

6.1 River processes in the upper course

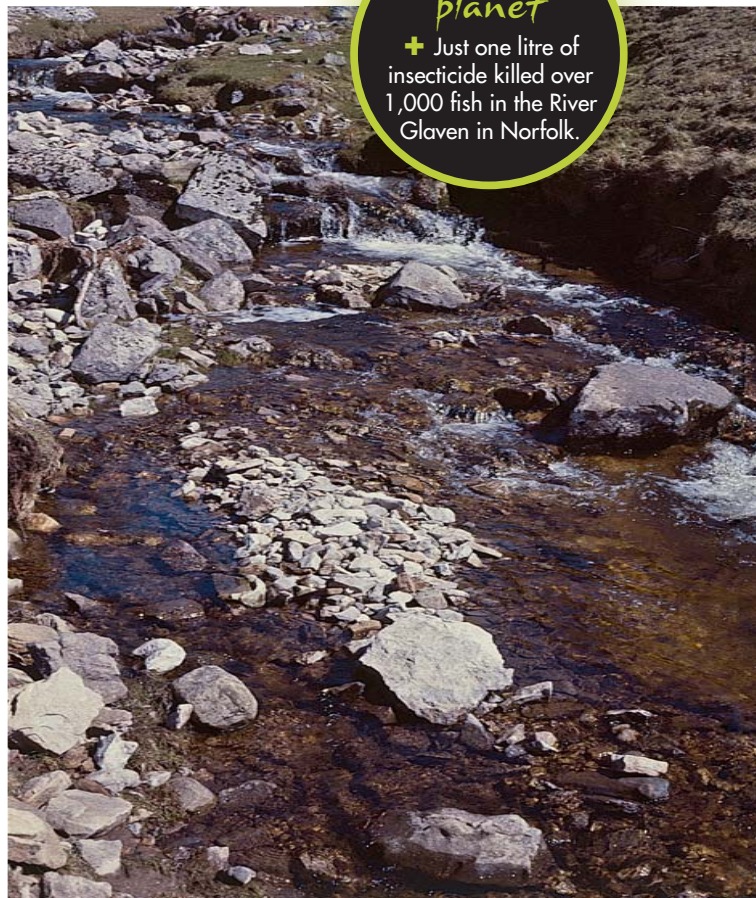
+ In this section, you'll learn about river processes in upland areas.

Buckden Beck

This is Buckden Beck, a small stream – or tributary – which flows into the River Wharfe in northern England. The Wharfe joins the River Ouse, and eventually flows into the Humber Estuary where it reaches the sea.

Look at the small rapids and waterfalls in the photo. This is typical of a river's **upper course**. The river loses height rapidly, making the stream look very fast. In fact, the stream is flowing slowly, as so much of the river's energy is lost through **friction** with the stream bed.

However, rainstorms increase the river's energy a lot, and allow it to carry large boulders and stones, which wear away – or **erode** – the channel. Therefore, most erosion is done during periods of wet weather.

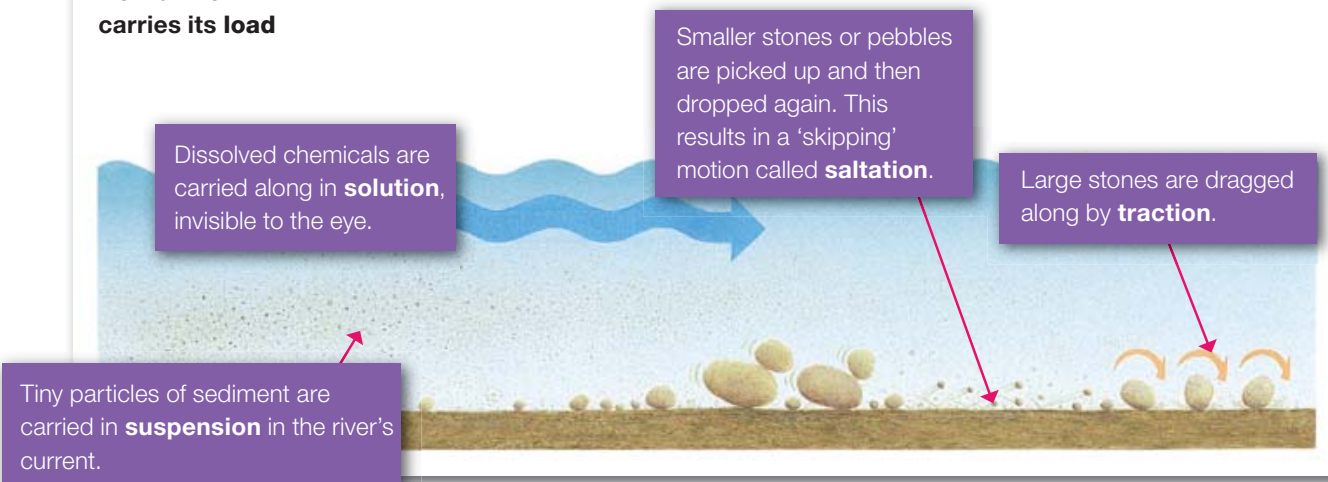


On your planet
+ Just one litre of insecticide killed over 1,000 fish in the River Glaven in Norfolk.

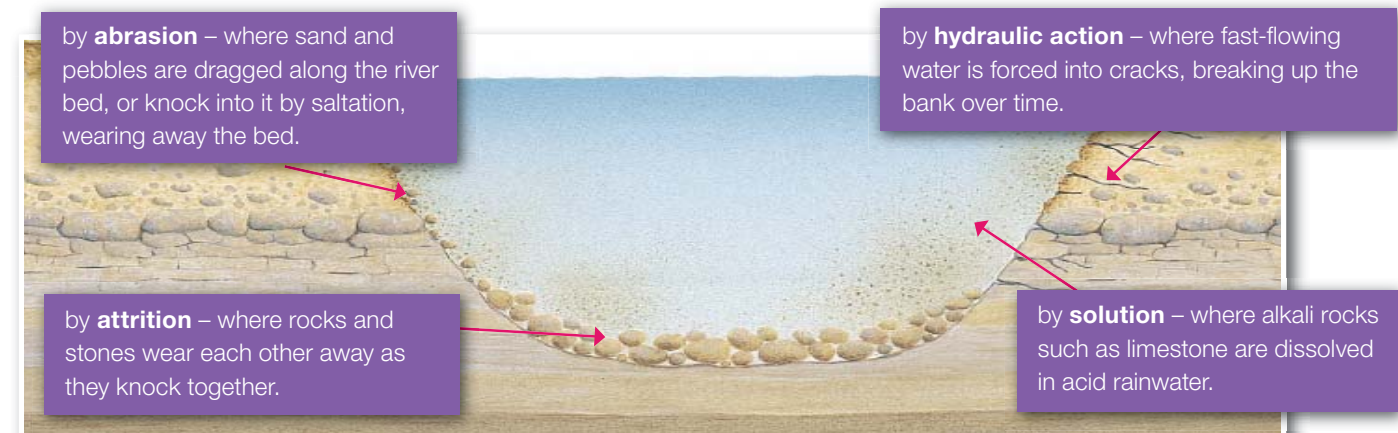
+ The material carried by a river is called its **load**.

Buckden Beck – the **gradient** (slope) of the river course is steep

How a river carries its load



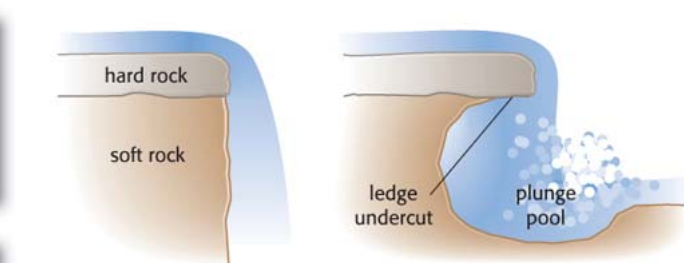
How a river erodes its channel



In the upper course, most erosion is vertical. Whenever it meets a hard – or **resistant** – rock, a step is formed. This can eventually become a waterfall. The river gains a great deal of energy where it falls over the lip of the waterfall, allowing it to erode rapidly.

+ **Erosion** means wearing away the landscape.

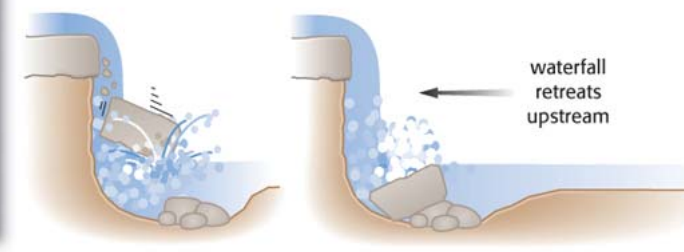
1 Waterfalls occur when a river crosses a bed of more resistant rock.



How waterfalls are formed

2 Erosion of the less resistant rock continues, undercutting the rock above. The river's energy creates a hollow at the foot of the waterfall known as a **plunge pool**.

3 The less resistant rock beneath is eroded more rapidly by abrasion and hydraulic action. This creates a ledge.



4 Eventually the overhanging ledge collapses. The waterfall takes up a new position, leaving a steep valley or **gorge**.

your questions

- For each set of words a) say which is the odd one out, b) explain your choice.
 - stream, tributary, river, waterfall
 - solution, attrition, plunge pool, abrasion
 - suspension, gorge, traction, load
 - hydraulic action, saltation, suspension, traction
- Explain how the following might change during wet weather:
 - The amount of water in the stream, and its energy
 - The amount of erosion that a stream can do
 - a waterfall.
- Explain the following features of a river's upper course:
 - it usually flows slowly, but sometimes flows rapidly
 - there are several large stones and boulders on the bed