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2024

MATRIC INTERVENTION

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GEOGRAPHY

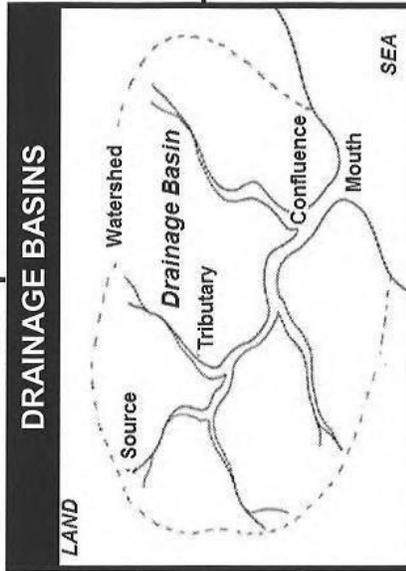


GEOMORPHOLOGY

1

FEATURES

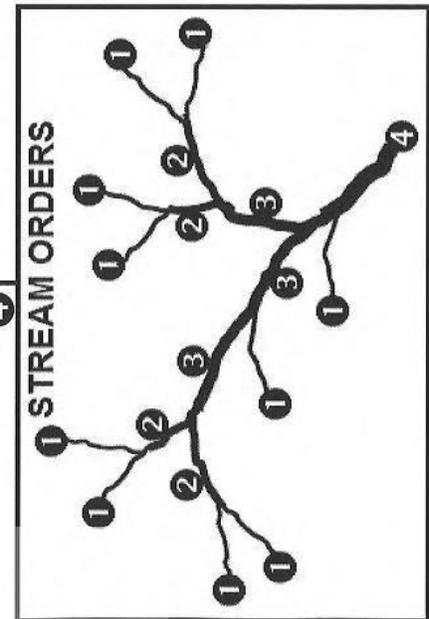
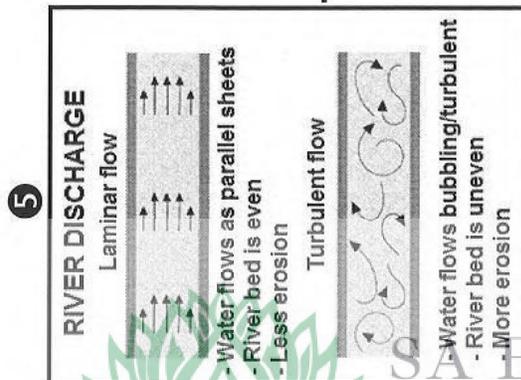
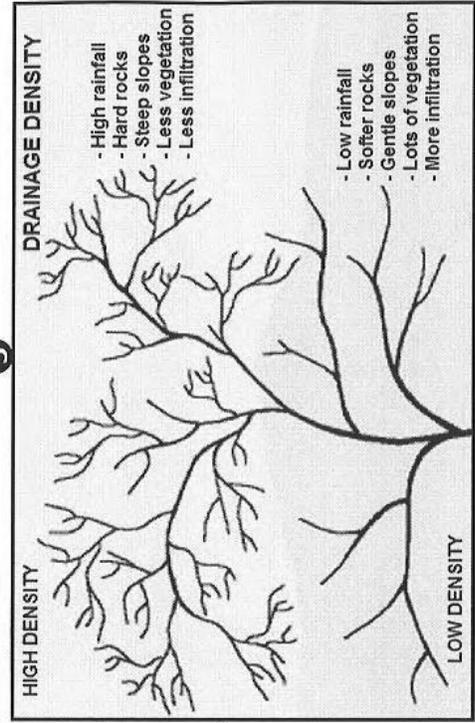
Catchment area	Area over which rain falls and is caught by a drainage basin	Watershed	High lying area separating two drainage basins
Infiltration	Movement of water through soil into the ground	Water table	Upper level of underground saturated rock
Confluence	Place where two rivers join	Run-off	The surface flow of water
Tributary	A river that joins a larger river	Groundwater	Water found under the ground
River mouth	Sea or lake where river ends	Interfluvium	High lying area between two river valleys
Source	Where river begins	River system	Main river with all its tributaries



2

TYPES OF RIVERS

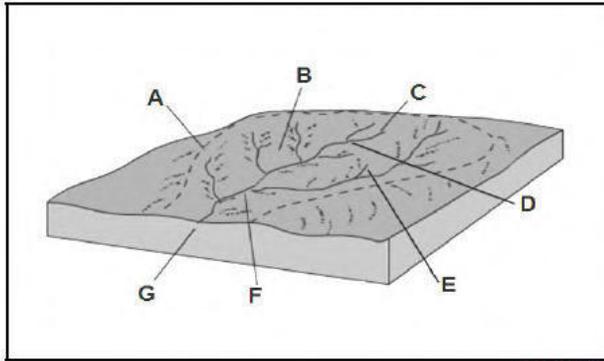
Type	Description	Example
Permanent	Flows all year	Amazon
Periodic	Flows in rainy season	Limpopo
Episodic	Flow after heavy rainfall	Auob Nossob
Exotic	Spans two types of climatic regions	Nile Orange



1+1=2
2+1=2
2+2=3
3+1=3
3+2=3
3+3=4
and so on

Geomorphology**Activity 16 Time frame 6 minutes**M16 **FIGURE 1.2: DRAINAGE BASIN**

1.2



[Adapted from

http://www.earthonlinemedia.com/ebooks/tpe_3e/fluvial_systems/drainage_basin.jpg]

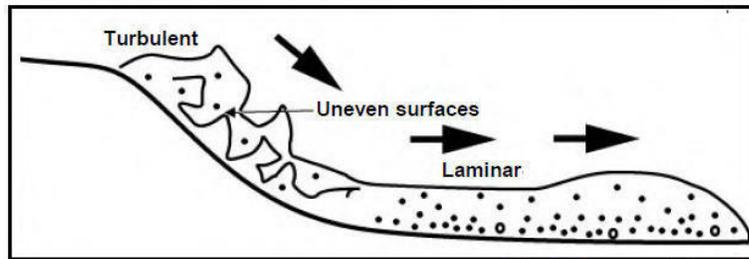
Refer to FIGURE 1.2 and label the diagram by completing the statements below. Write only the answer next to the question number (1.2.1–1.2.7) in the ANSWER BOOK.

- 1.2.1 **A** is a/an ..., which is a mountain range that separates one catchment area from another catchment area.
- 1.2.2 **B** is a/an ..., which is a high-lying area within a catchment area, which separates tributaries.
- 1.2.3 **C** is the ..., which shows the origin of a river system in mountainous high-lying areas.
- 1.2.4 **D** is the ... where two or more streams join.
- 1.2.5 **E** is a/an ..., which provides water to the main river.
- 1.2.6 **F** is in the ... course of the river.
- 1.2.7 **G** is the ... where the river flows into the sea.
- 1.2.8



How rivers form animation – 1min 07sec

<https://www.youtube.com/watch?v=ednXhLcwZz0>

Activity 17 Time frame 6 minutes
N14 **FIGURE 2.2: RIVER FLOW PATTERNS**
2.2
[Adapted from www.indiaa.edu]

Refer to FIGURE 2.2 showing river flow patterns. Indicate whether each of the following statements refer to turbulent or laminar flow in a river. You may use the same answer for more than one question.

- 2.2.1 Associated with a river bed that is level and even
- 2.2.2 Associated with an irregular and swirling flow
- 2.2.3 Effective in eroding and transporting sediment
- 2.2.4 Commonly occurs in the upper course of a river
- 2.2.5 Water flows in thin layers
- 2.2.6 Associated with a higher river velocity
- 2.2.7 Occurs where rapids are visible in the river's course
- 2.2.8 Has a larger stream load-carrying capacity

Activity 18 Time frame 6 minutes

- N18 Choose the correct word from those given in brackets which will make the sentence TRUE. Write down only the word next to the question numbers (1.2.1 to 1.2.8).
- 2.2.1 Rivers that flow all year round are (permanent/periodic) rivers
 - 2.2.2 (Exotic/Periodic) rivers flow during the rainy season only.
 - 2.2.3 Rivers that only flow after heavy rainfall are known as (episodic/exotic) rivers.
 - 2.2.4 The majority of rivers in South Africa are (periodic/permanent).
 - 2.2.5 In (permanent/episodic) rivers the river bed is always below the water table.
 - 2.2.6 The water table is always below the river bed in (exotic/episodic) rivers.
 - 2.2.7 (Periodic/Exotic) rivers flow all year round because they are fed by tributaries in high rainfall areas.
 - 2.2.8 (Permanent/Periodic) rivers are characteristic of interchanging seasons of high and low rainfall.

Activity 19 Time frame 12 minutes

 M17
1.5

FIGURE 1.5: A RIVER

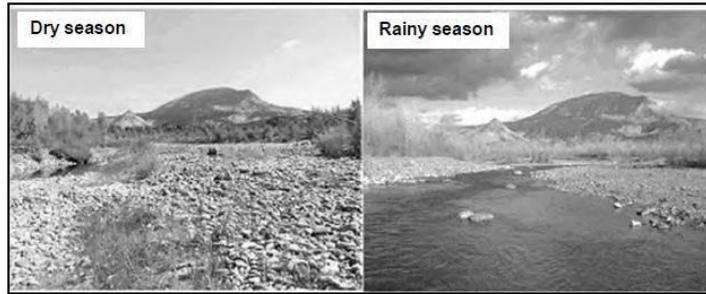

 [Source: <http://greatecology.com/restoring-ecosystems-lessons-science>]

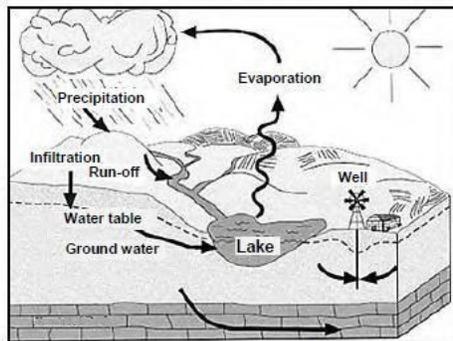
FIGURE 1.5 shows the amount of water in a river in the dry season and the rainy season.

- 1.5.1 Name the type of river in the photograph. (1 x 1) (1)
- 1.5.2 Provide evidence from the photograph to support your answer to QUESTION 1.5.1. (1 x 1) (1)
- 1.5.3 Define the term *water table*. (1 x 1) (1)
- 1.5.4 Draw TWO labelled diagrams to show the different positions of the water table in the dry season and the rainy season. (2 x 2) (4)
- 1.5.5 In a paragraph of approximately EIGHT lines, explain the influence of precipitation and gradient on the amount of deposited material evident on the river bed. (4 x 2) (8)

Activity 20 Time frame 12 minutes

 N15
2.5

FIGURE 2.5: GROUND WATER

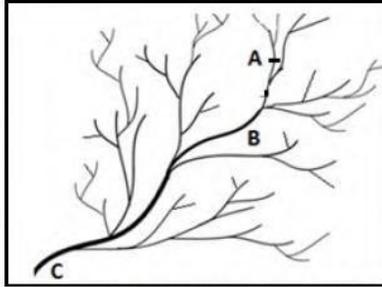

 [Adapted from www.pcastate.mn]

Refer to FIGURE 2.5, which illustrates factors that could influence the amount of ground water in the soil and answer the questions that follow.

- 2.5.1 Define the term *ground water*. (1 x 1) (1)
- 2.5.2 Differentiate between the terms *infiltration* and *run-off*. (2 x 1) (2)
- 2.5.3 What role does ground water play in the discharge (stream flow) of a permanent river during the dry season? (1 x 2) (2)
- 2.5.4 What effect would the construction of the well have on the water table? (1 x 2) (2)
- 2.5.5 Explain, in a paragraph of approximately EIGHT lines, FOUR natural factors that can cause the water-table level to rise. (4 x 2) (8)

Activity 21 Time frame 6 minutes

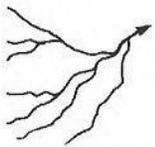
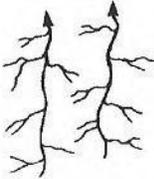
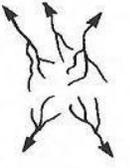
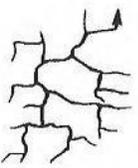
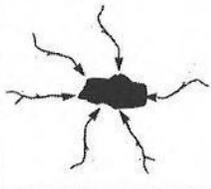
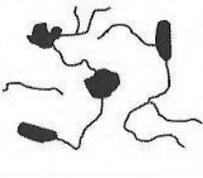
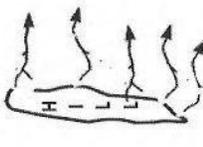
N14
1.2 **FIGURE 1.2: DRAINAGE BASIN**

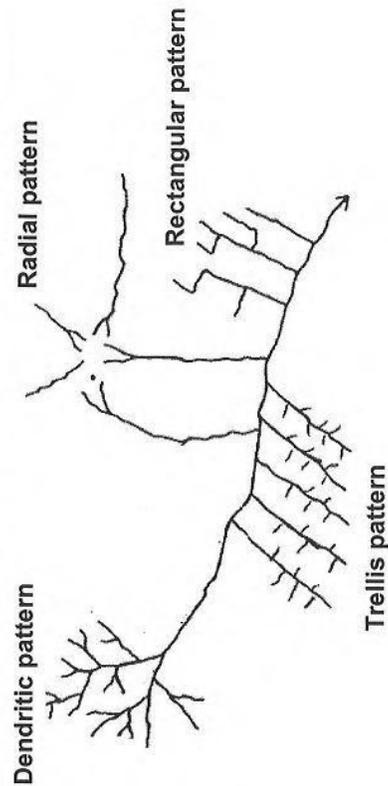


[Source: sageography.myschoolstuff.co.za]

Refer to the drainage basin in FIGURE 1.2 and answer the questions that follow.

- 1.2.1 Name the drainage pattern shown in the diagram.
- 1.2.2 At which angle do the tributaries join the main stream?
- 1.2.3 State whether this drainage pattern is associated with a surface that has a uniform or varied resistance to erosion.
- 1.2.4 Is the dominant process at **A** on the sketch erosion or deposition?
- 1.2.5 State the stream order at point **A**.
- 1.2.6 Is area **B** an interfluvium or a watershed?
- 1.2.7 Is the discharge of the river greater at **A** or at **C**?

DRAINAGE PATTERNS							
Pattern	Dendritic	Trellis	Radial	Rectangular	Centripetal	Deranged	Parallel
Diagram							
Description	Looks like branches of a tree. Tributaries join at acute angles.	Strong main stream joined by short tributaries at right angles	Looks like spokes of a wheel when viewed from above	Tributaries join at right angles and have bends of 90°	Opposite of radial pattern.	Small streams that have no specific pattern	Streams flow parallel to each other
Underlying structures	Uniform rocks of similar hardness	Gently sloping alternating layers of hard and soft rock	Rivers flow away from a high central point such like a butte or mesa	In areas with hard rock that is well jointed.	Streams flow towards a central basin such as a marsh or lake	Very flat areas that have experienced recent glaciation	Common along a ridge or hills.



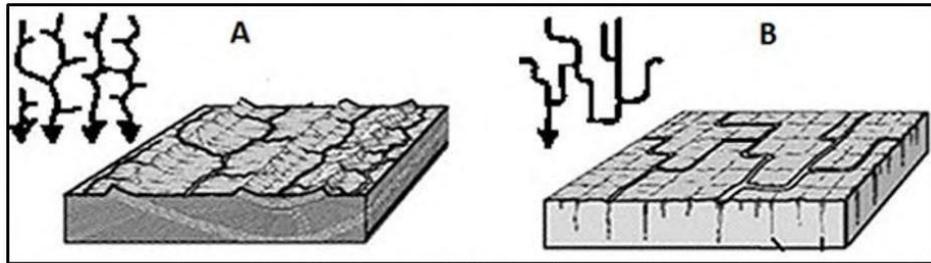
You must be in a position to do the following:

- Identify each of the patterns on diagrams.
- Identify stream patterns on topographic maps.
- Give a description of the patterns.
- Describe the underlying structures that caused the stream pattern.

Activity 22 Time frame 12 minutes

J18 FIGURE 1.5: TYPES OF DRAINAGE PATTERNS

1.5

[Source: <http://slideplayer.com/7545408/24/images/30/Stream+Drainage+Patterns.jpg>]

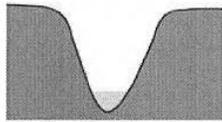
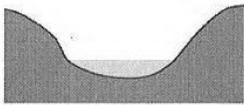
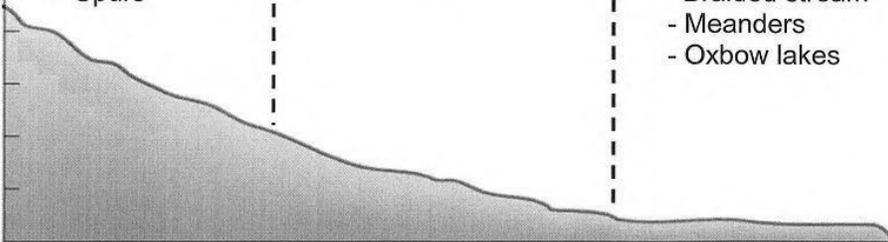
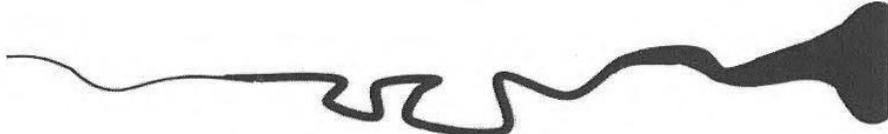
Study FIGURE 1.5 which shows two types of drainage patterns (A and B).

- | | | | |
|------|--|---------|----|
| 1.5. | Name the drainage patterns labelled A and B. | (1 x 1) | (1 |
| 1 | | |) |
| 1.5. | Name the underlying rock structure that gives rise to drainage patterns A and B. | (2 x 1) | (2 |
| 2 | | |) |
| 1.5. | State ONE of the following: | | |
| 3 | | | |
| | (a) Similarity between drainage patterns A and B | (1 x 2) | (2 |
| | | |) |
| | (b) Difference between drainage patterns A and B | (1 x 2) | (2 |
| | | |) |
| 1.5. | Why are the tributaries in drainage pattern A short in comparison to the length of the main river? | (1 x 2) | (2 |
| 4 | | |) |
| 1.5. | Account for the main streams in drainage pattern B having 90° bends. | (2 x 2) | (4 |
| 5 | | |) |

LONGITUDINAL- AND CROSS PROFILES

Longitudinal profile: The 'side view' of a river from its source to its mouth

Cross profile: The shape of the river valley from one bank to the opposite bank

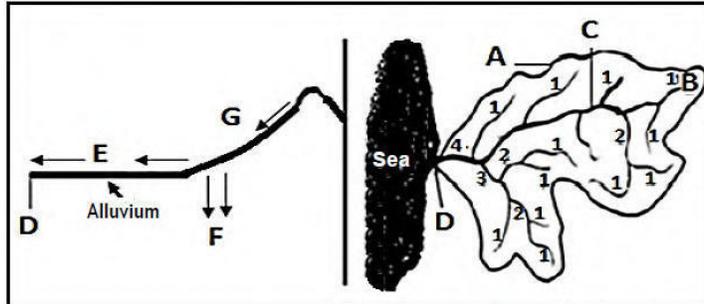
COURSE/ STAGE	UPPER COURSE (YOUNG STAGE)	MIDDLE COURSE (MATURE STAGE)	LOWER COURSE (OLD STAGE)
CROSS PROFILE			
GRADIENT	Steep	Gradual	Almost flat
SPEED	Flows fast	Flows slower	Flows very slowly
PROCESSES	Downward erosion	Lateral erosion	Deposition
LANDFORMS	<ul style="list-style-type: none"> - Waterfalls - Rapids - Spurs 	<ul style="list-style-type: none"> - Meanders - Spurs 	<ul style="list-style-type: none"> - Sandbanks - Marshes - Braided stream - Meanders - Oxbow lakes
LONGI- TUDINAL PROFILE			
VIEWED FROM ABOVE			



Fluvial Processes

Activity 23 Time frame 6 minutes

N15
1.2 **FIGURE 1.2: DRAINAGE BASIN AND ITS PROFILE**



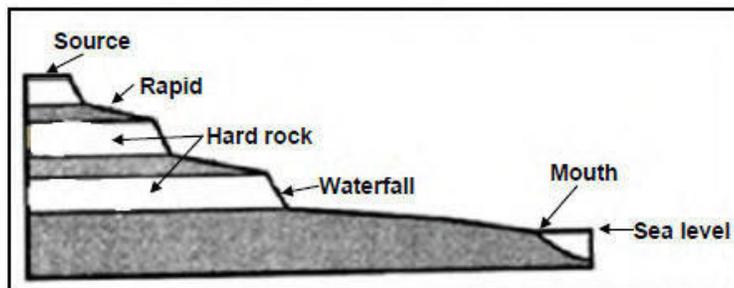
[Adapted from *Ohio Stream Management Guide 3*]

Refer to the drainage basin and its profile in FIGURE 1.2 and answer the questions that follow.

- 1.2.1 Name ONE source of water for drainage basin A.
- 1.2.2 Give a term that best describes B.
- 1.2.3 Name the stream order at point C.
- 1.2.4 Name a fluvial feature that is likely to form at point D in the river.
- 1.2.5 Name the process that gave rise to alluvium being found at point E.
- 1.2.6 Give a term that describes the movement of water at F.
- 1.2.7 Give the term that describes the high-lying area surrounding drainage basin A.
- 1.2.8 Give the term that describes the lowest point to which a river erodes

Activity 24 Time frame 12 minutes

N14
1.5 **FIGURE 1.5: LONGITUDINAL RIVER PROFILE**

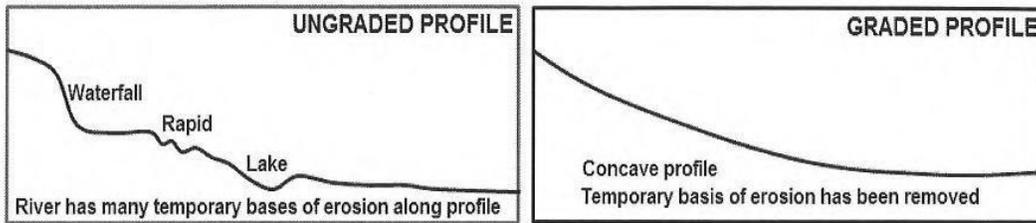


[Source: www.cliffsnotes.com]

FIGURE 1.5 shows a longitudinal river profile.

- 1.5.1 Explain the term *longitudinal profile*. (1 x 1) (1)
- 1.5.2 Name a temporary base level of erosion evident on the sketch. (1 x 1) (1)
- 1.5.3 Draw a labelled free-hand sketch of a graded longitudinal profile. (1 x 3) (3)
- 1.5.4 State ONE characteristic of the river bed of a graded river. (1 x 2) (2)
- 1.5.5 In a paragraph of approximately EIGHT lines, explain the processes that the profile in FIGURE 1.5 must undergo to change from an ungraded to a graded profile. (4 x 2) (8)

GRADED AND UNGRADED RIVER PROFILES

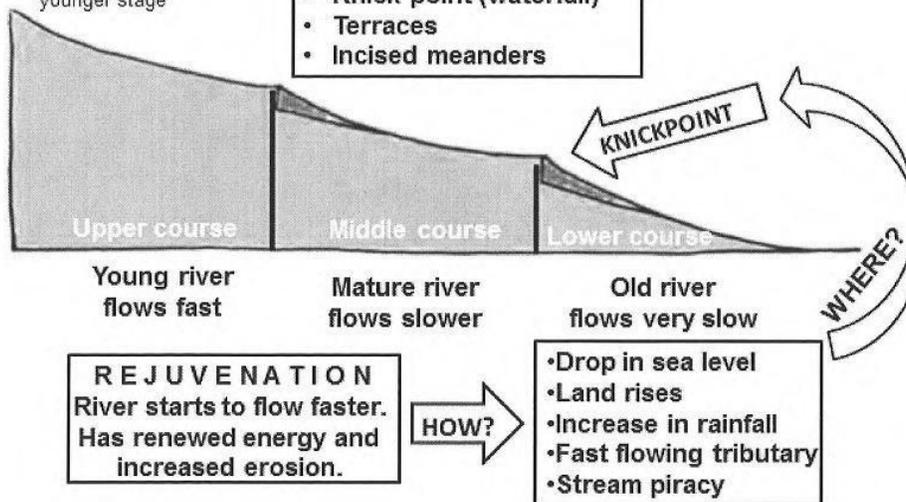


RIVER REJUVENATION

REJUVENATED:
Made to look younger.
River showing renewed characteristics of a younger stage

FEATURES/LANDFORMS

- Knick point (waterfall)
- Terraces
- Incised meanders

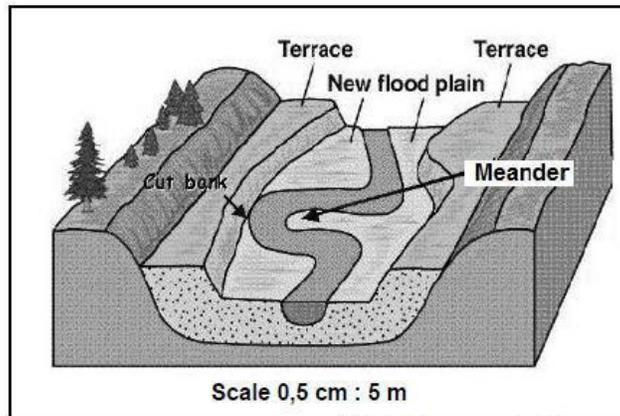


You must be in a position to do/answer the following:

- Identify the process of rejuvenation on a diagram.
- Define the concept, rejuvenation.
- Explain how rejuvenation occurs.
- Identify/describe the features/landforms of rejuvenation.

Activity 25 Time frame 12 minutes

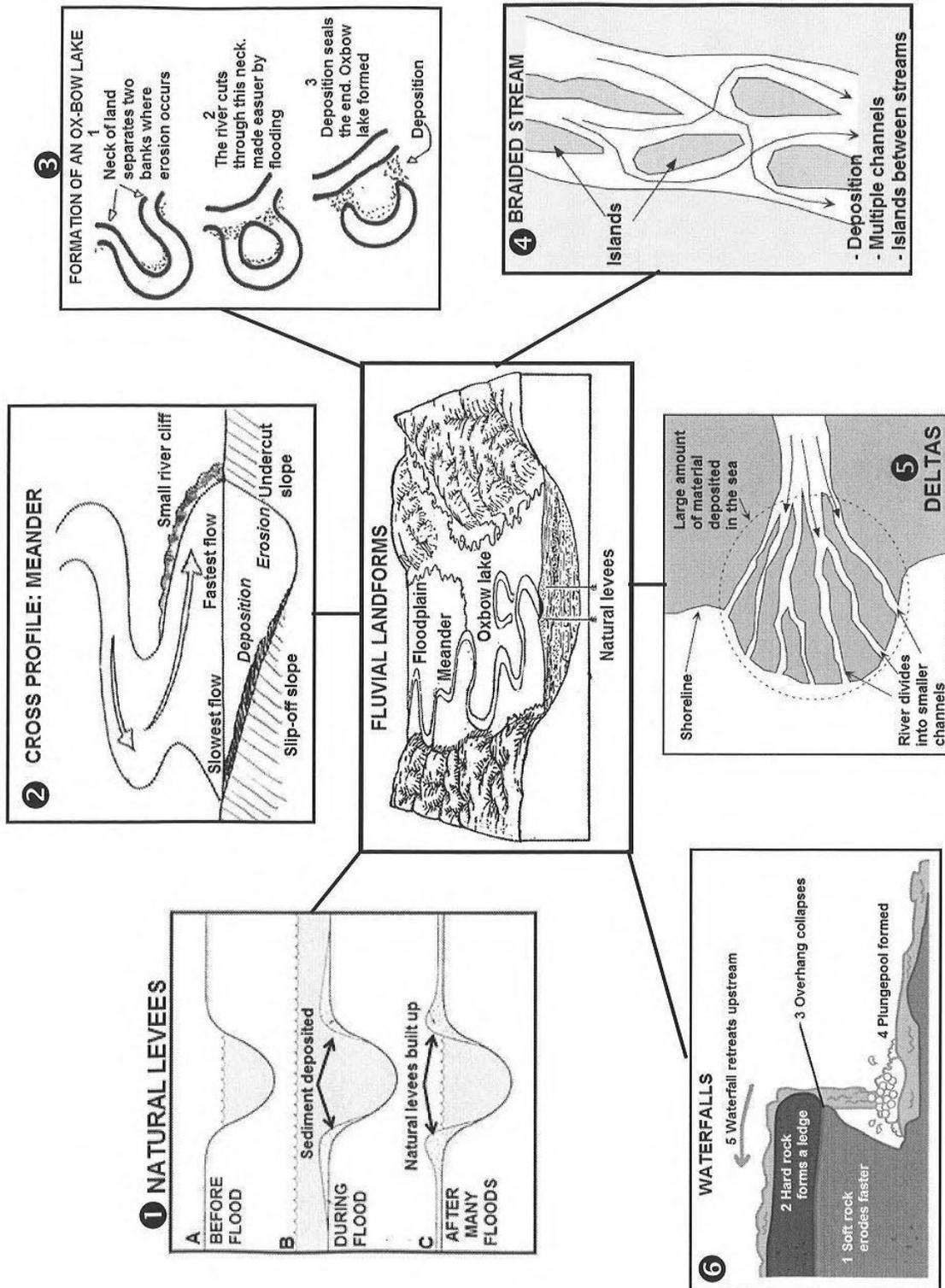
N 17 **FIGURE 2.6: RIVER REJUVENATION**
2.6



[Adapted from www.studyblue.com]

Study FIGURE 2.6 based on river rejuvenation in the lower course of a river.

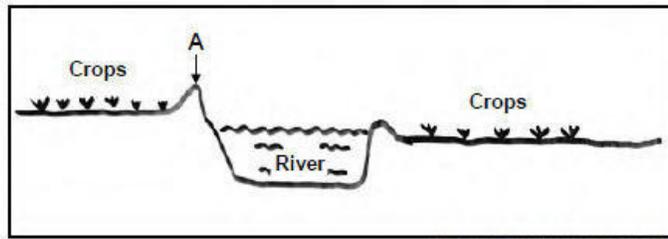
- | | | | |
|-------|---|---------|-----|
| 2.6.1 | State ONE characteristic of a rejuvenated river. | (1 x 1) | (1) |
| 2.6.2 | What evidence in the sketch indicates that the river has been rejuvenated? | (2 x 1) | (2) |
| 2.6.3 | Give TWO possible causes of river rejuvenation. | (2 x 2) | (4) |
| 2.6.4 | Describe the impact that rejuvenation will have on the meander in FIGURE 2.6. | (1 x 2) | (2) |
| 2.6.5 | Suggest ONE negative impact of rejuvenation on the future development of infrastructure. | (1 x 2) | (2) |
| 2.6.6 | Give evidence in FIGURE 2.6 to support the statement that terraces, even though they are flat, are not always suitable for farming. | (2 x 2) | (4) |



Activity 26 Time frame 12 minutes

N 14
1.6

FIGURE 1.6: LEVEE



[Source: Examiner's own sketch]

Refer to FIGURE 1.6 showing a levee.

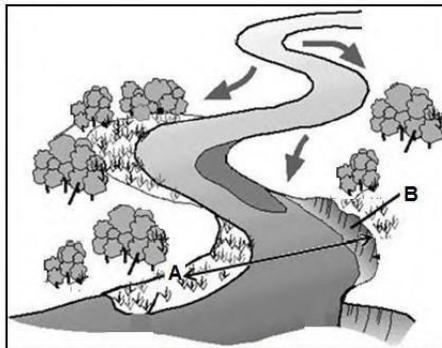
- 1.6.1 Identify the fluvial landform on which crops are grown. (1 x 1) (1)
- 1.6.2 Why is the landform in QUESTION 1.6.1 more likely to flood in the lower course? (2 x 2) (4)
- 1.6.3 Identify the natural feature **A** that protects crops from flooding (1 x 2) (2)
- 1.6.4 Briefly describe the formation of the natural feature in QUESTION 1.6.3. (2 x 2) (4)
- 1.6.5 Discuss the negative impacts on the farmer, should the river break through feature **A**. (2 x 2) (4)

Activity 27 Time frame 12 minutes

M17

FIGURE 1.6: STREAM CHANNEL

1.6

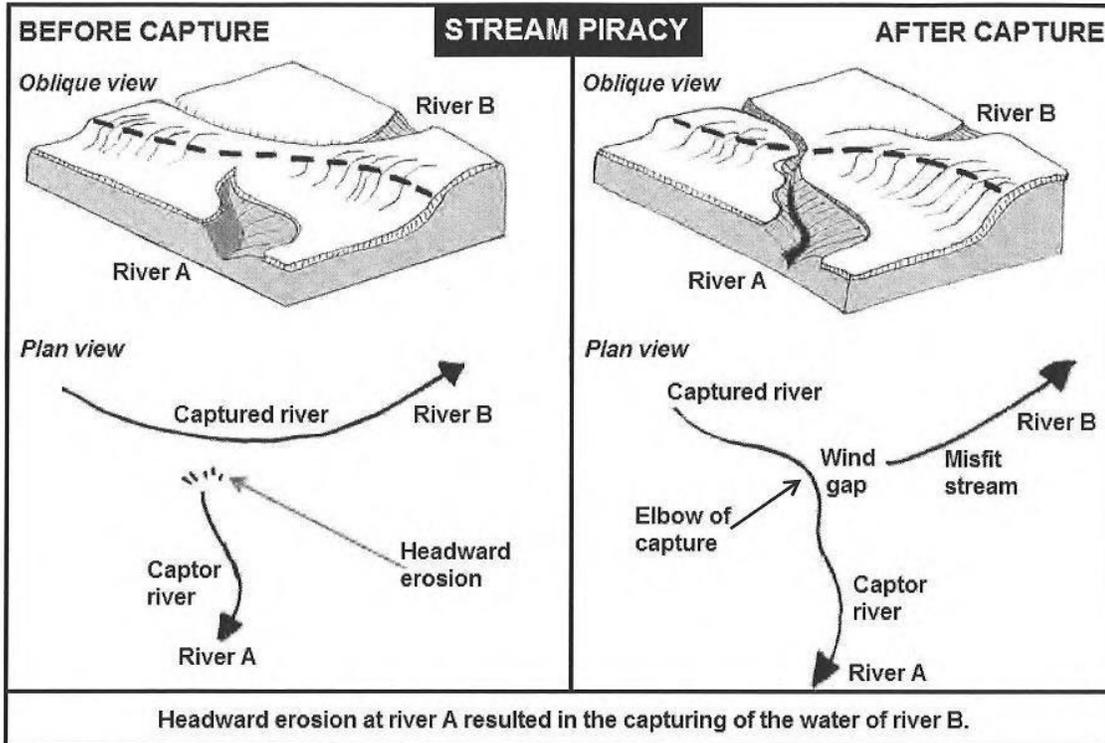
[Source: <http://adlib.everysite.co.uk/adlib/defra/content.aspx?id=0001L3890W.17UT30ZOH8G447>]

Refer to FIGURE 1.6 showing a stream channel.

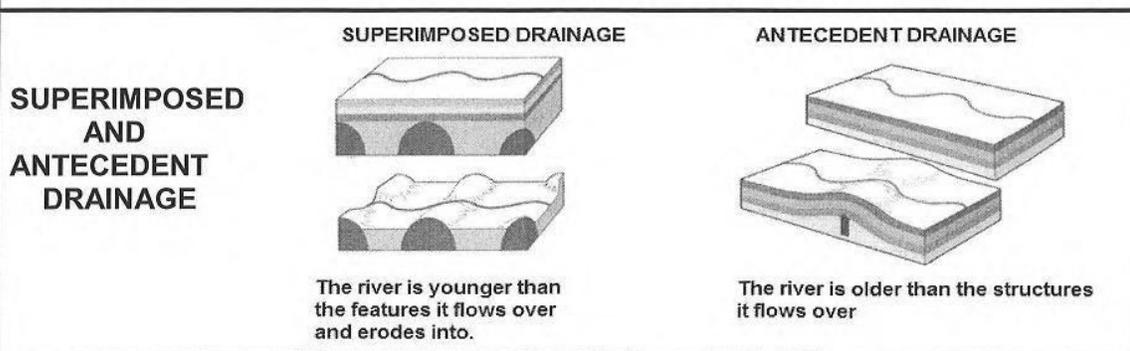
- 1.6.1 Identify the stream channel pattern shown in FIGURE 1.6. (1 x 1) (1)
- 1.6.2 In which course of the river is the illustrated stream channel pattern most likely to be found? (1 x 1) (1)
- 1.6.3 Give ONE reason why the illustrated stream channel pattern will develop in the course of the river named in QUESTION 1.6.2. (1 x 2) (2)
- 1.6.4 Draw a simple, labelled cross-section of the meander between points **A** and **B**. (2 x 2) (4)
- 1.6.5 You would like to develop a campsite along the banks of the illustrated river. After careful consideration, you choose a site along slope/bank **A** rather than along slope/bank **B**. In a paragraph of approximately EIGHT lines, explain why the site along slope/bank **A** is the better choice. (4 x 2) (8)

STREAM PIRACY

Stream piracy (river capture) takes place when the energetic stream (captor stream) cuts back and intercepts (takes) the water from the other river (captured/beheaded river).



FEATURE	EXPLANATION
Captor river	The energetic stream that intercepts (takes) the water of the other river.
Captured river	The river which water was intercepted (taken) by the captor river.
Misfit stream	The river that has lost its water. (Also called beheaded stream)
Elbow of capture	The place where stream piracy has taken place
Wind gap	The dry river valley between the elbow of capture and the misfit stream
Waterfall	May form at the point where the captured river flows into the captor river



Activity 28 Time frame 12 minutes



M16 FIGURE 2.5: RIVER CAPTURE

2.5

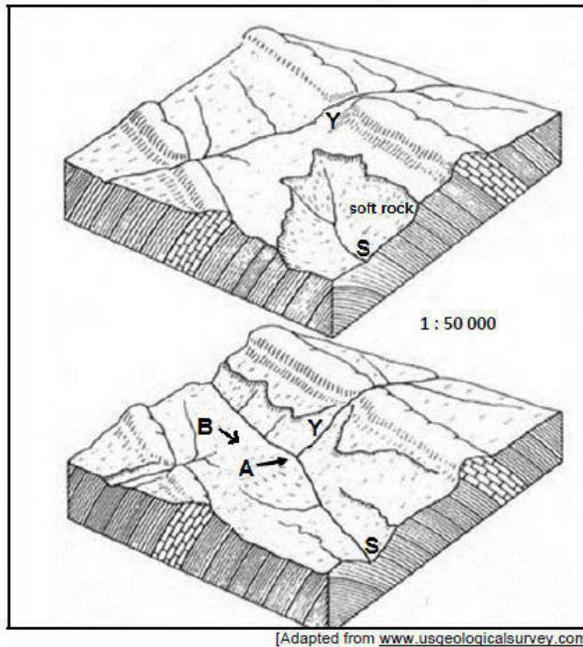


FIGURE 2.5 indicates river capture (stream piracy).

- 2.5.1 Label **S** and **Y** with the terms 'captor stream' and 'captured stream' respectively. (2 x 1) (2)
- 2.5.2 Name the features of river capture at **A** and **B** respectively. (2 x 1) (2)
- 2.5.3 Give TWO reasons for river **S** eroding at a faster rate. (2 x 2) (4)
- 2.5.4 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)

Catchment and River Management

Activity 29 Time Frame 12 Minutes

M16 FIGURE 2.6: MANAGING CATCHMENT AREAS AND DRAINAGE BASINS

2.6

South Africa needs to balance the demand for water with the availability of water. There are a number of ways in which to prevent the overexploitation of water resources:

1. Removing alien vegetation
2. Interbasin transfer schemes
3. Managing groundwater supplies
4. Recycling water
5. Conserving wetlands
6. Preserving vegetation cover

[Adapted from www.dwaf.gov.za]

Study FIGURE 2.6, which lists some tips from the Department of Water Affairs for the sustainable management of catchment areas and drainage

basins in South Africa, and then answer the questions that follow.

- | | | | |
|-------|--|---------|-----|
| 2.6.1 | Define the term <i>overexploitation</i> . | (1 x 1) | (1) |
| 2.6.2 | What is a <i>catchment area</i> ? | (1 x 1) | (1) |
| 2.6.3 | Explain how removing alien vegetation will help prevent the overexploitation of water resources in South Africa. | (2 x 2) | (4) |
| 2.6.4 | How does the conservation of wetlands contribute to the sustainable management of a drainage basin? | (1 x 2) | (2) |
| 2.6.5 | Discuss the importance of preserving vegetation cover in a drainage basin. | (3 x 2) | (6) |

Activity 30 Time frame 12 minutes

N15 FIGURE 1.6: IMPACT OF HUMANS ON DRAINAGE BASINS

VAAL RIVER UNDER PRESSURE

Sipho Masondo | The Times Live

The Vaal River and its catchment system are becoming increasingly toxic/poisoned – posing a threat to health, the economy and food production in four provinces.

Water scientists and other experts describe the Vaal River – which supplies water to Gauteng, the country's economic and industrial powerhouse, as well as to farmers in Gauteng, North West, the Free State and Northern Cape – as 'in crisis' and 'under siege' by polluters. Since the 1990s, the Department of Water Affairs has pumped water from the Lesotho Highlands into the river to supplement the water supply. This water is increasingly needed to dilute the pollution.

Said Krige: 'We are using expensive drinking water to sort out the problem of pollution. Dilution is not a solution to pollution.'

The water in the Vaal River system will eventually cost far more to treat, leaving companies such as Sasol and Eskom to pay more for the chemicals needed to treat the water before they use it. This will increase their costs.

[Adapted from www.timeslive.co.za]

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| 1.6.1 | Name TWO provinces that are dependent on the Vaal River as a water source. | (2 x 1) | (2) |
| 1.6.2 | Give TWO possible reasons why the Vaal River is becoming increasingly toxic/poisoned. | (2 x 1) | (2) |
| 1.6.3 | According to the article, water is pumped into the Vaal River to dilute/reduce the pollution. Explain why this is not a sustainable solution. | (2 x 2) | (4) |
| 1.6.4 | Explain, in a paragraph of approximately EIGHT lines, why the cost of food and electricity could increase in future if pollution of the Vaal River is not controlled. | (4 x 2) | (8) |

Activity 31 Time frame 12 minutes

Nov
14
2.5

FIGURE 2.5: IMPROVING WATER PRODUCTIVITY

STRATEGY FOR IMPROVING WATER PRODUCTIVITY	
<p>There has been a change in thinking concerning water resource management. Attention is being paid to activities that affect the upstream area of a river (catchment area) and the impact that this has on the lower reaches of the river. Some of the ways in which humans interfere with the river include building dams, water transfer, regulation, pollution, purification, et cetera. This changes the natural flow of the river. All of the above have one common effect, and that is that they impact on those who live downstream.</p>	
<p>The Upper Modder River is close to the relatively densely populated and industrialised greater Mangaung municipal area that includes Bloemfontein, Botshabelo and Thaba Nchu. The area is known to be marginal for crop production due to low and erratic rainfall. This, combined with clay soils, results in high water losses caused by run-off and evaporation.</p>	
<p>[Source: YE Woyessa, M Hensley and LD van Rensburg (Department of Soil, Crop and Climate Sciences, University of the Free State)]</p>	

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| 2.5.1 | Give the meaning of the term <i>water resource management</i> . | (1 x 1) (1) |
| 2.5.2 | Name ONE settlement in the article that has a negative impact on the Upper Modder River. | (1 x 1) (1) |
| 2.5.3 | State TWO ways in which humans are interfering with water productivity from the Upper Modder River. | (2 x 1) (2) |
| 2.5.4 | Name TWO factors that cause the high water run-off. | (2 x 2) (4) |
| 2.5.5 | In a paragraph of approximately EIGHT lines, explain how human interference along a river impacts on those that live further downstream. | (4 x 2) (8) |