6.5 Pooh sticks and flow rate

Class Outdoor

Aims:
Have a bit of fun enjoying your local river, and if you want, take it further to investigate the flow rate (speed of water).

You will need:
- Notepad and pencil
- 5m tape measure (or longer)
- Stopwatch
- Pooh sticks!

Instructions:

Pooh Sticks

1. Get each group member to find a pooh stick – there will be plenty along the riverbank.

2. Find a good spot to launch your pooh sticks from (a bridge or shallow riverbank) and work out where the finish line will be (maybe a rock or riverside tree).

3. Launch your pooh sticks simultaneously and see which one crosses the finish line first. You might do this as smaller groups but can have as many goes as you like!

4. Have a discussion about the winning stick - why did it win?
 - Was it the size, shape or weight of the stick?
 - Was it the position at the launch spot and the line it took down the river?
  - is the water flow even across the river?
  - are there in-stream obstacles or deep pools where the water flows more slowly?

5. Have a few re-runs paying more attention to these factors.

Measuring flow rate

We can use pooh sticks to measure how fast the water flows - the flow rate.

1. Measure a 5m stretch of riverbank (or a longer stretch if you have a clear bank).

2. Launch one pooh stick in line with the start of your tape measure and time how long it takes to reach the end of it.

3. Use the following formula to calculate the flow rate:

Distance travelled (metres) / time taken (seconds) = flow rate (m/s)

4. Repeat the experiment 5 times to get an average flow rate.

5. Move to a different section of river – is the flow rate the same there?

Handy notes:

Most of us will have played pooh sticks but it can be used as the basis for some river recording and calculations.

This game can be played in small streams or larger rivers but make sure the stick droppers at the start line and the recorders at the downstream finish line are within easy contact and visible to each other.

Do more:

Measuring flow rate – one step further

Water at the surface travels faster than near the stream bottom due to resistance from gravel and stones, etc.

We can correct for this by multiplying the flow rate on the surface by a correction factor, to get a better measure of the water flow. This number is 0.8 for rocky-bottom streams/rivers or 0.9 for muddy-bottom streams/rivers.