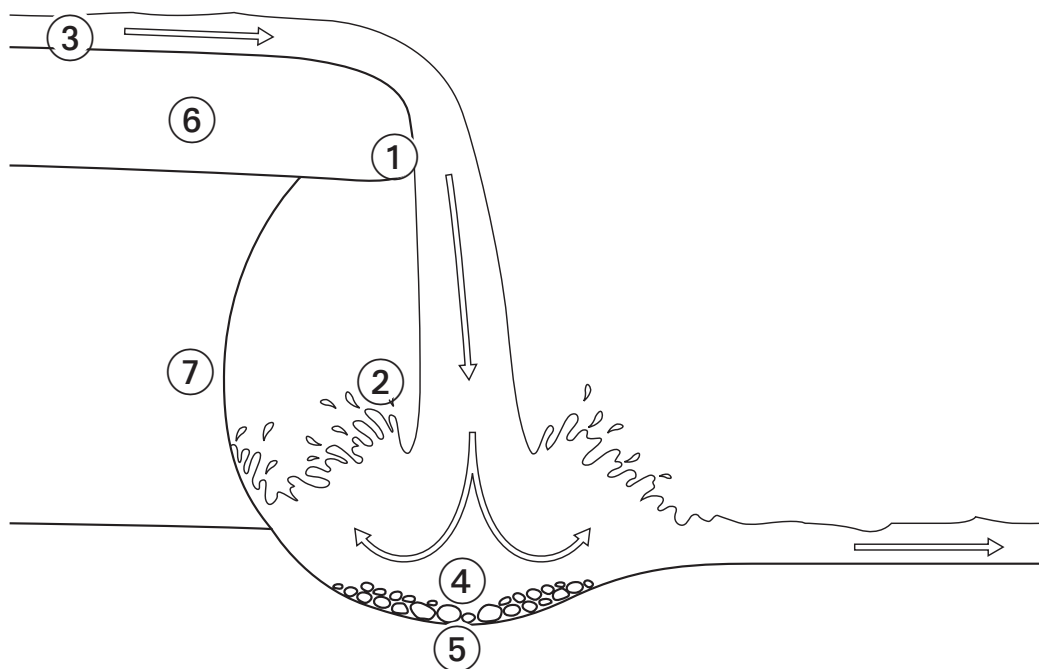


Waterfalls

A waterfall is a place where a river falls over a cliff and plunges down onto the rocks below.

Colour in the diagram, using blue for the river, brown for bands of hard rock, and grey for bands of soft rock.



Q1. Match the numbers on this diagram to the descriptions below. Write the correct number in each of the spaces in the description. The first one has been done for you.

As a river approaches a waterfall ^③ it flows over a band of hard rock It is the hard rock that forms the lip of the waterfall

Once the river has poured over the lip, it plunges down and crashes on the rocks below and creates clouds of spray.

The place where the water crashes is often filled with pebbles that have fallen from the lip

Here a deep pool can form as the plunging water scours the rock with the aid of the pebbles.

The swirling water in the pool may also wear away the soft rock behind the waterfall, causing it to collapse.

Answers

The answer to Q1 is:

As a river approaches a waterfall ③ it flows over a band of hard rock ⑥. It is the hard rock that forms the lip of the waterfall ①.

Once the river has poured over the lip, it plunges down and crashes on the rocks below ② and creates clouds of spray.

The place where the water crashes is often filled with pebbles that have fallen from the lip ④.

Here a deep pool ⑤ can form as the plunging water scours the rock with the aid of the pebbles.

The swirling water in the pool may also wear back the soft rock behind the waterfall ⑦, causing it to collapse.

Resources

- ▶ Water container and tap to act as waterfall, soft materials and a bowl to see how material is moved by falling water.

Background support

Waterfalls are parts of the river basin where water falls vertically, or nearly vertically, due to an interruption in the course of the river.

Steps in the landscape that cause waterfalls may be due to either a horizontal hard rock band, or glacial or ocean wave erosion. Rapids and low waterfalls, also known as cataracts, form a series of hard rocks rather than a single waterfall step.

Waterfalls and rapids make the most spectacular parts of a river basin. As the water falls or tumbles, its speed increases and it has increased erosive power. At the foot of a waterfall there is often a deep pool, called a plunge pool, where the bed has been worn away by the circulating abrasive action of pebbles carried over the waterfall lip in the falling water. Plunge pools may erode back under the waterfall, undermining the fall and causing the cliff to collapse. This may provide additional material for plunge pool erosion, but in the short term is more likely to cause the plunge pool to be filled in with a jumble of rocks.

Waterfalls are among the best known features of a river course, although they are actually quite uncommon.

Waterfalls are among the most compelling of river features because of their drama. Children may know of some of them, such as Niagara Falls on the Niagara River, Angel Falls in Ecuador, Kaitetur Falls in Guyana, and Victoria Falls on the Zambezi River. You may have others from your own knowledge.

Many waterfalls cannot be attributed to river action alone, and many outside the tropics are the result of past glacial erosion. Among the world's largest waterfalls, Yosemite Falls is a clear example of a waterfall flowing from a hanging valley, and subsequently almost unmodified by the river.

If you do not want to introduce the idea of past glaciation, choose the examples with care or find a way to work around what caused the waterfall in the first place.

You can also make a miniature waterfall in class using a large water container with a tap near the bottom. Turn on the tap and place different materials in a tray below it to see the differences between rates of erosion. Clay, sand, and gravel might be used.

Across the curriculum

Using this material you can link:

- ▶ Ideas of potential and kinetic energy, showing how one is converted into the other from the lip to the plunge pool;
- ▶ The different kinds of rock through actual examples;
- ▶ The formation of sediment by mechanical means;
- ▶ The production of hydroelectric power through the use of kinetic energy to turn turbines;
- ▶ The way in which some physical features can be spectacular and so have great tourist (and so wealth-creating) potential;
- ▶ Conservation of physical features when they have both tourist and development (through hydroelectric power) potential. Niagara is a classic example;
- ▶ The way in which some river features can severely disrupt transport along a river, and how some waterfalls have been bypassed by canals.