Your notes

GCSE Geography: revision notes

River landscapes

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The long and cross profiles

- The **long profile** shows how a river's height changes from its source to its mouth: steep in the upper course and gentle in the lower course.
- The **cross profile** changes too: a narrow, steep-sided V-shaped valley in the upper course, a wider valley with a **floodplain** in the middle course, and a very wide, flat **floodplain** in the lower course.
- The river's **discharge**, width and depth all increase downstream.

Processes

- Erosion: hydraulic action, abrasion, attrition and solution. Vertical erosion deepens the channel, mainly in the upper course. Lateral erosion widens it, mainly further downstream.
- Transportation: traction, saltation, suspension and solution.
- Deposition happens when the river loses energy, such as on the inside of bends, during floods and at the mouth.

Landforms

- Upper course: interlocking spurs, and waterfalls. A waterfall forms where hard rock lies over softer rock: the soft rock is eroded, undercutting the hard rock, which collapses. The waterfall retreats upstream, leaving a gorge. Example: High Force on the River Tees, where the river drops about 21 m over hard whinstone.
- Middle course: **meanders**. Fast water on the outside of a bend erodes a river cliff; slow water on the inside deposits a slip-off slope. An **ox-bow lake** forms when the narrow neck of a **meander** is cut through, usually during a flood, and the old bend is sealed off by deposition.

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- Lower course: **floodplains** (flat land built from deposited silt), **levees** (raised banks, built up because floods drop their heaviest sediment next to the channel) and estuaries (tidal river mouths with mudflats and salt marsh).

Flooding and hydrographs

- Physical factors that increase flood risk: heavy or long-lasting rain, impermeable rock, saturated or frozen ground, and steep slopes.
- Human factors: urbanisation (hard surfaces, and drains that carry water quickly to rivers), deforestation and some farming.
- A flood **hydrograph** shows a river's **discharge** after a storm. The **lag time** is the gap between peak rainfall and peak discharge. A short lag time and a high peak mean a higher risk of flooding.

Flood management

- Hard engineering: dams and reservoirs (store water and may generate electricity, but are expensive and flood land), straightening the channel (water drains away faster, but flooding may increase downstream), embankments (raised banks) and flood relief channels (take away extra water).
- Soft engineering: flood warnings and preparation, **floodplain zoning** (limiting building on the **floodplain**), planting trees and river restoration (returning a river to its natural course).
- Example: Banbury (2012). An £18.5 million scheme built a 2.9 km earth embankment, creating a flood storage area that holds about 3 million m^3 of water. It also added a pumping station, raised the main A361 road and created new wildlife habitats.

Key terms

Long profile	A side view of a river's height from its source to its mouth.
Cross profile	A view across a river's valley and channel.
Discharge	The volume of water flowing past a point each second.
Meander	A bend in a river.
Ox-bow lake	A horseshoe-shaped lake left when a meander is cut off.
Levee	A raised bank along a river, built up by deposition during floods.
Floodplain	The flat land beside a river that floods.
Lag time	The time between peak rainfall and peak discharge.
Hydrograph	A graph showing a river's discharge over time.
Floodplain zoning	Controlling what can be built in different parts of a floodplain.

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What shape is a river valley in the upper course?
2. What is discharge?
3. Where is the fastest flow on a meander?
4. What forms on the inside of a meander bend?
5. How does a waterfall form?
6. What is left behind as a waterfall retreats upstream?
7. How is an ox-bow lake formed?
8. What is a levee?

Answers

1. A narrow V shape
2. The volume of water flowing past a point each second
3. On the outside of the bend
4. A slip-off slope, where material is deposited
5. Soft rock under hard rock is eroded, and the overhang collapses
6. A gorge
7. A meander's neck is cut through, and the old bend is sealed off
8. A raised bank along a river, built up by floods

What to do next

Practise 14 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

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