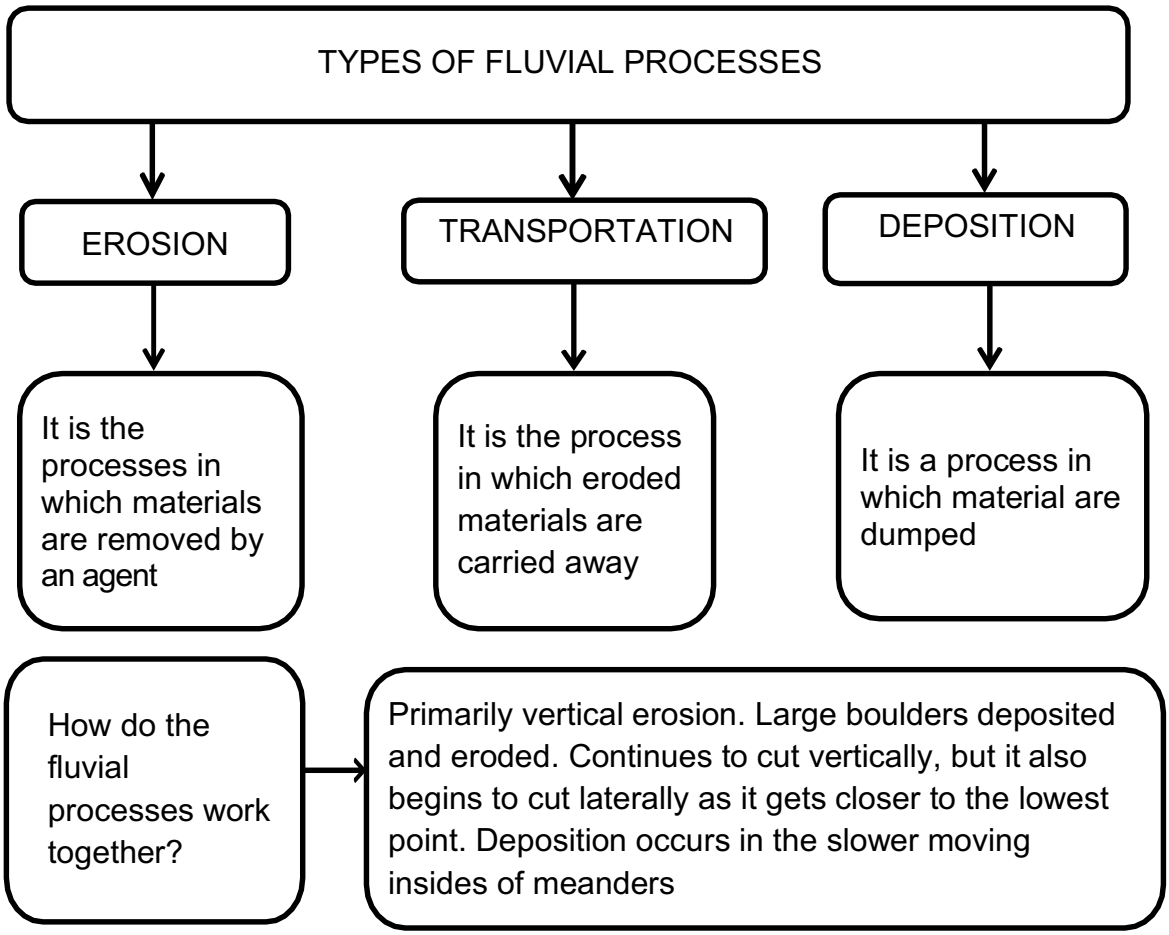
B. FLUVIAL PROCESSES

What are Fluvial Processes? → The physical interaction of flowing water and the natural channels of rivers and streams

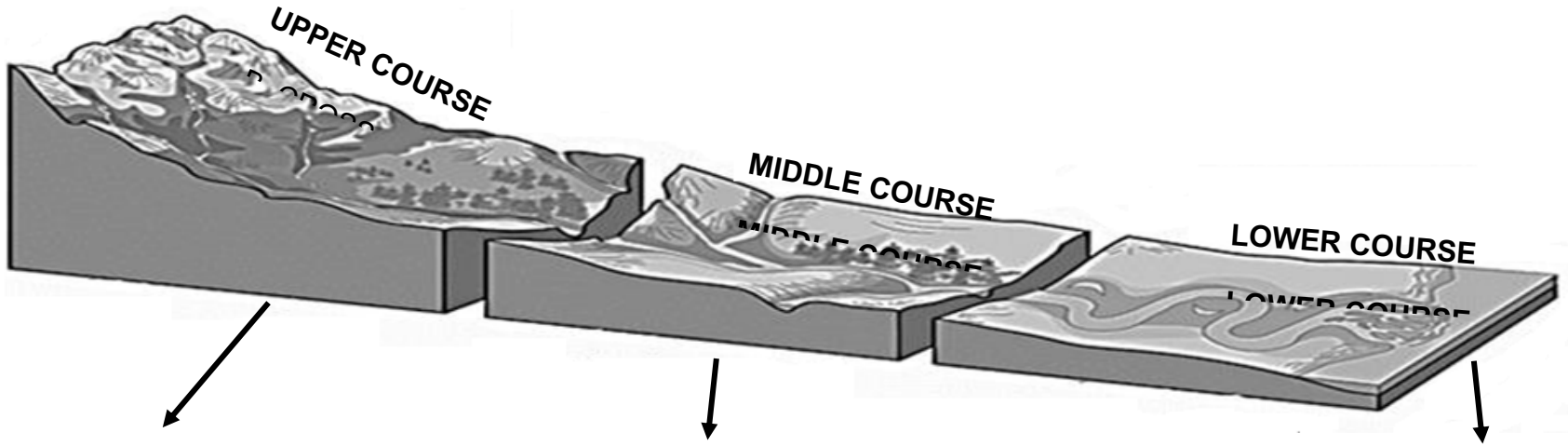


How do the fluvial processes work together? → Primarily vertical erosion. Large boulders deposited and eroded. Continues to cut vertically, but it also begins to cut laterally as it gets closer to the lowest point. Deposition occurs in the slower moving insides of meanders

11. RIVER PROFILES AND THE STAGES OF A RIVER

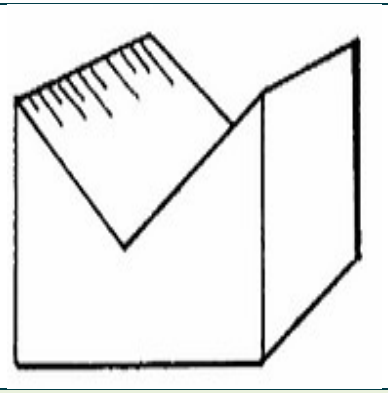
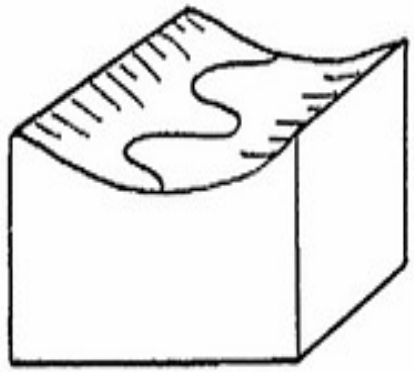
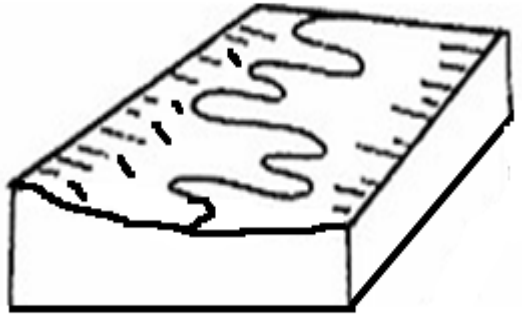
A. LONGITUDINAL PROFILE AND STAGES OF A RIVER

(Longitudinal profile - Side view of a river from source to mouth)



• Vertical erosion deepens the valley • Straight stream channel with short non-perennial streams • Turbulent flow due to uneven riverbed and valley slopes • Waterfall and rapids are being eroded through headward erosion • Large stream load with big boulders • Traction load	• Vertical erosion decreases and lateral erosion dominates • The channel becomes wider • The river starts to meander due to lateral erosion • Tributaries join the mainstream, increasing the volume and erosive power • Both laminar and turbulent flow occurs depending on the roughness of the riverbed and the sides • Saltation load occurs • Load becomes smaller due to attrition and abrasion	• Deposition dominates with very little erosion • The channel is at its widest • Extensive meandering of the river due to the flat surface and lateral movement of the river • Laminar flow dominates due to the smooth riverbed and sides • Suspension and solution load dominates • Very large load but smaller particles

B. CROSS /TRANSVERSE PROFILE: FRONT VIEW OF A RIVER

		
Upper course V-shaped valleys Waterfalls Rapids	**Middle course** U-shaped valleys River starts to meander	**Lower course** Wide open valley Floodplain Deltas

12. RIVER GRADING

A. KEY CONCEPTS AND NOTES

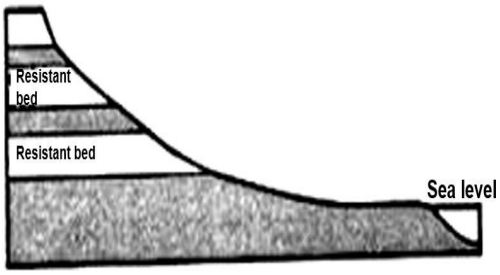
River grading: This is the balance/equilibrium between rate of erosion and rate of deposition.

<table>
<tr><th colspan="2">GRADING</th></tr>
<tr><td>Graded Rivers

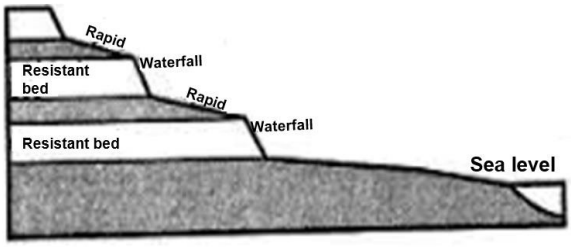
When there is a balance between erosion and deposition</td><td>Ungraded Rivers

When either erosion or deposition dominates</td></tr>
<tr><th colspan="2">LONGITUDINAL PROFILES OF GRADING</th></tr>
<tr><td>Graded Profile

• The longitudinal profile is SMOOTH CONCAVE
• Steep in the upper course and gentle in the lower course

 
</td><td>Ungraded Profile

• The longitudinal profile indicates knick points like waterfalls and rapids.
• The profile is therefore not smooth concave.

 
</td></tr>
</table>

Permanent / Ultimate base level of erosion

- The lowest level to which a river can erode.
- It is usually sea level

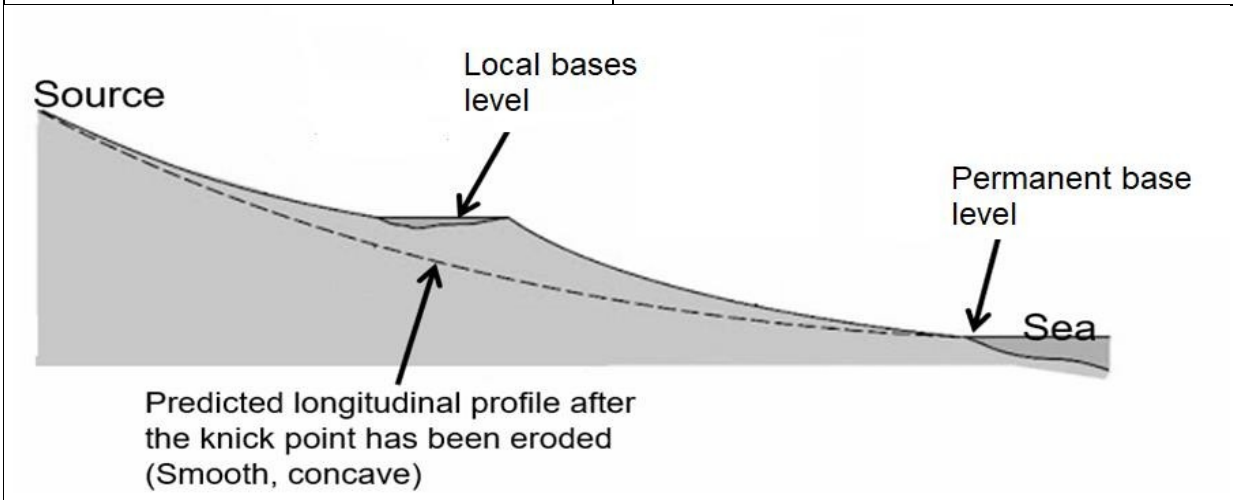
Temporary / Local base level

- When features/ structures delay further erosion
- This local base level causes a knick point in the profile, making it ungraded.

Types of local base levels

Human-made e.g., dams

Natural e.g., lakes, waterfalls, rapids

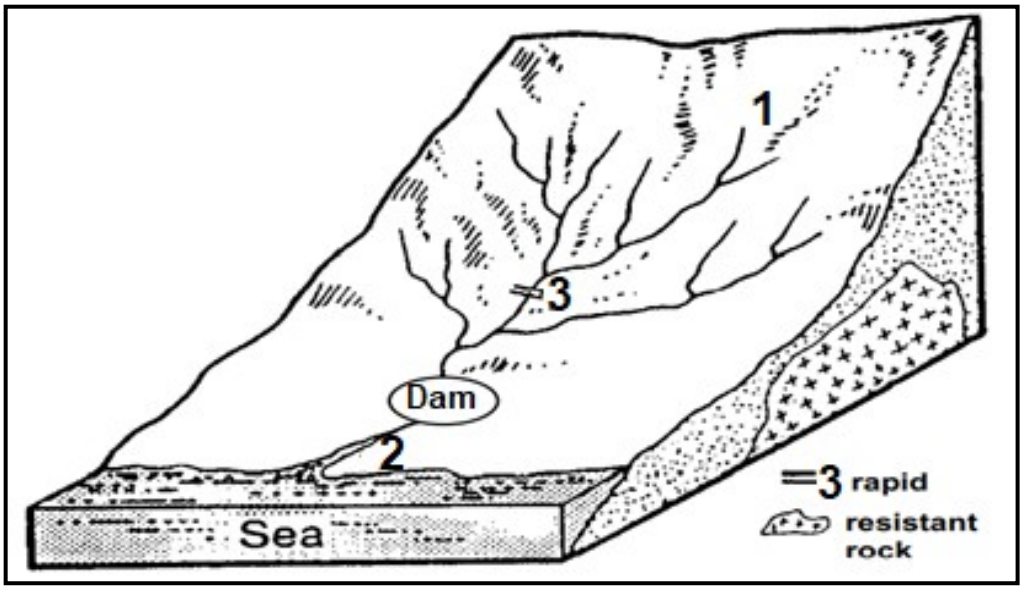


Processes involved in a river becoming graded from ungraded.

- Downward/Vertical erosion dominates in the upper course causing a steep valley slope.
- Headward erosion removes temporary base levels of erosion in the upper course.
- Downward/Vertical erosion removes temporary base levels (waterfall) in the upper course.
- This material is then transported downstream.
- Discharge of the river increases in middle course causing lateral erosion.
- Gradient in the middle course becomes less steep.
- Deposition dominates in the lower course because the gradient is gentle.
- Deposited materials fill up lakes and dams.
- The river profile will now develop a concave shape from upper to lower course.
- Equilibrium between erosion and deposition will maintain (result in) a graded profile.

C. RIVER GRADING ACTIVITIES

12.1 FIGURE 12.1 illustrates the stream profiles of a typical South African river from its source to its river mouth.



[Adapted: Hydrology and Landforms]

12.1.1 Define the term base level of erosion. (1 x 2) (2)

12.1.2 Identify ONE temporary base level of erosion in FIGURE 12.1 (1 x 1) (1)

12.1.3 Draw a labelled longitudinal profile of the river illustrated in FIGURE 12.1, clearly showing how the temporary base levels of erosion could have influenced the shape of the profile.(3 x 1) (3)

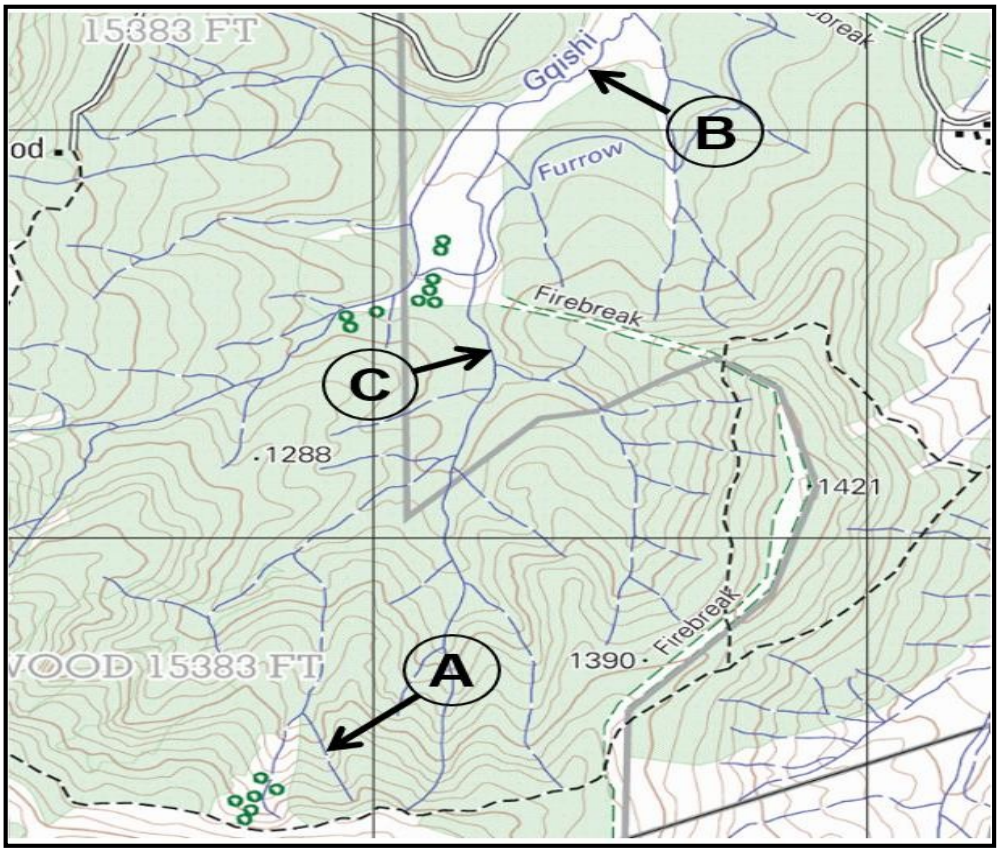
12.1.4 How would you describe the longitudinal profile that you have drawn in QUESTION 12.1.3? (1 x 2) (2)

12.1.5 Give a reason for your description in QUESTION 12.1.4. (1 x 2) (2)

12.1.5 Suggest THREE reasons why the cross-section profiles of the river change, from its source (**1**) to its river mouth (**2**). (3 x 2) (6)

MAP WORK APPLICATION

12.2 The map is an extract of 2930CA MERRIVALE.



12.2.1 In which stage is the Gqishi river at A and B on the topographic map. (2 x 1) (2)

12.2.2 Provide map evidence as reasons for your answers to QUESTION 12.2.1. (2 x 1) (2)

12.2.3 Explain the characteristics of the erosion in stages A and B . (2 x 2) (4)

12.2.4 Determine the stream order at C. (1 x 2) (2)

13. FLUVIAL LANDFORMS IN THE DIFFERENT STAGES OF THE RIVER

A. KEY CONCEPTS AND NOTES

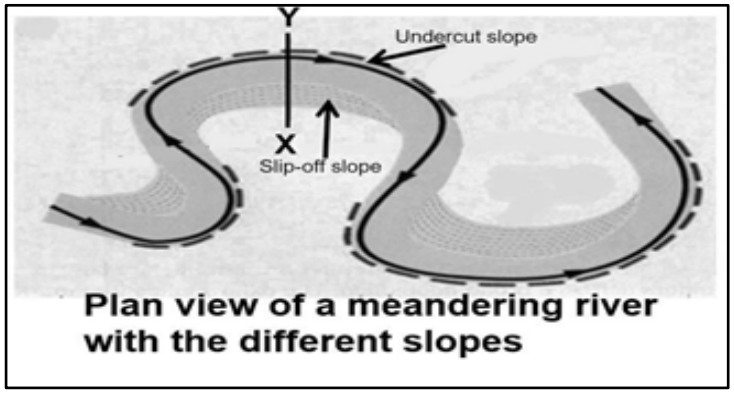
Fluvial landforms are those landforms generated by running water, mainly rivers. Some features are a result of river erosion and some a result of river deposition.

1. MEANDERS

A meander is defined as a distinct curve or loop in the course of a river channel.

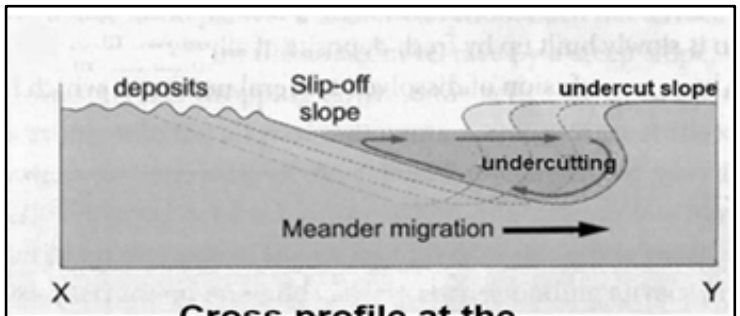
Formation

- In the middle course the river has more energy and a high volume of water as a result of tributaries joining
- Lateral (sideways) erosion starts to widen the river channel.
- As the river erodes laterally (to the right side then the left side) it forms large bends, and then horseshoe-like loops called meanders.
- The formation of meanders is due to both deposition and erosion and meanders gradually migrate downstream



Plan view of a meandering river with the different slopes

Two slopes with different characteristics develop at the meander loop.	
Undercut slope This slope develops at the outer bank. **Characteristics:** • The slope is concave. • The river flows fast at this side. • Erosion, especially undercutting occur • The area is deep.	**Slip-off slope** This slope develops at the inner bank. **Characteristics:** • This slope is convex. • The river flows slow at this side. • Deposition occurs. • The slope is shallow.



Cross profile at the meander loop/river bend

2. OXBOW LAKE

- The cut-off meander loop filled with water is called an oxbow lake.
- Continuous undercutting at the outer bank and deposition at inner bank
- Causes the horseshoe to become tighter over time, until the ends become very close together.
- During heavy rainfall and flooding the river breaks through the ends
- The loop is cut-off from the main channel.

Significance of OXBOW LAKES

- Oxbow lakes can be rich wildlife habitats,
- Can be utilised for agricultural purposes especially crop farming.
- Tourist attractions

How is the water in the oxbow lake maintained?

- During rainfall periods
- Flooding of the mainstream
- Underground water

Development of MEANDER SCARS
(Dry oxbow lake)

- Decrease in average rainfall over the years.
- Silt deposits from flooding

3. BRAIDED STREAM:

- A stream consisting of multiple small, shallow channels (distributaries)
- They divide and recombine numerous times forming a pattern resembling the strands of a braid.

Formation

- Braided streams form where the sediment load is deposited as shifting islands or bars between the channels
- When the river's carrying capacity is exceeded the river deposits its load into the channel.

Significance of BRAIDED STREAMS

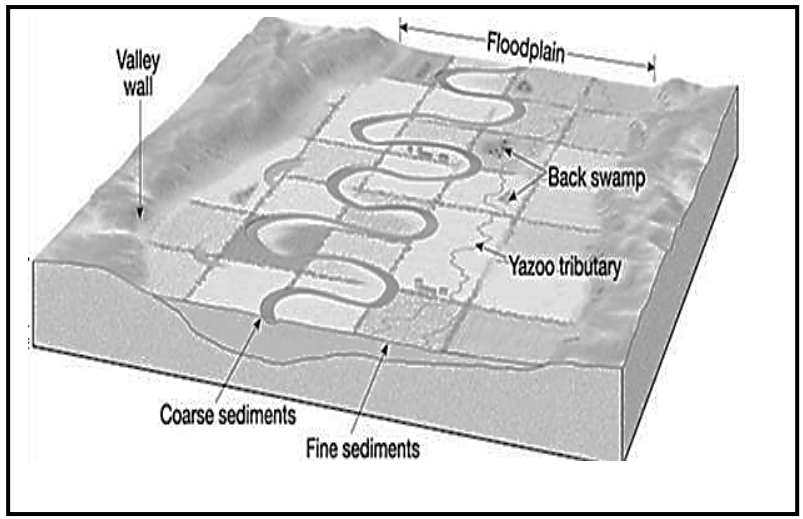
- Source of water for crop farming
- Silt deposits form fertile soil.
- Area preserves bird life.
- The area hampers the construction of infrastructure.
- It is therefore expensive to build roads and railway lines.

4. FLOOD PLAIN

A wide, flat area of land surrounding a river that continuously flood.

Formation

- Floodplains form due to mainly deposition.
- Because of the gentle gradient, there is more deposition occurring.
- The heavier load (rocks and pebbles) is deposited closer to the banks of the river.
- Lighter and smaller load is dropped further away from the river banks.



Significance of FLOOD PLAINS

- Floodplains provide fertile land for agriculture.
- Easy to construct infrastructure.
- Flat area is heavily populated.
- Settlements develop.
- Tourist attraction
- Source of water for economic and domestic purposes
- They are beneficial for wildlife by creating a variety of habitats for fish and other animals.
- It preserves water quality by continuous refreshing due to flooding.
- It provided numerous recreational opportunities.

5. NATURAL LEVEE

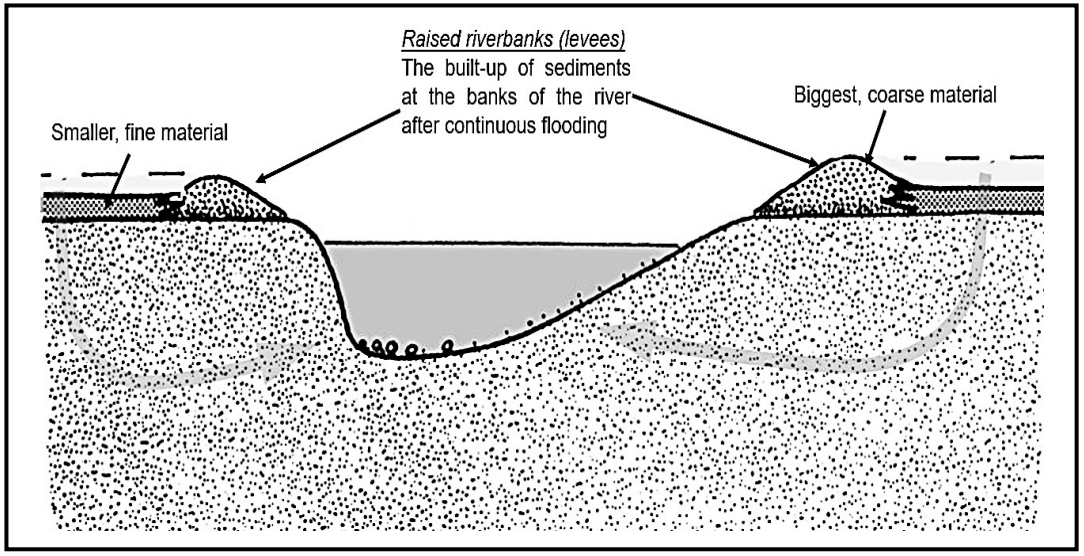
Levees are natural embankments (raised river banks) which are formed when a river flood.

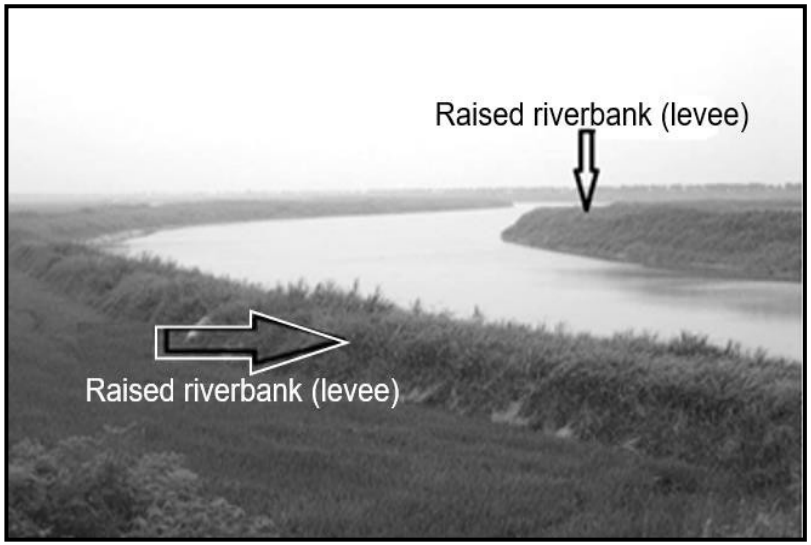
Formation

- Levees are formed by the repeated flooding of the river.
- When the river floods, the biggest, most coarse material will be deposited.
- This will be close to the river banks.
- Continuous flooding causes repeated deposition on the river banks.
- The banks form levees made of sediment, silt, and other materials.

Significance of NATURAL LEVEES

- They prevent rivers from flooding.
- Levees are usually parallel to the way the river flows, so levees can help direct the flow of the river.
- Levees can also provide a measure of protection from invaders.
- Fertile soil near levees is suitable for farming.
- Levees may be used to increase available land for habitation.





6. DELTAS

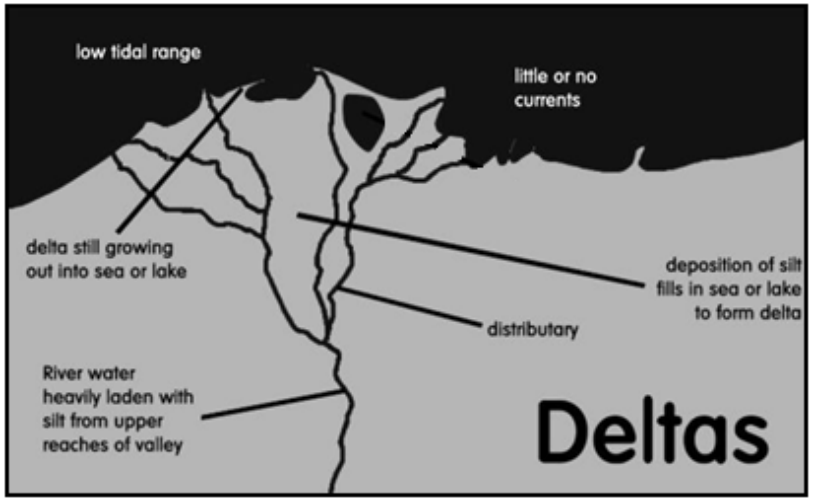
It is landform at the mouth of a river, where different channels (distributaries) of the same river flow into an ocean or sea.

Formation

- The river slows down at the mouth due silt deposits and gentle gradient.
- The channel splits into several smaller channels (distributaries) and it loses velocity.
- As the river loses velocity it deposits its load on the river bed.
- Both the bed load and suspended load are deposited producing fertile alluvial land.

Significance of DELTAS

- Deltas are usually highly fertile areas and support extensive crop cultivation.
- Sand and gravel are also quarried from deltas and are utilized for a variety of purposes e.g., road and building construction.
- They are important industrial hubs.
- Large settlements often grow up in the delta regions.
- Deltas are a source of water.
- Deltas sustain all ecosystems.
- Deltas ensures biodiversity.
- Tourism(leisure activities) opportunities are created by deltas and contributes to the economy.
- Can be part of water transport system.
- Deltas are a source of protein (fish)

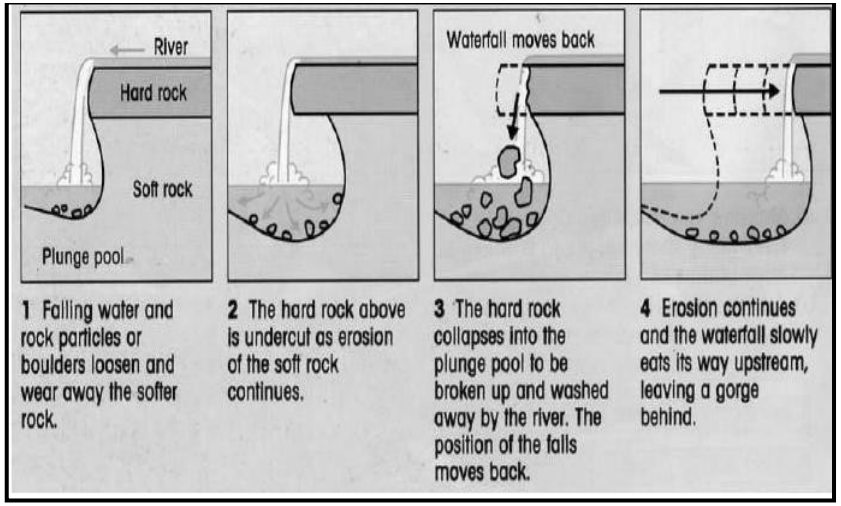


7. WATERFALLS

A waterfall is an area where water flows over a vertical drop or a series of steep drops in the course of a stream or river.

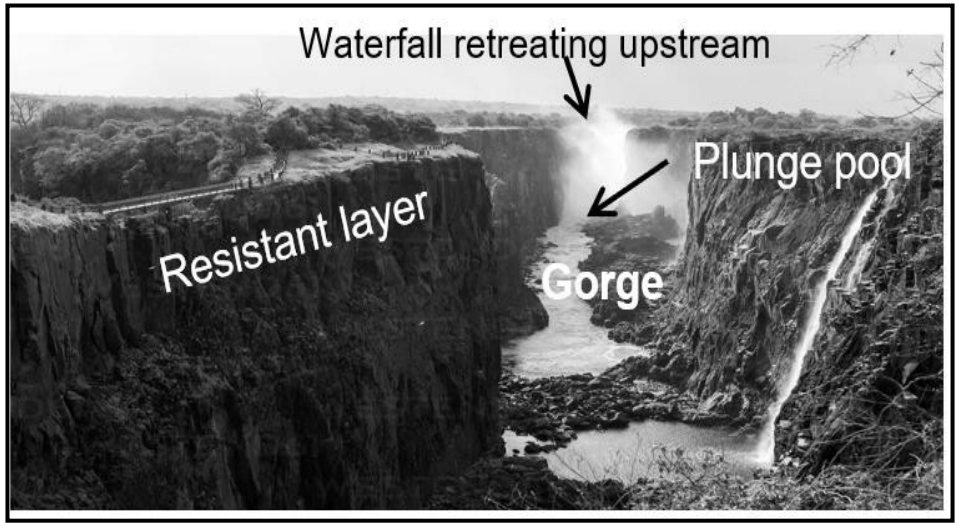
Formation

- Waterfalls often form in the upper stages of a river where it flows over different layers of rock.
- The soft rock erodes more quickly, undercutting the hard rock.
- The hard rock is left overhanging and because it is not supported, it eventually collapses.
- The fallen rocks crash into the plunge pool. They swirl around, causing more erosion.
- Over time, this process is repeated, and the waterfall moves upstream.
- A steep-sided gorge is formed as the waterfall retreats.



Significance of WATERFALLS

- The strong currents near falls are often used to generate hydro- electricity.
- Waterfalls are sometimes a disadvantage since they form a barrier to infrastructure development.
- Waterfalls attract tourists.
- Fishing can be carried out on waterfalls.
- Waterfalls is aesthetically pleasing.
- Waterfalls also provide opportunities for a wide range of, sometimes incompatible, outdoor leisure activities.

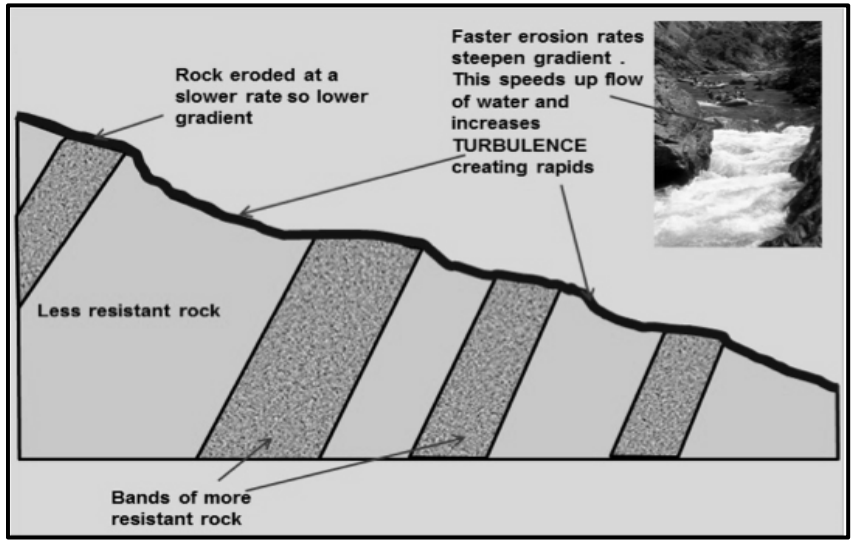


8. RAPIDS

Rapids are areas of shallow, fast-flowing water in a stream.
Rapids are stretches of fast-flowing water tumbling over a rocky-shallow riverbed.

Formation

- Water goes from one hard rock to softer rock
- Rock layers below the water is exposed
- Flowing water splashes over and around the rocks, forming what is called “white water”.



Significance of RAPIDS

- Attract tourists who want to raft down the stream.
- Water splashing over rocks is called white-water and it dissolve oxygen.
- The oxygen is useful to the ecosystem around the stream e.g., fish, insect and bacteria in the water.

B. FLUVIAL LANDFORMS AND FEATURES ACTIVITIES

13.1 Study FIGURES 13.1 A and 13.1 B showing fluvial landforms.

FIGURE 13.1A

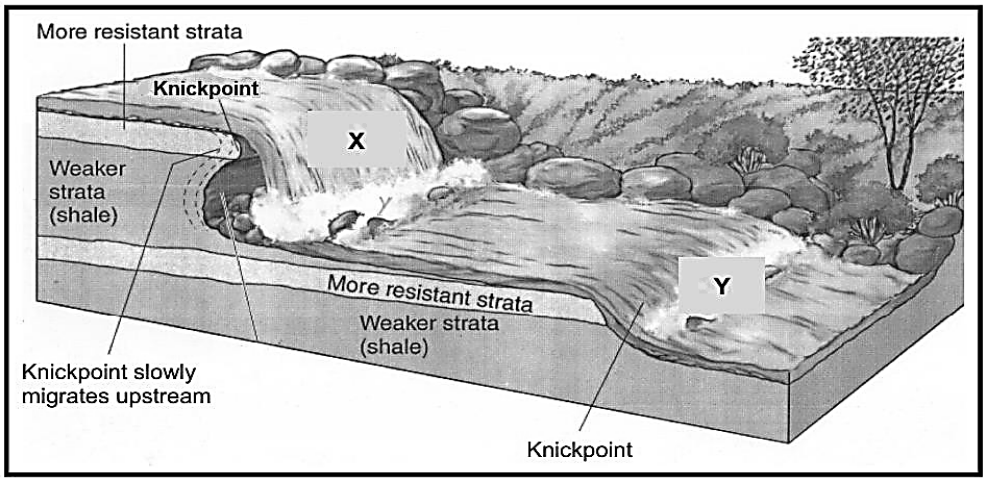
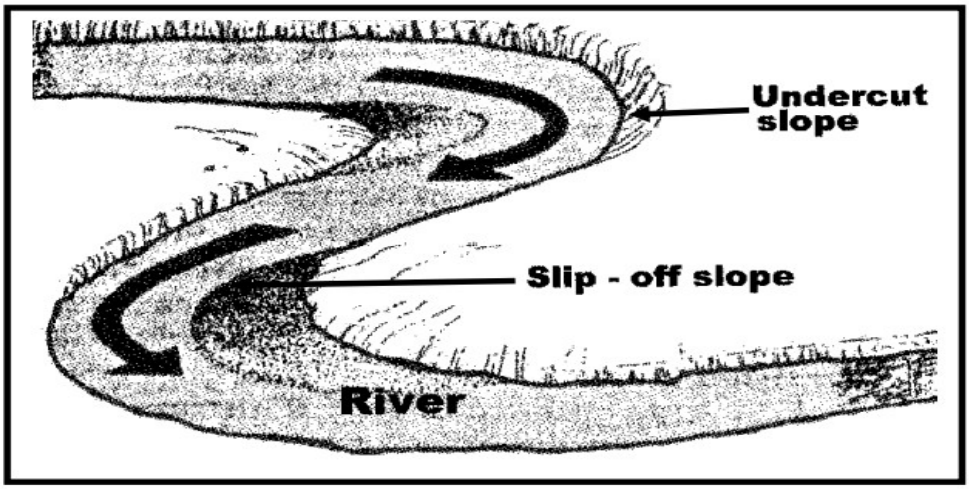


FIGURE 13.1B



13.1.1 Refer to FIGURE 13.1 A

(a) Define the term river discharge. (1 x 2) (2)

(b) Identify feature X. (1 x 1) (1)

(c) Along which course of the river does this feature commonly occur? (1 x 1) (1)

(d) Give a reason for your answer in QUESTION 13.1.1 (c). (1 x 1) (1)

(e) Account for the formation of feature X. (2 x 1) (2)

(f) Explain how feature X contributes to the economy of a country. (1 x 1) (1)

13.1.2 (a) Identify feature labelled Y. (1 x 1) (1)

(b) Name ONE popular sport that takes place at Y. (1 x 1) (1)

13.1.3 Refer to FIGURE 13.1 B showing a meandering river channel.

"Distinctive landforms (features) develop along the course of a river as a result of erosion or deposition."

(a) Define the term meander. (1 x 2) (2)

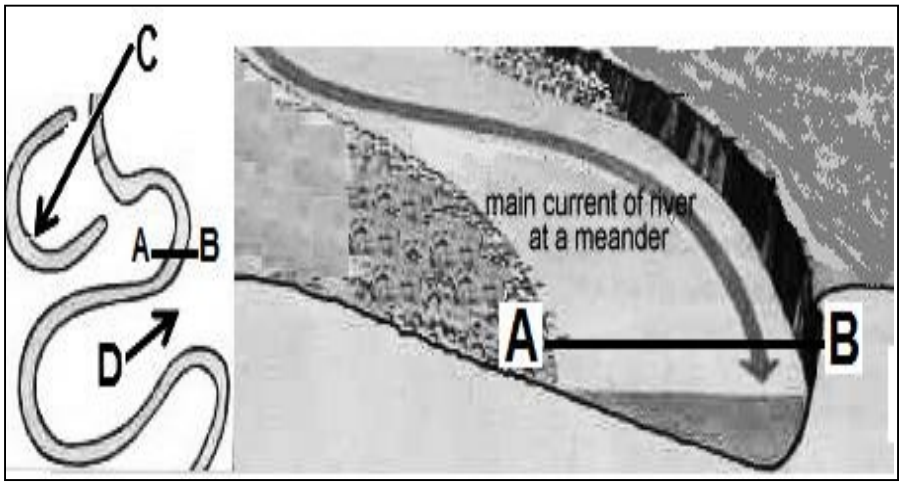
(b) Explain how a meander develops. (2 x 1) (2)

(c) Describe ONE characteristic of the "undercut slope" in a meander. (1 x 1) (1)

(d) Name the feature that will result from the narrowing of the meander neck. (1 x 1) (1)

(e) Suggest ONE reason why the feature identified In QUESTION 13.1.3(d) is classified as a "temporary feature". (1 x 1) (1)

13.2 Study the FIGURE 13.2 below and answer the questions that follow.



[Adapted from easymapwork.blogspot.com]

13.2.1	Identify fluvial landform C on the sketch.	(1 x 1)	(1)
13.2.2	In which course of the river is this landform found?	(1 x 1)	(1)
13.2.3	Identify slopes A and B.	(2 x 1)	(2)
13.2.4	Account for the differences in the gradient of slopes A and B.	(2 x 2)	(4)
13.2.5	Explain what will happen to feature C over time.	(2 x 2)	(4)
13.2.6	Mention one significance of the landform C.	(1 x 2)	(2)

13.3 Refer to the cartoon which illustrates activities at a river bend.

[Source: Ucdenver.org]

13.3.1 What is the term used to describe a river that winds and bends? (1 x 1) (1)

13.3.2 Name the TWO dimensions of a river that are visible in the cross profile. (2 x 1) (2)

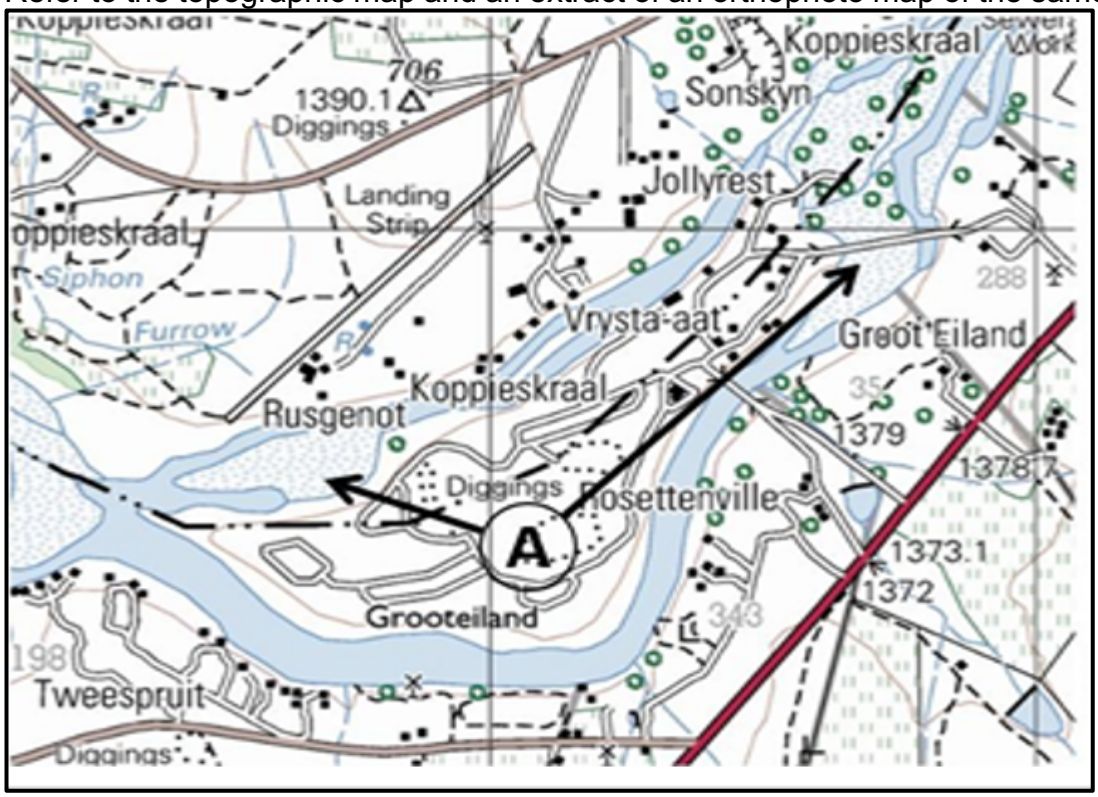
13.3.3 Name the slope of the river at B. (1 x 1) (1)

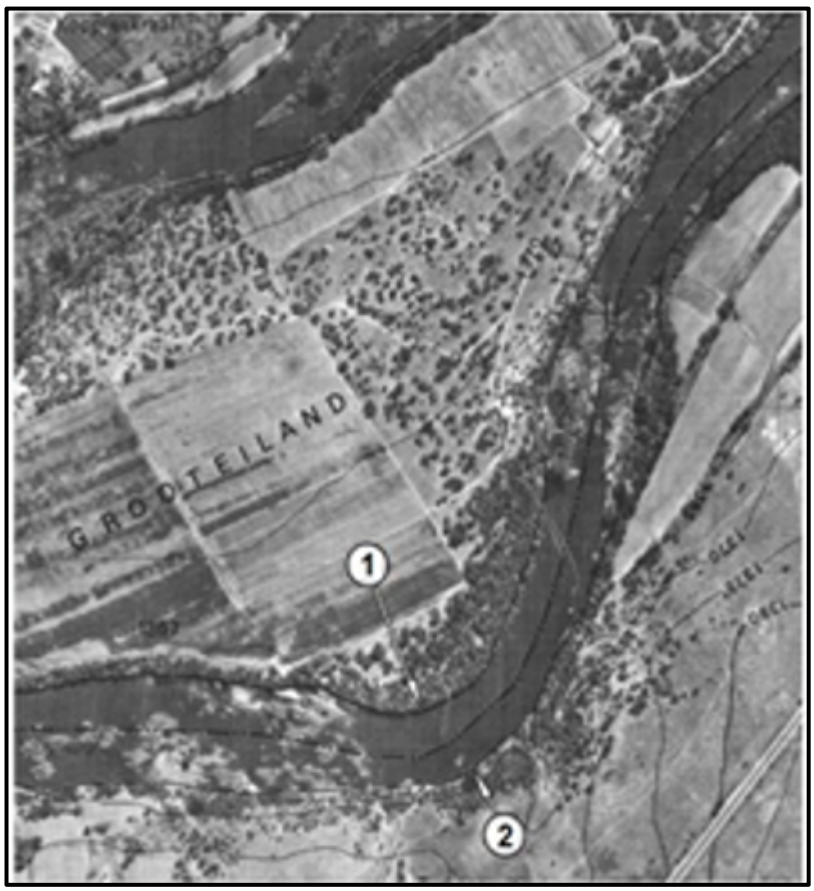
13.3.4 Why does the fish think both boys are idiots? (2 x 2) (4)

13.3.5 In a paragraph of approximately EIGHT lines, give a detailed explanation to account for the difference in the formation of slope A and slope B. (4 x 2) (8)

MAP WORK APPLICATION

13.4 Refer to the topographic map and an extract of an orthophoto map of the same area.





13.4.1 Name the dominant fluvial landform evident on the topographic map. (1)
(1 x 1)

13.4.2 Refer to fluvial feature A

(a) Name fluvial feature A. (1 x 1) (1)

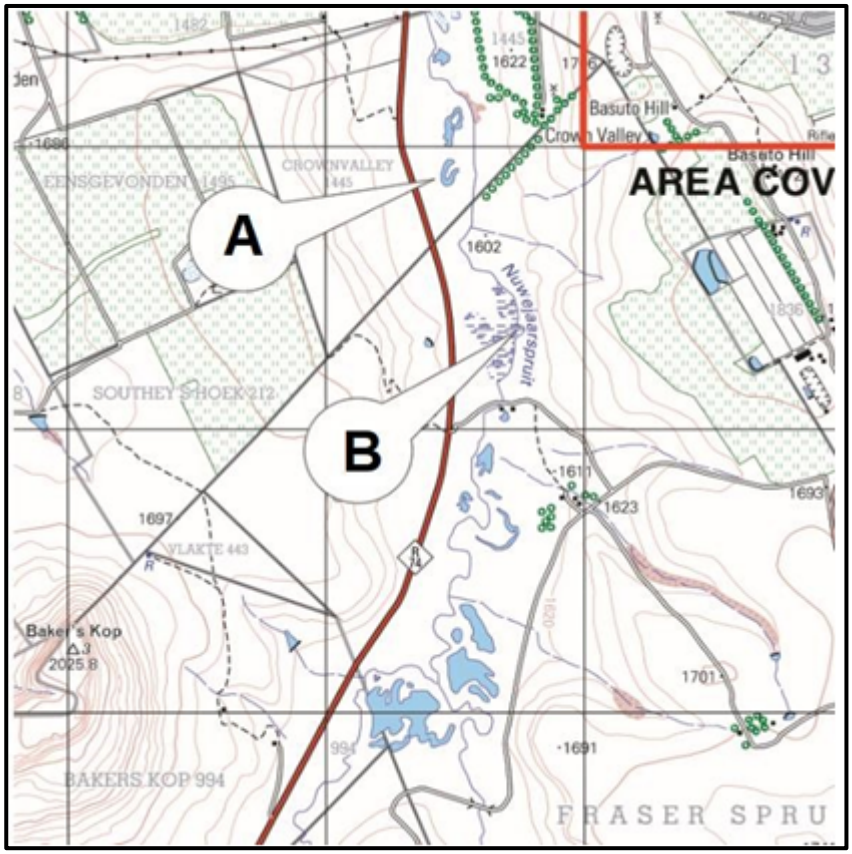
(b) How did the fluvial feature mention in QUESTION 13.4.2 (a) influenced the construction of roads in the area? (1 x 2) (2)

13.4.3 Refer to the orthophoto map, which is a part of the topographic map.

(a) Draw a labelled cross section from 1 to 2 on the orthophoto map. (4 x 1) (4)

(b) Explain how the dominant geomorphological process at 1 influenced agricultural activities. (1 x 2) (2)

13.5 The topographic map is part of the 2829AC HARRISMITH.



13.5.1 The Nuwejaarspruit (river) is in its lower course. Provide TWO evidences from the topographic map to support this statement. (2 x 1) (2)

13.5.2 Explain the impact of the Nuwejaarspruit (river) on human activities in the area. (2 x 2) (4)

13.5.3 Identify fluvial features A and B. (2 x 1) (2)

13.5.4 Discuss why the existence of landform feature A help to reduce flooding. (2 x 2) (4)

14. RIVER REJUVENATION

A. KEY CONCEPTS AND NOTES

Definition

When a river regains its erosive power

Explanation

It is made young (gaining erosive power) again and starts eroding

Characteristics

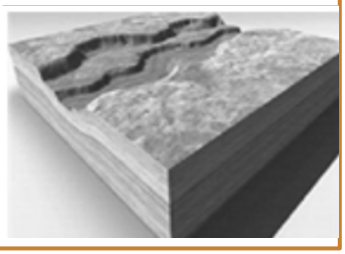
River flows faster and vertical erosion increases

CAUSES OF REJUVENATION

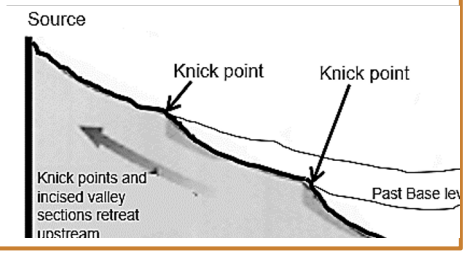
- DROP IN SEA LEVEL
- INCREASE IN RAINFALL
- STREAM PIRACY/RIVER CAPTURE
- ISOSTATIC UPLIFT
- DECREASE IN STREAM LOAD

B. RESULTANT LANDFORMS

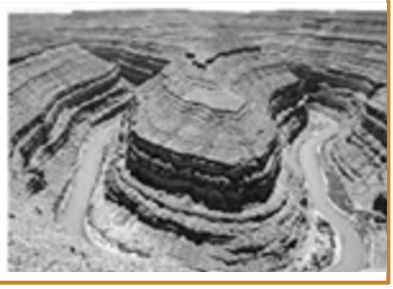
River terraces:
Bench or step that extends along the side of the valley and represents former level of the valley floor



Knick point:
Part of a river channel where there is sharp change in channel slope such as a waterfall or lake. A point where the new profile meets the old profile



Incised meanders:
The curve of a winding river with steep slopes on both sides rising to the former floodplain

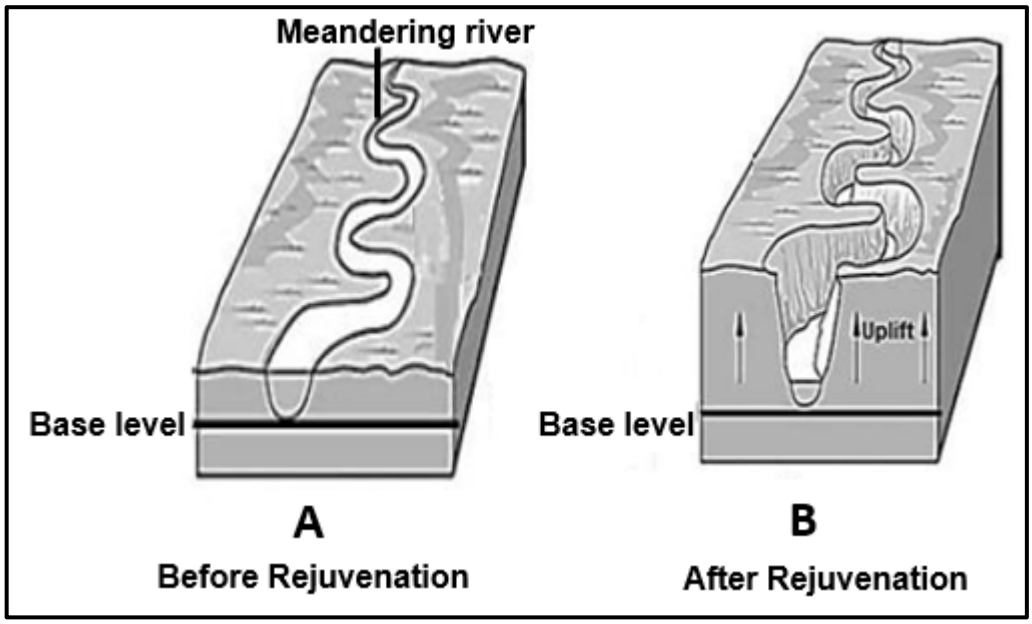


IMPORTANCE OF REJUVENATED LANDSCAPES

- Landforms are good for tourist attractions.
- People can visit areas with terraces for recreation.
- Old flood plain suitable for crop farming
- People can visit areas with terraces for recreation.
- Water at the knick point waterfalls can be used for power generation.

C. RIVER REJUVENATION ACTIVITIES

14.1 The FIGURES below illustrated the process of rejuvenation.



[Adapted from https://www.google.com/search?q=rejuvenation+of+rivers]

14.1.1 What type of erosion is associated with river rejuvenation? (1 x 1) (1)

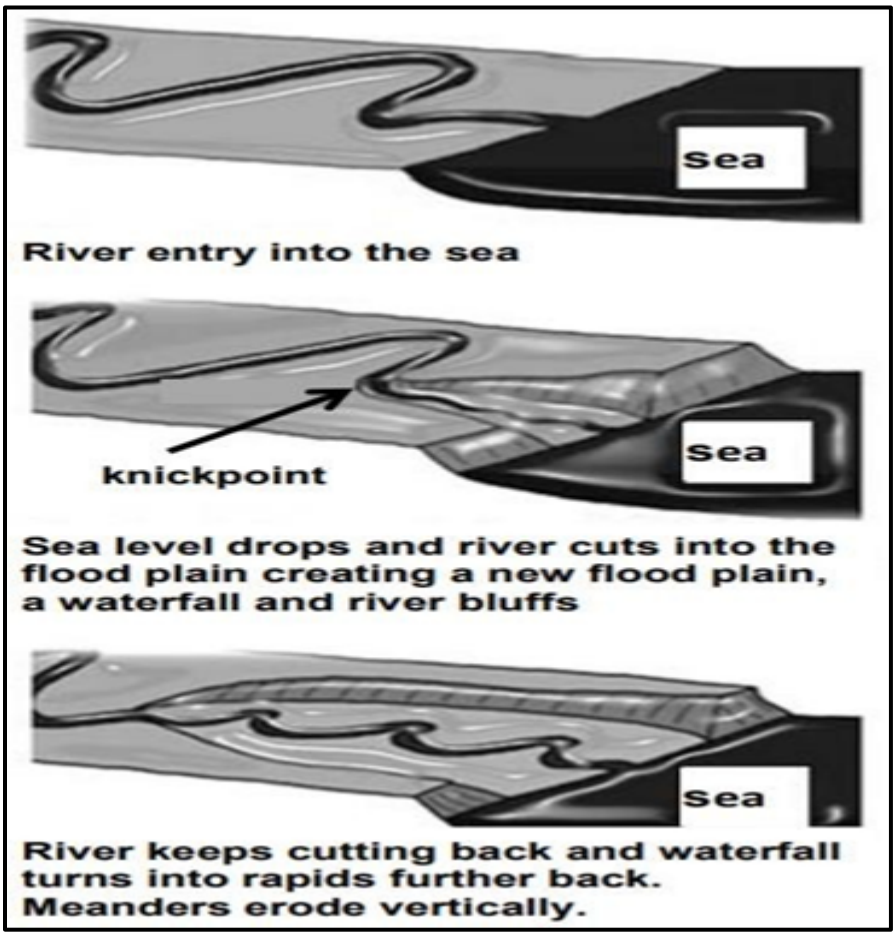
14.1.2 What evidence indicates that river rejuvenation has taken place? (1 x 2) (2)

14.1.3 Identify the force of upliftment associated with rejuvenation. (1 x 2) (2)

14.1.4 Why is rejuvenated land not suitable for human activity? (2 x 2) (4)

14.1.5 In a paragraph of approximately EIGHT lines, explain how rejuvenation could change the fluvial features downstream of the point of rejuvenation. (4 x 2) (8)

14.2 FIGURE 14.2. represents river rejuvenation.



[Source: https://alevelrivers.weebly.com/rejuvenation.html]

14.2.1 Define the term river rejuvenation. (1 x 2) (2)

14.2.2 Identify the condition that resulted in river rejuvenation. (1 x 1) (1)

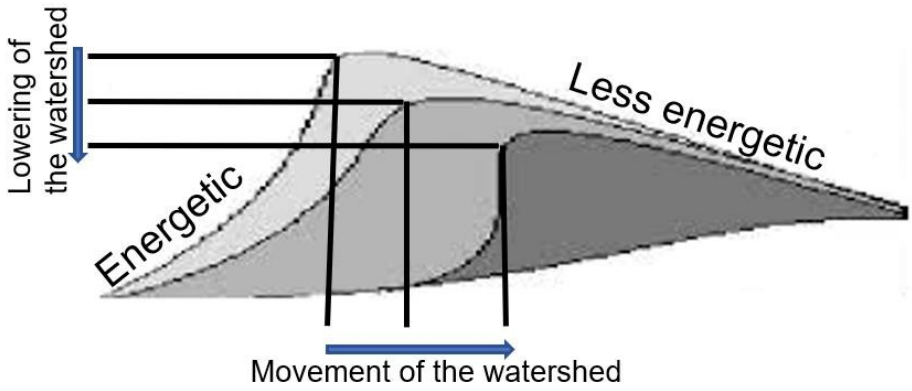
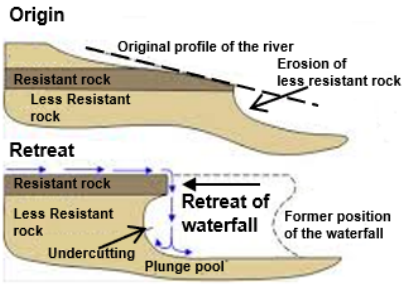
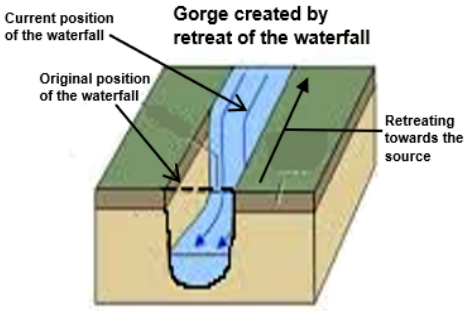
14.2.3 Name ONE fluvial feature that can form at the knick point along the river profile. (1 x 2) (2)

14.2.4 Explain the impact of river rejuvenation on the grading of a river. (2 x 2) (4)

14.2.5 Write a paragraph of approximately EIGHT lines elaborating on the changes that will occur in the fluvial features found in the illustrated course of the river as a result of river rejuvenation. (4 x 2) (8)

15. RIVER CAPTURE/STREAM PIRACY

A. KEY CONCEPTS AND NOTES

Concepts	Definition
River capture/stream piracy	When the more energetic (active) river, captures some of the water of a less energetic river.
Abstraction	The process whereby the watershed becomes lower and its position shifts. 
Headward erosion • Erosion takes place towards the source of a river. • Headwaters of a river are moving upstream. • Upper stream is moved backward. • Undercutting of upper reaches of river • Less resistant rocks promote the erosion process.	The stream erodes away at the rock and soil at its headwaters (source) in the opposite direction that it flows. This lengthens the stream channel and enlarge the drainage basin  

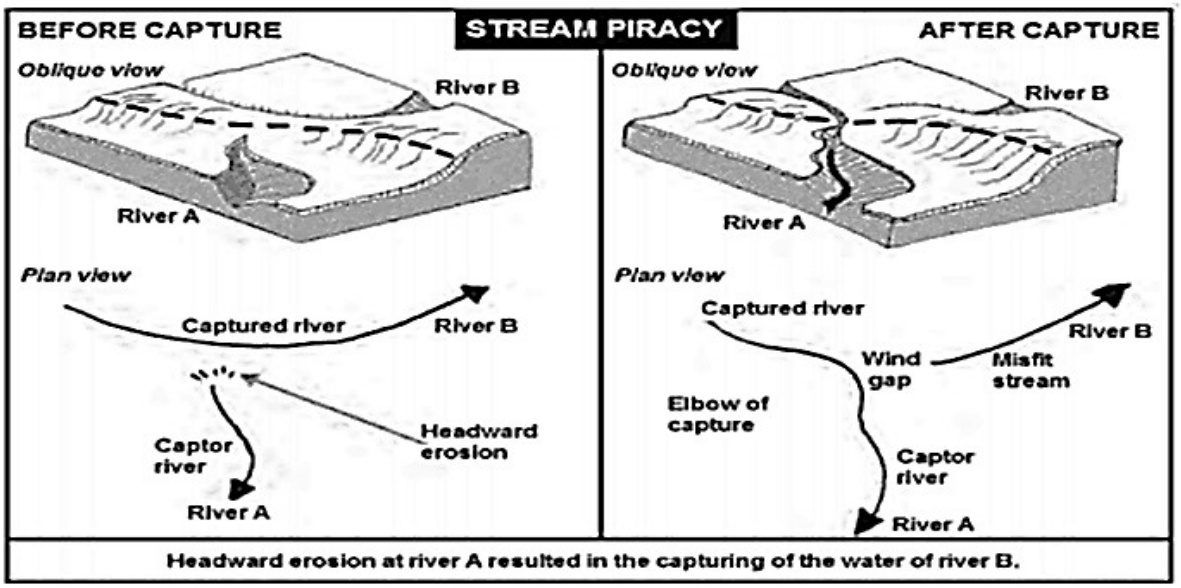
B. CAUSES AND CHARACTERISTICS

1. Causes of stream piracy.

- Steeper gradient on the side of the energetic stream of the watershed.
- The low-lying stream has more energy.
- Higher precipitation, giving greater runoff and more erosion to the energetic stream.
- Softer rocks on the side of the energetic stream cause faster erosion.
- Presence of faults or joints in rocks to assist the erosion process.

How does stream piracy occur.

- The more energetic stream erodes backward at its source.
- The energetic stream captures the waters of the less energetic stream.



FEATURE	EXPLANATION
Captor Stream	The energetic stream that intercepts (takes) the water of the less energetic stream
Captured Stream	The river from which water was intercepted (taken) by the captor stream)
Misfit Stream	The stream that has lost his water. Also called beheaded stream. The river is too small for then valley it flows in
Elbow of capture	The place at which stream piracy (river capture) takes place. Usually, a knickpoint waterfall develops.
Wind gap	The dry river valley between the misfit stream and the elbow of capture.

Characteristics of Captor stream after piracy

- Volume of water increases in the stream.
- Downward erosion increases.
- Carrying capacity of the river increases.
- River rejuvenates.

Characteristics of misfit stream after stream piracy

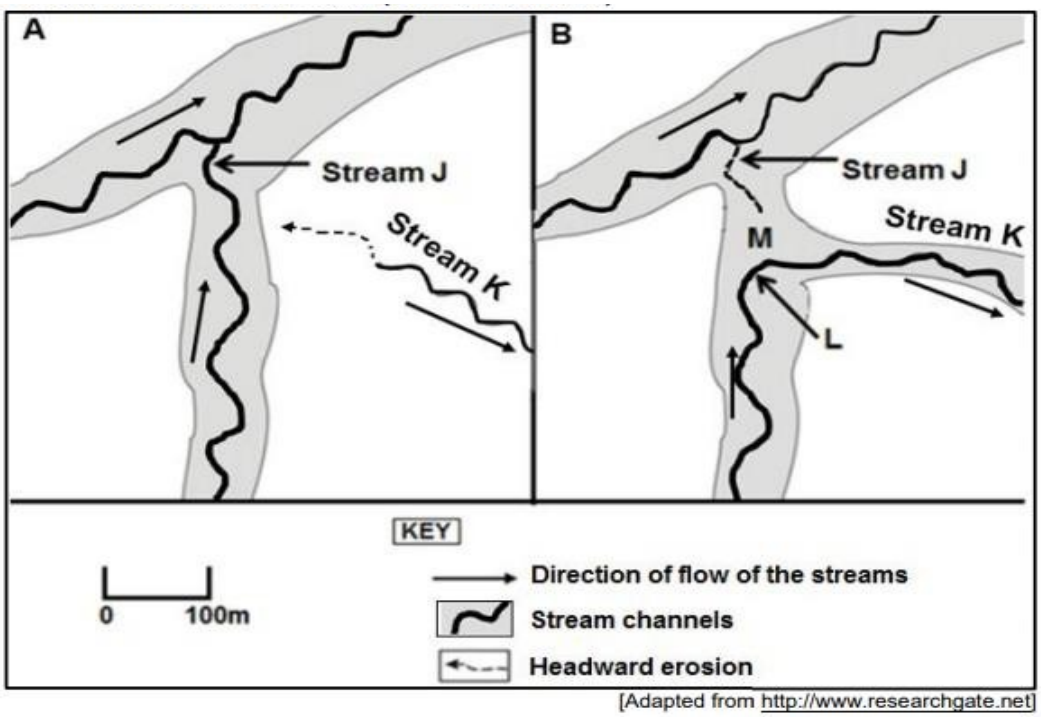
- Volume of water decreases
- Stream too small for its channel/valley
- Deposition of stream load occurs.
- Water erosion is reduced, but wind erosion will increase.
- Carrying capacity is reduced.

<table>
<tr><th colspan="2">2. IMPLICATIONS OF RIVER CAPTURE</th></tr>
<tr><th colspan="2">1. Human activities</th></tr>
<tr><td>At the Captor Stream
More agricultural production
Less irrigation
Increase in production might lead to manufacturing.
Increase in water might cause flooding and people must relocate.
More water might have damaged the recreational facilities on the banks of the river.</td><td>At the Misfit Stream
People will relocate due to job losses in agriculture.
Decrease in agricultural production.
Financial implication due to irrigation
Less of recreational facilities due to less income
Factories close due to lack of water
Decrease in fishing for source of food</td></tr>
<tr><th colspan="2">2. Settlements</th></tr>
<tr><td>Captor Stream
Due to increase of water along the banks people must relocate.</td><td>Misfit Stream
Due to the decrease in agricultural production people relocate.
Rural- urban migration
The settlement might become a ghost town</td></tr>
<tr><th colspan="2">3. Recreation</th></tr>
<tr><td>Captor Stream
Recreational facilities along the banks of the river might be damaged.
Increase in water sports</td><td>Misfit Stream
Decrease in water sports.
Because of less people, there is financial instability in the area</td></tr>
<tr><th colspan="2">4. Agriculture</th></tr>
<tr><td>Captor Stream
Increase in crop production.
More exports
Less irrigation</td><td>Misfit Stream
More water expenses.
Decrease in crop production</td></tr>
</table>

2. IMPLICATIONS OF RIVER CAPTURE	
5. Ecosystem	
Captor Stream • Habitat will be disturbed. • Increase in water will cause an increase in fish. • Diversity of ecosystems will develop because of the increase in vegetation.	**Misfit Stream** • Marine/water ecosystem disturbed. • Less fish • Land degradation due to soil erosion • Decrease in biodiversity
IMPLICATIONS OF RIVER CAPTURE	
Elbow of capture • Tourist attraction due to the waterfall • Job creation in the tourism sector • There can be hydroelectricity being generated. • Area of research	**Wind gap** • Biodiversity is destroyed. • Decrease in crop production and farming activities. • Soil erosion will increase.

C. STREAM PIRACY ACTIVITIES

15.1 Refer to sketches A and B of FIGURE 15.1



[Adapted from http://www.researchgate.net]

15.1.1 Define the term river capture. (1 x 2) (2)

15.1.2 Describe the erosion associated with the process of river capture in sketch A. (1 x 1) (1)

15.1.3 Identify features L and M that result from river capture. (2 x 1) (2)

15.1.4 Match the terms captor stream and misfit stream to streams J and K in diagram B. (2 x 1) (2)

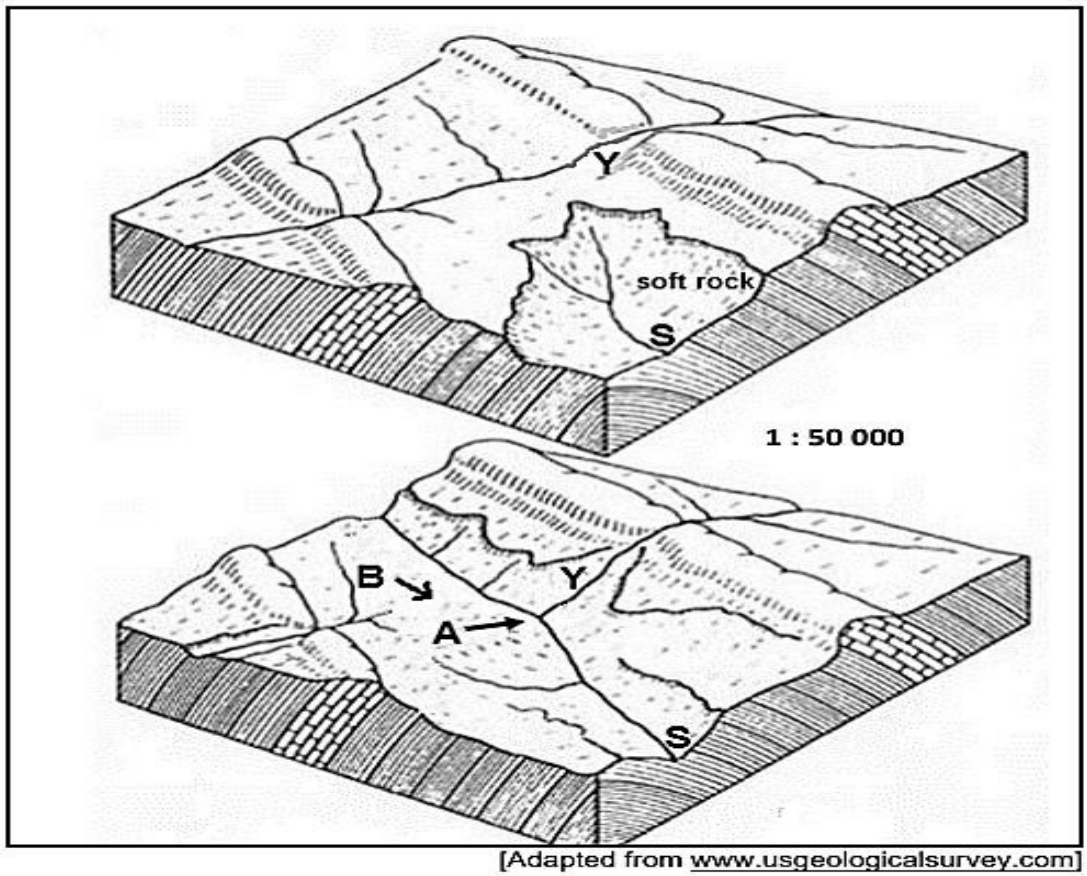
15.1.5 (a) What is a watershed? (1 x 2) (2)

(b) How can the process of river capture cause the watershed to change its position? (1 x 2) (2)

15.1.6 What effect will river capture have on the volume of water in stream K? (1 x 2) (2)

15.1.7 What can the local farming community around stream J do to continue with their daily activities after river capture have taken place? (2 x 2) (4)

15.2 Refer to the sketches that indicate the river capture process.



[Adapted from www.usgeologicalsurvey.com]

15.2.1 Identify streams S and Y. (2 x 1) (2)

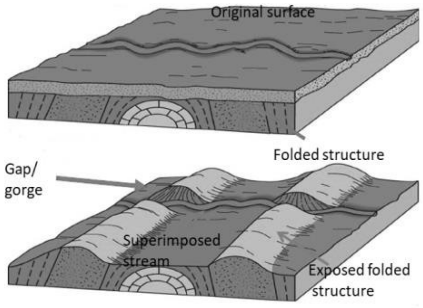
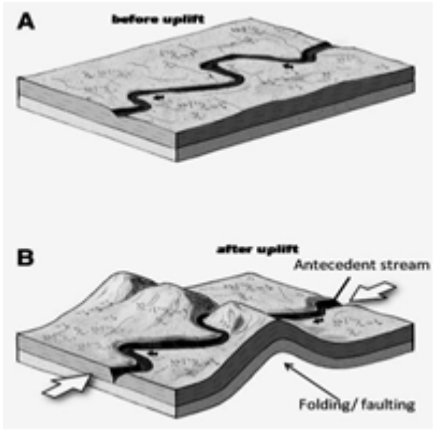
15.2.2 Name the features of river capture at A and B respectively. (1 x 1) (1)

15.2.3 Give TWO reasons for the river S eroding at a faster rate. (2 x 1) (2)

15.2.4 In a paragraph of approximately EIGHT lines, explain the impact of river capture on the volume of water and the erosive ability of rivers B and S respectively. (4 x 2) (8)

16. SUPERIMPOSED AND ANTECEDENT DRAINAGE PATTERNS

A. KEY CONCEPTS AND NOTES

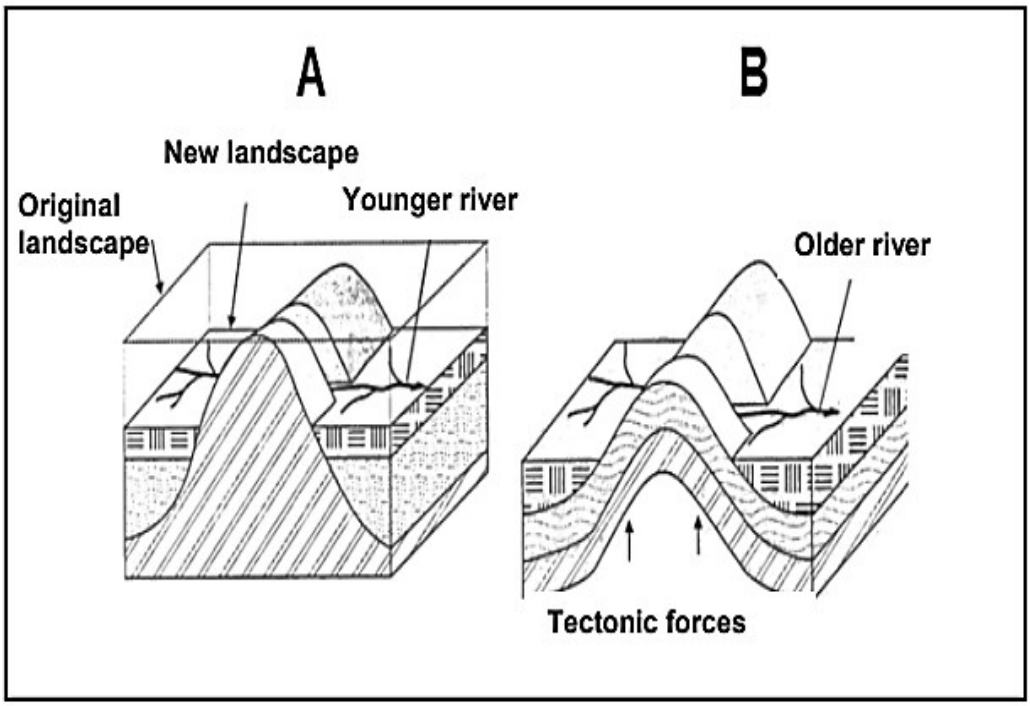
Concepts	Definition	Description	
Superimposed	A drainage pattern/stream that has been established on an earlier surface	• Rivers are younger than the structures across which they cut. • May cut narrow gab/gorges if forced across bands of hard rock	
Antecedent	Occurs where a river developed its course before the high- lying area was formed.	• Rivers is older than the landform across which they cut. • Warping, folding or faulting occurred. • May cut narrow gab/gorges if forced across bands of hard rock	

B. Why the streams maintained their course

- Softer rock over which they flow.
- Volume of water increase through rejuvenation and increased rainfall.
- There are crack and joints where the river flows

C. SUPERIMPOSED AND ANTECENDENT DRAINAGE ACTIVTIES

16.1 Study FIGURE 16.1 which shows superimposed drainage (A) and antecedent drainage (B).



[Adapted from *Exam Fever Series*]

16.1.1 Distinguish between superimposed drainage and antecedent drainage. (2 x 2) (4)

16.1.2 Give ONE reason why superimposed drainage does not change its course. (1 x 2) (2)

16.1.3 Name ONE unique feature associated with the flow patterns of superimposed and antecedent drainage. (1 x 2) (2)

16.1.4 Identify the tectonic force associated with the uplift of the surface evident in diagram B. (1 x 2) (2)

16.1.5 Give the relationship between the rate of down cutting and tectonic uplift in antecedent drainage. (2 x 2) (4)

16.1.6 Explain why the illustrated landscapes are not suitable for human habitation. (2 x 2) (4)