

Tim Manson

CCEA

GCSE

GEOGRAPHY STUDY GUIDE

UNIT 1

Understanding Our Natural World



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Colourpoint Educational
An imprint of Colourpoint Creative Ltd
Colourpoint House
Jubilee Business Park
21 Jubilee Road
Newtownards
County Down
Northern Ireland
BT23 4YH

Tel: 028 9182 0505
E-mail: sales@colourpoint.co.uk
Website: www.colourpoint.co.uk

The Author



Tim Manson learned to love Geography from an early age. He is a graduate of Queens' University, Belfast, the University of Ulster and the Open University. He has been teaching Geography for over 27 years and is the Vice Principal at Cullybackey College. He is a Principal Examiner for an awarding body in Geography and is a keen advocate for creative uses of ICT in learning and teaching. He has a highly successful website: www.thinkgeography.net

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Contents

How to use this book.....	4
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Study Material

Theme A River Environments	5
Theme B Coastal Environments	24
Theme C Our Changing Weather and Climate	36
Theme D The Restless Earth	54

Practice Questions

Getting the Best Grade Possible	68
Theme A River Environments	72
Theme B Coastal Environments	76
Theme C Our Changing Weather and Climate	79
Theme D The Restless Earth	82
Revision Advice	88

Glossary.....	91
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How to use this book

This study guide is divided into two sections:

1. Study material

This addresses the key features of the CCEA GCSE Geography specification, the case studies and the key geographical terms. It also offers revision tips.



Key geographical terms

These key geographical terms are used throughout the specification. Each term is clearly defined.



Test your revision

These questions are designed to check your understanding of the course content. You can get someone to ask you the questions or test yourself.



Revision tip

These tips offer examiner guidance on what areas to focus on, how to avoid confusion and what might be asked on the exam.

2. Practice questions

This includes exam-style questions, tips on how to answer them and sample answers. It also offers examiner advice on how to get the best grade possible, develop your exam technique and improve your revision skills.

Study Material

Theme

A

River environments

1. The drainage basin: a component of the water cycle
2. River processes and landforms
3. Sustainable management of rivers

Part 1

The drainage basin: a component of the water cycle



Key geographical terms

Drainage basin: The area of land that is drained by a river and its tributaries.

Water cycle: A natural system where water is in constant movement above, on or below the surface of the Earth, and is changing state from water vapour (gas) to liquid and to ice (solid).

Interception: When water is trapped by vegetation (store) before it reaches the ground.

Watershed: The dividing line between one drainage basin and another.

Source: The starting point of a river.

Tributary: A small river or stream that flows into a larger river.

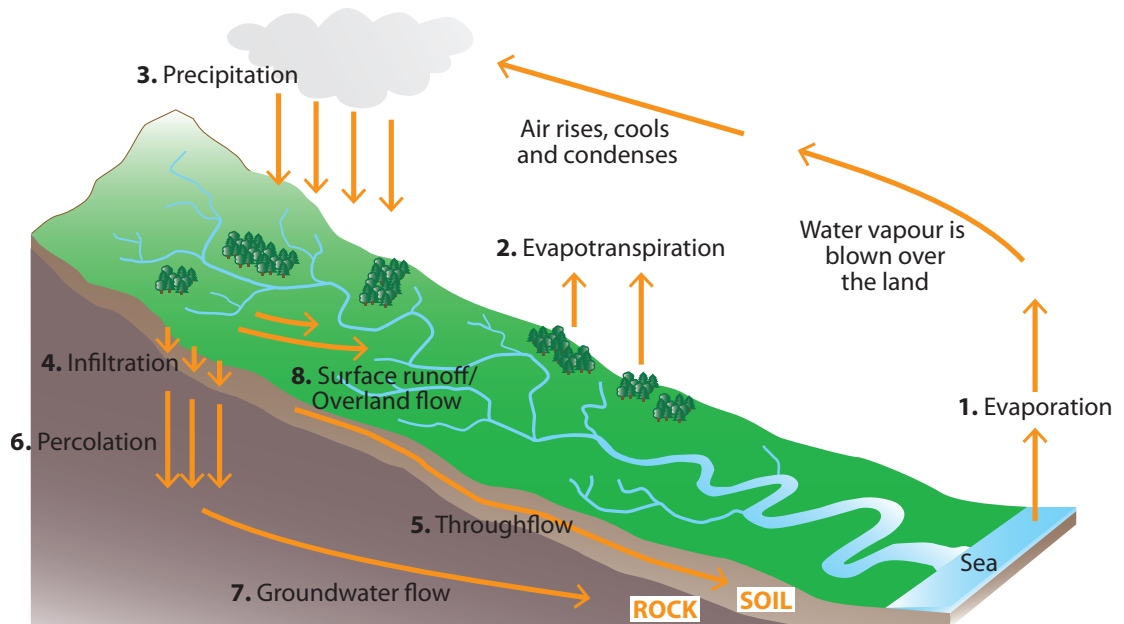
Confluence: Where two rivers meet.

River mouth: The place where the river flows into the sea.

The water cycle

The **water cycle** is a natural system where water is in constant movement above, on or below the surface of the Earth, and is changing state from water vapour (gas) to liquid and to ice (solid).

The water cycle



1. Evaporation

Water is transformed into water vapour in the atmosphere.

2. Evapotranspiration

Water is transferred from land and water surfaces to the atmosphere by evaporation and plant transpiration.

3. Precipitation

Water vapour condenses into drizzle, rain, sleet, snow and hail, and this falls towards the surface of the land.

4. Infiltration

Water soaks (filters) into the soil.

5. Throughflow

Water moves downhill through the soil.

6. Percolation

Water moves from the soil into the spaces (pores) in the rock.

7. Groundwater flow

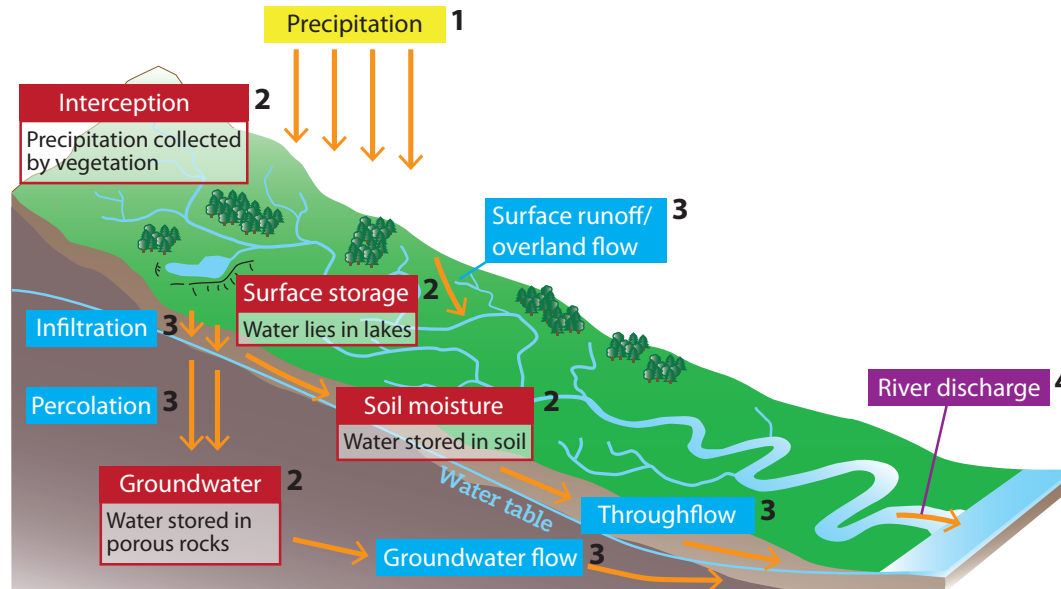
Water moves slowly through the rock back into the sea.

8. Surface runoff/overland flow

Water moves across the surface of the land.

The drainage basin system

A **drainage basin** is the area of land that is drained by a river and its tributaries. When water falls onto the land the force of gravity pulls it downhill towards the sea.



The drainage basin system

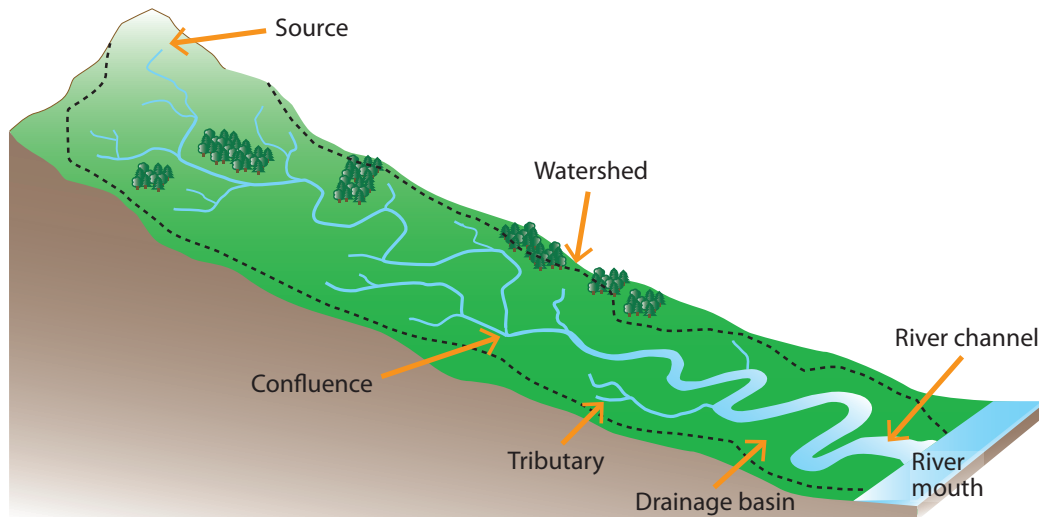
1. Inputs: are when water is introduced or put into the system.

2. Stores: occur when water is kept within the system and not moved through it.

3. Transfers: are processes or flows within the system, where water is moved from one place to another.

4. Outputs: occur when water leaves the system. Water is carried through the river and back into the sea.

Characteristics of the drainage basin



The characteristics of the drainage basin

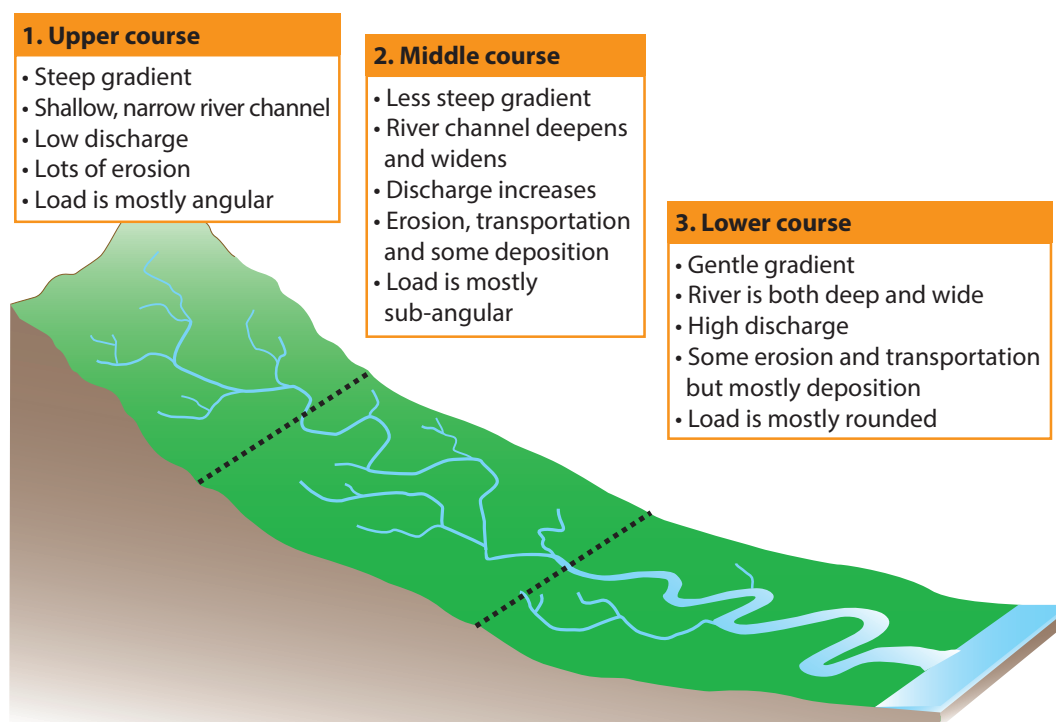


Revision tip

It is important that you learn the key geographical terms and understand the key elements of the water cycle and drainage basin system. These topics often feature in the exam.

How does a river change along a long profile?

The long profile is the shape of a river as it flows downstream from the source to the river mouth. Rivers can be divided up into three distinct stages (courses), each with different influences that shape the landscape through which the river flows. As the river moves downstream from the upper course, through the middle course to the lower course, the river characteristics will change.



River characteristics along a long profile

There are five main characteristics that change as the river moves along a long profile:

1. The gradient decreases downstream

The gradient is the angle of the river bed. It decreases as the river flows from the source through the different courses (upper, middle and lower) towards the mouth. The upper course is steep but the lower course will be relatively flat.

2. The depth increases downstream

The depth is how deep the water in the river is. River depth will increase from its source to its mouth and is usually measured in centimetres.

3. The width increases downstream

The width is the distance from one riverbank to the other riverbank. River width will also increase from its source to its mouth and is usually measured in metres.

4. The discharge increases downstream

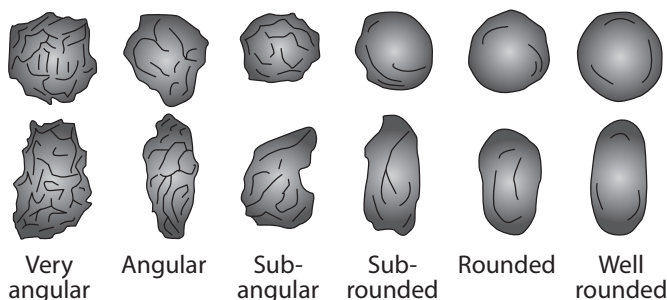
The discharge is the amount of water that passes a point in a river at a particular time. It is measured in cumecs – cubic metres of water per second.

Cross-sectional area (depth and width) m^2	×	Velocity (speed) m/sec	=	Discharge m^3/sec
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5. The load becomes smaller and rounder downstream

The load (also known as bedload) is the material that the river is carrying. It is mostly material that has been eroded from the riverbed and the riverbanks.

The size and shape of bedload changes dramatically along the course of a river. The size of load can range from tiny pieces of sediment to large boulders. The greater the velocity (and discharge) of a particular river, the more load that can be carried. The stones are angular in the upper course but the sharp edges become worn down as they journey towards the lower course.



The Powers Index of roundness (used to observe stone shape, angularity and roundness)

It is the erosion, transportation and deposition processes that change the shape and characteristics of the river. These are explained on the next page.



Test your revision

1. Describe the role of evapotranspiration in the water cycle.
2. Explain the difference between infiltration and percolation.
3. What is the difference between stores and transfers in the drainage basin system?
4. Describe three ways that a river might change along its long profile.
5. Why does the gradient of a river change as it moves downstream?
6. How would you calculate the discharge of a river?
7. Draw a diagram of a drainage basin and mark up the following features: the source, a confluence, the watershed and a tributary.

Part 2

River processes and landforms

River processes

1. Erosion

Erosion occurs in a river when the riverbed and riverbank are worn away. The four types of erosion in a river are:

a) Attrition:

Stones carried downstream knock against each other and start to wear each other down. This makes the load smaller and more rounded downstream.

b) Hydraulic action:

The speed and force of the water removes material from the riverbed and banks.

c) Abrasion/corrasion:

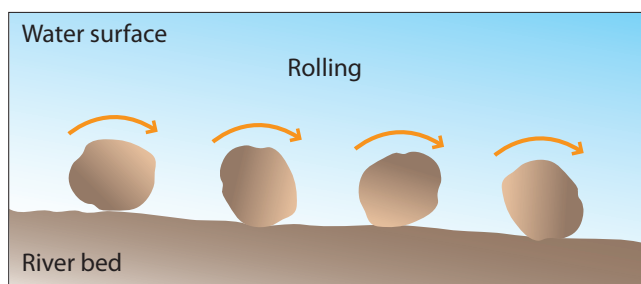
The force of moving water grinds the stones being carried by the river against the riverbed and banks, and this dislodges material.

d) Solution/corrosion:

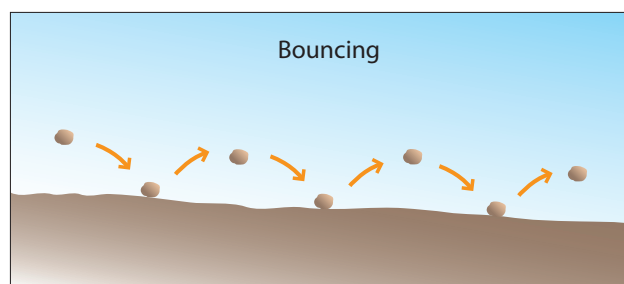
Weak acid (chemicals) in the water reacts with the rock and dissolves soluble minerals.

2. Transportation

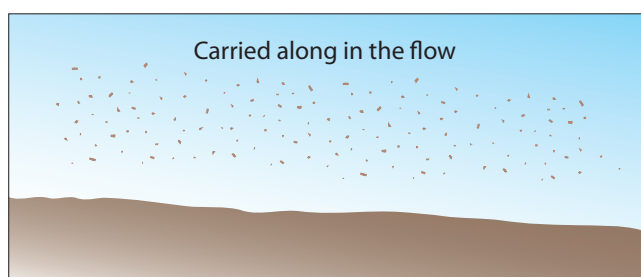
Transportation is when the eroded material is carried from one place to another through the river system. The four types of transportation in the river are:



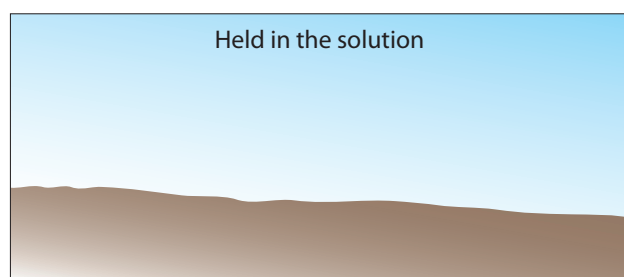
a) Traction: The heaviest particles of eroded material are **rolled** along the riverbed.



b) Saltation: Some of the heavier particles are **bounced** along the riverbed but are not held up in the flow of the river.



c) Suspension: As the water speed increases, the river picks up particles. When particles are **carried along in the flow** of the water they do not make contact with the riverbed.



d) Solution: Some minerals dissolve easily in the water and microscopic particles are **held up in the solution of the water**.

**Revision tip**

It is easy to get confused between the different erosion and transportation processes, so make sure that you learn them carefully. It might help to write the letter E (for erosion) or T (for transportation) beside each process.

3. Deposition

Deposition occurs when the river load becomes too heavy for the river to carry and material is dumped (or deposited) along the course of the river.

**Revision tip**

A common exam question shows some bedload data gathered during fieldwork and asks you to describe and explain the processes that have been working on the river. You will need to be aware of the river changes downstream (see page 8) and the different ways that erosion, transportation and deposition work on the river.

**Test your revision**

1. Describe the difference between erosion and transportation.
2. Explain how abrasion helps to erode the riverbanks.
3. Describe the conditions that cause traction to take place in a river.

The formation of river landforms

**Key geographical terms**

River landforms: The main features that can be found along the course of a river. They are usually formed by either erosion or deposition in the river.

Waterfall: A vertical cliff of water where the water flows over a layer of hard rock on top of a layer of softer rock. The softer rock underneath is eroded away causing the cliff edge to gradually move backwards.

Meander: A bend in a river. The river flows fastest on the outside of the bend, causing erosion. The river flows slower on the inside of the bend, causing deposition.

Slip-off slope: The inside of a meander, where river load is deposited because of the slower flow of water.

River cliff: The outside of a meander, where the fast-flowing water causes erosion of the riverbank, creating a steep bank.

Floodplain: The area of land next to a river that is likely to flood. Silt is deposited when floodwater covers the area.

Levee: A build-up of material on the banks of a river caused by repeated flooding. It raises the height of the riverbank. The largest, coarsest material will be dumped close to the riverbank.



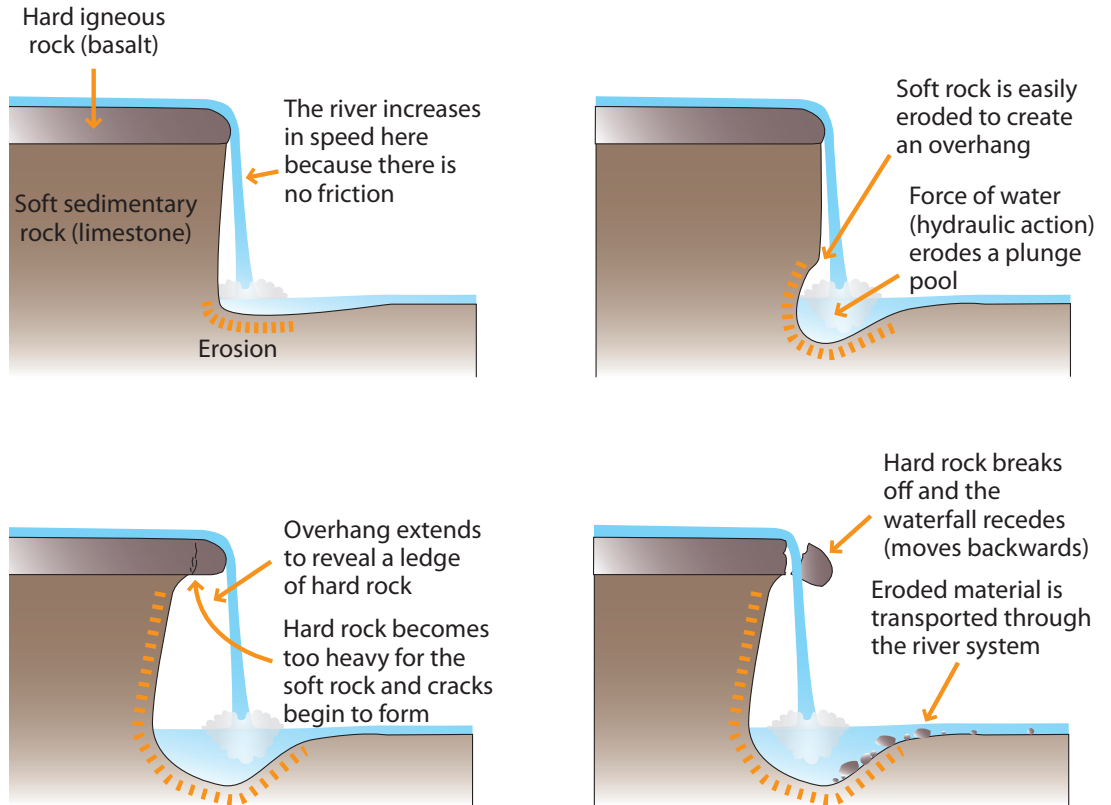
Revision tip

Make sure that you can explain (in detail) how a waterfall erodes and can draw a cross section of the waterfall.

Waterfalls

Waterfalls form where water flows from an area of hard rock to an area of softer rock. Hydraulic action, abrasion and attrition all erode the softer rock, which is transported and deposited further downstream. Often the edge of the waterfall recedes, creating a gorge.

The formation of a waterfall



The formation of a gorge

