

RIVER LANDSCAPES

AQA GCSE Geography



Paper 1 Question 4 Revision Booklet



James Craigmyle
The John Roan School

River Processes

TASK 1: Define these key words:

<u>Erosion:</u> Hydraulic action: Abrasion: Attrition: Solution: Lateral erosion: Vertical erosion:	<u>Transportation:</u> Traction: Saltation: Suspension: Solution: Drainage Basin: Discharge: Surface Run off:
--	---

River Profiles

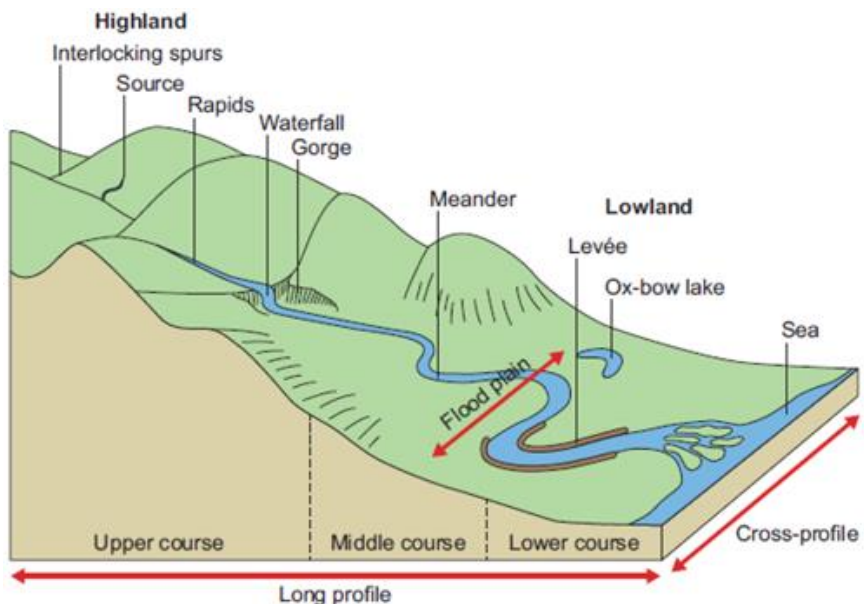


Figure 1: Diagram showing the long profile of a river and its landforms

Course	Cross profile
Upper	
Middle	
Lower	

Figure 2: A diagram showing the cross profile of a river valley and river channel

TASK 2: Use figure 1 & 2 to complete the table describing changes to a river.

Feature of a river	Upper course	Middle Course	Lower Course	Processes causing change
River Valley Gradient	<i>Steep, narrow valley</i>	<i>Gentle slope, valley becomes wider</i>	<i>Wide and flat river valley</i>	<i>Erosion</i>
River Channel Width				
River Channel Depth				
River discharge				

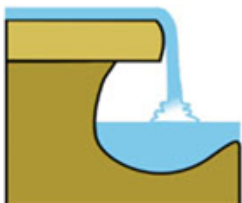
Upper Course Landforms – (Created by Erosion)

Waterfalls & Gorges

TASK 3: Complete the Gap fill to explain the formation of a waterfall.

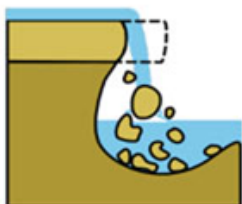


K A waterfall is formed in the _____ course of a river where it flows over a layer of _____ rock, followed by a layer of _____ resistant rock.



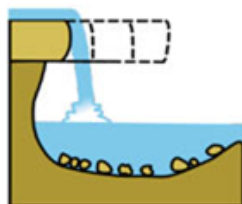
U If the softer rock is exposed, abrasion (material scraping away at the river channel) causes _____ erosion, eventually creating a _____ in the river channel and a waterfall is formed.

K _____, this step becomes larger and creates a plunge pool which _____ the layer of resistant rock.



U The resistant rock is undercut as _____ and abrasion makes the plunge pool larger and eventually becomes unstable and _____.

K The waterfall now _____ upstream and the process repeats. A steep sided _____ is left downstream where the waterfall used to stand.



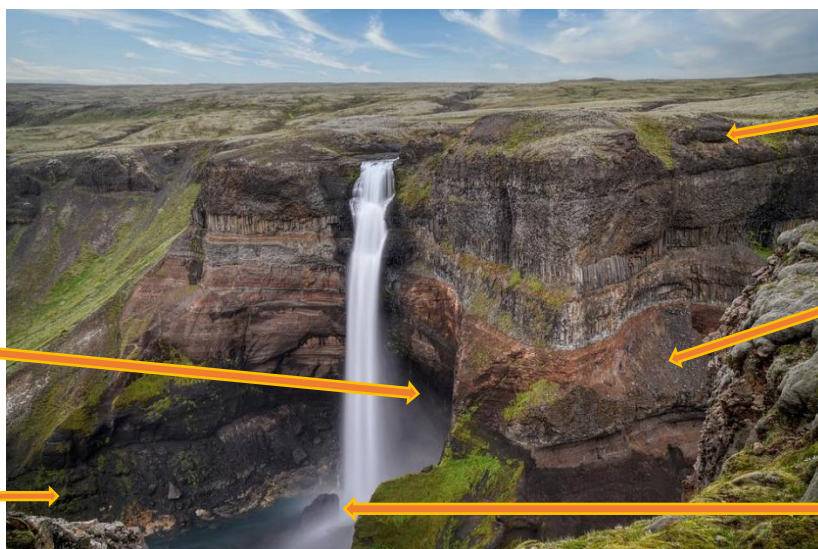
U The gorge is made deeper as the material that has collapsed into the plunge pool causes _____ to occur.

Word Bank

Step/drop	vertical	Hydraulic Action	collapses	upper	Over time
gorge	undercuts	retreats	resistant	Less	abrasion

TASK 4: Label the photograph with the words below to show the key features of a waterfall.

Plunge Pool	Resistant rock	Less Resistant rock	Undercutting of hard rock	Gorge
-------------	---------------------------	---------------------	---------------------------	-------



Resistant Rock

V-shaped Valleys & Interlocking Spurs

TASK 5: Sort these statements (1-4) to explain the formation of Interlocking Spurs & V shaped Valleys

This vertical erosion deepens the valley, making the sides steeper and exposed.

As the small stream flows it will erode downwards and scrape away the bottom of the channel (vertical erosion).

Over time, weathering and gravity wear away the steep valley sides, forcing material into the stream, which it uses to cut the valley deeper.

In the upper course, a river often winds around ridges of land called 'spurs'. This is because it does not have enough energy to erode through them.

Figure 3 – A photograph and diagram showing Interlocking Spurs and a V Shaped Valley

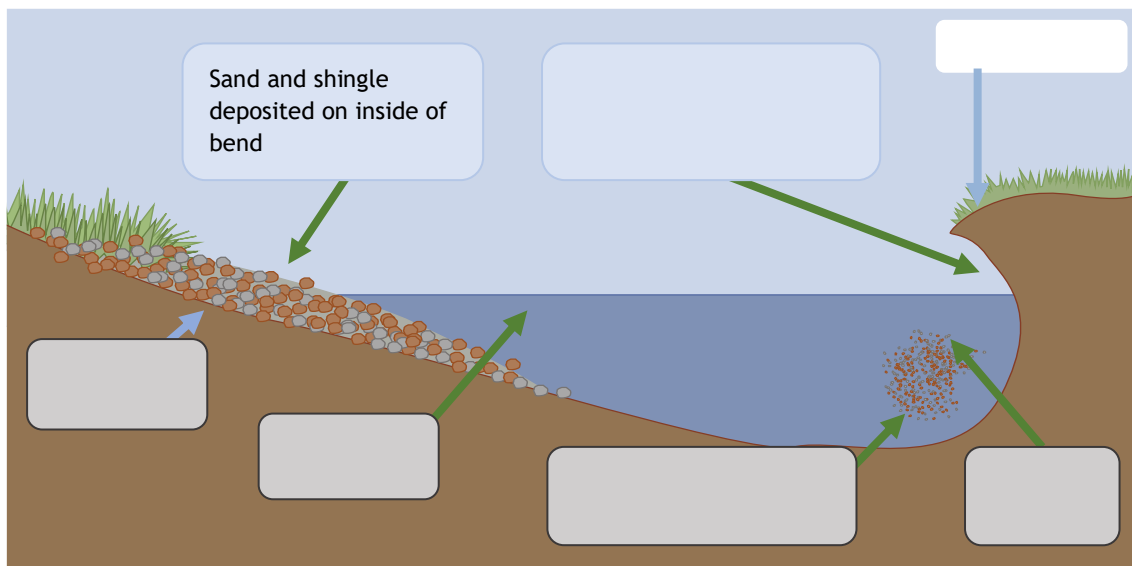


Middle Course Landforms – (Created by Erosion & Deposition)

Meanders

TASK 6: Add the labels for the cross section of a Meander.

Slip off slope	Fastest current
Slower current	Bank on outside of bend being undercut by lateral erosion
River cliff	Much fine material in suspension



TASK 7: Explain why deposition occurs on the inside bend of a meander and erosion occurs on the outside bend.

Oxbow Lakes

The continuous erosion on the outside bend of meanders means that the river slowly moves and changes shape over time. This can lead to the formation of an Oxbow Lake.

TASK 8: On the diagram showing the formation of Oxbow Lakes, shade the areas where erosion is taking place. *(The first has been done for you.)*

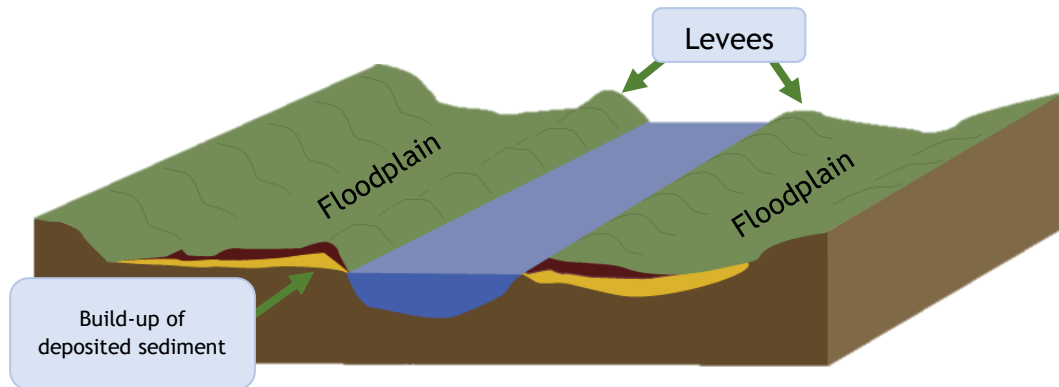
TASK 9: Answer the questions to create a sequence that explains the formation of Oxbow Lakes.

K – What is a meander and what is happening on the outside and inside bends?
U – Name and describe physical processes of erosion occurring.
K – What does this causes the meander to do over time?
U – What happens to the ‘neck’ between two meanders?
K – What event and physical processes occur to ‘cut the neck’ between meanders?
U – What is now left behind? What occurs over time?

Lower Course Landforms – (Created by Deposition)

Floodplains & Levees

TASK 10: Complete the gap fill to explain the formation of Floodplains and Levees.



Floodplain	Levee
<p>This is a wide area of land found on either side of a river.</p> <p>When a river floods, the water stops flowing and loses, so it depositsthat was being transported.</p> <p>Layers of silt build up to provide a wide, flat area of fertile making floodplains perfect for</p>	<p>A levee is a river bank formed after many events. When the river overflows its banks, the water slows and is deposited. larger sediment is dropped to the river as it heavier, so requires more energy to transport. and finer silts are carried Over the years the larger sediment deposited builds up and creates raised river banks called</p>
Soil energy	raised farming
flat	sediment
furthur	decreases
	flood levees
	silt closer

TASK 11: Suggest ways that floodplains provide opportunities for people.

Estuaries

Estuaries are tidal areas where the river meets the sea



TASK 12: Complete the sentences by filling in the blank spaces

1. Outgoing freshwater of a river meets the incoming (tidal) seawater. This causes the river's velocity to dramatically _____ resulting in the process of _____.
2. Overtime deposited muddy sediment break the water surface to form extensive _____.
3. Vegetation colonises the area to form _____.

Factors affecting Flood Risk

TASK 13: Define the following key words

Relief of the land		Permeable rock	
Tributaries		Impermeable rock	
Surface Run off		Infiltration	
Discharge		Saturated	

TASK 14: Explain how each factor could increase or decrease the rate of surface run off into a river.

FACTOR	How it influences the rate of surface run off
RELIEF (Steep slopes or flat?)	<i>Steep slopes cause faster surface run off.</i> <i>Gentle slopes cause slower surface run off</i>
ROCK TYPE (Permeable or Impermeable?)	
SOIL SATURATION (Soil fully saturated or not saturated?)	
VEGETATION (Lots of trees or not?)	
LAND USE (Urban or Rural?)	
DRAINAGE DENSITY (Lots of tributaries into river or not many?)	
AMOUNT OF PRECIPITATION (Prolonged rainfall or dry period?)	

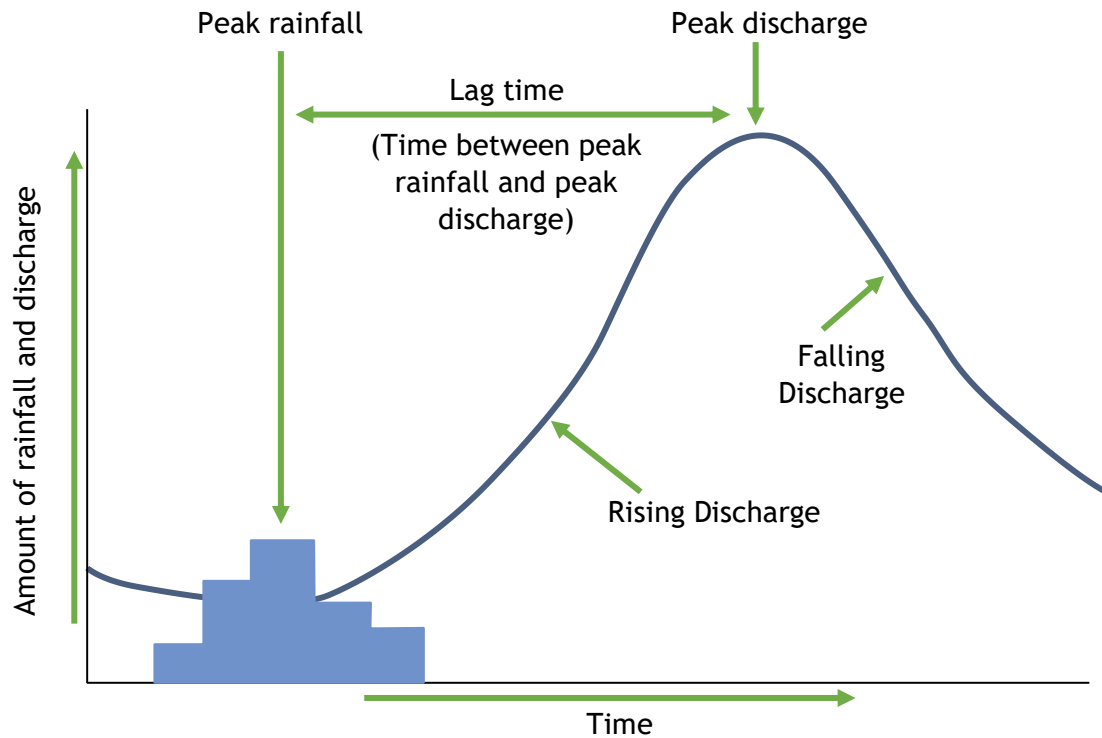
TASK 15: Explain other causes of flooding not mentioned in the table above.

Physical causes of flooding	Human causes of flooding

Flood Hydrographs

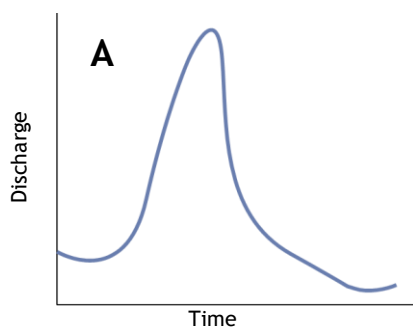
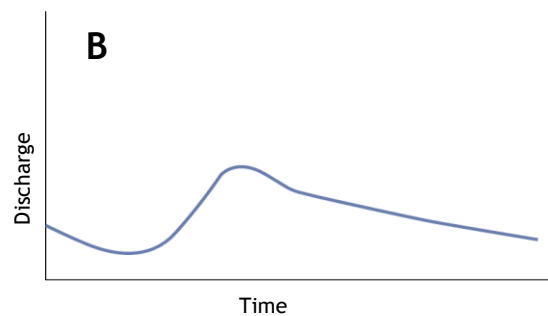
A hydrograph shows how a river's discharge changes after a period of rainfall

It shows how discharge rises after rainfall, reaches its peak, and then returns to the normal rate of flow over time.



TASK 16: Explain how the rate of surface run off around a river will influence a its lag time and peak discharge

TASK 17: Explain how each factor could contribute to the shape of the two flood hydrographs.



Factor	Drainage basin A	Drainage basin B
Drainage basin tributaries	<i>Many tributaries in a drainage basin will mean that peak discharge of a river will be quickly become higher.</i>	<i>Fewer tributaries will mean that peak discharge of a river will not rise as much.</i>
Rock type		
Soil		
vegetation		
Land use		
Relief		

Managing Flood Risk

TASK 18: Define the following key terms

Hard Engineering Strategies:

Soft Engineering Strategies:

TASK 19: Complete the table for Hard Engineering Strategies

Name of strategy	How it works to reduce the risk of flooding	Advantages	Disadvantages
Dam & Reservoir			
Flood wall /embankment			
River Channel Straightening			
Flood Relief Channels			

TASK 20: Complete the table for Soft Engineering Strategies

Name of strategy	How it works to reduce the risk of flooding	Advantages	Disadvantages
Flood warnings and Preparation			
River Restoration			
Afforestation (Tree planting)			
Floodplain Zoning			

River Management Case Study

TASK 21: Complete the case study sheet for your chosen example of _____.

<u>Background / Location of</u>		<u>Causes of flooding:</u>
<u>Impacts:</u>		
<u>What has been done to reduce the risk of flooding?</u>		
<u>Costs and Benefits</u> <i>Use two colours to show costs and benefits.</i>		
Social	Economic	Environmental