Date: Friday, 01 May 2020

Title: Fluvial Processes – Erosion, Transportation and Deposition

Knowledge Recall: Key word crossword

Without looking at last lessons notes, try and complete the key word crossword

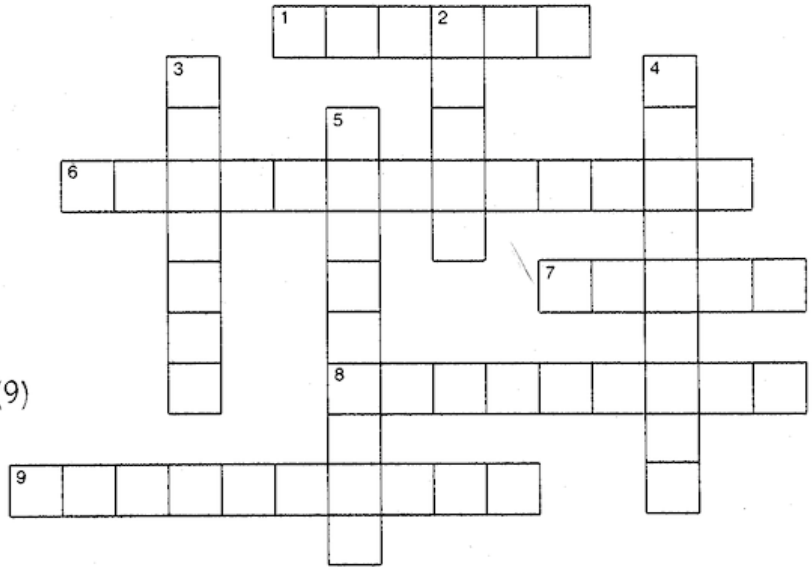
Solve the crossword using the clues below.

Across

1 Where a river starts (6)
6 An area drained by a river (8, 5)
7 The end of a river (5)
8 Where rivers flow into (3, 2, 4)
9 Where a small river joins a larger one (10)

Down

2 A large stream (5)
3 A river flows in this (7)
4 A stream or small river that flows into a bigger one (9)
5 The boundary between two river basins (9)



LO: To explore how rivers erode, transport and deposit material.

SUCCESS CRITERIA:

I can **describe** the fluvial processes.

I can **explain** how a river erodes, transports and deposits material.

I can **suggest** how velocity affects the processes of erosion, transportation and deposition.

There are three main river processes

Erosion

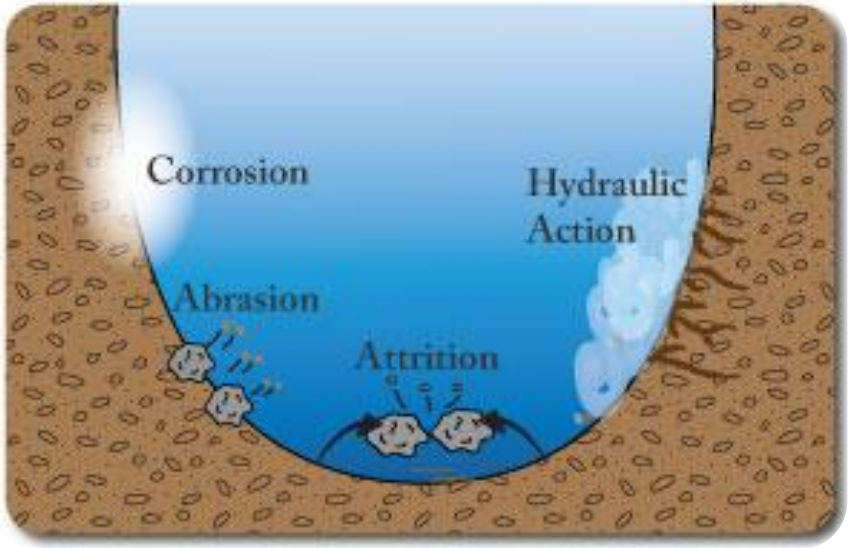
Transportation

Deposition

Erosion

The ability of a river to erode depends on its velocity. So, the faster a river is flowing, the more erosion takes place.

EROSION IS THE WEARING AWAY OF ROCKS, RIVER BED AND BANKS



Hydraulic action
= sheer force of the water

Attrition
= rocks hit against each other and become smaller

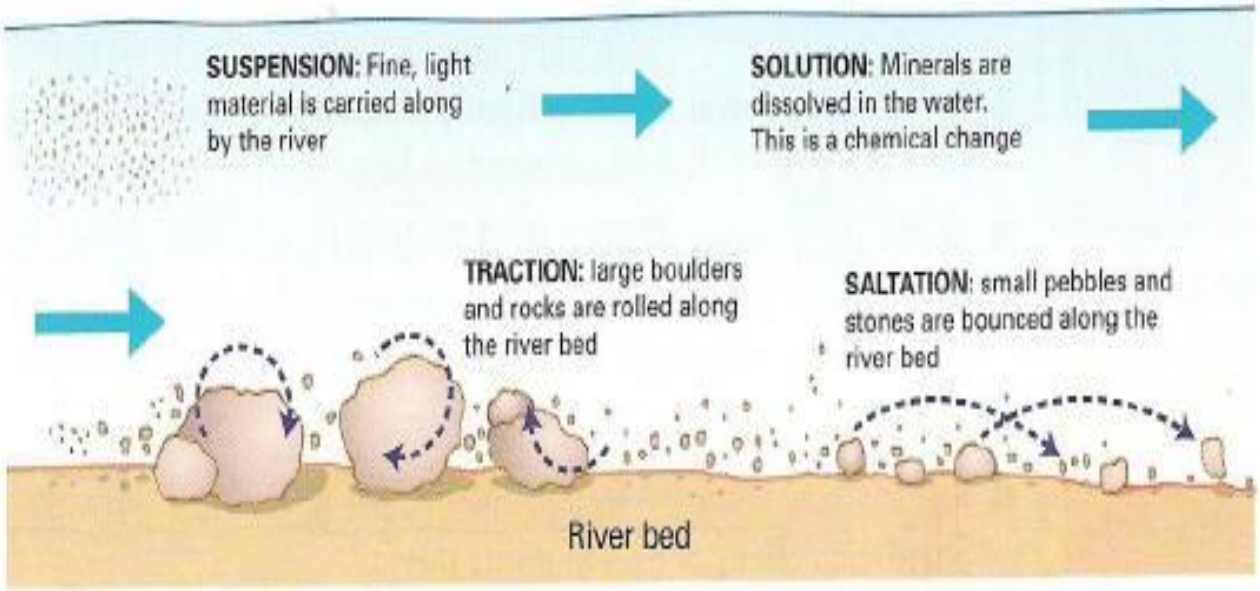
Abrasion
= rocks in the river scrape and scour the river bank

Solution
= rocks dissolve into the water

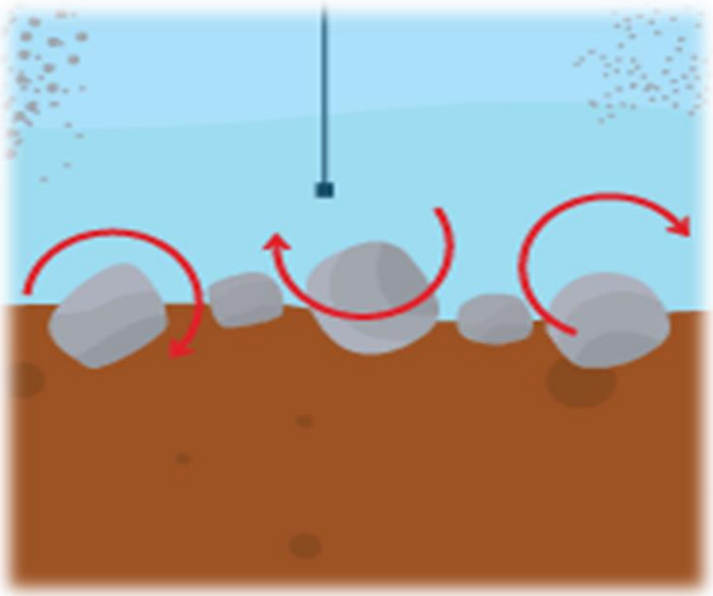
Transportation

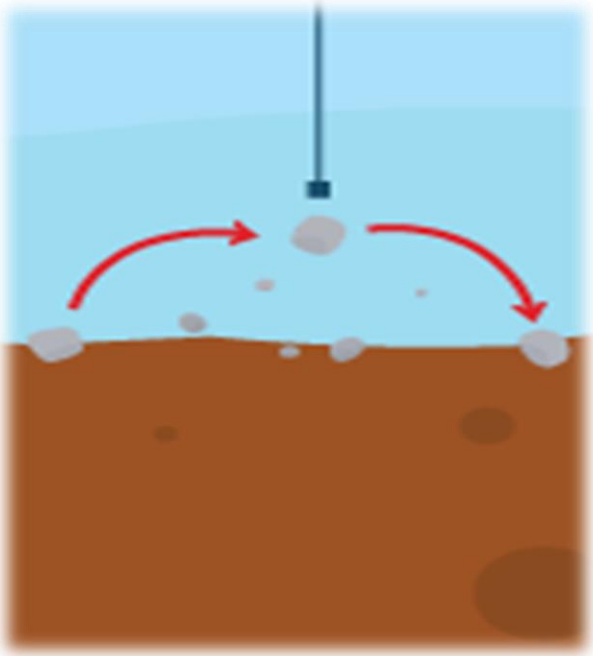
TRANSPORTATION IS WHEN THE ERODED MATERIAL IS CARRIED AWAY

Transportation depends on velocity but also particle size. If a river is flowing fast, it is more able to transport larger material.



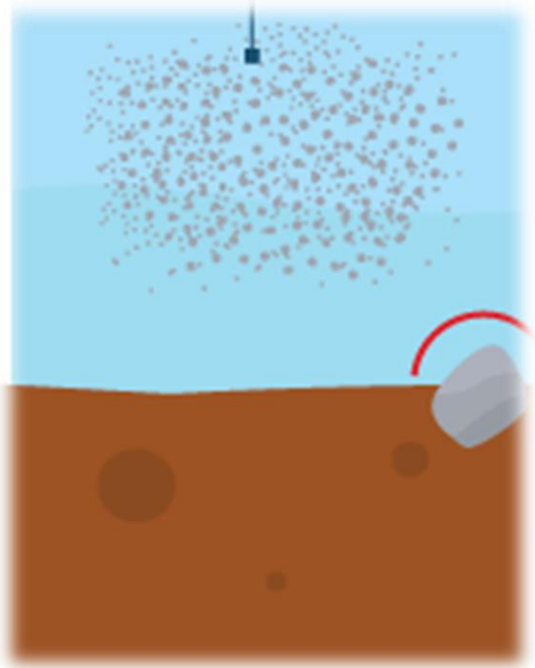
Traction
= where large pebbles are rolled along the river bed

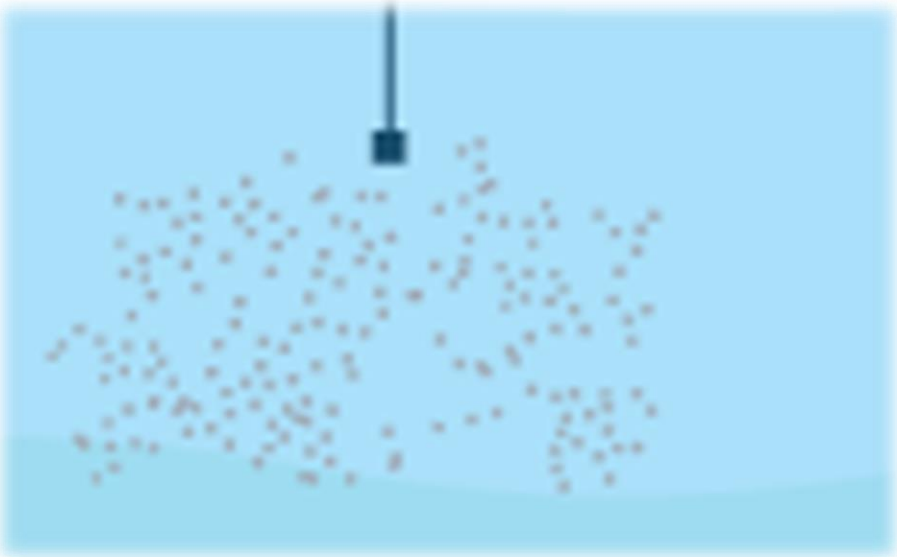




Saltation
= pebbles are bounced along the river bed

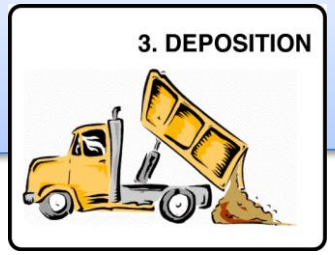
Suspension
= where smaller particles are carried suspended in the load





Solution
= where dissolved particles are carried invisibly

Deposition

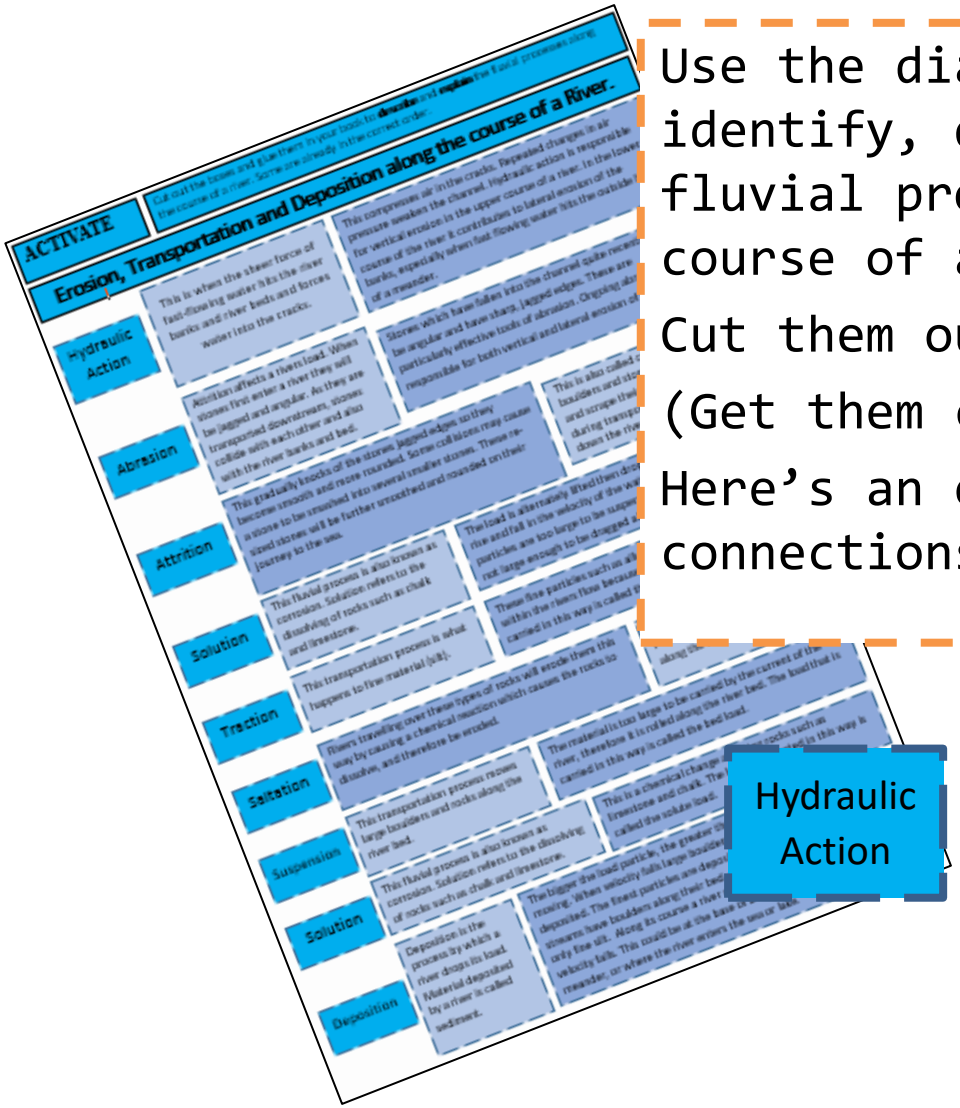


Rivers deposit material when they lose velocity (slow down). The bigger the load particle, the greater the velocity needed to keep it moving. That's why large particles (like boulders) are deposited first and small, fine particles (like silt) are deposited last.

There are a few reasons why rivers slow down and deposit material:

- The volume of water in the river decreases
- The amount of eroded material in the water
- The water is shallower
- The river reaches its mouth

TASK 1: Erosion of the river bed and banks



Use the diagrams and text boxes to identify, describe and explain the fluvial processes that occur along the course of a river.

Cut them out and glue them in your books

(Get them checked first!)

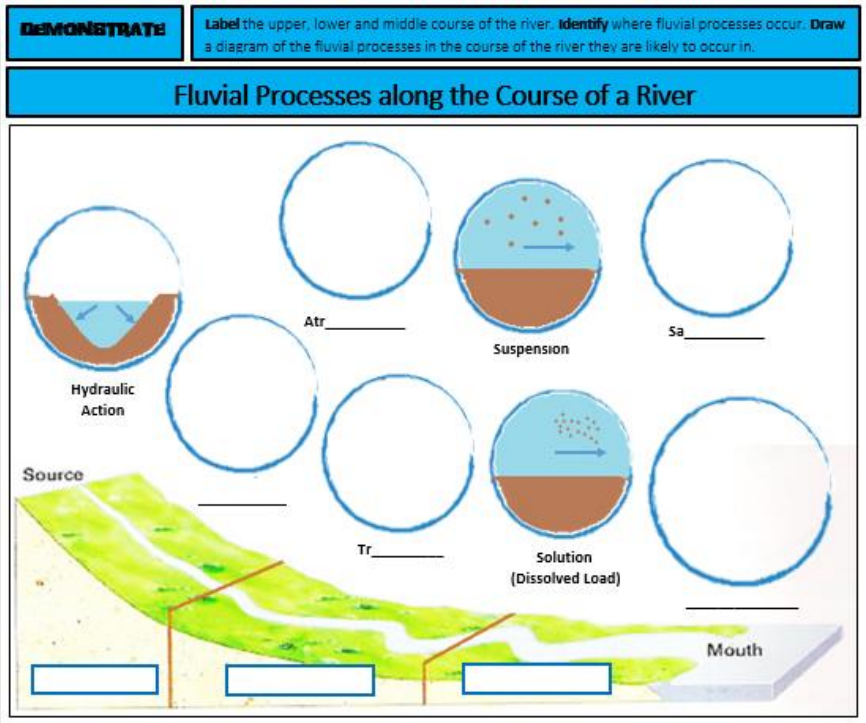
Here's an example of what your connections should look like.

Hydraulic Action

This is when the sheer force of fast-flowing water hits the river banks and river beds and forces water into the cracks.

This compresses air in the cracks. Repeated changes in air pressure weaken the channel. Hydraulic action is responsible for vertical erosion in the upper course of a river. In the lower course of the river it contributes to lateral erosion of the banks, especially when fast flowing water hits the outside bend of a meander.

TASK 2: Fluvial Processes along the Course of a River



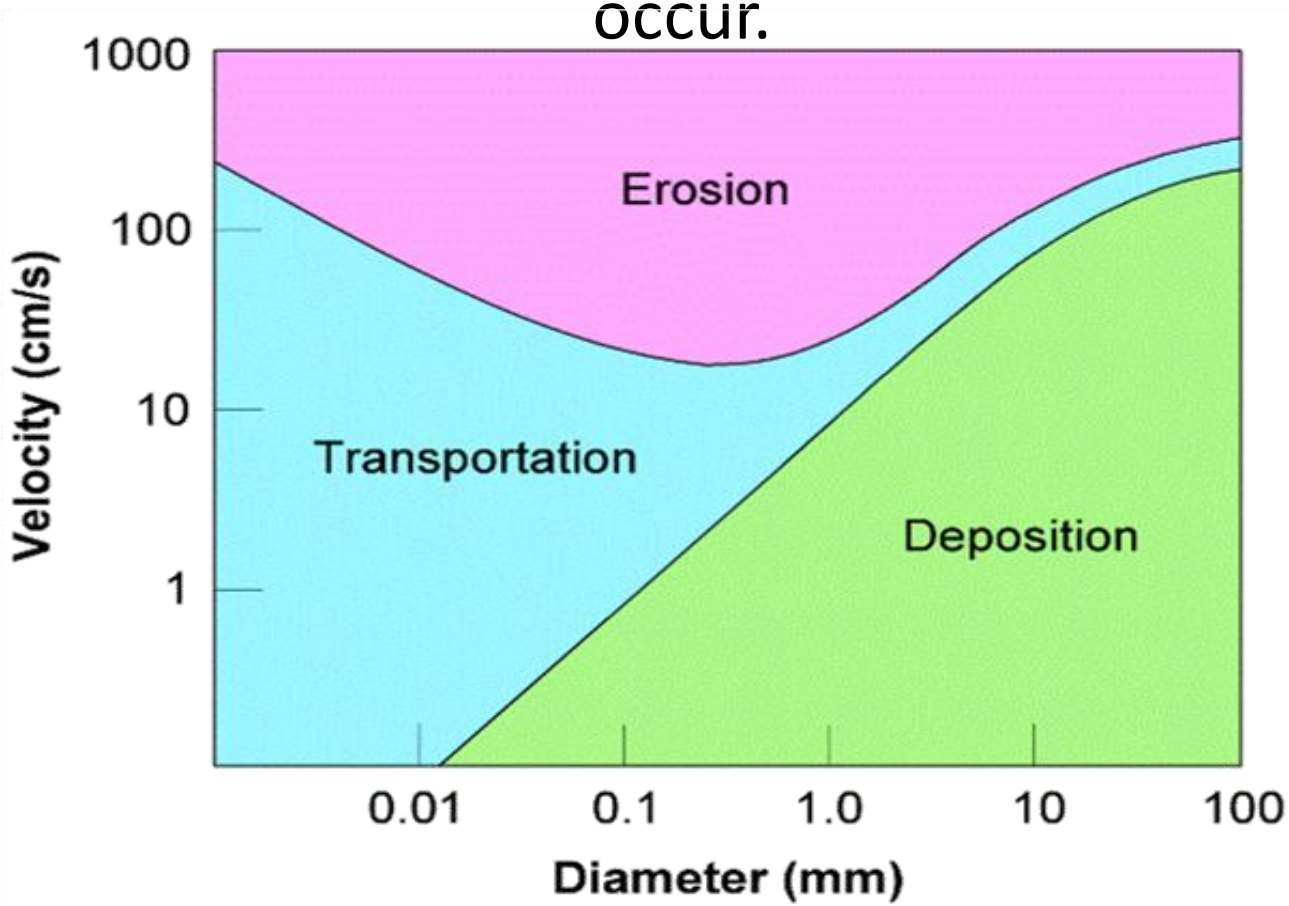
Label the upper, lower and middle course of the river.

Identify the fluvial processes.

Draw a diagram of the fluvial processes in the course of the river they are likely to occur in.

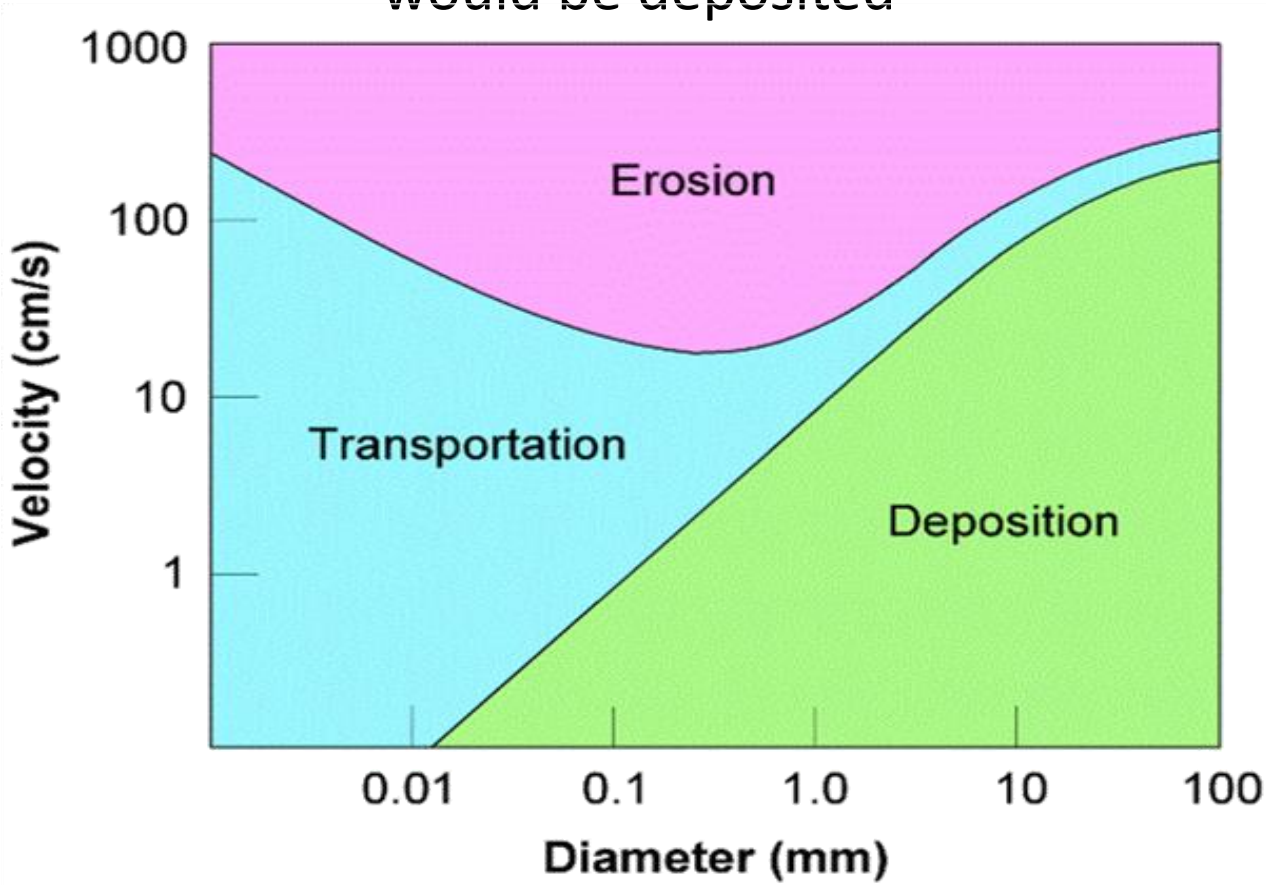
Hjulstrom Curve

The Hjulstrom Curve (below) shows the different critical velocities at which erosion, transportation and deposition occur.

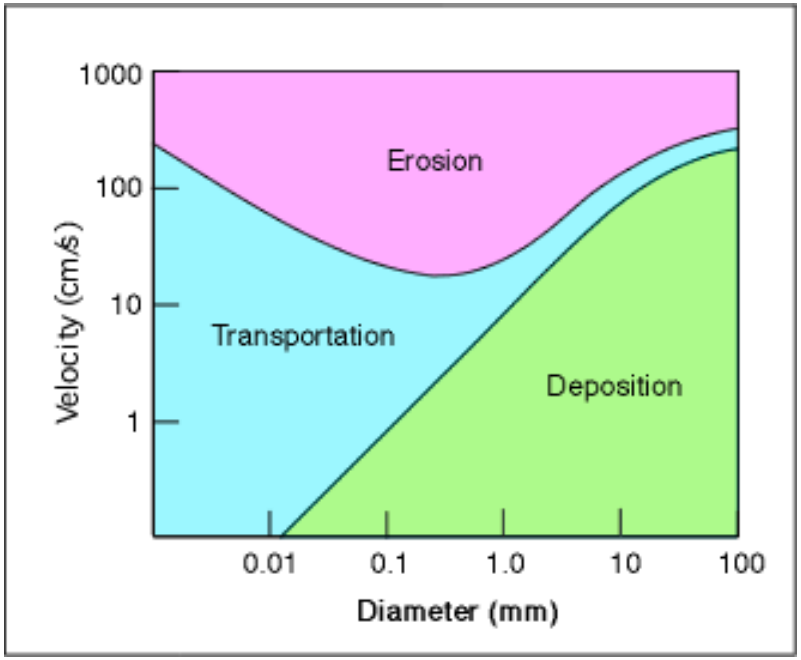


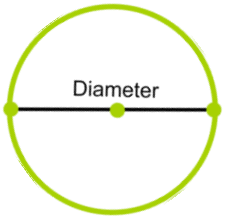
Hjulstrom Curve

The blue section shows that large 10mm diameter particles are transported between velocities of about 85-110cm/sec. If the velocity dropped below 85cm/sec (and enters the green section) the particles would be deposited



Task 3: **Apply** your understanding to the Hjulstrom Curve – a graph used by hydrologists.





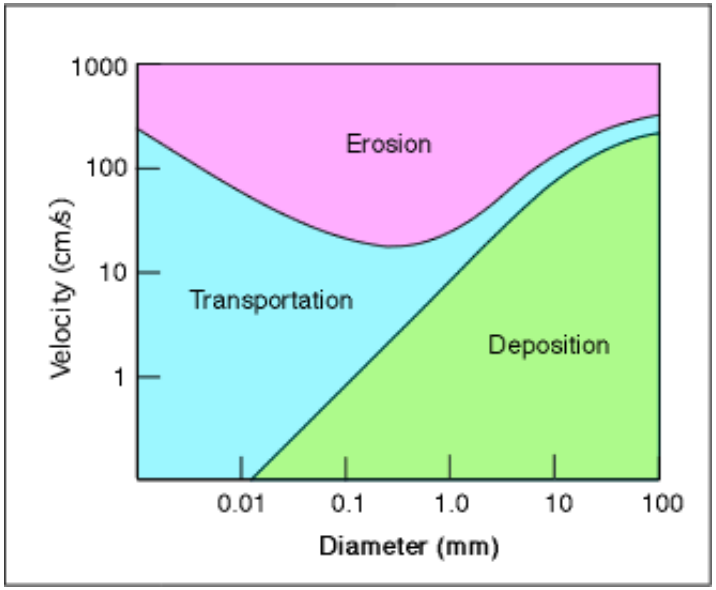
Using the Hjulstrom Curve, **suggest** how velocity (speed of the river) affects the processes of erosion, transportation and deposition (4).

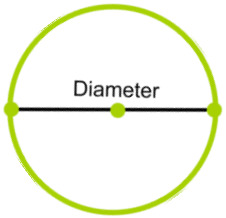
MARK SCHEME:

Suggest the general relationship between particle size and the velocity at which erosion occurs (use data to back it up).

Suggest the general relationship between particle size and the velocity at which deposition occurs (use data to back it up).

TASK 3: Apply your understanding to the Hjulstrom Curve – a graph used by hydrologists.





Using the Hjulstrom Curve, **suggest** how velocity (speed of the river) affects the processes of erosion, transportation and deposition (4).

MODEL ANSWERS:

The higher the velocity the more erosion that occurs (1), for example when the river flows between 400cm/s material is likely to be eroded regardless of diameter (1).

The larger the boulder the more deposition that occurs (1), for example when the particle size has a diameter between 1.0 and 100mm, the particle will be deposited at speeds between 0 and 300cm/s (1).