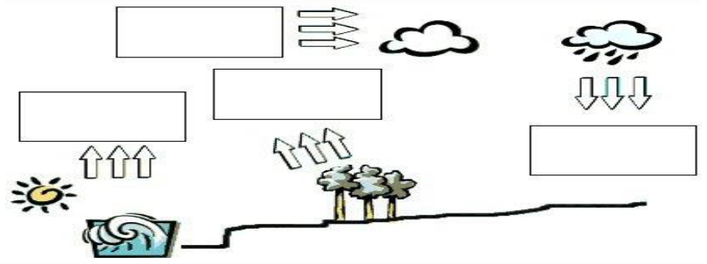
UK Evolving Physical Landscape -

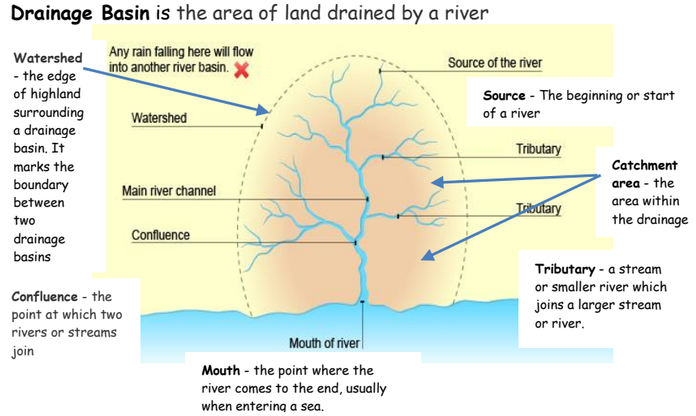
RIVERS

The **Hydrological Cycle** (also known as the water cycle)
Label the diagram below to show the processes of the hydrological cycle



The course of the river is divided into 3 sections: upper; middle; lower

Drainage Basin is the area of land drained by a river



There are **3 processes at work in a river**.
Define the following:

erosion

transportation

deposition

Examiners top tip:
When writing answers to questions about the formation of river landforms such as waterfalls, meanders, ox-bow lakes, levees, ensure that the sequence of formation is correct and refer to river processes.

The LONG PROFILE of The River Severn shows how the gradient (steepness) changes over the different courses

Plynlimon, 610m's above sea level	Shrewsbury	Tewkesbury and the Severn Estuary, Bristol Channel

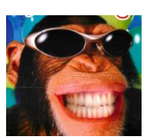
Erosion – rivers erode in 4 ways

Hydraulic action –

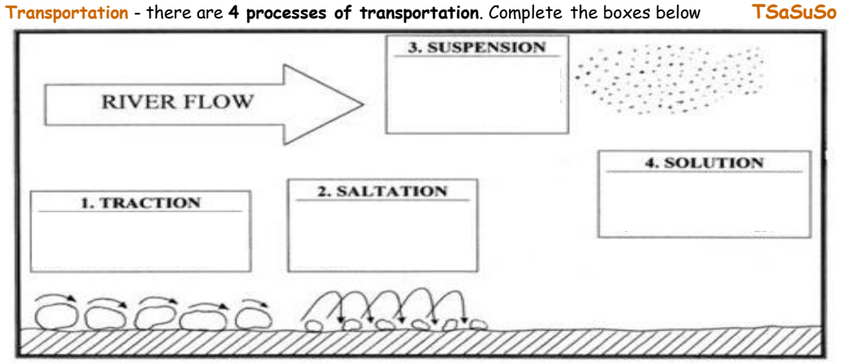
Abrasion / corrAsion –

Attrition –

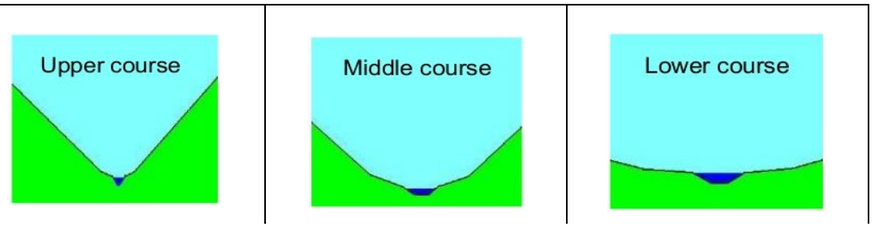
CorrOsion / solution



Transportation - there are **4 processes of transportation**. Complete the boxes below **TSaSuSo**



The CROSS PROFILE of The River Severn shows what a cross section of a river looks like



Complete the table below to show how the rivers characteristics change along the long profile of The River Severn

	Upper course	Middle course	Lower course
Gradient			
Discharge			
Depth			
Channel shape			
Velocity			
Valley shape			
Sediment size and shape	Large, angular stones	Eroded material has become smaller and more rounded	Sediments are visible in the river as muddy water

Each course of the river will have **distinctive features**. Use the space below to name them

source		mouth

VERTICAL and **LATERAL EROSION** change the cross profile of a river and both can happen at the same time although one is usually dominant over the other at different points along the river

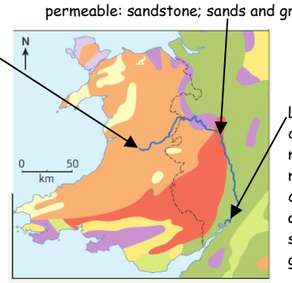
Vertical erosion

Lateral erosion

Geology Map

Middle course – rocks are softer and more permeable: sandstone; sands and gravel

Upper course – high steep slopes with hard impermeable shale and grit



Lower course – mainly soft mudstones covered with alluvium, sands and gravel

Figure 8 Simplified geology map of the River Severn catchment

How will the rock type influence a rivers discharge?

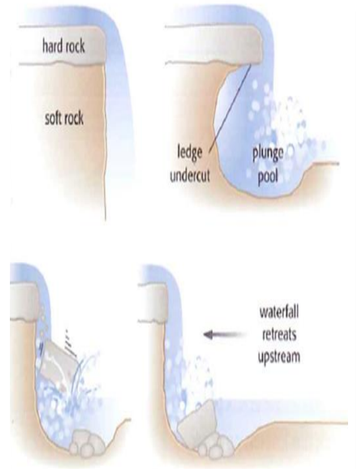
Features found in the **UPPER COURSE**

USE the diagrams 1 – 4 to **EXPLAIN** the formation of a waterfall
Key words:
resistant rock
less resistant rock
abrasion
hydraulic action
undercutting
plunge pool
gorge

How waterfalls are formed

1.

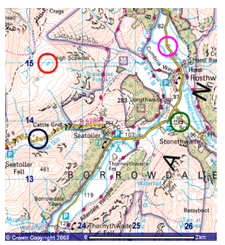
3.



2.

4.

Waterfalls on a map what **evidence** can you see?



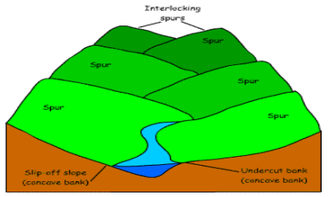
Deposition occurs when a river slows down or looses its velocity. This may happen because:

1.

2.

3.

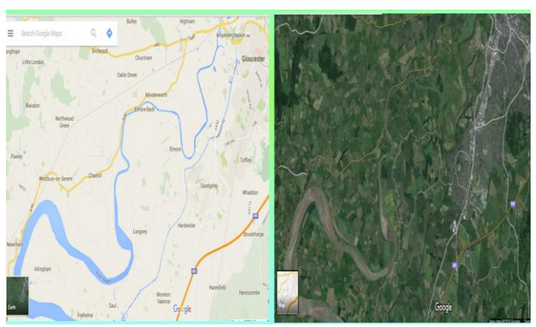
Interlocking spurs – these are a feature that are found in a rivers upper course. **Explain** how they form:



Interlocking spurs on a map:

Cross-section of a meander (remember to add labels):

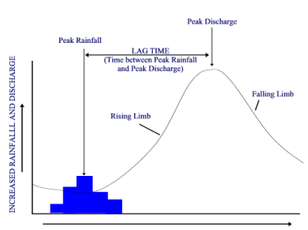
Meanders on maps and photographs
Give the **definition** of a meander –



Label a meander onto both the map and the aerial photograph

Flood hydrographs

What does a flood hydrograph show?



As a river moves to the middle course it continues to **erode** and **transport** materials. It also starts to **deposit** materials. It creates distinctive landforms. These include meanders and ox-bow lakes. Use the space below to **draw a labelled diagram(s) that explains** the formation of **meander**.

Add one more labelled diagram to show the formation of an **ox-bow lake**

An aerial view of an ox-bow lake

Predict: what do you **think** will happen to an ox-bow lake over time?

Define the terms:
Rising limb

Falling limb

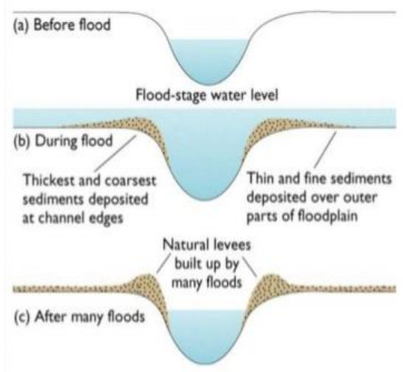
Peak rainfall

Peak discharge

Lag time

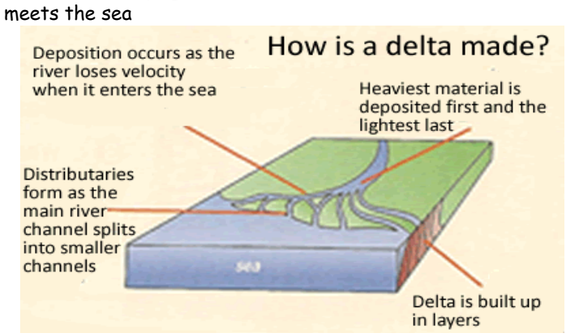
The rivers journey continues downstream, It is now in the lower course. Lateral erosion is dominant and the river channel is at its widest and deepest. The lower course will also contain meanders and ox-bow lakes but there are new features too. Label the characteristics of a flood plain onto the photograph:

Levees are a good example of how a river **deposits** material



Explain why heaviest material is found closest to the river bank whilst the lighter materials are found further away.

Deltas are low lying areas that are found where the river meets the sea



River discharge (the volume of water that flows in a river per second) is affected by a number of physical factors:

Geology	Vegetation	Drainage basin shape
Soil Type	Slope	Antecedent conditions

As a river continues into the lower course it is transporting a large amount of material (although this is usually through solution and suspension so it doesn't really look like much). The volume of transported material can slow the velocity of the water. The speed of the water in the river will also slow as it reaches the sea.

Highlight the text that you believe to be important above. You are allowed no more than 8 words.

Human activities contributing to flooding

Located example – river flooding

Location: River: Date: Summer 2007

Physical causes of flooding:

1. Rainfall in England and Wales was double the average for June and July and four times greater in Worcestershire
2. May – July the wettest months on record since record began
3. The Severn and the Avon, with their large catchment areas meet at Tewkesbury (confluence)

Human processes:

1.
2.
3.

Effects:

1. Tewkesbury was severely flooded
2. Flood waters reached Tewkesbury Abbey for the first time in 250 years
3. Water supplies were contaminated when a pumping station failed and residents had no water on tap for 2 weeks

Reducing the impact of flooding

1. The Environment Agency issued flood warnings via a live flood map and produced a 3 day flood risk forecast
2. Advice for homeowners included use tiles or rugs instead of carpets
3. Electrical sockets should be fitted at 1.5 meters above the ground floor level
4. Fit plastic windows and door frames rather than wooden ones
5. Install flood door barriers

Increasing flood risk

There are increasing risks from river flooding and this is expected to continue in the future.

Climate change

1.

2.

3.

Threats of flooding to	
people	environment

Managing flood risk

Hard and soft engineering are used to help manage the risk of river flooding but each method has costs and benefits

Hard engineering – definition:

Dams and reservoirs/ upstream storage dam

benefits	problems

Flood barriers / demountable defences

benefits	problems

Soft engineering – definition

River restoration/river maintenance

benefits	problems

Human activities and their impact on a storm hydrograph

Why is the rising limb steeper and the lag time shorter in an urban area?

How would the line alter for woodland if the trees were cut down (deforestation)?