


# Meanders

Most rivers follow a winding path made of many bends and loops of differing sizes.


**Q1.** Write the name for a river bend.  M.....


**Q2.** The diagram below is a side view of a large river bend and river bed.

**(a)** Colour the river in blue.

**(b)** Which side of the bend has the deeper water, the outside or the inside?

 .....

**(b)** One river bank is steeper than the other. Is the steepest side on the inside or the outside of the bend?  .....

**(c)** The faster the flow, the easier it is for the mud and silt to be washed away. Which side of the bend can mud settle out on?  .....

**(d)** What does the large arrow show?

 .....

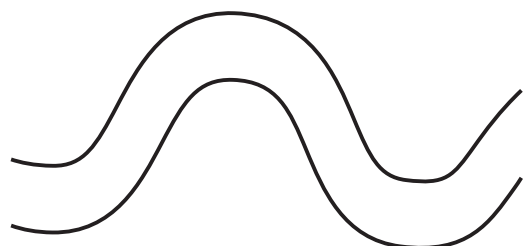
**(e)** The smaller arrows on the side view show how water moves from one bank to the other, as well as flowing to the sea. Complete this sentence, which describes what the effect is:

As the water flows around the outside of the bend it scours the bank. The scoured material is then carried

 .....

 .....

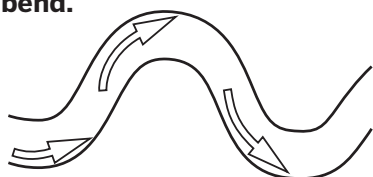
**Q3.** On the diagram on the right, draw arrows where erosion is most powerful.



## Answers

### Q1. Meander

- Q2. The purpose of this question is to make sure that students have thought carefully about each part of the bend.**
- (a) Outside  
(b) Outside  
(c) Inside  
(d) The arrow shows the path of fastest water (and thus how it hugs the outside of the bend, causing scouring).  
(e) This is an extension question. The most complete answer will be along the following lines: 'As the water flows around the outside of the bend it scours the bank. The scoured material is then carried across the channel to the slacker water on the inside of the bend, where it may settle out and build up the bank.'
- Q3. The answers to Q2 should allow students to accurately draw an arrow that hugs the outside of a bend, then crosses the river in the straight section after the bend, before hugging the outside of the next bend.**



## Resources

- Board, tap or jug of coloured water, and collecting bowl. This will make meanders.

## Background support

Meanders are some of the most obvious river features and can be seen readily on many maps. Introduce the term meander carefully through the use of more common words. For example, introduce a meander as a curved part of the river, or as a river bend, then proceed through the term 'winding' to meandering. Then point out that not all bends are meanders, so that it becomes a challenge to spot a meander and identify it from an isolated bend.

The key to this lies in the fact that meanders are regularly sweeping curves rather than irregular and random bends in a river which is otherwise more or less straight. Then focus on the fact that meanders are produced by the natural flow of water in a river (rather than chance obstacles, hard rock bands, and other special factors).

Rivers cut channels in rock, but they form meanders and braided patterns in a floodplain. A floodplain, a more or less flat strip of land either side of a river, is a depositional feature made of sediment left behind by a river. It is not an erosional feature in the sense that it is not cut into rock. Meanders, braids, and many other features of a river floodplain are formed in sediment; only in exceptional circumstances are they cut into rock.

Two types of channel are most common:

Deep, winding, or meandering single channels occur in places where most material carried is fine sediment such as silt and clay. These channels form most easily when the floodplain consists of fine material, such as clay, which sticks together when it is wet. Most meandering river channels change their courses gradually.

Shallow, wide, braided channels occur where the material is mainly sand, gravel, or pebbles.

### Meanders

As mentioned above, it is vital to help students to differentiate between 'aimless' twists and turns of a river on very flat land, and the regular graceful river twists and loops (meanders and oxbows). Rivers on very gentle slopes often change course randomly. Meanders occur where rivers have a pronounced gradient. (Here 'gentle' and 'pronounced' are relative terms and 'steep' may still only mean a gradient of 1 metre/km.)

As water flows around a meander, it moves to the outside of the bend. Here, material is abraded (scoured) from the bed and banks, especially at times of high water. By contrast, on the inside of a meander the flow is much slower, and this tends to set up a corkscrew flow of water whose result is to transfer scoured sediment from the outside to the inside of the bends.

Over time, this pattern of erosion and deposition causes a river to migrate over the floodplain without changing width.

Rivers flow in channels which, for the most part, are made by the rivers that flow in them. Most of the channel-shaping takes place when the channels are full or in flood. This happens about once every two or three years. For the rest of the time little change occurs.

Do also try out the generation of meanders described on pages 34 and 35 of this *Teacher's Resources*. All ages find it fun – teachers, too!