River Processes

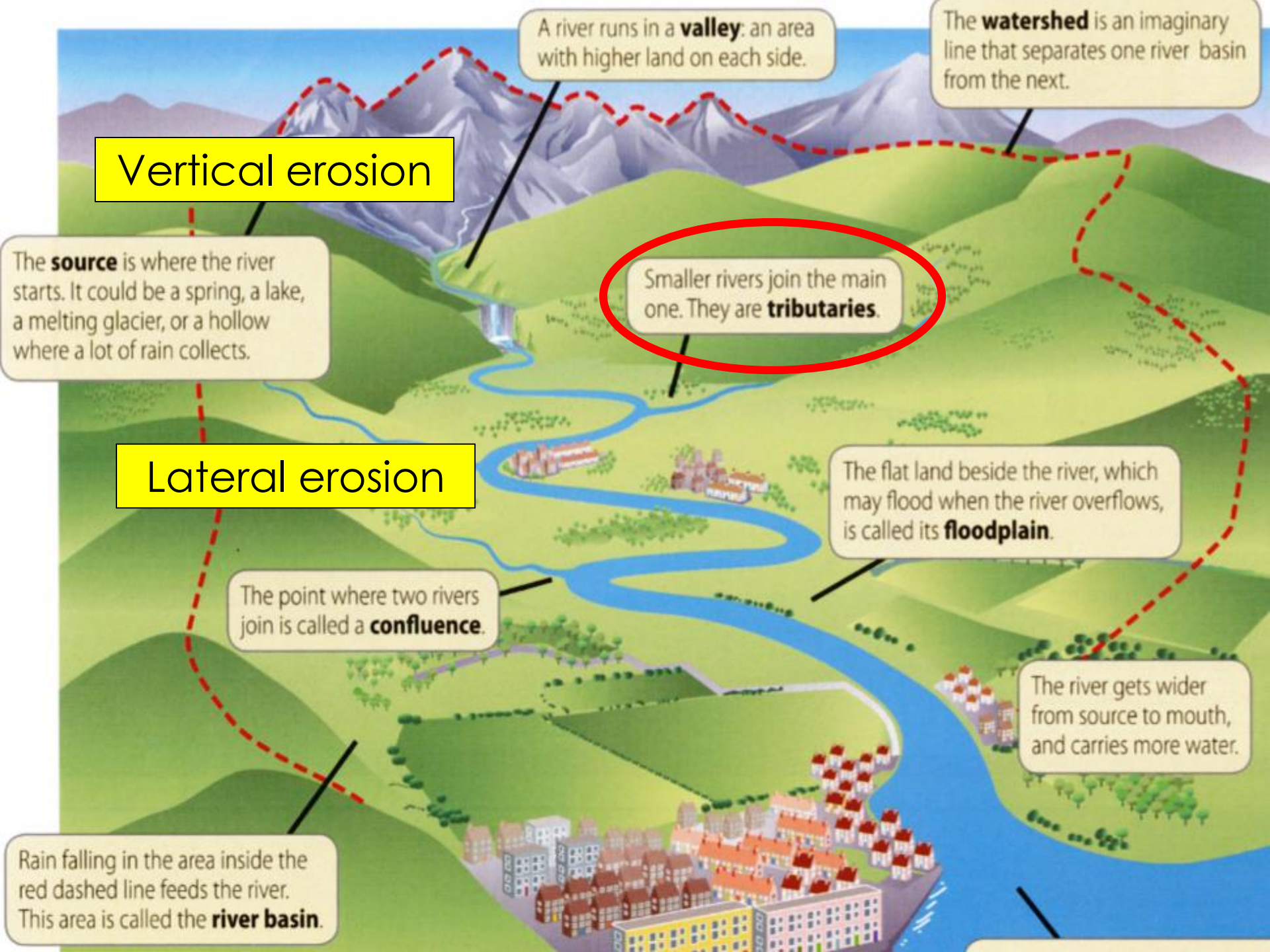
Learning Objective:

- **Discover** *how* a river erodes, transports and deposits material

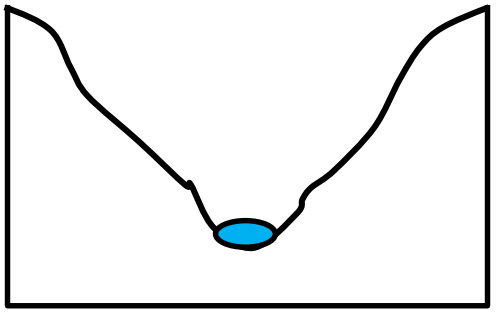
Learning Outcomes:

- **Compare** vertical and lateral erosion
- **Describe** how a river erodes, transports and deposits
- **Apply** understanding to a photograph

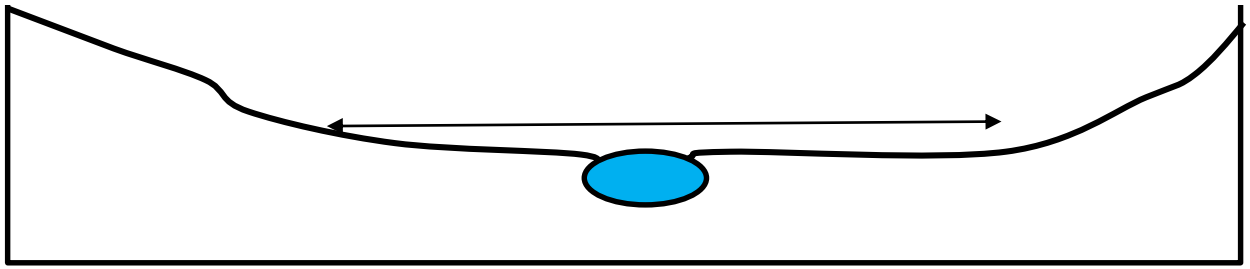

Turbulent water, but slower than downstream – why?
Video


A river runs in a **valley**: an area with higher land on each side.
The **watershed** is an imaginary line that separates one river basin from the next.
Vertical erosion
The **source** is where the river starts. It could be a spring, a lake, a melting glacier, or a hollow where a lot of rain collects.
Smaller rivers join the main one. They are **tributaries**.
Lateral erosion
The flat land beside the river, which may flood when the river overflows, is called its **floodplain**.
The point where two rivers join is called a **confluence**.
The river gets wider from source to mouth, and carries more water.
Rain falling in the area inside the red dashed line feeds the river. This area is called the **river basin**.

Vertical erosion – turbulence causes rough, angular particles to scrape along the river bed



Lateral erosion – widens the valley with ***tributaries*** bringing more water to make the river bigger.
A **deeper** river = less friction, so more energy and faster!

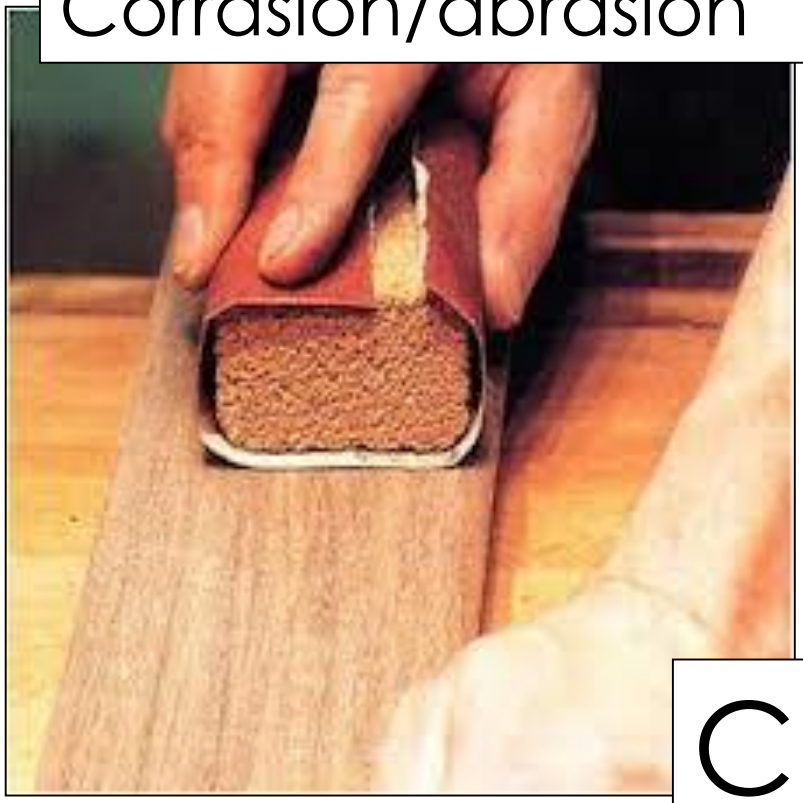


River erosion is …

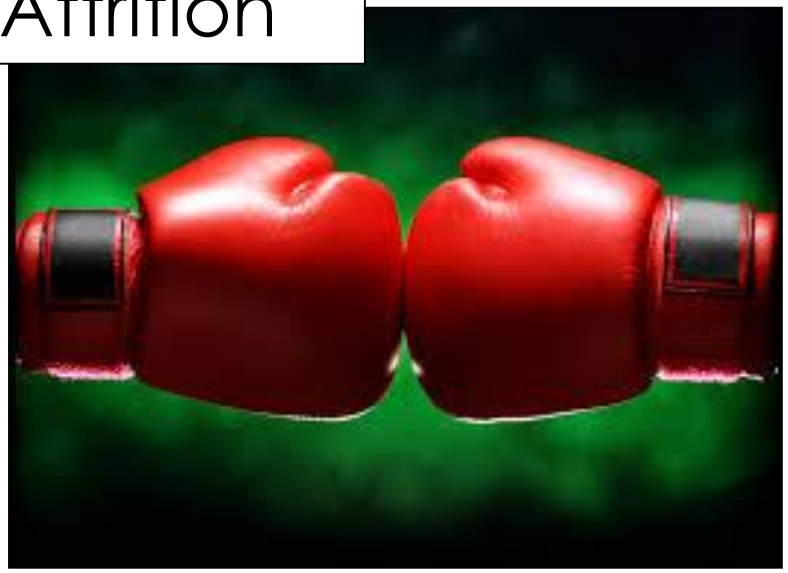
… the wearing away of rock and soil found along the river bed and banks. Vertical erosion occurs downwards and lateral erosion occurs sideways.

Vertical or lateral?

Corrasion/abrasion



Attrition



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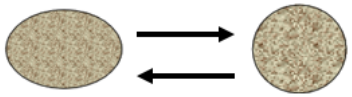
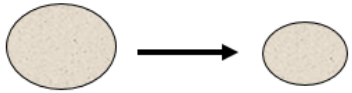
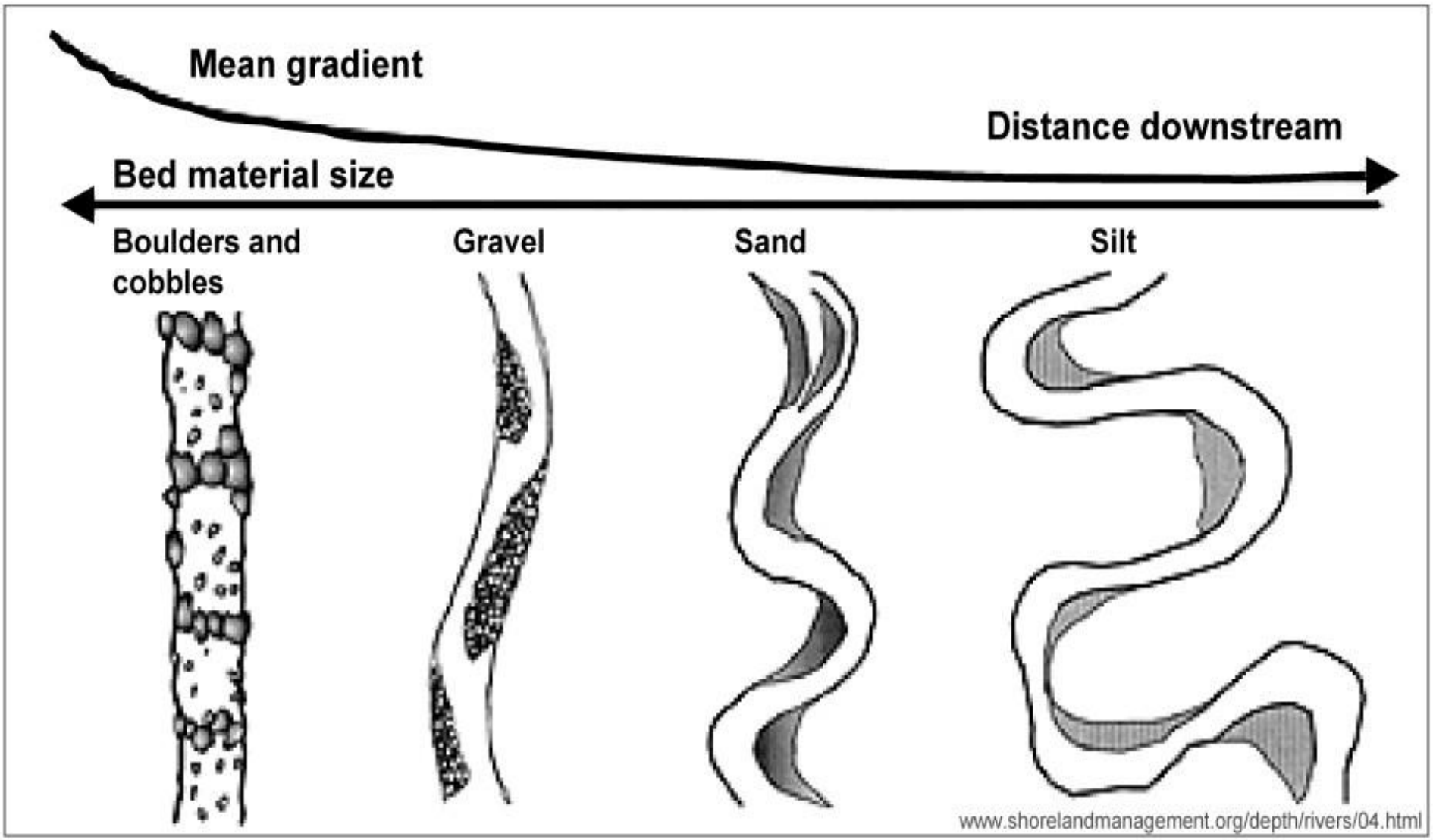
Solution

Hydraulic action

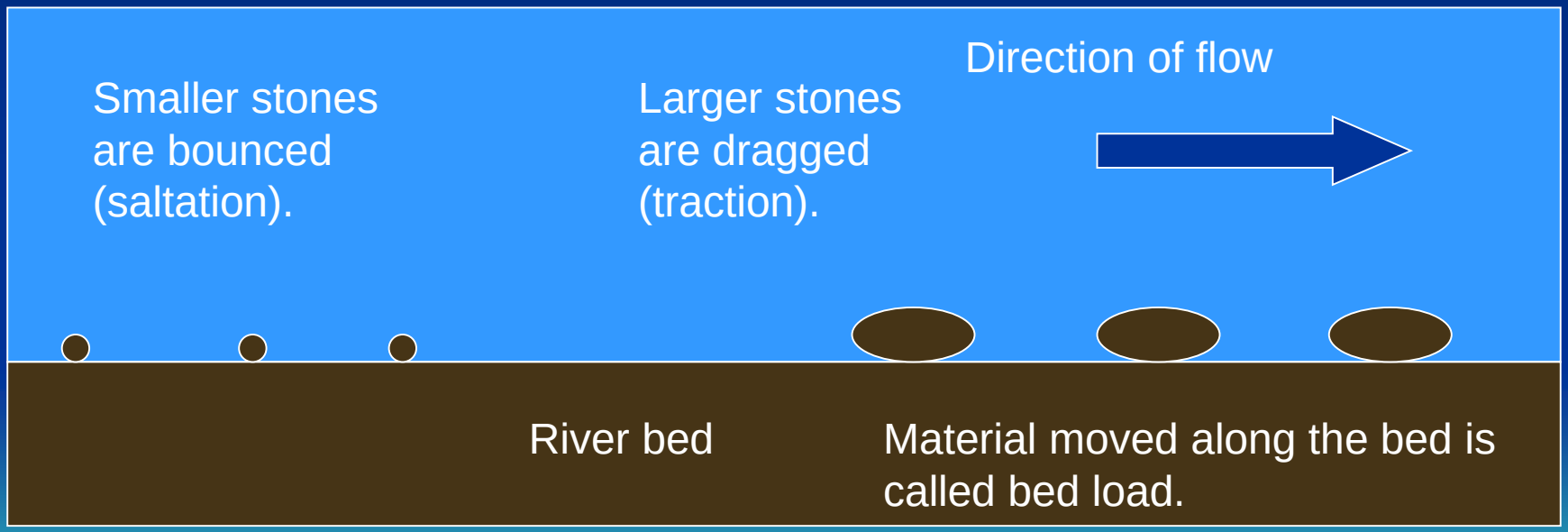
Erosion Processes

Corrasion/ abrasion	Attrition	Solution	Hydraulic action
			
The bed and banks are worn down by the river's load. The river throws these particles against the bed and banks, sometimes at high velocity.	Material (the load) carried by the river bump into each other and are smoothed and broken down into smaller particles.	This is the chemical action of river water. The acids in the water slowly dissolve the bed and the banks.	This process involves the force of water against the bed and banks.

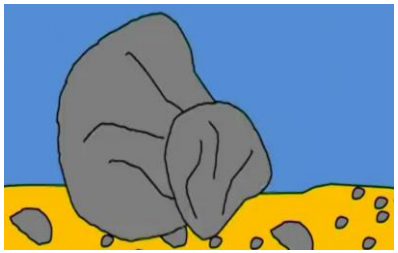
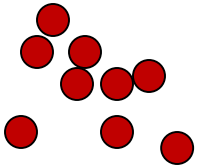
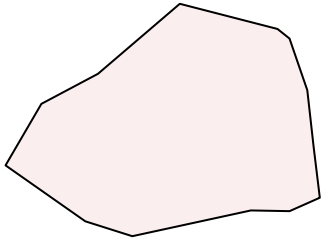
Sediment size downstream – why does it change?



Transportation



Transportation Processes

Traction	Saltation	Suspension	Solution
			
Large boulders and rocks are rolled along the river bed.	Saltation - small pebbles and stones are bounced along the river bed.	Suspension - fine, light material is carried along in the water.	Dissolved minerals in limestone and chalk are *carried* along in solution.

How do rivers deposit?

- **Larger rocks** deposit in the upper course – during high flow they can be transported a short distance
- Suspended sediment will be **deposited on the banks** when velocity is slowed by friction
- Most deposition happens at **the river mouth** where there is a **gentle gradient** and interaction with **tides**
- All involve a ***reduction*** in speed!

-What is taking place at X – erosion / transport / deposition?

-Do you think the river is flowing quickly or slowly?

Annotate the photograph with evidence of erosion, transportation and deposition

The size and shape of a river valley depends on the work of the river under ***flood*** *conditions.*

Do you agree with this. Explain why. (6 marks)

Think about:

-What does it take to erode?
-What does it take to transport a large amount of sediment?
-Where does the material end up and how does it shape the river valley?

The size and shape of a river valley depends on the work of the river under ***flood*** *conditions.*

Do you agree with this. Explain why. (6 marks)

It does to a large extent as it's only after heavy rainfall that the river has ***enough energy to erode and enlarge*** it's channel and the river valley. Hydraulic action would only be effective with a lot of force in the river from a flood.

The amount of load that a river carries ***depends on it's speed***. After a rainstorm, rivers look muddy and transport a lot of material to be deposited and build up the banks somewhere else. This changes the shape of the river valley.