

# YEAR 10 UNIT 6: 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



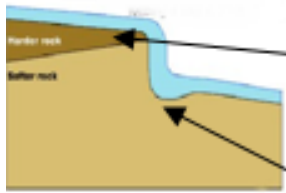
Areas -200m: Flat or rolling hills. Warmer weather. i.e. Fens

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

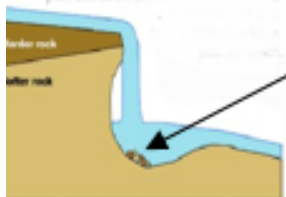
## Upper Course of a River

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

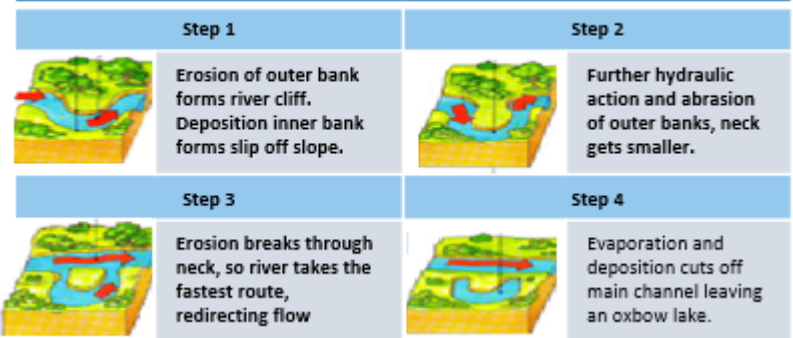
**Infiltration** - Water absorbed into the soil from the ground.

**Transpiration** - Water lost through leaves of plants.

## Middle Course of a River

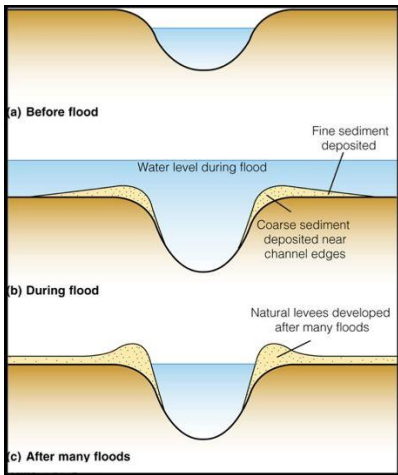
Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

## 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

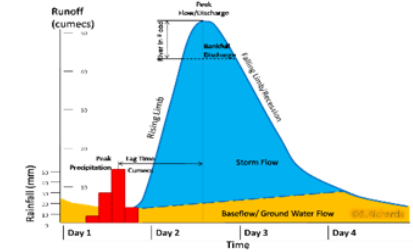
River discharge is the volume of water that flows in a river. Hydrographs who discharge at a certain point in a river changes over time in relation to rainfall

**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

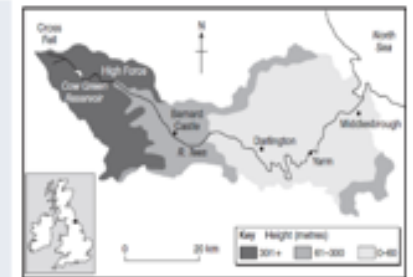
Located in the North of England and flows 137km from the Pennines to the North Sea at Red Car.

### 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.