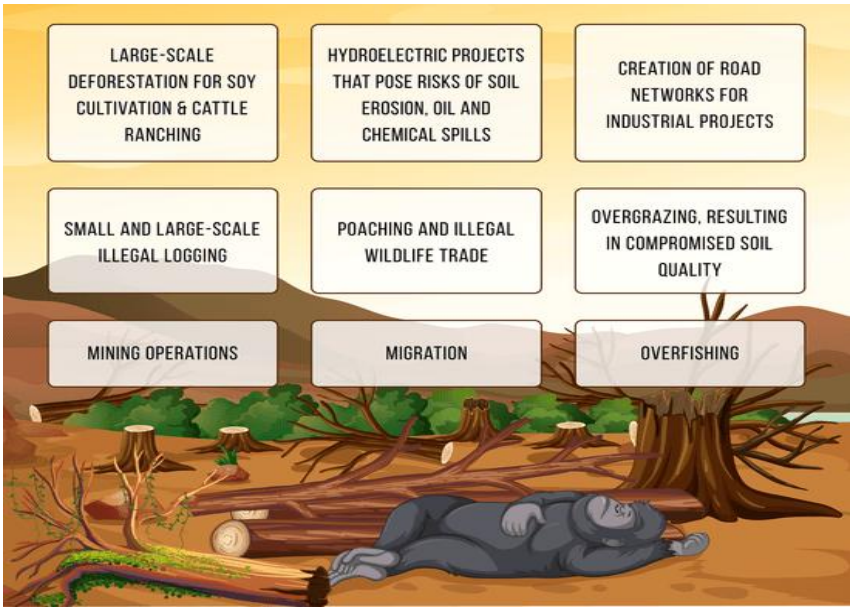
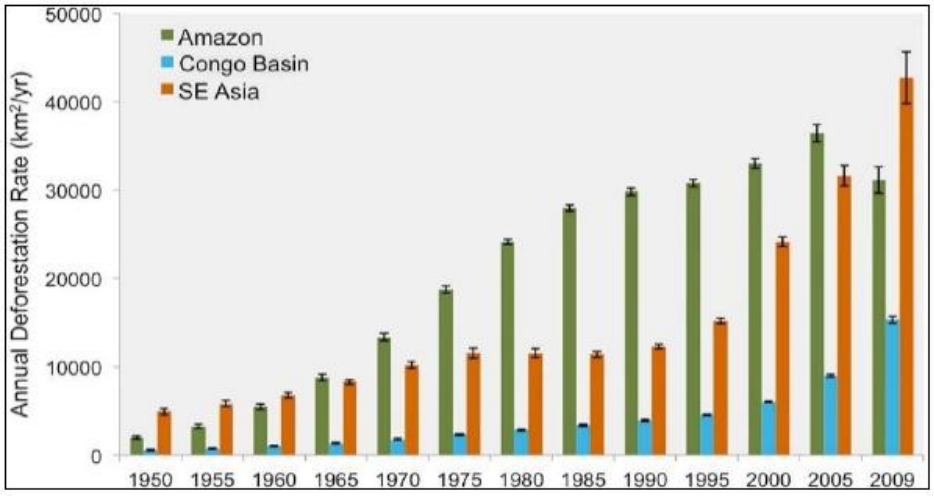
4. Define 'biodiversity'. _____

_____

_____

5. Explain how **human activities** have **reduced biodiversity** in tropical rainforests.





6. Describe the general pattern of deforestation rates between 1950-2009.

7. Compare rates of deforestation in the three regions shown.

The specification says that you need to know '***A case study of a tropical rainforest***' to illustrate the causes and impacts of deforestation.

Add detail into each of the boxes below to help you revise your case study. Include data and reference to stakeholders.

A CASE STUDY OF DEFORESTATION IN A TROPICAL RAINFOREST

My case study: *Malaysian Rainforest*

Causes of deforestation	Impacts of deforestation
Subsistence farming	Economic development
Commercial farming	
Logging	Soil erosion
Road building	
Energy production	Contribution to climate change
Mineral extraction	
Settlement growth - Population pressure	Local livelihoods destroyed?

Which of these **causes** and **impacts** do you consider to be the **most significant**? Highlight them in your table and think about WHY you consider them to be the most significant. ***You may be asked to assess/evaluate this in the exam.***

Key idea: Tropical rainforests need to be managed to be sustainable.

8. Why do tropical rainforests need to be **managed**? Your answer should outline their **importance** to people and the environment.

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MINI ISSUE EVALUATION TASK

There are many strategies to **manage** the rainforest sustainably. To help you revise this topic and also to practice the ISSUE EVALUATION component of Paper 3, you need to decide which strategy you think should be prioritised. In each box below, **describe each strategy,** then **summarise** key **advantages** and **disadvantages**.

STRATEGIES	IMAGE	BRIEF DESCRIPTION	ADVANTAGES	DISADVANTAGES
Selective logging				
Replanting				
Conservation and education				

Ecotourism				
International hardwood agreements				
Debt reduction				

9. Now that you know the advantages and disadvantages of a range of rainforest management strategies, select **one** strategy and **justify why it is the best option** to manage the rainforest sustainably.

Chosen option: _____

This is the best option to manage the rainforest because _____

_____

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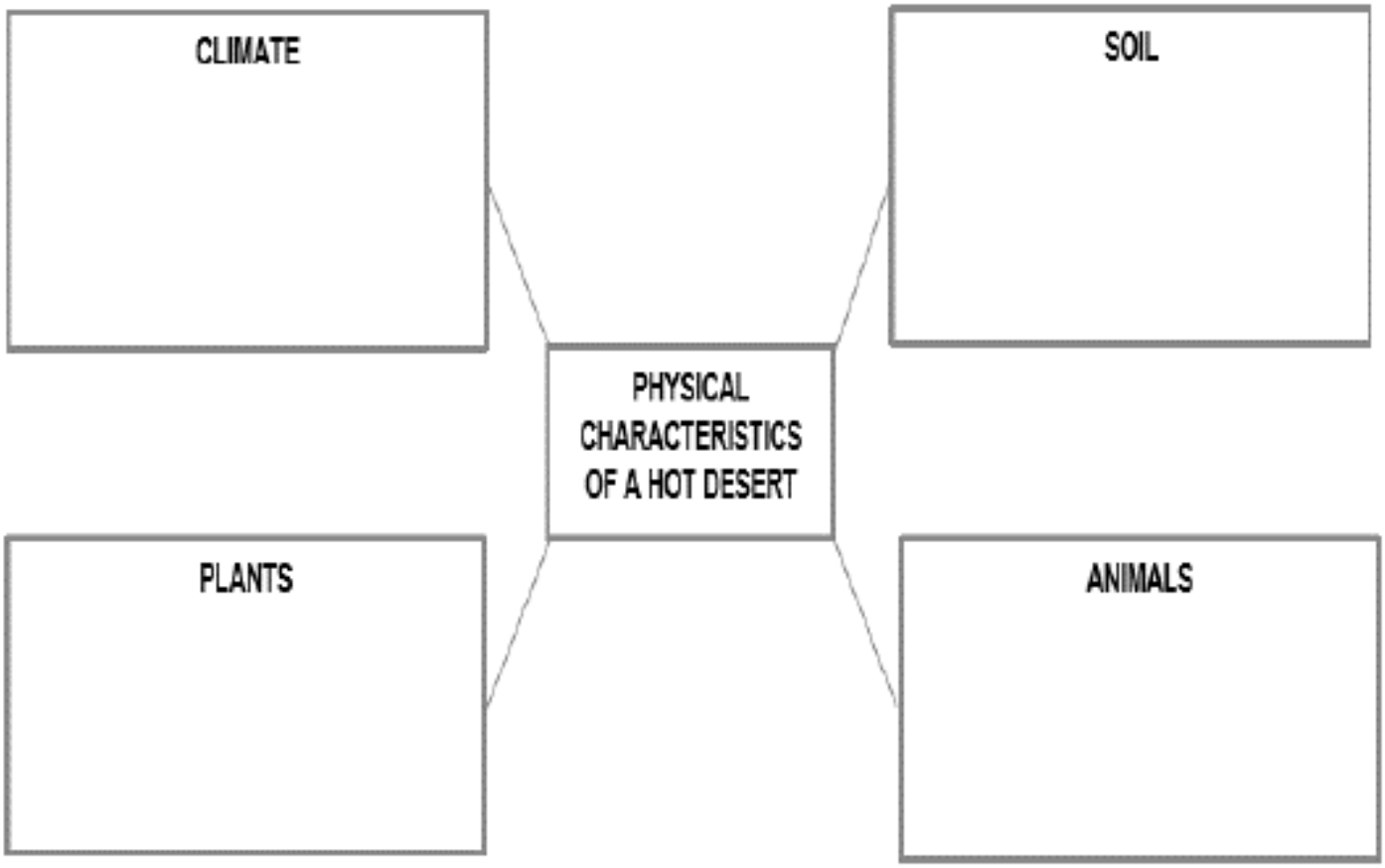
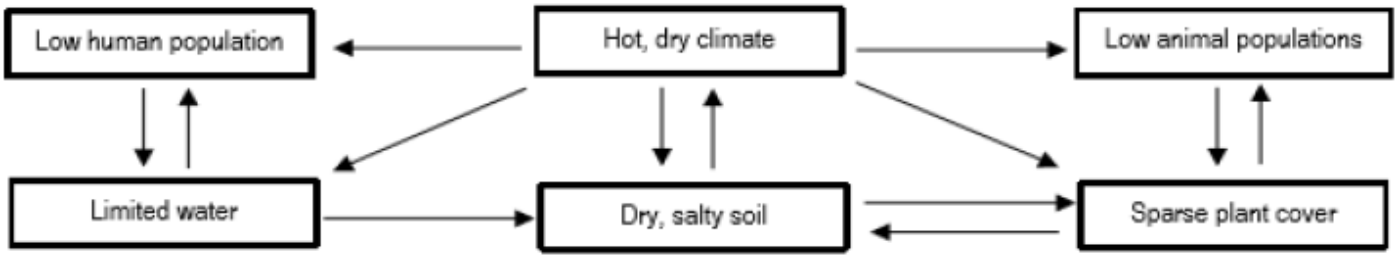
Hot deserts

Key idea: Hot desert ecosystems have a range of distinctive characteristics.

Complete the mind map below on the physical characteristics of a hot desert by adding brief notes to each box.



10. Using the **figure** below, **describe** and **explain** the interdependence of climate, water, soils, plants, animals and people in a hot desert.



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11. **Identify** one plant and one animal found in a hot desert, and **describe** how the they have adapted to the harsh desert climate.

Chosen plant: _____

_____

_____

_____

_____

Chosen animal: _____

_____

_____

_____

_____

EXAM-STYLE QUESTION: **Don't forget to B.U.G the question.**

12. Explain why biodiversity in hot deserts is particularly vulnerable to climate change. (4)

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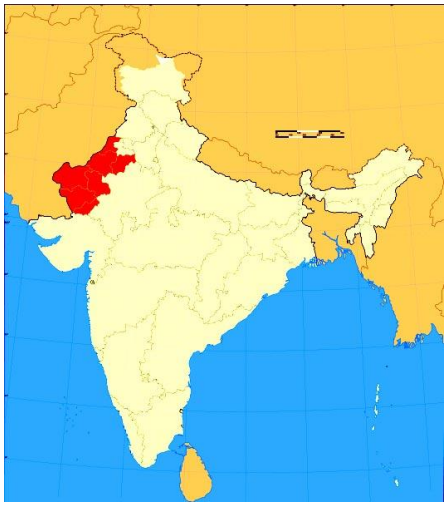
Key idea: Development of hot desert environments creates opportunities and challenges.

The specification says that you need to know '***A case study of a hot desert***' to illustrate development opportunities and the challenges of developing in hot deserts.

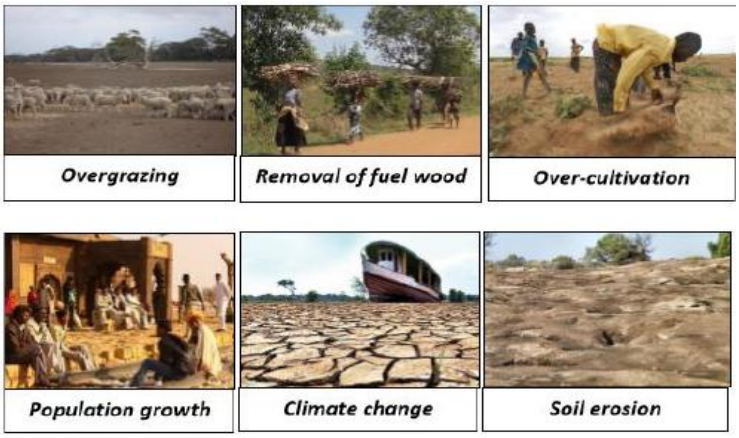
'Development opportunities' refers to the options that exist to improve income and quality of life. **'Challenges of developing'** refers to the difficulties that are encountered in trying to develop.

Complete the template below to help you learn and revise your case study of a hot desert.

<table>
<tr><td colspan="4">A CASE STUDY OF A HOT DESERT
My case study: <u>The Thar Desert</u></td></tr>
<tr><td rowspan="4">Development opportunities of a hot desert</td><td>Tourism</td><td rowspan="3">Location</td><td rowspan="3">Label the Thar Desert and the countries which border it.
Write a brief summary detailing its location (don't forget to use compass directions)
  </td></tr>
<tr><td>Energy</td></tr>
<tr><td>Mineral extraction</td></tr>
<tr><td>Farming (different types)</td><td>Challenges of developing in a hot desert</td><td>Explain how the following challenges make development difficult.
Link the challenges to the opportunities you've already mentioned.
• Extreme temperatures
• Water supply
• Inaccessibility</td></tr>
</table>

Key idea: Areas on the fringe of hot deserts are at risk of desertification.

Annotate each box with 1-2 sentences explaining how each factor causes desertification.



MINI ISSUE EVALUATION TASK

There are several strategies to **reduce the risk of desertification**. To help you to practice skills needed for the ISSUE EVALUATION component of Paper 3, **complete the sentences below.**

Water management *involves)*: _____

_____

It helps to reduce the risk of desertification by _____

_____

Its disadvantages/difficulties are _____

_____

Soil management *involves)*: _____

_____

*It helps to reduce the risk of desertification by*_____

_____

Its disadvantages/difficulties are _____

_____

Tree planting *helps to reduce the risk of desertification by*_____

_____

Its disadvantages/difficulties are _____

_____

Use of appropriate technologies *is where* _____

_____

*It helps to reduce the risk of desertification by*_____

_____

Its disadvantages/difficulties are… _____

_____

Paper 2: Section C – Resource Management - Provision of resources

Key idea: Food, water and energy are fundamental to human development.

1. Explain why access to safe and reliable water is necessary for people to enjoy a decent standard of living.

_____

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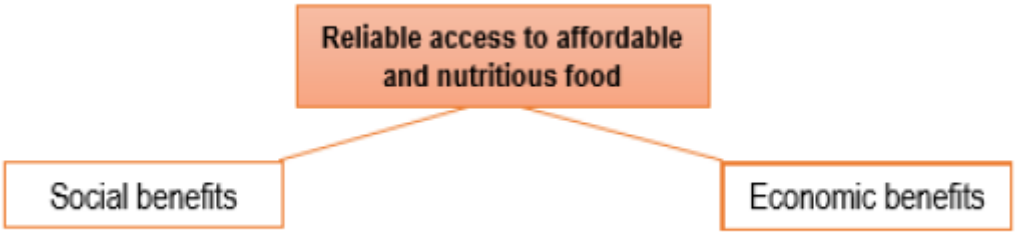
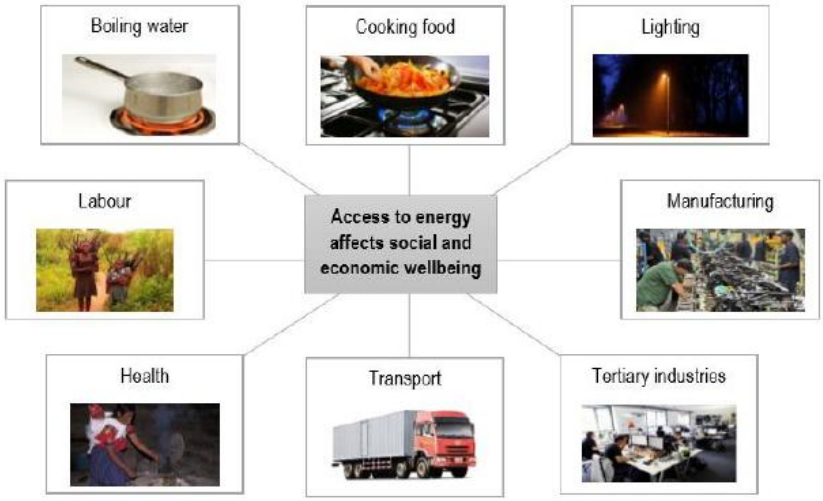
Create flow charts to show the social and economic benefits of access to nutritious food.



Study the model below, 'Access to energy affects social and economic wellbeing'.



2. Outline some of the ways that poor access to energy limits social and economic wellbeing.

3. Study **Figures A** and **B**, on the following page.

Using **Figures A** and **B (on the next page)** and your own knowledge, suggest why some places with **high precipitation** experience **water scarcity**.

Figure 1:

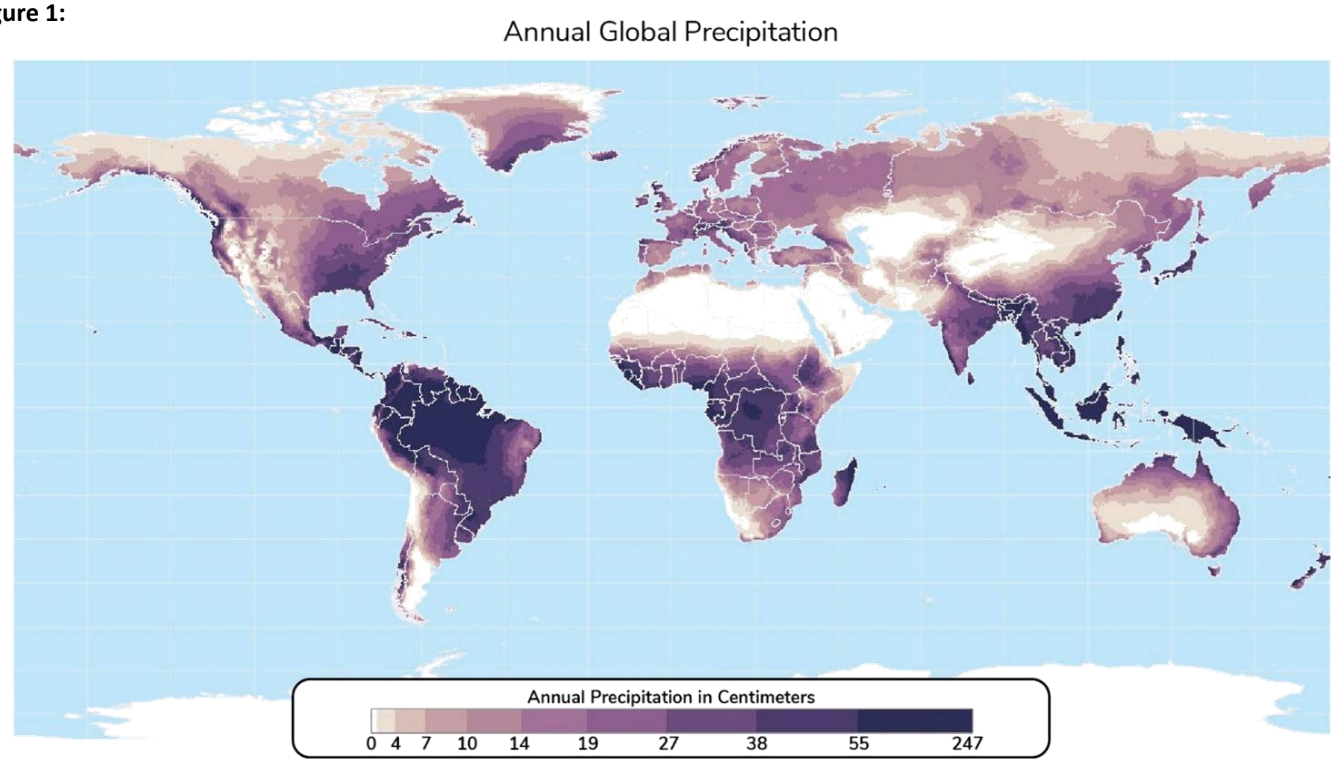
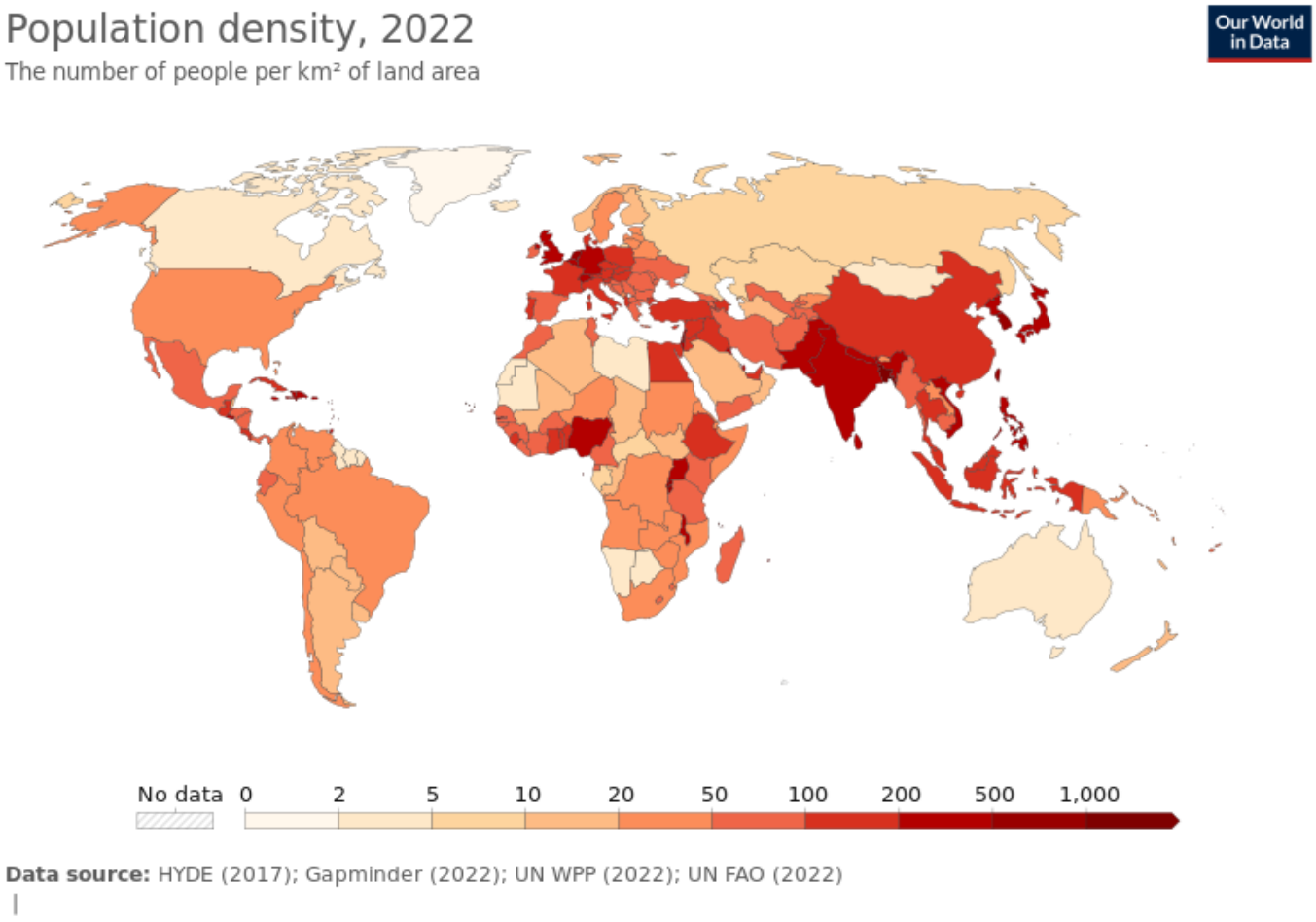


Figure 2:



Using the vocabulary provided, **complete** the paragraph on **resource demand and consumption**.

Vocabulary*: unsuitable, buy, electricity, import, NEEs, Venezuela, food, wealth, long-term, standard, greater, desalination, expensive, availability, barrels, none, dry, extract, technological, manufacturing, wind, exported, reserves, cars, USA, fuel, afford.*

The global distribution of resources such as water, energy and _____ is very uneven. Some countries don't have their own natural energy _____, while others have enormous reserves. For example, _____ has an estimated 297 billion _____ of oil while the USA has 36 billion and some countries have _____. Some countries have large food supplies, while other have _____ climates or environments that are _____ for food production. To access more resources, some countries have to _____ them or find _____ solutions to produce more. For example, some countries invest in _____ farms to harness renewable energy, while others pay for _____ plants (e.g. Spain), while others import oil (e.g. _____). Importing resources is very _____. Investing in renewable technologies is also expensive, but can provide a _____ solution. Consequently, consumption of resources is dependent on a country's level of _____, as well as resource _____. It is little surprise that resource consumption is _____ in HICs, because they can afford to _____ resources. Also, people in HICs are used to a certain _____ of living, for example in the UK people expect to have _____ in their homes and _____ to drive their cars. Consumption is increasing rapidly in _____. In China, there are approximately 300 million _____ on the roads and this is rapidly increasing as wealth rises. In NEEs industries such as _____ are expanding and this requires a lot of energy. In general, as wealth increases in NEEs, people can _____ to buy more food and water, which increases consumption. Resource consumption is lower in LICs for various reasons: they may not be able to afford to _____ their existing resources, or they may have to buy expensive imports which they can't afford, or foreign companies may own their natural resources so they are _____ out of the country.

Key idea: The changing demand and provision of resources in the UK create opportunities and challenges.

EXAM-STYLE QUESTION - Don't forget to B.U.G the question.

4. Suggest and **explain** two reasons why demand for high-value foods such as exotic fruits and vegetables has increased in the UK in recent decades.

Reason 1: _____

_____

_____

_____

Reason 2: _____

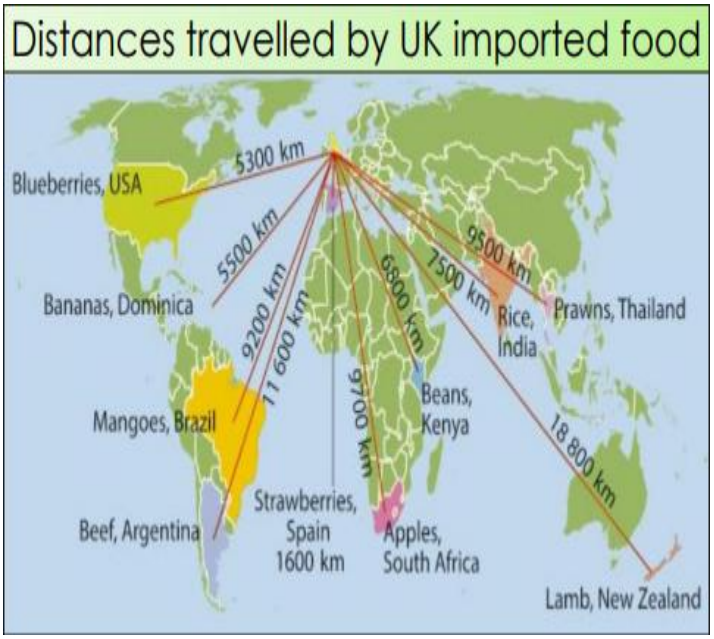
_____

_____

_____

Study **the figure below**, showing distances travelled by a range of food imports to the UK.

5. Using **Figure C** and your own knowledge, explain why the carbon footprint associated with UK food consumption is increasing.



A variety of strategies exist to reduce food miles.

Create a mind map to briefly explain a range of these strategies.

Strategies to reduce food miles in the UK

6. Outline **one** change in UK farming practices since the 1960's.

7. Annotate **Figures D** and **E** below with the following information:

a. Places with **high annual rainfall**

b. Places with **low annual rainfall**

c. Places with **dense populations**

d. Places with **scarce populations**

Figure D: UK population density

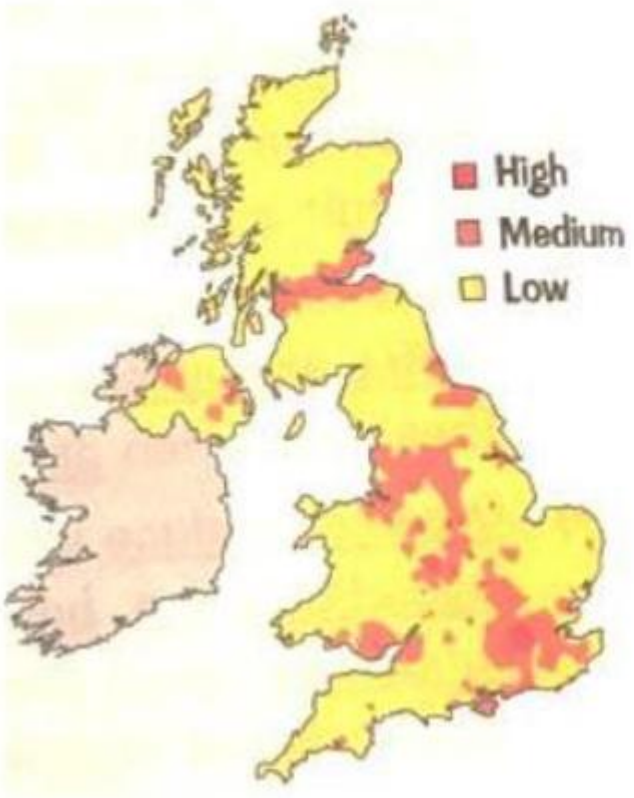


Figure E: UK average annual rainfall

8. Using **Figures D** and **E** and your own knowledge, explain why water may need to be transported from some parts of the UK to other parts.

_____

_____

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9. Using **Figures D** and **E** and your annotations, **circle the correct fact** in each sentence below.

a. The UK's population is predicted to increase by 1 million / 10 million / 100 million by 2040

b. Most new homes will be built in the north-east / north-west / south-east

c. Wales, northern Scotland and south-west England have dense populations / sparse populations

d. London, Manchester and Glasgow have dense populations / sparse populations

e. The north of England and all of Scotland tends to have a water surplus / water deficit

f. The south-east of England and the east of Northern Ireland tend to have a water surplus / water deficit

g. Areas that are likely to suffer water deficits are those with dense populations and low rainfall / those with sparse populations and high rainfall

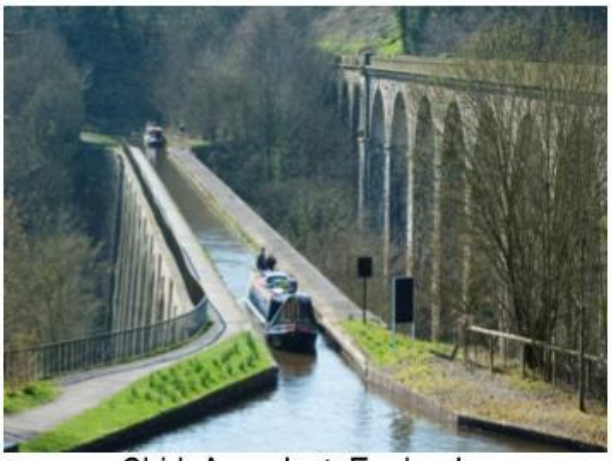
10. Transferring water from areas of surplus to areas of deficit has a range of impacts. Annotate the pictures of the dam and aqueduct below with issues or conflicts that can arise over water transfer (e.g. economic, social, environmental, political).

Two major modes of water transfer in the UK

Dams

Craig Goch dam, Wales

Aqueducts



Chirk Aqueduct, England

11. Offer **two** reasons why the demand for water in the UK is increasing.

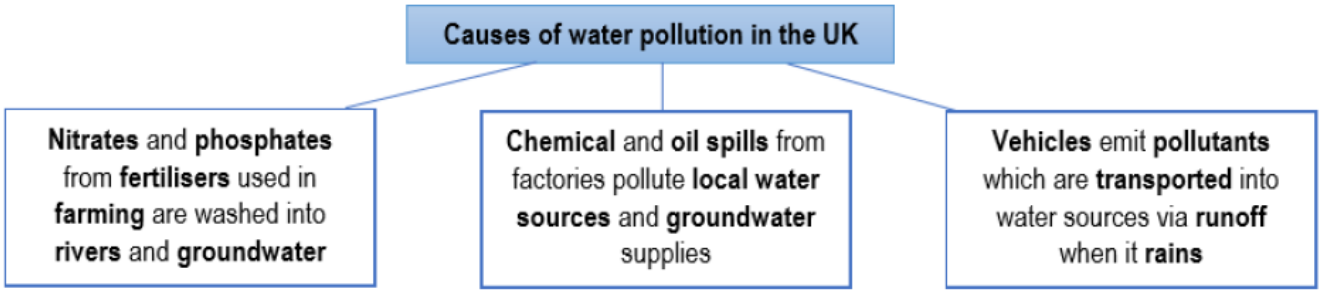
Reason 1: _____

_____

Reason 2: _____

_____

The model below shows some causes of water pollution in the UK. Revise them!



12. For **one** of the causes of water pollution above, outline a strategy that is used to manage the problem.

Chosen cause of water pollution: _____

Strategy: _____

_____

_____

_____

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_____

Study the graph to the right, which shows how the UK's energy mix has changed over time.

13. Compare the UK's 1970 and 2014 energy mixes.

_____

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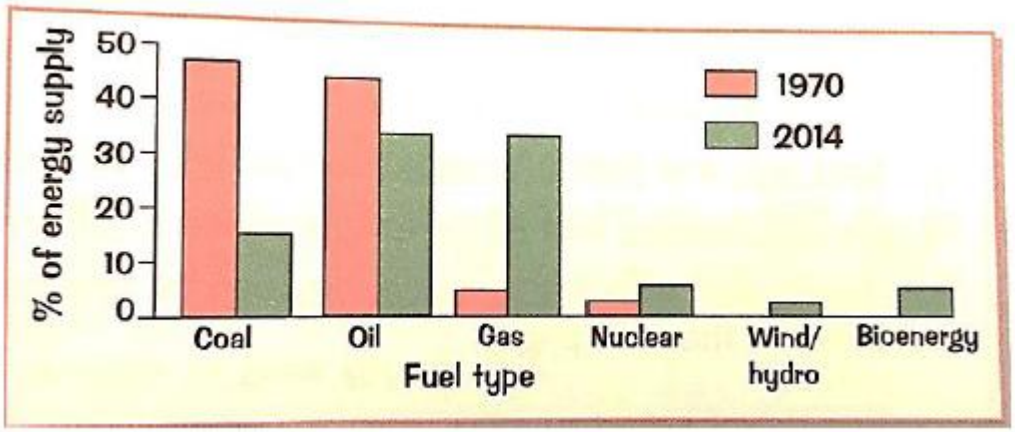

14. Describe how the UK's reliance on coal changed between 1970 and 2014.

_____

_____

_____

_____

15. Using the graph below, describe how the UK's reliance on imported coal has changed, and explain these changes.

_____

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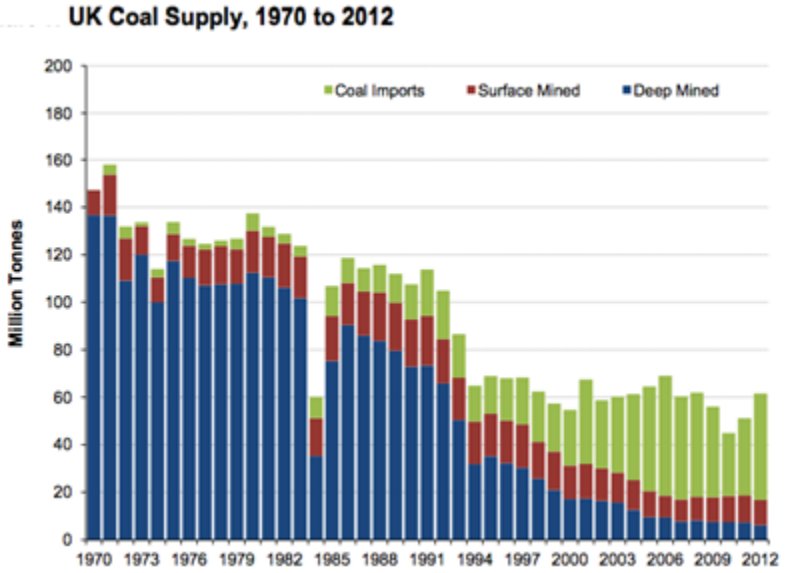


16. Which of the following statements is **true**?

a. The UK's reliance on domestic coal is increasing.

b. The UK's reliance on gas has increased in recent decades.

c. Renewable energies such as wind are slowly increasing in use.

d. Nuclear energy has no environmental risks.

e. Burning fossil fuels emits greenhouse gases.

Economic issues result from the exploitation of both renewable and non-renewable energy sources in the UK.

17. Beneath the model below, note down some of the issues/problems/conflicts that occur. (Consider social/ environmental/ political impacts as long as they relate to economic issues.)

Command Words

Skill Area	Command Word	Meaning	Example Exam Question
Basic Recall & Description	**Define**	Provide the precise meaning of a term.	Define the term *ecosystem*.
	Describe	Set out the characteristics of something.	Describe the characteristics of a river in its lower course.
	Identify	Name or otherwise characterise something.	Identify two reasons for urban growth in LICs.
	State	Express clearly and briefly.	State one physical factor that affects the water supply.
	Give	Produce an answer from recall.	Give two reasons why the demand for food is increasing in the UK.
	Outline	Set out main characteristics.	Outline one way urban planning can improve the quality of life for the urban poor.
	Name	Identify using a recognised technical term.	Name one country where water supply is a serious issue.
Analysis & Explanation	**Analyse**	Break information into parts and identify their characteristics.	Analyse how river landforms are influenced by geology.
	Explain	Set out reasons, causes, or purposes.	Explain how energy insecurity can affect a country's development.
	Interpret	Translate or make sense of data or information.	Interpret the pattern shown in the rainfall graph for a tropical rainforest.
	Discuss	Present key points, including different ideas or strengths/weaknesses.	Discuss the challenges of developing hot desert environments.
Evaluation & Judgment	**Assess**	Make an informed judgement based on evidence.	Assess the impacts of urban sprawl on the rural–urban fringe.
	Evaluate	Judge based on evidence and consider alternatives or outcomes.	Evaluate the effectiveness of hard engineering strategies to manage river flooding.
	Justify	Support a choice or viewpoint with evidence and reasoning.	Justify the use of floodplain zoning in reducing the impacts of flooding.

Key Tier 2 and Tier 3 Vocabulary

Paper 1: Section C – Physical Landscapes in the UK Topic: Rivers	
Term	**Definition**
Abrasion	**Rocks carried along by the river, scrape and wear down the river bed and banks.**
Attrition	**Rocks being carried by the river smash together and break into smaller, smoother and rounder particles.**
Cross profile	**The side-to-side cross-section of a river channel and/or valley.**
Dam and reservoir	**A barrier (made of earth, concrete or stone) built across a valley to interrupt river flow and create a human-made lake (reservoir) which stores water and controls the discharge of the river.**
Discharge	**The quantity of water that passes a given point on a stream or riverbank within a given period of time.**
Embankments	**Raised banks constructed along the river; they increase channel depth so the river can hold more water. They are expensive and unnatural-looking but protect surrounding land.**
Estuary	**The tidal mouth of a river where it meets the sea; wide banks of deposited mud are exposed at low tide.**
Flood	**Occurs when river discharge exceeds channel capacity and water spills onto the floodplain.**
Flood plain	**The relatively flat area on either side of a river channel, which is sometimes flooded.**
Flood plain zoning	**Land use planning to reduce flood risk by restricting building on flood-prone land near the river.**
Flood relief channels	**Artificial channels that take excess water from the river during high discharge to reduce flood risk.**
Flood risk	**The predicted frequency of floods in a given area.**
Flood warning	**Reliable advance information about possible flooding, giving people time to protect property and evacuate.**
Fluvial processes	**Processes relating to erosion, transport, and deposition by a river.**
Gorge	**A narrow, steep-sided valley formed as a waterfall retreats upstream.**
Hard engineering	**Artificial structures (e.g. concrete walls, dams) used to manage rivers and reduce flooding.**
Hydraulic action	**The force of water traps air in cracks in the riverbank; the pressure weakens and breaks it apart.**
Hydrograph	**A graph showing river discharge in relation to rainfall over time.**
Interlocking spurs	**Ridges of land that the river winds around in its upper course.**
Lateral erosion	**Erosion of the riverbank sides, especially on the outside of meanders, leading to valley widening.**
Levees	**Raised banks of sediment along a river, formed naturally by flooding or built to prevent floods.**
Long profile	**The gradient of a river from its source to its mouth.**
Meander	**A pronounced bend in a river.**

Ox-bow lake	**An arc-shaped lake cut off from a meandering river.**
Precipitation	**Moisture falling from the atmosphere as rain, hail, sleet, or snow.**
Saltation	**Small particles bouncing along the river bed.**
Soft engineering	**Using natural processes and local materials to manage rivers, often cheaper and more sustainable.**
Solution	**Soluble particles dissolved in river water.**
(Channel) straightening	**Removing meanders to make the river flow faster and reduce flood risk.**
Suspension	**Fine material carried within the river water.**
Traction	**Large particles rolled along the river bed.**
Vertical erosion	**Downward erosion of a river bed, deepening the channel.**
Waterfall	**A sudden drop in the river's course, usually where harder rock overlies softer rock, causing vertical erosion and retreat.**
Paper 1: Section B - Living World **Topic: Ecosystems**	
Term	**Definition**
Abiotic	Relating to non-living parts of an ecosystem.
Biotic	Relating to living parts of an ecosystem.
Consumer	An animal that eats animals and/or plant matter.
Decomposer	An organism, such as a bacterium or fungus, 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 their physical environment.
Food chain	The connections between different organisms (plants and animals) that rely on one another as their source of food.
Food web	A complex interconnection of all the food chains in an ecosystem.
Nutrient cycling	A set of processes whereby organisms extract minerals necessary for growth from soil or water before passing them on through the food chain and, ultimately, back to the soil and water.
Global ecosystem	A very large ecological area on the Earth's surface with fauna and flora (animals and plants) adapting to their environment. Examples include tropical rainforest and hot desert.
Paper 1: Section B - Living World **Topic: Tropical rainforests**	
Term	**Definition**
Biodiversity	The variety of life in the world or a particular habitat.
Commercial farming	Farming to sell produce for a profit to retailers or food processing companies.
Debt reduction	A political agreement where countries are relieved of some of their debt in return for protecting their rainforests.

Deforestation	The chopping down and removal of trees to clear an area of forest.
Ecotourism	A type of tourism that involves responsible travel to natural areas that helps to conserve the environment and sustain the wellbeing of the local people. It often involves education, is usually in small groups, and has minimal impact on the local ecosystem.
Logging	The business of cutting down trees and transporting the logs to sawmills.
Mineral extraction	The removal of solid mineral resources from the earth. These include ores (e.g. iron and aluminium), precious stones (e.g. diamonds), building stones (e.g. granite), and solid fuels (e.g. coal and oil shale).
Selective logging	The cutting out of trees which are mature or inferior to encourage the growth of the remaining trees in a forest or wood.
Soil erosion	Removal of topsoil faster than it can be replaced due to natural (water and wind), animal, and human activity. Topsoil is the most fertile layer as it contains the most organic, nutrient-rich material.
Subsistence farming	A type of agriculture producing food and materials for the benefit only of the farmer and their family.
Paper 1: Section B - Living World **Topic Hot deserts**	
Term	**Definition**
Appropriate technology (Intermediate technology)	Technology that is suited to the needs, skills, resources, knowledge and wealth of local people in the environment in which they live.
Biodiversity	The variety of life in the world or a particular habitat.
Desertification	The process by which land becomes drier and degraded as a result of climate change or human activities or both.
Hot desert	An ecosystem that is characterised by high average temperatures and very low precipitation.
Mineral extraction	The removal of solid mineral resources from the earth. These resources include ores which contain commercially valuable amounts of metals (e.g. iron and aluminium), precious stones (e.g. diamonds), building stones (e.g. granite) and solid fuels (e.g. coal and oil shale).
Over-cultivation	Exhausting the soil by over-cropping the land.
Paper 1: Section A - Urban issues and challenges	
Term	**Definition**
Brownfield site	Land that has been used, abandoned, and now awaits some new use. Commonly found across urban areas, particularly in the inner city.
Dereliction	Abandoned buildings and wasteland.
Economic opportunities	Chances for people to improve their standard of living through employment.
Greenfield site	A plot of land, often in a rural area or on the edge of an urban area, that has not yet been subject to any building development.
Inequalities	Differences between poverty and wealth, wellbeing, and access to jobs, housing, education, services, open land, and safety.
Integrated transport systems	When different transport methods connect together, making journeys smoother and more appealing. Encourages use of public transport and can reduce congestion.
Mega-cities	An urban area with a population exceeding ten million people.
Migration	The movement of people from one area to another with the intention of settling there.

Natural increase	The difference between the birth rate and the death rate of a population.
Pollution	The presence of harmful chemicals, noise, dirt or other substances in the environment.
Rural-urban fringe	The transition zone between urban areas and the countryside, where there is often competition for land use.
Sanitation	Measures to protect public health, including clean water supply and waste/sewage disposal.
Social deprivation	The extent to which an individual or area lacks access to services, decent housing, income, and employment.
Social opportunities	Chances for people to improve their quality of life, such as access to education and healthcare.
Squatter settlement	An area of poor-quality housing, often without basic services, built on land not legally owned by the inhabitants.
Sustainable urban living	Living in a way that causes minimal environmental damage, has a strong community, secure jobs, and includes energy efficiency, public transport, and fair resource use.
Traffic congestion	When the volume of traffic exceeds road capacity, leading to traffic jams and slow movement.
Urban greening	The process of increasing and preserving open spaces like parks and gardens in urban areas.
Urbanisation	The increasing percentage of a country's population living in towns and cities. Rapid urbanisation often occurs in LICs and NEEs.
Urban regeneration	The revival of old urban areas, either through renewal (modernising old buildings) or redevelopment (demolition and new construction).
Urban sprawl	The unplanned expansion of urban areas into surrounding rural land.
Waste recycling	The process of recovering and reusing useful materials from waste.
Paper 2: Section C - Resource management	
Term	Definition
Agribusiness	Application of business skills to agriculture.
Carbon footprint	A measurement of all the greenhouse gases we individually produce through burning fossil fuels for electricity, transport, etc., expressed as tonnes (or kg) of carbon-dioxide equivalent.
Energy mix	The range of energy sources of a region or country, including both renewable and non-renewable sources.
Food miles	The distance food is transported from the producer to consumers.
Fossil fuel	A natural fuel such as coal or gas formed in the geological past from the remains of living organisms.
Local food sourcing	A method of food production and distribution that is local rather than national or international. Food is grown, raised, and harvested near consumers and distributed over short distances.
Organic produce	Food produced using environmentally and animal-friendly methods on organic farms. Artificial fertilisers are banned, and farmers maintain fertile soil by rotating crops and using compost, manure, and clover. It is free of synthetic additives like pesticides and dyes.
Resource management	The control and monitoring of resources so that they do not become depleted or exhausted.

Case Study Overview Sheets

Section C: Physical landscapes in the UK: Rivers - erosional and depositional landforms, River Tees, UK

Paper:	Paper One
Section:	Section C: River Landscapes of the UK
Location:	The River Tees is located in the north of England. It flows east from the Pennines (Cross Fell) to the North Sea at Middlesbrough.

Specification Content	Notes:
An example of a river valley in the UK to identify its major landforms of erosion and deposition.	
UK river valley location	The River Tees is around **137 km long**, rising at **Cross Fell (893m)** in the **Pennines**, and flows east through **County Durham** and **North Yorkshire** before reaching the **North Sea at Middlesbrough**. The river passes through **steep uplands**, a **meandering middle course**, and a **broad, flat estuary** near its mouth.
Major landforms of erosion.	**High Force Waterfall and Gorge (Upper Course)**: Located near Forest-in-Teesdale, High Force is the UK's largest waterfall (21 m). It is formed where hard igneous Whin Sill rock lies over softer sandstone and shale. The softer rock erodes more quickly by hydraulic action and abrasion, creating an undercut and a plunge pool. Over time, the unsupported overhang of hard rock collapses, and the waterfall retreats, forming a gorge downstream.
Major landforms of deposition	**Meanders, Levees and Floodplains at Yarm (Middle Course)**: The River Tees widens and slows, leading to lateral erosion and meandering. At Yarm, large bends are formed as water erodes the outer banks and deposits on the inner banks. During floods, sediment is deposited on the floodplain, creating levees. Over time, these raise the river banks above the level of the floodplain. **Tees Estuary (Lower Course):** At the mouth of the River Tees, where it flows into the North Sea, the river's velocity slows, leading to the deposition of fine sediments and the formation of extensive mudflats and sandbanks. One of the most notable features is Seal Sands, a tidal mudflat and saltmarsh designated as a nature reserve due to its importance for migratory birds and seals. Despite being close to Teesport (one of the UK's largest ports) and surrounded by heavy industry, including petrochemical plants and steelworks, the area maintains significant ecological value, meaning it supports a wide range of living organisms and contributes to a healthy ecosystem. Seal Sands demonstrates how conservation efforts can coexist with industrial land use in the estuary.

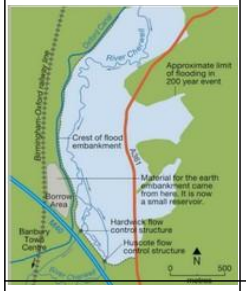
Upper Course

Middle Course

Lower Course

Section C: Physical landscapes in the UK: Rivers - Flood management, River Cherwell, Banbury

Paper:	Paper One
Section:	Section C: River Landscapes of the UK
Location:	Banbury is located in **central England, it** is a market town in Oxfordshire, approximately **50 km north of Oxford**. The town is built on the **floodplain of the River Cherwell**, a **tributary of the River Thames**, making it vulnerable to flooding.

Specification Content	Notes:
An example of a flood management scheme in the UK to show: **• why the scheme was required** **• the management strategy** **• the social, economic and environmental issues.**	
Why the scheme was required?	**Flood History:** Banbury has a history of severe flooding. Major floods occurred in 1998, affecting over 150 homes and businesses, and again in 2007, both causing widespread disruption and damage. **Vulnerability:** The town is built on a floodplain, making it naturally prone to flooding. Urban expansion and increasing areas of impermeable surfaces (e.g., roads and buildings) have reduced natural infiltration, increasing surface runoff. Key infrastructure at risk includes the M40 motorway, a railway line, and hundreds of homes and businesses. **Economic Cost:** The 1998 flood alone caused an estimated £12.5 million in damage to property, infrastructure, and the local economy. **Need for Protection:** To reduce the risk of future flooding and limit economic and social disruption, a comprehensive and long-term flood management scheme was needed to protect the growing population and critical infrastructure.
The management strategy 	**The Management Strategy (2012)** The scheme cost £18.5 million and involved both hard and soft engineering approaches: **Hard Engineering Features** • 2.9 km earth embankment (up to 4.5m high) built north of Banbury to create a flood storage area that protects the M40 motorway and Oxford Canal. • Flood storage area can hold up to 3 million m³ of water, reducing pressure downstream. • Two flow control structures regulate water flow into Banbury during heavy rainfall. • The A361 road was raised and culverts installed to improve drainage and maintain traffic flow even during floods. • A pumping station transfers excess water into the River Cherwell downstream when needed. **Soft Engineering Features** • A Biodiversity Action Plan created new habitats such as ponds, trees, and hedgerows, which help absorb floodwater and improve local ecosystems. • The embankment construction used 100,000 tonnes of earth; the excavation site was converted into a permanent reservoir.
The social, economic and environmental issues.	**Social:** • 441 homes and 73 commercial properties protected from flooding. • Roads and motorways remain open, reducing disruption to people's daily lives. • Quality of life improved with new green spaces and footpaths **Economic:** • Cost: £18.5 million, funded by the Environment Agency and Cherwell District Council. • Estimated £100 million in flood damage avoided. • Businesses remain open during storms, avoiding loss of income. **Environmental:** • New habitats created under the Biodiversity Action Plan. • Some land lost to the flood storage reservoir, but designed to be environmentally beneficial. • Natural processes like infiltration and interception are used to help manage water.

Section A: Urban issues and challenges - NEE city - Rio De Jamario, Brazil

Paper:	**Paper Two**
Section:	**Section A: Urban issues and challenges**
Location:	Rio de Janeiro is located in Southeast Brazil on the Atlantic coast, around Guanabara Bay. It is the second most populous city in Brazil and a major economic and cultural hub in Latin America.

Specification Content	Notes:
The case study examines a major city in a low-income or newly emerging economy (LIC/NEE), highlighting its regional, national, and international significance, the drivers of its growth such as natural increase and migration, the opportunities and challenges created by urbanisation - including access to services, economic development, slum management, and environmental issues and examples of urban planning efforts aimed at improving the quality of life for the urban poor.	
Growth of Rio	• **Capital Status:** Former capital of Brazil until 1960, remains one of the most important cultural and economic cities in the country. • **Historical Growth:** Rapid urban growth in the 20th century due to rural-urban migration and natural increase. • **Population:** Rio has a population of over 12.5 million across the city and metropolitan area making it a megacity. • **Urban Expansion:** Rapid urban sprawl grew from the city core to surrounding hillsides, with favelas forming as informal settlements). 
Regional Importance of Rio	• Over 12.5million people live in and around the city who also work in the city (job opportunities for the people of Rio). • People will benefit from the city's wealth through the growth of businesses on the outskirts e.g. suppliers. • A key reason for growth of the city is the migration of low skilled workers to the outskirts of the city to access jobs. • Hub for entertainment, sports, and culture.
National Importance of Rio	• Rio was the capital city of the country until 1960. The capital city is now Brasília. • Second most important industrial centre in Brazil after São Paulo. • Port and airport link the city nationally. • Centre for research, higher education, and media. • Headquarters of major Brazilian companies and banks for example, The HQs of Petrobras (Brazil's largest oil company) are located in Rio. • Centre for research and media which attracts highly qualified migrants from universities all over the country. There has been a physical growth of the business centre in the city due to its significance to the economy. • Rio is a major economic centre, producing 5% of the country's GDP (the country's wealth) making it home to Brazil's second largest GDP.
International Importance of Rio	• Port and airport link the city internationally. • Attracts international investment and tourism. • Rio is the most visited city in the Southern Hemisphere. Carnival attracts 1million visitors each year. • Rio is an iconic city due to the Christ the Redeemer statue, which is one of the seven wonders of the modern world. It attracts 1.6million visitors a year. • People from other NEE countries such as China and South Africa, as well as HICs from USA and Europe, locate in Rio to take up highly specialised position in industry. • Global centre for oil and gas industry with offshore drilling and refining. • Hosted the 2014 FIFA World Cup and 2016 Olympic Games. 
Population Growth	**Rapid population growth** in Rio is driven by: • **Rural-urban migration**: People move from poorer parts of Brazil, particularly the drought-prone northeast, in search of jobs and better living conditions. • Over 1.2 million people have migrated to Rio in the last decade. • **Natural increase**: A youthful population results in a high birth rate, contributing to urban growth. • Many migrants are of childbearing age, boosting natural growth. • Rio's urban area has expanded to accommodate the growing population, but housing and infrastructure have struggled to keep pace. • Urbanisation has led to rapid expansion of favelas (e.g., Rocinha, Complexo do Alemão). **Push factors from rural areas:** • Lack of jobs and low wages - Lack of future prospects. • limited healthcare and education opportunities. • **Poor living conditions** with limited sanitation • Climate change impacts - floods, droughts and land degradation. • Political instability and poverty. **Pull factors to Rio:** • Availability of jobs and better paid jobs in construction, services, and tourism (especially before and after the 2014 World Cup and 2016 Olympics). • Improved healthcare, education, and housing prospects. • Urban lifestyle, infrastructure, and access to electricity and clean water. • The appeal of the city's vibrant culture and improved quality of life.
Economic Opportunities	• **Finance & Commerce:** Rio is Brazil's second most important industrial city after São Paulo - Headquarters of major oil and gas companies (e.g., Petrobras). • **Port and Airports:** Rio has Brazil's second-largest port and 5 airports including Galeão International Airport, creating low and high skilled work. • **Tourism Hub:** One of Brazil's most visited cities - Christ the Redeemer (one of the New 7 Wonders of the World), beaches (e.g., Copacabana, Ipanema), Carnival festival, creating many jobs in the hospitality and tourism industry. • **Construction Boom:** Infrastructure projects like roads, stadiums, metro systems and housing ahead of Olympics and World Cup created many jobs. • **Service Sector:** Growing job opportunities in education, healthcare, retail, banking, insurance, and retail. • **Oil Industry:** Rio is a major centre for offshore oil drilling and refining creating jobs. 🏭 **Main Industrial Zones in Rio:** **1. Zona Norte (North Zone) -** Location: Around Avenida Brasil and Guanabara Bay. • Home to Rio's main port - Port of Rio de Janeiro, handling large volumes of cargo (imports and exports), including oil, steel, manufacturing goods and food products. • Contains large oil refineries, petrochemical complexes, and steelworks. • Significant industries: shipbuilding, oil refining, food processing, and cement production. **2. Cidade Nova and Centro (Central Business District)** • While mainly commercial, some light manufacturing and service industries are based here, especially financial, IT, and creative sectors. **3. Santa Cruz (West Zone)** • Location of heavy steel industries, such as the TKCSA steel plant. • Attracts large foreign investment. • Provides significant employment and contributes to Rio's industrial output.

Social Opportunities Access to Services (Health and Education)	**Healthcare:**
	• Rio de Janeiro provides free healthcare (SUS) throughout the city and people have better access to hospitals, doctors' surgeries and pharmacies than in other parts of Brazil.
	• There are three public hospitals and six private ones, however most hospitals are located in the wealthier south and west zones of the city.
	• Healthcare is also available for poorer people living in favela and health cover here has increased from 4% to 70%. However, health services are limited; many people in the favelas rely on overcrowded clinics (2 health clinics for a population of about 100 000).
	• 'Family heath teams' of medical professionals or charity-based services such as Doctors Without Borders go into the favela to treat patients and test people for different diseases. This has led to early detection of illnesses and increased life expectancy in the favelas.
	• The Santa Marta favela with a population of 8,000, is located 13km away from its nearest hospital.
	• Life expectancy still does vary across the city:
	  • Wealthy areas like Barra da Tijuca: 77 years
	  • Favelas like Cidada de Deus: 45 years
	
	Education:
	• Rio has over 1,000 primary schools, 400 secondary schools and six universities which means 90% of children aged 10 can read and write.
	• School attendance is improving but drop-out rates remain high especially in poorer areas as children drop out.
	• The Brazilian government made education compulsory for all children aged 4–14 in 2009 to help reduce inequality and improve access to opportunities for low-income families, however about 25% of the poorest children do not attend school regularly.
	• About 50% of children continue education after the age of 14 in Rio.
	• The 'Grants for Families programme' offers financial support to poor families if their children attend school and 'Schools for Tomorrow' are working with communities to improve education provision offering vocational training in the favelas. Free childcare provision is also offered to enable parents (especially mothers) to seek employment.
	• Sports such as football, volleyball, athletics, are used to encourage children and teenagers from the favelas to stay in school. They provides free sports training, along with educational support, snacks, and school materials.
	• In 2001 the university of Estáscio de Sá opened in the in Rocinha providing further educational opportunities for families in the favela.

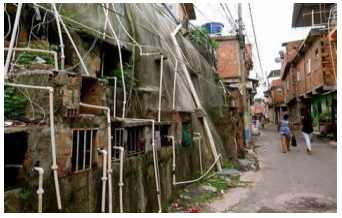
Social Opportunities Access to resources (Water and Energy)	**Water Supply:** • Rio de Janeiro has the largest water treatment works in the world. • People living in the city have a much greater chance of having a fresh water supply than people in rural areas of the country. • Around 80% of Rio's water comes from the Guandu River. • In 2014, around 95% of Rio's population had access to mains water, thanks to government investment. • Before improvements, favelas suffered from irregular water supply and illegal tapping. • The city invested in over 300 km of new water pipes to improve access, especially in poor neighbourhoods. • In some areas like the West Zone, water access has become more reliable due to these efforts. **Sanitation:** • Urban growth has led to improved sewage networks in some parts of the city. The city has Installation of 12 new sewage works since 2004 and 5km of sewage pipes. • The Alegria sewage treatment plant is one of the biggest, helping reduce pollution in Guanabara Bay. **Energy:** • Around 99% of the city's residents have direct access to electricity as electricity access has expanded as Rio grows. • New power lines have been installed and the construction of the Simplicio Hydroelectric Complex in 2013 has increased Rio's supply of energy by 30%. • Two nuclear reactors are located in Rio supplying 3% of Brazil's energy needs, and a third was due to start operating in 2023 however work has been suspended. • Over 150 solar panels have also been fitted to the roofs of many building in the Santa Marta favela through a community project, providing affordable energy to the residents. • The city invested in low-cost electricity connections, helping reduce blackouts and improve safety.
Social challenges Access to services (health and education)	**Challenges in healthcare**: • Healthcare inequality is severe, especially between rich and poor areas. In wealthy neighbourhoods like Barra da Tijuca, life expectancy is 80 years, while in poorer areas like Campo Grande, it falls to just 45 years. • Infant mortality is a major issue in favelas, with 50 deaths per 1000 live births, compared to much lower rates in the wealthier south zone. • In 2013, only 55% of the population had access to a family health clinic, highlighting the limited availability of basic healthcare services in many parts of the city. • Hospitals are often located far from the favelas. For example, residents of Santa Marta have to travel 13km to reach the nearest hospital. • Transport infrastructure is poor in favelas, with limited or no road access, making it extremely difficult for ambulances or residents to reach medical care during emergencies. **Challenges in education:** • Educational inequality is widespread. In poorer areas, many children drop out after age 14 to support their families through work, contributing to a cycle of poverty. • Although education is compulsory from ages 6 to 14, only around 50% of children stay in school beyond this age. • A lack of schools in favelas means many children must travel long distances, which discourages attendance. • Teaching quality is low due to a shortage of qualified teachers, caused by low salaries and poor working conditions. • Poverty is a key barrier: families often rely on their children to earn money, which means education is not prioritised. • These factors contribute to low literacy rates, limited job prospects, and high unemployment in favela communities.
Challenges of managing resources (water, sanitation and energy)	**Water Supply** • 12% of Rio's population does not have access to running water. • Water pipes are often leaking, poorly maintained, and subject to illegal tapping, resulting in 37% water loss. • Many favelas lack legal land ownership, so households are not connected to the city's water grid and must collect water from centralised points. • Over 200 tonnes of raw sewage flows into Guanabara Bay daily, and 55 rivers are polluted by run-off from favelas. • Health risks include outbreaks of cholera and other waterborne diseases. **Sanitation** • Around 50% of sewage is still untreated, particularly in favelas. • 35% of Rio's sewage is dumped in open sewers, often directly into rivers or the sea, contributes to poor water quality in Guanabara Bay • The city's sewage treatment systems cannot cope with the demand caused by rapid population growth. • Open sewers are a health risk, especially in densely populated favelas, leading to the spread of diseases such as typhoid, dysentery, and cholera. **Energy Supply** • 99% of homes officially have access to electricity, but the system lacks reliability. • There is a lack of legal electricity connection for many favela homes leading to illegal connections to the grid, often causing blackouts due to system overload. Tapping into electricity is also dangerous and unsustainable. • High energy demand from both the growing population and industrial sector is putting pressure on supply systems.

Challenges of Managing the Environment in Rio	**Water Pollution**
	• Guanabara Bay is heavily polluted by:
	  • Untreated sewage as over 200 tonnes of raw sewage enters Guanabara Bay daily, reducing water quality.
	  • Industrial waste as over 50 tonnes enters Guanabara Bay daily, reducing water quality.
	  • Oil spills and waste products from ships, reducing water quality.
	• Pollution threatens marine wildlife
	
	Management Strategies:
	• Ships fined for illegal discharges.
	• New sewage plants and sewage pipe installation reducing pollution of waterways.
	• **Advantage**: Protects beaches like Copacabana and Guanabara Bay.
	• **Disadvantage**: Population growth may outpace improvements.
	
	Waste Management
	• Rio produces 3.5 million tonnes of waste per year, but less than 2% is recycled.
	• Waste collection is limited in favelas due to steep, narrow streets.
	• Rubbish clogs rivers, contributes to pollution and floating debris in Guanabara Bay.
	Management Strategies:
	• waste-to-energy power plant burns 30 tonnes of waste daily, reducing waste on the street and from getting into rivers, but Still releases pollutants into the atmosphere, contributing to air pollution. It also supplying electricity for 1,000 homes.
	• Seropedica landfill captures methane gas for electricity and fuel, reducing the release of greenhouse gasses into the atmosphere.
	
	Traffic Congestion & Air Pollution
	• Rio is the most congested city in South America and car ownership has increased by 40% in recent years.
	• Air pollution causes 5,000 deaths per year.
	• Smog is formed from traffic and industrial emissions.
	Management Strategies:
	• **Expansion of the Metro System** - Rio has expanded its underground metro network to encourage people to use public transport instead of cars.
	• Fewer cars on the roads means less exhaust pollution and lower congestion.
	• **New Toll Roads** - Toll roads have been introduced to reduce inner-city traffic by discouraging unnecessary driving. This helps cut down on emissions in busy urban areas.
	• **One-Way Systems on Coastal Roads** - During rush hour, some coastal roads become one-way to improve traffic flow. This reduces congestion, lowering the amount of exhaust fumes produced.
	• **Use of Cleaner Fuels** - Seropédica landfill gas is now captured and converted into fuel for waste vehicles, reducing emissions from municipal transport.
	• **Advantage**: Less congestion, reduced pollution.
	• **Disadvantage**: To avoid toll roads other quieter roads could become busier increasing air pollution in these areas.

Challenge of reducing unemployment and crime.	**Challenges in Rio - Unemployment**
	• Unemployment is particularly high in favelas, where many people lack formal education and skills. With so many residents competing for the same low-skilled jobs, securing stable work is very difficult.
	• A large proportion of favela residents are employed in the informal sector. These jobs are low-paid, unreliable and offer no job security, contracts, or employment rights. Informal work includes street vending, recycling, domestic work, and car washing—jobs which often don't provide enough income to support a family.
	• Youth unemployment is especially high, and limited job opportunities contribute to poverty and increase the risk of young people turning to crime.
	
	Challenges in Rio - Crime
	• Crime is a serious and widespread issue in favelas, with drug trafficking, gang violence, and armed robbery being common.
	• The murder rate can reach 20 per 1000 people in some areas. This is largely due to:
	  • Territorial battles between rival gangs.
	  • Frequent armed confrontations with police.
	  • Lack of government presence or control in many favelas.
	• Many victims are innocent bystanders, including children, who are caught in crossfire during gun battles.
	• Some children are recruited into gangs, often to act as lookouts or couriers. Many join because:
	  • They need to help support their families
	  • They see no alternative opportunities due to poverty and lack of jobs
	• In response, the government introduced Pacifying Police Units (UPPs) in 2008 to reclaim control of favelas from gangs and restore law and order by establishing a permanent police presence. However, in some favelas, violence continues and residents mistrust the police, accusing them of corruption and excessive force.








Rio Squatter settlements (Favelas)	**Squatter settlements**: Areas where people build homes on land they do not own, often illegally, providing basic shelter for many of the world's poorest people. **Construction** • Homes typically made from scrap materials such as wood, plastic sheeting and corrugated metal. • Over time, residents may use more durable materials to improve housing quality. **Global Context** • Common in many cities of low-income and newly emerging countries. • Also known as: Informal settlements, Shantytowns, Favelas, Barrios, Slums **Notable Squatter Settlements in Rio** • Over 1,000 favelas (squatter settlements) exist across Rio, including large, well-known ones like Rocinha, Santa Marta and Complexo do Alemão. • Typically located in undesirable or dangerous areas, such as: • Steep hillsides prone to landslides (e.g. Rocinha, Santa Marta) • Land near rubbish tips or polluted rivers • Areas close to industrial zones or under main roads • Favelas are often built illegally on land the residents do not own, and they lack access to basic services. • Many began as small clusters of self-built homes but have expanded rapidly due to urban migration and population growth.  **Favela Populations in Rio** **Favela** / **Estimated Population** / **Notes** **Rocinha** / Approximately 100,000 – 225,000 / Official census data suggests 100,000, but unofficial estimates go up to 225,000. It's the largest favela in Brazil. **Santa Marta** / Around 6,000 – 8,000 / A much smaller favela in the South Zone, known for its steep slopes and proximity to wealthy areas. **Complexo do Alemão** / Around 70,000 – 120,000 / A large complex of 13 interconnected favelas in the North Zone. Seen as a hotspot for gang activity and UPP interventions. **Problems of Living in Squatter Settlements (Favelas) in Rio** **High Population Density** • Favelas like Rocinha are densely populated, with estimates of over 225,000 people living in a compact hillside area. • Like Makoko in Lagos (which has ~250,000 people), Rio's favelas are overcrowded, increasing pressure on housing, services, and sanitation. **Poor Housing Conditions** • Homes are self-built using scrap materials like wood, metal sheets, and bricks, with no formal planning. • Most lack legal ownership, making them vulnerable to eviction or demolition. • Many are built on steep hillsides, increasing the risk of landslides after heavy rainfall (e.g., 2010 landslide killed over 200). • Limited access to clean water, electricity, and proper sewage systems– many residents tap into these illegally. **Sanitation and Health** • Favelas often lack basic sanitation infrastructure – open sewers and overflowing bins are common. • Health problems like cholera and diarrhoea spread easily due to poor hygiene. • Infant mortality can reach 50 per 1000 births (compared to much lower rates in richer areas). • Residents in areas like Santa Marta are located 13km from the nearest hospital, with limited road access for ambulances. **Economic Conditions** • Most residents work in the informal economy: e.g., street vending, car washing, recycling – jobs that are low-paid, unreliable, and offer no legal protections. • Similar to Makoko (Lagos), some rely on traditional livelihoods, like fishing or local services. • High unemployment levels – especially for young people – contribute to poverty and crime. **Crime and Safety** • Many favelas are controlled by drug gangs, with frequent gun battles between gangs or with police. • Murder rates can reach up to 20 per 1000 people in some areas. • Children are often recruited into gangs to earn money for their families. • Pacifying Police Units (UPPs) have tried to reduce crime by reasserting control, but results are mixed, with continued violence and mistrust in some areas. **The Future of Favelas** **Pride and Resilience** • Despite challenging conditions, many residents take pride in improving their homes using 'self-help' methods. • In favelas like Rocinha, residents have added electricity, running water, and brick walls without government assistance. • Community groups have led projects to install basic infrastructure (e.g., clean water, makeshift sanitation) and organise local waste collection. **Community Facilities** • In Rocinha, community centres, informal clinics, and local schools have been developed by residents and NGOs • In Santa Marta, improved transport links (e.g., a cable car system) have helped connect the community to formal services and job opportunities. • Although government services are limited, volunteer-run health programmes and sports projects have been introduced to support youth and public health. **Demolition Threats** • Some favelas are under threat due to urban development and Olympic-related infrastructure projects. • The 2016 Olympics led to evictions in favelas near the city centre and sports venues (e.g., Vila Autódromo), where hundreds of homes were demolished to make way for roads and facilities. • Residents are often not offered suitable alternative housing or are relocated far from job opportunities. • Many protest that favelas are seen as a problem to be removed, rather than supported and upgraded.

Examples of urban planning efforts aimed at improving the quality of life for the urban poor.

How Are Favelas Being Improved in Rio?
Favelas are being improved through urban planning schemes like the Favela Bairro Project, aiming to:
- Upgrade living conditions without relocating residents.
- Provide basic infrastructure (water, sanitation, electricity).
- Improve safety, mobility, and access to services.
- Promote community involvement in planning (bottom-up development).

Common improvements include:
- Wider paved roads for emergency services and rubbish collection.
- Proper sanitation systems (drainage and clean water).
- Health clinics, schools, and leisure centres.
- Hill stabilisation to prevent landslides and replacement of wooden homes with brick buildings.
- Legal land ownership and access to credit.
- Community policing to reduce gang violence.

The Favela Bairro Project
- Ran from 1994–2008, costing US $1 billion.
- Targeted over 250,000 residents in 73 favelas (mainly in the North Zone, including Complexo do Alemão).
- A bottom-up development approach: residents identified their own priorities.
- The "Slum to Neighbourhood Project" recognised residents' right to stay and gave them a sense of ownership, dignity, and stability.

Key Features:
- Cable car system in Complexo do Alemão – free daily return trips to the city centre.
- New medical, educational, and daycare facilities.
- Adult literacy and job training (e.g., computing, hygiene).
- Legal land titles offered, increasing home security.
- Brick homes replaced unsafe wooden structures.
- Community-led policing units to improve trust and reduce crime.

How Successful Was the Favela Bairro Project?
Successes:
- Improved quality of life – better housing, sanitation, education, and health services.
- Boosted employment and mobility through new infrastructure (e.g., cable car).
- Increased community pride and involvement in local planning.
- Helped formalise previously informal settlements, making them part of the city.

Failures:
- High cost: limited to certain areas, many favelas saw no improvements.
- Rent prices increased in upgraded areas, pushing poorer residents out.
- Some infrastructure (like the cable car) became unmaintained or unused after funding stopped.
- Long-term sustainability depended on continued investment, which fell after Brazil's 2015 recession.

What Has Happened Since?
- In 2017, the cable car in Complexo do Alemão was shut down due to lack of funding, cutting off vital access for residents.
- Recession-hit economy led to the withdrawal of government support, halting further expansion.
- While some favelas remain improved, many still face poor sanitation, unemployment and crime and lack of policing.
- The project proved urban upgrading works, but long-term success requires ongoing funding and support.

Transformations from Slum to Neighbourhood:

Before (Favela)	After (Neighbourhood)
Houses made of wood and scrap	Homes rebuilt with brick and concrete
No ownership or legal status	Land ownership granted to residents
No sanitation or sewage system	Drainage systems and piped water installed
Narrow, steep, unpaved paths	Wider, paved roads and steps added
Few or no public services	Schools, health centres, leisure facilities built
High crime and gang control	Community policing (UPPs) introduced
No formal transport	Cable car system installed (e.g., in Complexo do Alemão)





Section A: Urban issues and challenges- HIC city - Manchester, UK

Paper:	**Paper Two**
Section:	**Section A: Urban issues and challenges**
Location:	Manchester is a city located in North West England.

Specification Content	Notes:
The case study focuses on a major UK city, examining its significance both nationally and globally, the effects of national and international migration on its development and character, the opportunities generated by urban change - including cultural diversity, employment, and urban greening—as well as the challenges faced, such as urban deprivation, housing inequalities, environmental issues, and the impact of urban sprawl on surrounding rural areas and commuter settlements.	
About Manchester	• Manchester is one of the UK's largest and fastest growing cities. • Known for its industrial heritage, universities, football clubs, and vibrant culture. • Population of around 550,000 in the city, over 2.5 million in Greater Manchester.
Historical importance	• First industrial city in the world; major textile and cotton producer during the Industrial Revolution. • Birthplace of the modern computer and site where the atom was first split • Historic global trading links via the Manchester Ship Canal and textile exports
National importance	• Home to the BBC at MediaCityUK, Granada TV (e.g. Coronation Street) - broadcasting informative and entertaining programmes across the UK • Economic centre contributing 10% of UK employment. • One of the UK's main financial hubs (Spinningfields – HSBC, Barclays). • Cultural hub with world-famous music scene (e.g. Oasis, The Smiths), football clubs (Manchester United, Manchester City). • Four major universities with 85,000 students (boosting economy and knowledge sector).
International importance	• Manchester University ranked in the top 60 globally; attracts international researchers and students. • Exported £14.9 billion worth of goods worldwide in 2019. • Over 200 languages spoken – one of Europe's most diverse cities. • International media and technology links (e.g. BBC World Service). • Hosts major global events (e.g. concerts, international sports tournaments).

Environmental information	**Green Space:**
	• Green space with over 20 parks in the city including Heaton Park (one of the largest in Europe).
	• Mayfield Park is Manchester's first new city centre park in over 100 years, developed as part of urban regeneration.
	• Town Hall Extension Green Roof: This features sedum plants and helps reduce urban temperatures, manage rainfall, and encourage biodiversity.
	• Urban greening initiatives like Castlefield Green Corridor aim to create linked green spaces and promote wildlife.
	• Focus on reducing carbon emissions and developing sustainable transport (Metrolink, cycling routes).
	• Investment in green infrastructure to improve air quality and reduce flood risk
	
	Sustainable Transport and Pollution Reduction:
	• Expanded Metrolink light rail system encourages public transport use and reduces car reliance.
	• Investment in walking and cycling infrastructure (e.g. Bee Network plan).
	• Low Emission Zones and electrification of buses are being introduced.
	
	Blue Infrastructure Improvements:
	• Improvements to the River Medlock, River Irwell, and Rochdale Canal include:
	  • Re-naturalisation of riverbanks.
	  • Creation of wetland habitats to reduce flood risk and improve water quality.
	  • Improved access to water spaces for recreation.

Impact of Migration	**National migration:** students from all over the country come to the three large universities in the city. During term times this increases the population in the south of the city in neighbourhoods such as Fallowfield. This part of the city has lots of bars and cafes which are supported by the student population, as well as a high proportion of rental houses. **International migration:** Manchester is one of the most ethnically diverse cities in Europe with over 200 languages being spoke in the city. Parts of the city are particularly diverse e.g. Cheetham Hill as well as China Town in the centre and 'The Curry Mile' in south Manchester.
Urban change created social and economic opportunities: cultural mix, recreation and entertainment, employment, integrated transport systems.	**Cultural mix:** Manchester International Festival every two years brings a wide range of cultural performances across the city (music, theatre, art). Other festivals across the city include St Patrick's Day parade, Manchester Caribbean Carnival and Chinese New Year. Opportunity for social integration and appreciation. Businesses see a boost in custom during festival times. **Recreation and entertainment:** Football and other sporting events e.g. cycling and rugby, indoor ski slope close to the Trafford Centre, music concerts – Manchester is known all over the world for its indie bands e.g. Oasis, Elbow and Joy Division. **Employment:** Retail is a major employer in the city (15%) e.g. Manchester Arndale and the Trafford Centre. There is still a large industrial area near Old Trafford and there has been a massive increase in media jobs in recent years when the BBC moved to Salford. **Integrated transport systems:** the Metrolink tram system is linked to bus stations, national train stations (Piccadilly and Victoria), park and Manchester Airport. One ticket can be used on the Metrolink and buses. However, journeys can be long and expensive.




urban change created environmental opportunities: urban greening.	**Urban greening** **Definition:** The process of increasing and protecting green spaces in towns and cities. It includes things like: • Parks and gardens • Street trees and green roofs • Green corridors and walking routes • Improving riverbanks and canals (blue infrastructure) **Manchester's Green and Blue Infrastructure Strategy sets out objectives:** • To improve the parks and green spaces so that people use them e.g. Music festivals in Heaton Park. • To create green space in new building developments and add green space to current buildings e.g. grass roof on the Town Hall and green areas in New Islington). • Improve access to green areas via green corridors like the Green Loop which seen disused rail lines turned into walkable routes (e.g. Salford's urban trail). • Mayfield Park is Manchester's first new city centre park in over100 years, redeveloped from a brownfield site.	
urban change created social and economic challenges: urban deprivation, inequalities in housing, education, health and employment	• **Deprivation** - Parts of the city suffer deprivation 2.7% of the population of Manchester are on benefits, compared to just 1.8% in the UK as a whole, showing that people are poorer and may be unlikely to afford a 'normal' standard of living. Inner city areas, particularly in north Manchester (e.g. **Miles Platting**) suffer more from deprivation compared to wealthy wards in south Manchester (e.g. **Didsbury West**). • **Inequalities in housing** – High proportion of people in poor quality and small housing in MP, high proportions of people in social housing. House prices in DW are very high. • **Inequalities in education** – MP 45% of GCSE pupils achieved acceptable level of attainment, compared to 83% in DW, probably due to poor attendance at school and poor aspirations due to high unemployment. • **Inequalities in health** - Life expectancy is lower in MP (71.5 years) compared to DW (79.2 years), because of issues such as obesity and poor health choices e.g. smoking and alcohol consumption. Coronary heart disease is a big problem in MP. • **Inequalities in employment** – 12% of people in MP are on credit due to unemployment, compared to 2% in DW. High levels of unemployment due to poor outcomes in education.	 

Urban change created environmental challenges: dereliction, building on brownfield and greenfield sites, waste disposal.	**Dereliction**
	Definition: When buildings or land are abandoned and fall into poor condition or disrepair. These areas can:
	• Attract crime, vandalism, and anti-social behaviour
	• Be expensive and difficult to redevelop
	• Be targeted for urban regeneration
	
	Dereliction in Manchester:
	• There are many parts of Manchester that have been left abandoned leading to buildings becoming derelict, attracting vandalism. This is mainly an issue in inner city areas.
	• Former industrial sites like Ancoats and the Mayfield Train Station were left abandoned after deindustrialisation.
	• These areas attracted vandalism and crime.
	
	Brownfield Sites
	Definition: Previously developed lands, often abandoned industrial sites that may need decontamination.
	• **Advantages**:
	  • Helps reduce urban sprawl by focusing development within the city.
	  • Better access to public transport, lowering car reliance.
	  • Utilizes existing infrastructure and can improve urban environments.
	• **Disadvantages**:
	  • High costs for demolition and decontamination.
	  • Increased prices due to high demand for land in urban areas.
	
	Brownfield Sites in Manchester:
	Often contaminated and expensive to develop but prevent urban sprawl.
	• Manchester City FC's, stadium used to be at Maine Road in Moss Side before they got a new stadium in Ardwick. The stadium was demolished in 2003 and the Maine Road site was left empty for two years until the site was used to build 474 new houses on it.
	• MediaCity was built on the former Manchester Ship Canal docks.
	• Recent regeneration projects (e.g. Mayfield Park) show positive change, but many sites remain
	
	Greenfield Sites
	Definition: Undeveloped lands, often agricultural or rural, on the outskirts of urban areas.
	• **Advantages**:
	  • No need for demolition or decontamination.
	  • Generally lower land costs.
	• **Disadvantages**:
	  • Poor public transport links may lead to increased car use.
	  • Risk of urban sprawl, causing uncontrolled growth.
	  • Loss of valuable agricultural land and natural habitats.
	  • Once developed, these lands rarely return to their natural state.
	
	Greenfield sites in Manchester:
	• Many greenfield sites in Salford are being used to build affordable new homes for the rising population.
	• Development in **Salford's rural-urban fringe** is controversial.
	• Local opposition due to loss of green space and pressure on services like schools to support a rising population.
	• Peel Holdings, the developer, is being criticised for taking up green space rather than brownfield sites.
	
	Waste disposal in Manchester:
	• Residents in Manchester have a number of different household bins in order to help them to recycle.
	• Recycling rates have increased by **2.5%**, but total waste has increased by **3%**, leading to more landfill.
	• Issues in Manchester are that, although initially people used them, the rates of recycling have stagnated (not improved), despite us generating more waste. Therefore, the city is using more and more landfill to cope with its waste.
	• There is a greater need for effective waste management strategies.
		
		 
		 
		 
		 

Impacts of urban sprawl on the rural–urban fringe, and the growth of commuter settlements.	**Urban Sprawl on the rural-urban fringe** **Definition:** The uncontrolled outward growth of a city into the surrounding countryside. It can lead to: • Loss of greenfield land and habitats • More commuting and traffic congestion • Pressure on rural services like schools and healthcare Definition: The **rural–urban fringe** is the **edge of a city**, where the **urban area meets the countryside**. It often contains **mixed land uses** such as: • Housing estates • Business parks • Retail parks (e.g. Trafford Centre) • Farmland and green spaces **Urban Sprawl on the rural-urban fringe in Manchester:** • Manchester has grown outward, especially into Salford and southern suburbs • Driven by rising population and shortage of affordable inner-city housing. • Former satellite towns (e.g. Bury, Bolton, Rochdale) are now part of Greater Manchester's conurbation (a large urban area formed when a city expands and merges with nearby towns) • New housing estates are being built on expensive greenfield land. • Stanley Green Retail Park was built on the rural-urban fringe south of Manchester. • The bypass was built to cope with larger numbers of vehicles, however, local people have better services close by rather than having to travel into Manchester. **Commuter settlement:** Definition: A town or village where people live, but travel (commute) daily into a nearby city for work. These places often: • Have good transport links (motorways, trains) • Attract young professionals and families • Face rising house prices, traffic, and pressure on services **In Manchester:** • **Ramsbottom** which is north of Bury is a popular semi-rural area with good motorway links (M66). • Attractive due to scenery and conservation status - semi-rural setting in a conservation zone, so will remain 'unspoilt'. • Property prices are rising, which is pricing out locals. • Increased traffic and pollution; money often spent in the city rather than the local economy.




Section A: Urban issues and challenges- Urban regeneration- New Islington, Manchester

Paper:	Paper Two
Section:	Section A: Urban issues and challenges
Location:	New Islington is located in the inner city of Manchester, in the north-west of England. It lies just east of Manchester city centre, close to the Northern Quarter and alongside the Ashton Canal. The area is part of the Greater Manchester conurbation, within the district of Ancoats and Beswick. Historically, it was known as the Cardroom Estate, developed during the post-industrial period to rehouse workers from slum clearance. It is now a key focus for urban regeneration, supported by local authorities, private developers like Urban Splash, and community organisations.

Specification Content	Notes:
An example of an urban regeneration project illustrates the reasons for the area's need for regeneration and highlights the main features of the project.	
Why was it needed?	The area was originally the Cardroom Estate, located in inner-city Manchester (north of the city centre). • Deindustrialisation (the decline of traditional manufacturing industries, such as textiles, coal mining, and shipbuilding) had a major impact on Manchester in the late 20th century. • Factories and mills that once provided employment closed down, especially after the decline of the UK's textile industry. The Cardroom Estate, built to house factory workers, was left socially and economically deprived once those jobs disappeared. With no local employment: • Unemployment rose, and poverty increased. • The estate saw a rise in crime, drug dealing, vandalism, and antisocial behaviour. • By the mid-1990s, 50% of homes were unoccupied or squatted, and the area became known as a "sink estate." • Poor-quality housing built post-Industrial Revolution for factory workers. The estate became a sink estate where taxis and police wouldn't enter after dark. • Poor layout (e.g. cul-de-sacs and blind spots) made the area hard to police, attracting joyriders and gangs. • Shops closed, and basic services were lacking. Locals felt unsafe, and many moved away, worsening the area's decline. There was a need for modern housing and safe public spaces, especially after regeneration began in nearby areas following the 2002 Commonwealth Games.
What were the main features of the project?	**Main Features of the Project:** • Regeneration led by Urban Splash, supported by Manchester City Council (£10 million invested). • 1,700 new homes built – mix of private and some refurbished social housing. • Addition of key social infrastructure: • Health centre, New Islington Free School, cafés, restaurants, village hall. • Transport improvements: • New bus route and the New Islington tram stop on the Metrolink line. • Environmental improvements: • Eco-park, orchard, and football pitch. • New cycle lanes and canal-side paths to reduce car use and improve wellbeing. • Restoration of historical buildings like the old Manchester Hospital. • Lighting, pedestrianisation, and public seating to improve safety and aesthetics. • Green space (New Islington Marina) is now a popular, well-used community area.
Successes and Failures of regeneration in Manchester	**Successes of the New Islington Regeneration** **Improved Housing** • 1,700 high-quality homes built (modern apartments, renovated mills). • Some existing social housing was improved. **Better Local Facilities** • New health centre, primary school, village hall, cafés, restaurants, and shops. • New Islington tram stop improves public transport access. **Environmental Improvements** • Creation of eco-park, orchard, and green space around New Islington Marina. Canal paths and cycle lanes promote walking and cycling. • Historical buildings restored and public areas modernised with seating, lighting, and landscaping. **Community Use & Safety** • Area is now well-used by families and professionals. • Pedestrianised streets and lighting have improved safety and attractiveness. **Failures / Criticisms of the Regeneration** **Lack of Affordable Housing** • Many of the new homes in New Islington are expensive, high-end apartments designed for young professionals. • Only a small amount of social housing was kept or built, meaning original residents were often forced out. • This process is called gentrification where wealthier people move into a regenerated area, and local, lower-income residents are priced out due to rising house prices and living costs. **Ongoing Social Problems** • Despite investment, some areas (e.g. along the canal) still experience antisocial behaviour, vandalism, and drug use. • Some social divides remain between new wealthy residents and those in older housing.

Section A: Urban issues and challenges - Sustainable urban living - Freiburg, Germany

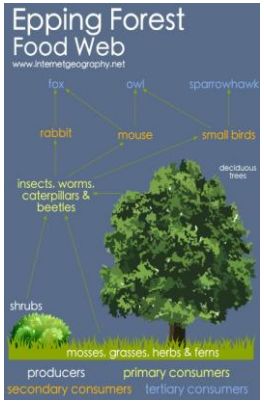
Paper:	Paper Two
Section:	Section A: Urban issues and challenges
Location:	Freiburg is located in the south-west of Germany, near the borders with France and Switzerland. It is known as one of Germany's greenest cities and a global leader in sustainable urban development

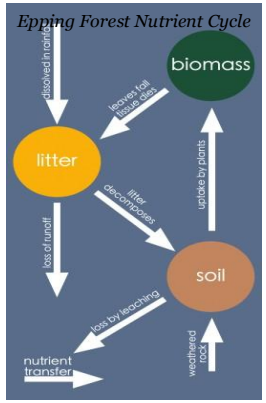
Specification Content	Notes:
Sustainable urban living encompasses features such as water and energy conservation, waste recycling, the creation of green spaces, and the implementation of urban transport strategies to reduce traffic congestion.	
Overview	Freiburg aims to be a Green City, integrating water and energy conservation, waste recycling, green space creation, and sustainable transport to reduce traffic congestion and foster a high-quality urban environment.
How is Freiburg sustainable?	**Water conservation** • Promotes rainwater harvesting through green roofs and domestic systems - green roofs filter and collect rainwater for use inside homes. • Permeable pavements allow rainwater to soak into the ground, reducing runoff. • Water is reused for toilets and gardens, helping to protect water supplies. • This reduces pressure on reservoirs and groundwater stores, securing water for future generations. **Energy conservation** • Freiburg plans to be 100% powered by renewable energy by 2050. • There are over 400 solar panel installations, including at the city's football stadium. • Many homes generate their own electricity with solar panels, and surplus energy is sold back to the grid. • This reduces reliance on fossil fuels and cuts greenhouse gas emissions. **Waste recycling** • Freiburg uses comprehensive recycling programs and policies to minimize landfill and encourage reuse • Households separate waste into different bins: paper, glass, metals, food, etc. • Freiburg has a recycling rate higher than the German average (Germany: 70%). • Annual waste reduced from 140,000 tonnes (1988) to 50,000 tonnes (2000). • Biowaste is turned into energy at local incinerators. **Creation of green spaces** • 40% of the city is forested, with 56% of that under strict protection. • 44,000 trees planted along streets and in parks. • Tram tracks are grass-covered, and many buildings have green roofs. • These green areas improve air quality, encourage biodiversity, and offer recreational space.
Implementation of urban transport strategies to reduce traffic congestion	Freiburg defines itself as the "city of short distances": integrated transport and land-use planning encourage walking, cycling, and public transport. An integrated transport system links different types of transport (like buses, trams, trains, bikes, and walking) so that they work together efficiently and smoothly. Key Features: • Easy connections between types of transport (e.g. tram to bus, or train to bike) • One ticket can be used for multiple modes (e.g. bus + tram) • Timetables are coordinated, so you don't have to wait long when changing • Well-designed transport hubs where everything links in one place • Encourages people to leave their cars at home **Urban transport strategies in Freiburg:** • Freiburg has an integrated transport system, updated every 10 years. • Emphasis on public transport with a reliable and affordable tram network which is frequent, every 7 minutes, low-cost tickets and event tickets are valid for transport. 70% of residents live within 500 m of a tram stop. • Cheap, integrated ticketing means one pass works across all public transport • 400 km of cycle paths and 9,000 bike parking spaces, including bike-and-ride at stations. • Bike lanes and park-and-ride systems link with tram stations • Over 79% of trips are made by bike, tram, bus, or foot • Pedestrian-friendly areas and low-speed zones encourage walking and cycling • Car ownership is low: fewer than 500 cars per 1,000 people. • Local government imposed low residential speeds (30 km/h), and restricted parking. In Vauban district, owning a parking space costs £20,000, discouraging car use. Results: +25,000 tram journeys per year −30,000 car journeys per year **How Freiburg reduces pollution:** • Freiburg reduces pollution by encouraging public transport use and cycling, which lowers car emissions through its low-emission tram network and extensive bike paths. This helps reduce the city's carbon footprint, which is a key goal of sustainable urban living. **How Freiburg reduces congestion:** • Congestion is reduced because 70% of people live within 500m of a tram stop, and the city uses car-free zones and expensive parking to discourage driving. Freiburg keeps traffic levels low, which is essential for creating a clean, safe, and efficient urban environment. **How Freiburg improves quality of life:** • Freiburg improves quality of life by creating safe, quiet, and green neighbourhoods, where walking, cycling, and public transport are convenient and affordable. This promotes healthier lifestyles and supports the social and environmental aims of sustainable urban living.

Section B: The living world: Ecosystems - Epping Forest, UK

Paper:	**Paper One**
Section:	**Section B: The Living World**
Location:	Epping Forest is a large deciduous and ancient forest in the South East of England. The forest is found to the north of London and within the M25 ring road.

Specification Content	**Notes:**
An example of a small scale UK ecosystem to illustrate the concept of interrelationships within a natural system, an understanding of producers, consumers, decomposers, food chain, food web and nutrient cycling.	
Producers, consumers, decomposers	**Producers -** (Organisms that make their own food using sunlight through photosynthesis) • A wide variety of native tree species including **beech, elm, oak, and ash** • **55,000 veteran pollard trees** that provide habitats and carry out photosynthesis • **177 species of lichen and moss** (including knothole yoke-moss) **Consumers -** (Animals that eat plants or other animals) • **Nine species of reptile/amphibian** • **Ten species of bat** • **28 species of butterfly** including the **purple emperor** **Decomposers -** (Organisms that break down dead organic material and return nutrients back to the soil) • **700 species of fungi**, thriving on deadwood • over 100 lakes and ponds provide essential habitats for numerous fauna species(animals) and flora (plants).
Food chain; Food web	• **Producers:** Mosses, grasses, herbs, ferns, shrubs, and deciduous trees such as oak, beech, and ash. These carry out photosynthesis and form the base of the food web. • **Primary Consumers:** Insects, worms, caterpillars, beetles, rabbits, mice, and deer. These feed directly on producers. • **Secondary Consumers:** Owls, sparrowhawks, adders, foxes, and small birds. They feed on primary or other consumers. • **Decomposers:** Fungi, bacteria, and earthworms. They break down leaf litter and dead organisms, returning nutrients to the soil.
Nutrient cycling	Epping Forest is a temperate deciduous woodland where nutrient cycling is rapid and balanced due to high productivity and seasonal leaf fall • Around 1500 species of fungi help decompose organic matter. • Leaf litter builds up each autumn, then breaks down, enriching the soil with nutrients. • Nutrients are absorbed by plant roots, transferred into biomass, and returned to the litter layer when plants die or lose leaves. • Rainfall can cause leaching or runoff, but the dense vegetation helps minimise nutrient loss. • This creates a closed-loop system, maintaining fertility and supporting a diverse food web.





Section B: The living world: Tropical Rainforests - Malaysia (NEE)

Paper:	**Paper One**
Section:	**Section B: The Living World**
Location:	Malaysia, is located in Southeast Asia, is split between two regions: Peninsular Malaysia, which borders Thailand, and East Malaysia, situated on the island of Borneo

Specification Content	**Notes:**
A case study of a tropical rainforest to illustrate: • **causes of deforestation – subsistence and commercial farming, logging, road building, mineral extraction, energy development, settlement, population growth** • **impacts of deforestation – economic development, soil erosion, contribution to climate change.**	
Introduction to Malaysia's Rainforest	Malaysia is home to the **24th largest rainforest in the world**, covering an area of **192,838km².**
Rates of Deforestation in Malaysia	• **Deforestation** is the large-scale cutting down of trees, often for profit-making activities like timber exports and agriculture. • Between **2000 and 2013**, Malaysia had the **highest rate of deforestation in the world**, losing **14.4%** of its forest cover, an area larger than **Denmark**. • Deforestation rates fluctuated between **2012 and 2015**, but between **2016 and 2020**, the rate steadily declined from **185,200 to 73,000 hectares per year**. • Overall, between **2001 and 2021**, Malaysia lost **17%** of its rainforest cover, with the highest losses in **Sarawak**.
Causes of Deforestation in Malaysia	**Commercial Farming -** Malaysia is the **second-largest producer of palm oil** globally. Palm oil, found in 50% of supermarket products, is a major driver of deforestation. Since the 1970s, large areas of rainforest have been cleared for **oil palm plantations**. **Population Pressure -** From **1956 to 1980**, Malaysia's government encouraged urban poor to migrate to rural areas. This **transmigration policy** led to the clearing of around **15,000 hectares** of rainforest for new settlements and plantations. **Energy Development - Hydropower** accounts for about **11%** of Malaysia's electricity. The **Bakun Dam**, completed in **2011**, is the **largest dam in Asia outside China**, flooding over **700 km²** of forest to supply energy. **Mineral Extraction - Bauxite and tin mining** is common in Peninsular Malaysia, with increased exports since a ban was lifted in **2019**. Additionally, **oil and gas drilling** has recently begun in Borneo. This has lead to large areas of the forest being cleared. **Logging -** During the **1980s**, Malaysia was the world's largest exporter of tropical wood. **Clear-felling** led to significant habitat destruction, but it has since been replaced by **selective logging**, where only mature trees are cut down. **Road Building -** Roads have been constructed to access energy projects, settlements, and mining areas. However, **rainforest road networks** are often unmapped, which may underestimate the extent of deforestation. **Subsistence Farming -** Local communities use **slash-and-burn farming** to clear land, a practice that can become unsustainable if fires spread uncontrollably.

Section B: The living world: Hot Deserts - Thar Desert, India (NEE)

Paper:	**Paper One**
Section:	**Section B: The Living World**
Location:	The Thar Desert is in northwest India. It is one of the major hot deserts of the world with the highest population density. Many people living in this desert are subsistence farmers but with increasing development opportunities, the human population is growing. Due to population pressures this environment is increasingly under threat.

Specification Content	**Notes:**	
A case study of a hot desert to illustrate: **• development opportunities in hot desert environments: mineral extraction, energy, farming, tourism** **• challenges of developing hot desert environments: extreme temperatures, water supply, inaccessibility.**		
Development opportunities in hot desert environments: mineral extraction, energy, farming, tourism.	The Thar Desert is known as the teeming desert as it is the most populated desert area with a population of around 30 million. However, the relative density is still low. Despite having an extreme climate, the Thar Desert can provide development opportunities. These include: • **Mining -** the desert has valuable reserves of minerals such as feldspar and gypsum. These minerals are used to produce a range of things from cement to fertilisers and are therefore valuable. Limestone and marble are also quarried in the area. • • **Energy generation** - energy is produced in the Thar Desert using solar panels. This energy is used to clean water supplies contaminated with salt (desalination). Wind energy is also used to generate electricity - Jaisalmer Wind Park, India's largest wind farm constructed in 2001. • **Farming -** irrigation in the Thar Desert has made commercial arable farming viable (the Indira Ghandi canal opened in 1958 after 30 years of construction) and brought water to the Rajasthan region of India from the Himalayas to the north. The canal allowed land to be irrigated and so subsistence and commercial farming grew after the canals completion.. Producing crops such as wheat and cotton has created many jobs and generated income for the local economy. • **Tourism** - the Thar Desert National Park attracts many visitors who want to see some of the 120-species found there. Tourists explore the desert with local guides on camels. Tourism is an important source of income and creates many jobs for local people. The multiplier effect of tourism creates many development opportunities.	   
Challenges of developing hot desert environments: extreme temperatures, water supply, inaccessibility.	Development in the Thar Desert includes many challenges such as: • **Extreme temperatures** - temperatures in the Thar Desert can exceed 50°C in the summer months. It is hard for people to work on farm, in mines or as tourist guides during these months as it is simply too hot. • **Water supply is a major challenge in the Thar Desert due to low rainfall (120–240 mm/year) and high temperatures, which increase demand.** Water is essential for farming, mining, and tourism, so it must be used **sustainably**. Traditional sources include **tobas** (natural ponds) and **johads** (manmade tanks), but these are limited. **Seasonal rivers**, like the **River Luni**, only flow after rainfall and are unreliable. • I**naccessibility** - the desert covers a huge area of 200,000 km². Most of the desert is inaccessible due to the extreme environmental conditions and poor infrastructure. Limited road network across the desert. Tarmac melts and sand blows across roads. Many places are only accessible by camel.