

## Simple flume activities:

### Introduce concepts of erosion, transport and deposition

Additional resources: Model sheep, some pebbles, lolly sticks and monopoly buildings

#### Starter:

Set up the flume with a single meander in the test bed as shown. The rear of the flume needs to be raised by about 2/3cm.

Place a sheep on each side of the meander, about 1cm from the sides of the river, and ask students to guess which sheep will fall in the river first.

Turn on the water and watch the unfortunate animal on the outside bend fall in! It works every time!



#### Activity one: What happens at a meander?

Allow a river to develop over the test bed over a few minutes. Get students to point out the areas where sand is being eroded and where deposition is happening. Observe the development of river cliffs and slip-off slopes. Small coloured floating objects in the water can be used to point to the thalweg (fastest current)

Pupils could sketch the processes and features they observe, it may be possible to take a digital photo of the meander and transfer this to a shared network folder for labels to be added using word processing.

#### Activity two: What factors influence erosion rates?

Get pupils to suggest how erosion rates in the flume may be increased. How can erosion rates be measured? Students may suggest using a scale such as a ruler or even better, collecting and measuring the amount of sand discharged in the outflow pipe.

Vary the angle of the flume and the discharge to observe the outcome in terms of erosion and transport rates. Erosion rates may also be seen to slow down when the sand is thoroughly saturated – why is this?

#### Activity three: How can erosion rates be reduced?

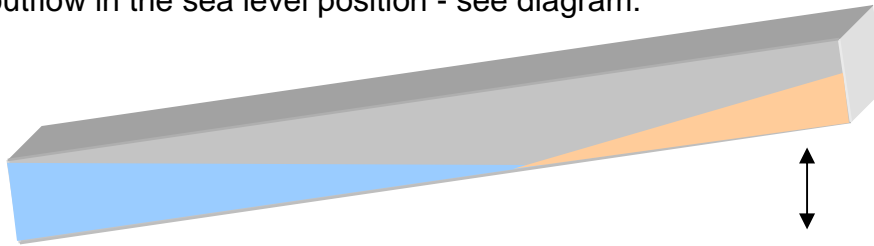
Consider that the flume meander is representing a real life hazard where the erosion is threatening a house or village (use monopoly buildings) Get pupils to suggest ways of managing this problem and model them in the flume. Pupils may suggest solutions such as revetments or other ways to reinforce the river cliff.

They may contemplate straightening or canalising the river bend. They may even think of removing the house or doing nothing! Again students could edit a digital photo of the meander and suggest which options are the best in the short term / long term, or are the cheapest, best for the environment etc.



#### Activity four: What happens at a river mouth?

The flume needs to be set up with the sand in one half of the flume and the outflow in the sea level position - see diagram:



A river flowing over the test bed will now tend to form a delta as it reaches the "sea". The process may be improved by using a proper delta flume or nothing more advanced than a length of half pipe which conducts the river discharge and rests on the test bed. Sand is placed in the half-pipe to represent bed load which will then form a better delta shape on reaching the sea. Students can experiment with varying the discharge and the flume angle, as well as building a dam to reduce sediment transport. A piece of wood can be used to create waves that can influence the shape of the delta, or erode it once the sediment transport has been reduced.

Other basic river processes to try are braiding, oxbow lakes and even levee formation if the sand is poorly graded.

