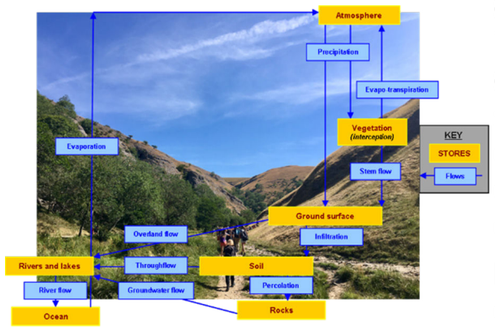
Theme 2: CHANGING ENVIRONMENTS
Key Idea 2.2: Shaping the landscape - Rivers

GEOLOGY

Permeable rocks (sedimentary rocks e.g. sandstone and limestone) allow water to **permeate** (flow) through vertical and horizontal joints in them. Such rocks are **porous** which means they have tiny pore spaces which can hold water as a **groundwater** store. As a result water takes longer to get to river stores so flooding is less likely to occur.

Impermeable rocks (igneous rocks e.g. granite, and metamorphic rocks e.g. slate) have few or no more spaces or joints. Water is not able to permeate through them so water flows over the surface as ***overland flow*** to **lake and rivers stores**. Clay-rich soil is also impermeable as the very fine grains mean there are no pore spaces. Rivers with impermeable rocks (and/or clay-rich soils) in their drainage basins are therefore more likely to flood.

THE HYDROLOGICAL CYCLE



When **precipitation** falls into a **drainage basin** (area of land drained by a river and its **tributaries**) it either flows or is stored. Either **overland** (surface) **flow** occurs, or the water flows into the soil (**infiltration**). Once in the soil the water moves downhill as **throughflow** and/or **percolates** deeper into pores and joints in the bedrock where it continues to travel as **groundwater flow**.

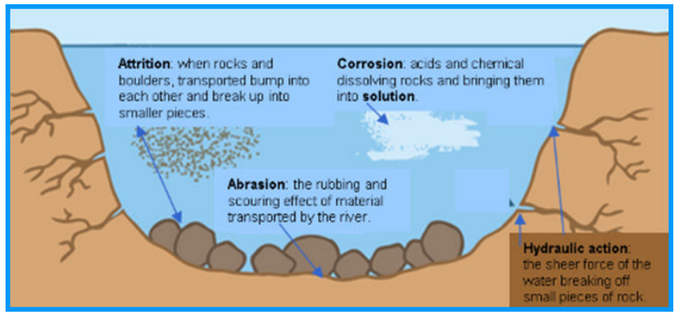
Humans actions alter these stores and flows which can either increase or decrease rates of flow to rivers and hence increase or decrease flood risk.

Rates of infiltration, throughflow and groundwater flow depends on:

- size/shape of drainage basin
- amount of rainfall and intensity of storms
- amount/type of vegetation cover
- permeability and porosity of the soil and underlying bedrock.

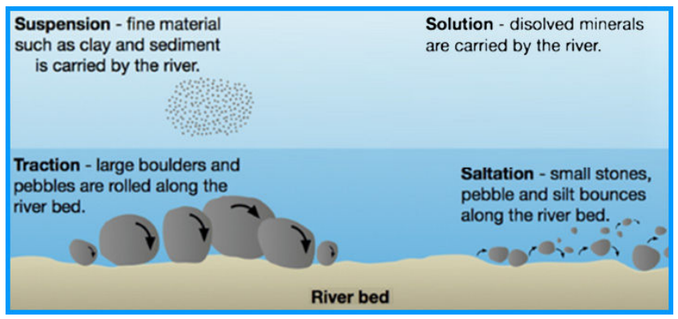
PROCESSES IN THE FLUVIAL SYSTEM

EROSION: BREAKDOWN AND REMOVAL OF SEDIMENT.



Vertically in the upper course.
Laterally in the middle and lower course on the outside of meander bends.

TRANSPORT: THE MOVEMENT OF MATERIAL BY THE RIVER.



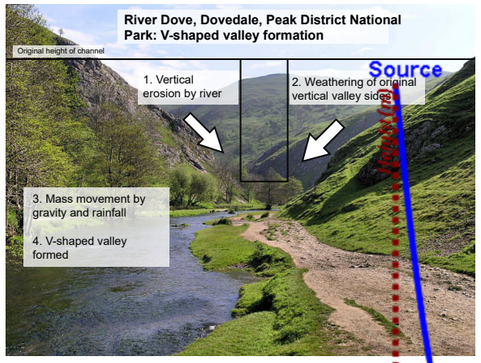
DEPOSITION: THE LAYING DOWN OF MATERIAL DUE TO LOSS OF RIVER ENERGY.

Occurs on inside of meanders and at the river mouth.

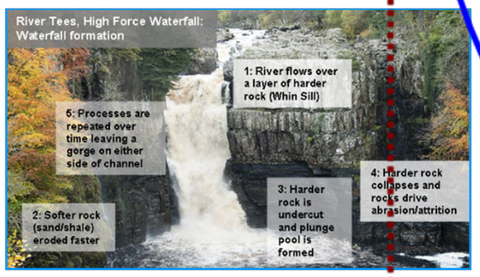
LANDFORMS

UPPER COURSE

V-Shaped valley:

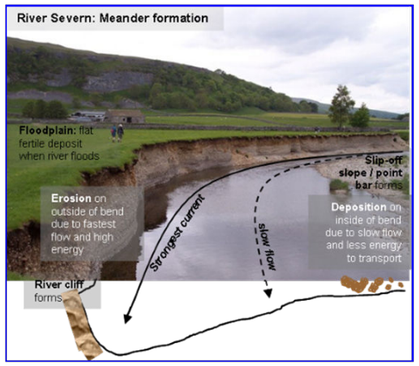


Waterfalls and gorges:

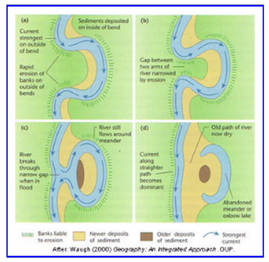


MIDDLE COURSE

Meander and floodplain:



Oxbow lake



LOWER COURSE

Meander and floodplain.

Estuaries:
Form where large rivers meet the sea in relatively sheltered settings. At low tide the river deposits clay and silt forming deep mudflats and salt marshes.

These represent key ecosystems supporting high biodiversity of plant and animals.

Deltas:
Form when the river deposits its material faster than the sea can remove it in large rivers e.g. the River Nile.