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## **Teacher Information: Measuring the Flow Rate of the Font Stream**

Mottisfont village was named in the Domesday Book. It was a good place for a settlement due to water transport and fresh water from the font. There is evidence of water mill foundations where the font stream meets the river.

The font is a natural source of water that flows from an underground reservoir. It is thought that the power of the font stream was used to provide energy for a water mill in the past, and later used to power the spit in the kitchen.

Stream flow rate is the volume of water that passes a fixed point per unit of time. Typically this is expressed as litres per second. Understanding this measurement helps in flood preparation and proper engineering of drainage areas. Stream flow is also a factor in some water quality parameters, including habitat for aquatic species, pollution concentration and land erosion. Flow can be affected by a number of both natural and human factors and can change rapidly. Today the stream flow is monitored because the river is used for trout fishing.

**Investigation:** what is the flow rate of the Font stream?

**Curriculum link:** Scientific Enquiry Objectives UKS2: I can take measurements of time with increasing accuracy and precision, taking repeat reading and record my own data on a table.

**Location:** straight stretch of Font stream

**Health and safety:** although the Font stream itself is shallow, be aware of the proximity of the river. The activity requires close supervision and careful risk assessment prior to your visit.

**Resources (for 4 groups of 4 children):**

- 10 metre tape measure
- 1 plastic metre rule
- 2 marker flags
- 4 stopwatches
- 4 calculators
- 4 pencils
- 4 worksheets (downloadable from [www.nationaltrust.org/mottisfont](http://www.nationaltrust.org/mottisfont))
- 4 clipboards (available for loan from Mottisfont)

**Activity:**

1. Show children the font and explain that it is the source for the water in the Font stream. The water then joins the Abbey Stream, which is a haven for fish and other wildlife. Explain to the children that it is important that the water is not polluted because of the wildlife and that only the sticks for the experiment may be thrown into the water.

2. Follow the path to the straight section of the stream where the experiment will take place.



3. Explain to the children that we are going to play Pooh Sticks to find out the flow rate of the water. Children to find a small stick from the environmental art area. (Reiterate that nothing else should be thrown into the stream). They could record their measurement three times and find the average. Time how fast it takes for a twig to float from the starting point to the finishing point on the tape measure.
4. On the first bridge below the font, teacher to measure the width of river with measuring tape.



5. Teacher to measure depth of water using a metre rule. (Hold an upright metre stick in one place in the stream, as the stream bed is fairly flat, and measure from the stream bed to the surface of the water)
6. Teacher to use a long tape measure to set a distance of the stream to measure e.g. 10 metres. Set up marker flags to show the beginning and end points on the bank.
7. Use the width, depth and length to establish the volume of water in the stream in that section (LxWxD) in cubic metres. There are 1000 litres of water in a cubic metre, so multiply the volume just calculated by 1000 to convert it to litres.
8. To then see how fast that volume of water is moving, time a marker moving along it. Children to time how fast it takes for a twig to float from the starting point to the finishing point on the tape measure. They could record their measurement 3 times and find the average.
9. Children to work in groups. Assign roles – recorder, measurer, equipment manager, and calculator. Give the children the worksheet table to complete.

1 **Equipment manager** collects and drops twig at start.

2 **Measurer** times how long it takes.

3 **Recorder** to write down the results.

4 **Calculator** works out the flow rate.

_____ litres of water	Time in seconds for twig to flow between markers
1 <sup>st</sup> measurement	
2 <sup>nd</sup> measurement	
3 <sup>rd</sup> measurement	
Average time in seconds	

Calculate the flow rate by dividing the number of litres of water by the average time in seconds. This will tell you how many litres of water per second are flowing through the stream.

“Flow rate” = “number of litres of water” divided by “average time in seconds”

**Plenary:** share and discuss the results and their reliability. Ask the children what might make the stream flow more quickly or more slowly.

## Additional information for teachers



### **The Font at Mottisfont**

The Font or spring has been here since at least Saxon times and probably for a lot longer than that. In those days village moots or meetings were held here, and the combination of the words 'moot' and 'font' could have given rise to the name Mottisfont. It has never been known to run dry and was used as a source of water for several houses in the village as well as the walled garden until as recently as the 1940s. The water is filtered down through the chalk that ends on the east side of the valley into underground reservoirs. Mottisfont is on a bowl of silts, clays and sand, and there are springs up and down the valley.

A spring is a location where groundwater naturally emerges from the Earth's subsurface in a defined flow and in an amount large enough to form a pool or stream-like flow. Springs can discharge fresh groundwater either onto the ground surface like at Mottisfont or, directly into the beds of rivers or streams, or directly into the ocean below sea level. Springs form the headwaters of some streams. Some springs are thought to have healing properties.