

YEAR 11 UNIT 2: Rivers



Relief of the UK can be divided into uplands and lowlands. Each have their own characteristics.

Areas +600m: Peaks and ridges cold, misty and snow common. i.e. Scotland



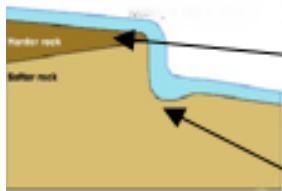
Areas -200m: Flat or rolling hills. Warmer weather. i.e. Fens

Deposition - When the sea or loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.

Upper Course of a River

Near the source, the river flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

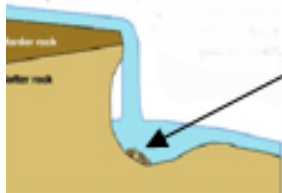
Formation of a Waterfall



1) River flows over alternative types of rocks.

2) River erodes soft rock faster creating a step.

3) Further hydraulic action and abrasion form a plunge pool beneath.



4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.

5) Waterfall retreats leaving steep sided gorge.

Transportation

Solution - Minerals dissolve in water and are carried along.

Suspension - Sediment is carried along in the flow of the water.

Saltation - Pebbles that bounce along the sea bed.

Traction - Boulders that roll along a river/sea bed by the force of the flowing water.

Erosion - The break down and transport of rocks – smooth, round and sorted.

Attrition - Rocks that bash together to become smooth/smaller.

Solution - A chemical reaction that dissolves rocks.

Abrasion - Rocks hurled at the base of a cliff to break pieces apart.

Hydraulic Power - Water enters cracks in the cliff, air compresses, causing the crack to expand.

Water Cycle Key Terms

Precipitation - Moisture falling from clouds as rain, snow or hail.

Interception - Vegetation prevent water reaching the ground.

Surface Runoff - Water flowing over surface of the land into rivers

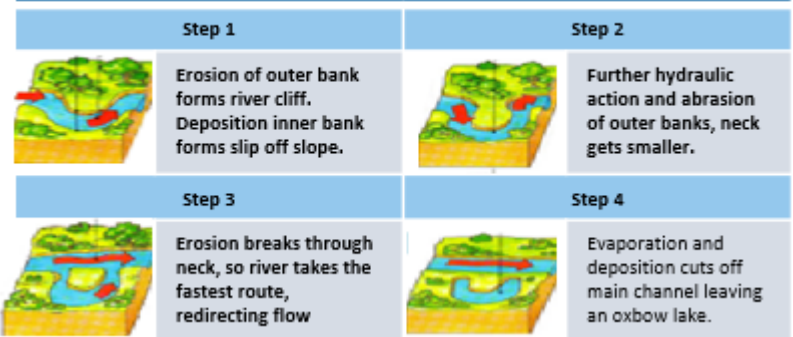
Infiltration - Water absorbed into the soil from the ground.

Transpiration - Water lost through leaves of plants.

Middle Course of a River

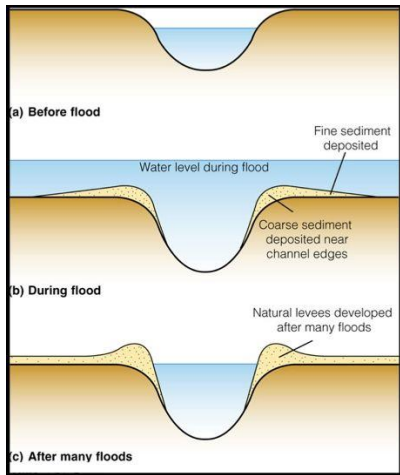
Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

Formation of Ox-bow Lakes



lower Course of the River

Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited



Formation of floodplains and levees

When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials build up to form natural levees.

- Nutrient rich soil makes it ideal for farming.
- Flat land for building houses.

Physical and Human Causes of flooding.

Physical: Prolonged & heavy rainfall - Long periods of rain causes soil to become saturated leading runoff.

Physical: Geology - Impermeable rocks causes surface runoff to increase river discharge.

Physical: Relief - Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.

Human: Land Use - Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.

Hydrographs and River Discharge

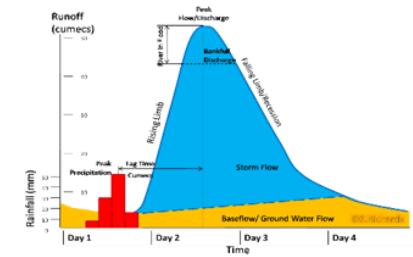
River discharge is the volume of water that flows in a river. Hydrographs who discharge at a certain point in a river changes over time in relation to rainfall

Peak discharge is the discharge in a period of time.

lag time is the delay between peak rainfall and peak discharge.

Rising limb is the increase in river discharge.

Falling limb is the decrease in river discharge to normal level.



River Management Schemes

Soft Engineering

Afforestation – plant trees to soak up rainwater, reduces flood risk.

Demountable Flood Barriers put in place when warning raised.

Managed Flooding – naturally let areas flood, protect settlements.

Hard Engineering

Straightening Channel – increases velocity to remove flood water.

Artificial Levees – heightens river so flood water is contained.

Deepening or widening river to increase capacity for a flood.

Case Study: The River Tees

Location and Background

Located in the North of England and flows 137km from the Pennines to the North Sea at Red Car.

Geomorphic Processes

Upper – Features include V-Shaped valley, rapids and waterfalls. High Force waterfall drops 21m and is made from harder Whinstone and softer limestone rocks.

Gradually a gorge has been formed.

Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town.

Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.



Management

- Towns such as Yarm and Middleborough are economically and socially important due to houses and jobs that are located there.

- Dams and reservoirs in the upper course, controls river's flow during high & low rainfall.

- Better flood warning systems, more flood zoning and river dredging reduces flooding.