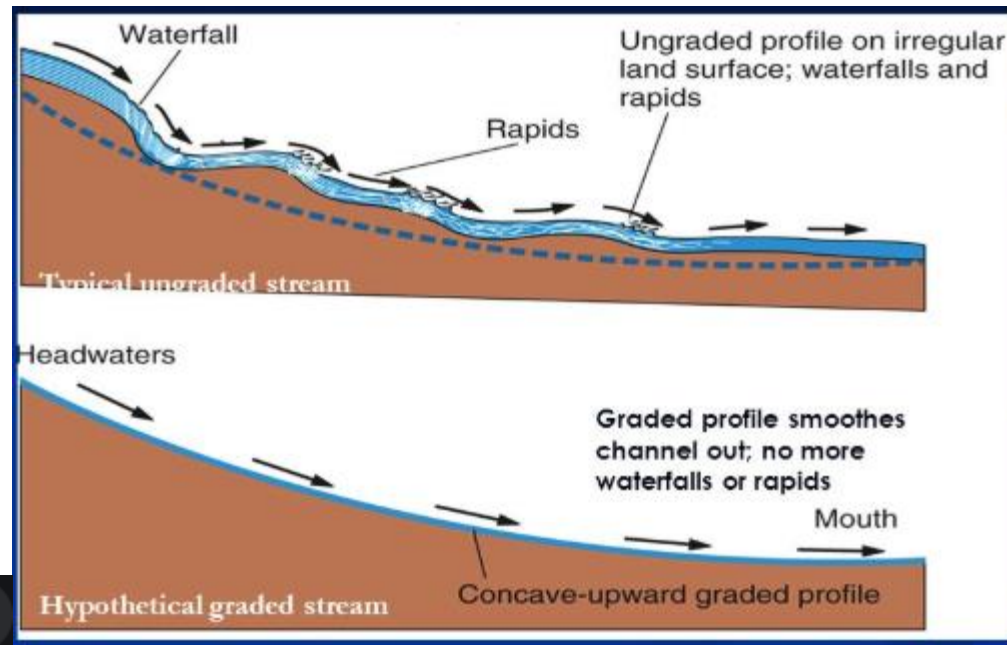




GEOMORPHOLOGY



RIVER GRADING

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River grading:

- Distinguish between graded and ungraded streams
- Base level of erosion
- Temporary base level of erosion
- Permanent base level of erosion

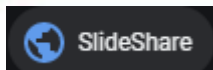
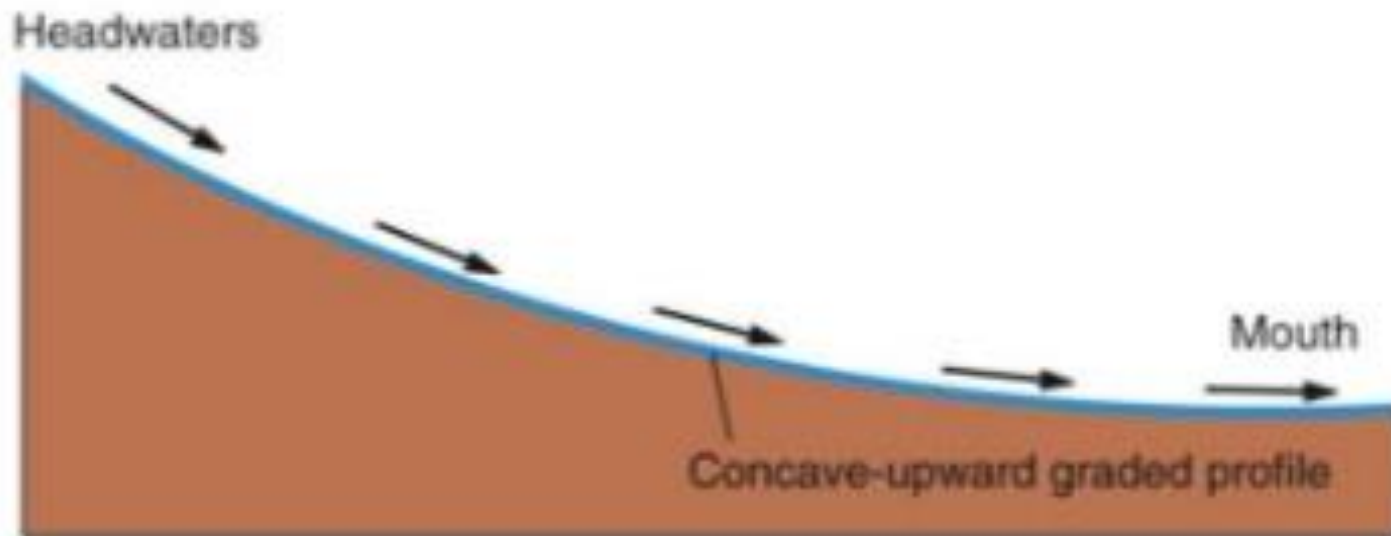


RIVER GRADING

Is the state of balance/equilibrium between rate of erosion and rate of deposition.

Graded river

Here the river has just enough energy to carry its load neither erosion or deposition is occurring (Results in graded profile)



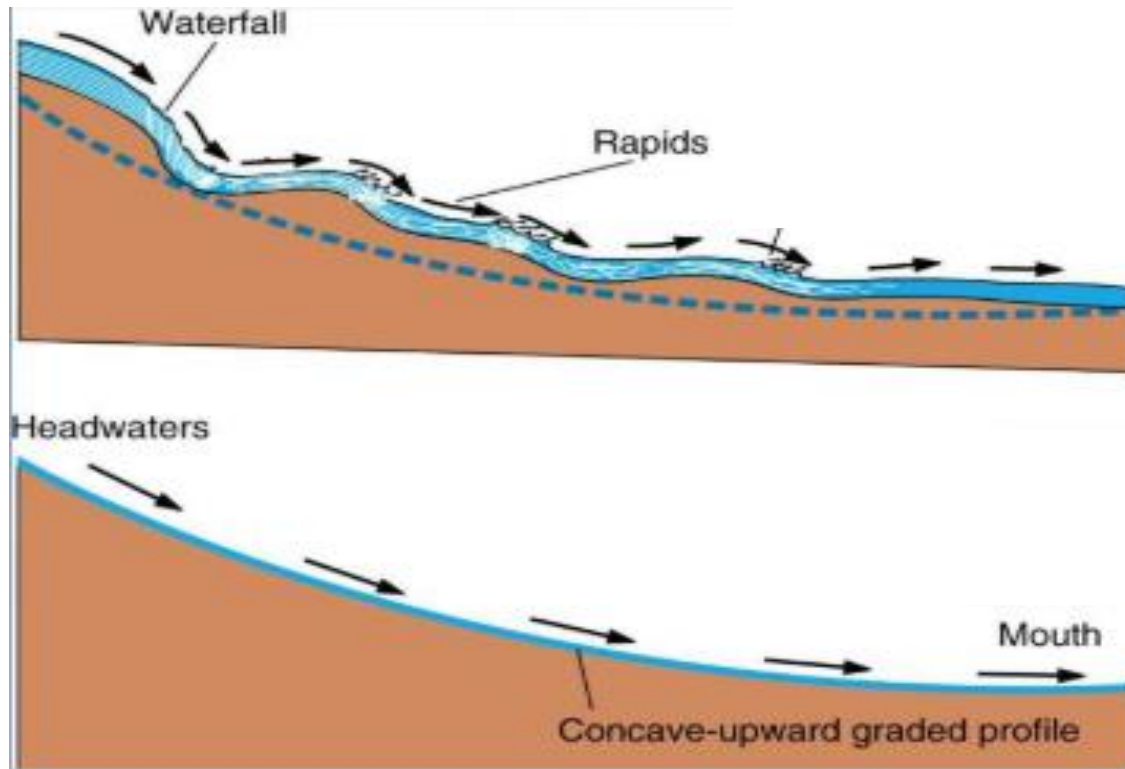


Ungraded profile

Is a river profile that has irregularities/obstruction/temporary base levels along its path (It is not smooth)

Graded profile

Is a smooth concave profile which is steep at the source and gentle at the mouth. It has no obstructions





Temporary base level

Is a point along a river's course that prevents it from eroding any deeper at the moment but may be eroded through or change in time. (Results in ungraded profile)

Ultimate base level/Permanent base level

The lowest point to which a river can erode, sea level

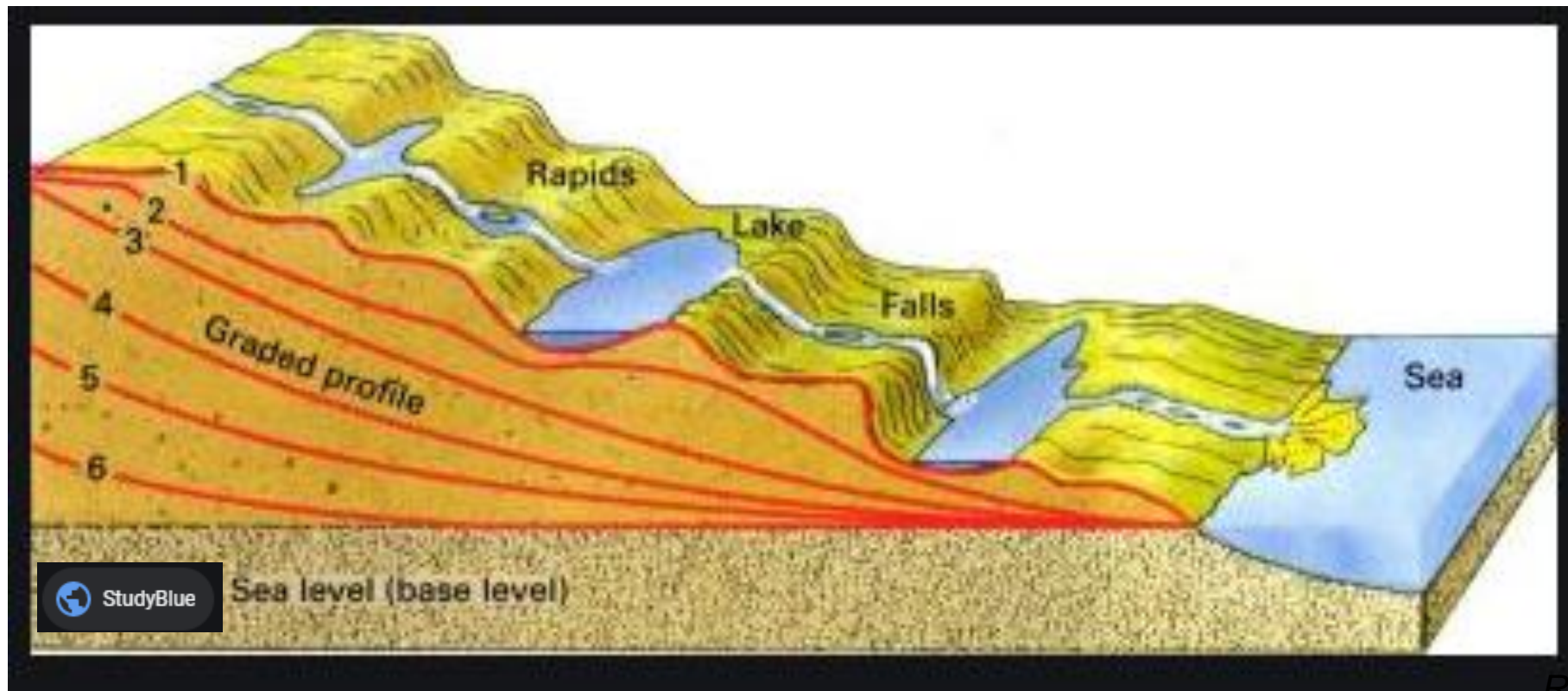
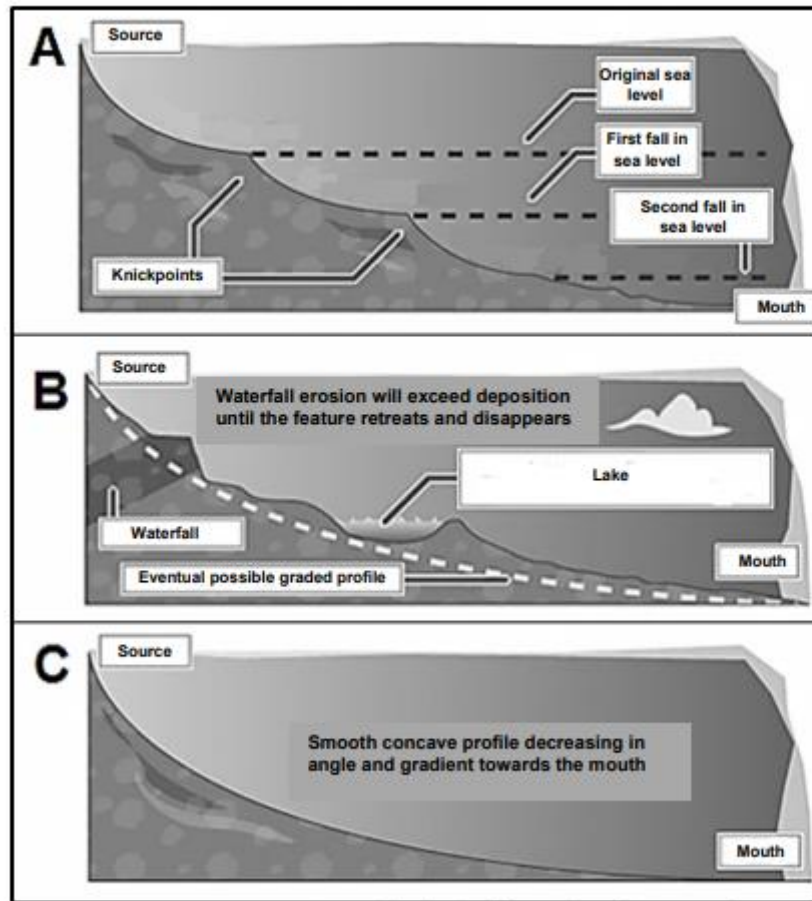




FIGURE 1.6: RIVER GRADE AND LONGITUDINAL PROFILES OF A RIVE



[Adapted from alevelgeography.com]



1.6 Refer to FIGURE 1.6 showing river grade and the longitudinal profiles of a river.

1.6.1 Give a geographical term to describe the irregular shape of longitudinal profile **B**. (1 x 1) (1)

1.6.1 Ungraded profile (1) (1 x 1) (1)



1.6.2 Name a temporary base level evident in longitudinal profile **B**. (1 x 1) (1)

- 1.6.2 Lake (1)
- Waterfall (1)
- Knickpoint (1)
- Rock outcrops (1)
- [ANY ONE]

(1 x 1) (1)



1.6.3 What evidence suggests that rejuvenation has taken place in longitudinal profile **A**? (1 x 2) (2)

1.6.3 A drop in the original sea level (2)
Presence of knick points/waterfalls (2)
Ungraded profile (2)
A sudden change in gradient (2)
[ANY ONE] (1 x 2) (2)



1.6.4 Describe, with reasons, the changes a river meander will undergo after rejuvenation. (2 x 2) (4)

1.6.4 **Description/Change**

The meander will become incised/entrenched (2)

The meander will develop steeper sides (2)

Will form a cut-off meander/ox bow lake (2)

[ANY ONE CHANGE]

Reason

The amount of energy of the river would increase (2)

The velocity of water flowing within the meander increases (2)

The rate of downward/vertical erosion in the meander will increase (2)

A stronger flow will result in the river cutting through the meander neck (2)

[ANY ONE REASON] (2 x 2) (4)



1.6.5 In a paragraph of approximately EIGHT lines, explain the processes that assisted the graded river in profile **C** to have a steep gradient in the upper course and a gradual gradient in the lower course. (4 x 2) (8)

1.6.5 Processes creating the steep gradient in the upper course

Headward/Backward erosion of knickpoints will increase the steepness of the slope (2)

Downward erosion creates a steep gradient (2)

In the upper course water flow is mostly turbulent (2)

The stream has enough energy to carry larger particles (2)

Larger particles increase downwards erosion (2)

Processes creating the gradual gradient in the lower course

Lateral erosion will lead to a more gradual gradient (2)

Sediments are deposited in the lower course (2)

In the lower course water flow is laminar (2)

The carrying capacity is reduced due to the wider river channels (2)

This increases the friction on a river bed and sides and slows water flow resulting in greater deposition rates (2)

[ANY FOUR. MUST REFER TO BOTH STEEP GRADIENT AND GRADUAL GRADIENT] (4 x 2) (8)