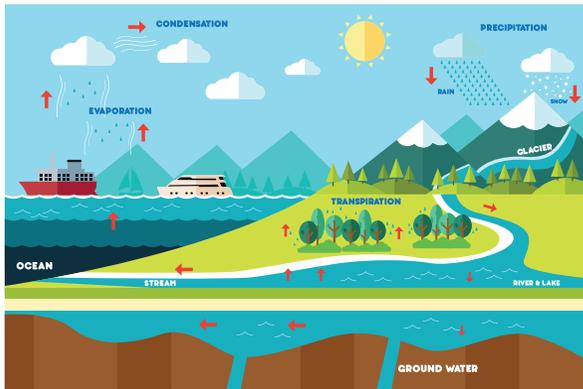


## HYDROLOGICAL CYCLE



# Rivers

## RIVER PROCESSES

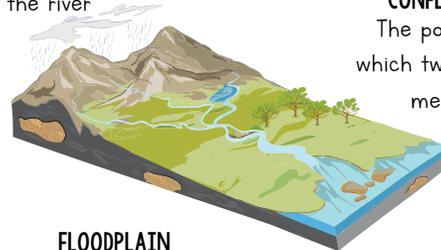
**EROSION** where rocks are worn away and the land changes shape.  
**TRANSPORTATION** where eroded material is carried by the river downstream.  
**DEPOSITION** where transported material is dropped when the river loses energy, such as when it enters the sea.

## DRAINAGE BASIN

**SOURCE**  
The origin of the river

**TRIBUTARY**  
Smaller streams/ rivers that flow into a larger one.

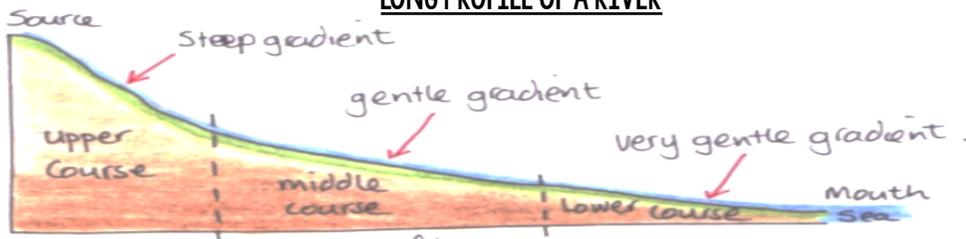
**CONFLUENCE**  
The point at which two rivers meet.



**FLOODPLAIN**  
Flat land along the river that is prone to flooding.

**MOUTH**  
The end where the river meets the sea.

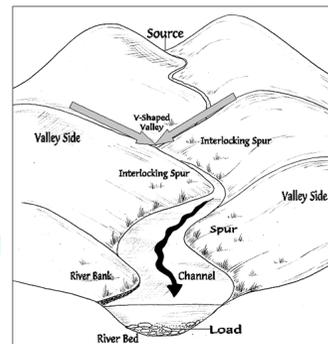
## LONG PROFILE OF A RIVER



## THE UPPER COURSE

### FEATURES

Steep-sided V-shaped valleys, interlocking spurs, rapids, waterfalls and gorges.



When a river is near its source, it often develops a V-shaped valley as the river erodes down (this is called **vertical erosion**).

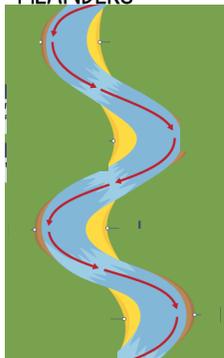
At the same time, weathering breaks up material on the valley slopes. Weathered material from the valley sides gets deposited in the river.

## THE MIDDLE COURSE

### FEATURES

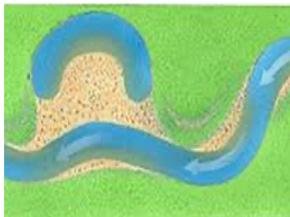
Wider, shallower valleys, meanders, and oxbow lakes

### MEANDERS

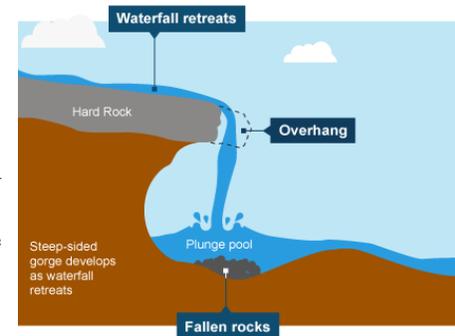


1. The formation of meanders is due to both **deposition** and erosion and meanders gradually move downstream.
2. The force of the water **erodes** and undercuts the river bank on the outside of the bend where water flow has most energy.
3. On the inside of the bend, where the river flow is slower, material is **deposited**, as there is more friction.
4. Over time the horseshoe become tighter, until the ends become very close together. As the river breaks through the ends join, the loop is cut-off from the main channel.
5. The cut-off loop is called an **oxbow lake**.

### OXBOW LAKE



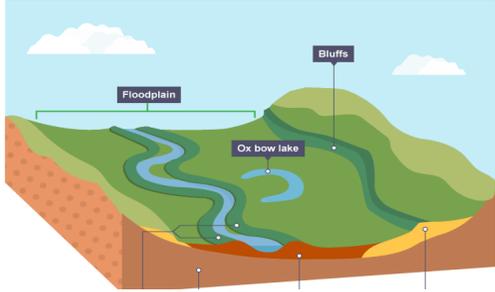
1. The soft rock erodes more quickly, **undercutting** the hard rock.
2. The hard rock is left **overhanging** and eventually collapses.
3. The fallen rocks crash into the **plunge pool**. They swirl around, causing more erosion.
4. Over time, this process is **repeated** and the waterfall moves upstream.
5. A steep-sided **gorge** is formed as the waterfall retreats.



## THE LOWER COURSE

### FEATURES

Wide flat-bottomed valleys, floodplains and deltas

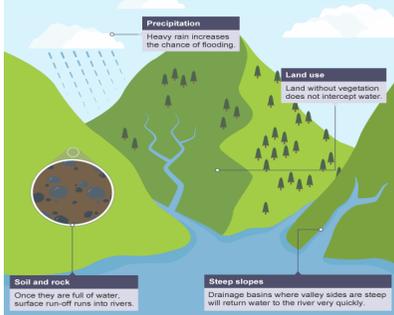


A floodplain is the area around a river that is covered in times of flood. It is a very fertile area. This makes floodplains a good place for agriculture. A build-up of alluvium on the banks of a river can create levees, which raise the riverbank.

## FLOODING

A flood occurs whenever a river overflows its banks (exceeds its 'bankfull' discharge). However, a flood becomes a problem when the water rises to a level where it threatens property and/or life. Rivers usually flood due to a range of physical factors. These physical factors can be divided into **climatic factors** and **drainage basin characteristics**. **Human intervention** can also make flooding worse.

### HUMAN CAUSES OF FLOODING

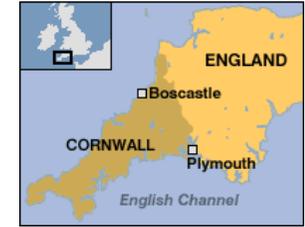


### PHYSICAL CAUSES OF FLOODING



CAUSE	SOURCE	KEYWORDS	DEPOSITION	WATERSHED
EFFECT	MOUTH	CONFLUENCE	MEANDER	V-SHAPED VALLEY
RESPONSE	LONG PROFILE	WATERFALL	OXBOW LAKE	HYDROLOGICAL CYCLE
DRAINAGE	FLOODPLAIN	EROSION	DELTA	

## BOSCASTLE



### CAUSES

There was a spell of heavy localised rainfall - 89 mm of rain fell in an hour on saturated ground from previous rainfall. Topography of the land. The landscape upstream of Boscastle, a steep-sided valley, acted as a funnel directing vast volumes of water into the village.

### WHAT HAS BEEN DONE?

- £45 million has been spent on a flood defence scheme.
- The scheme incorporates drainage, sewerage systems and land re-grading.
- Boscastle car park has been raised in height, which will stop the river from bursting its banks so easily.
- New drains allow water to run into the lower section of the river quickly.
- The river channel has been made deeper and wider so that it can accommodate more water.

## BANGLADESH



### CAUSES

Much of Bangladesh lies on a floodplain. Over half of the country lies 6m below sea level. There are 3 major rivers: The Ganges, Brahmaputra and Meghna. Meltwater from the Himalayas.

### RESPONSES - SHORT TERM

- Food aid from the Government and other countries.
- Water purification tablets.
- People repaired embankments and helped to rescue people.
- Free seed given to farmers

### RESPONSES - LONG TERM

- Introducing flood warning systems.
- Emergency planning.
- Dams planned.
- Reducing deforestation.
- Building embankments.
- Building raised flood shelters.