Activity 4.6 Extraction of 'fibres' from stinging nettles

Purpose

- To extract 'commercially useful fibres' from a plant stem and investigate their properties.
- To develop certain experimental skills, namely planning an experiment that will produce appropriate results to test a hypothesis or idea, using apparatus and a procedure that is suitable to produce valid results.

Safety

Wear eye protection and gloves when handling the unretted nettles to avoid being stung.

Wash your hands after handling the soaked fibres.

Notes on the procedure

The method for extracting the fibres from mature nettle stems is given in the Student sheet. Students could do this themselves or it could be done in advance and the fibres provided already extracted from the stem. Note that retting is very smelly.

The aim of this core practical is for students to design and carry out an experiment to test the strength of extracted fibres. The Student sheet provides some points that they should bear in mind when planning and guides the student towards developing some ideas to investigate.

This can be a very straightforward experiment and although some might think it is KS3 level, bear in mind that biomechanical experiments can be fairly simple. The aim here is to get students to think carefully about planning an investigation. This highlights experimental skills and is good practice for the A2 coursework investigations.

In fact, producing good results from this activity is quite fiddly and requires a certain skill.

The fibres could be clamped at each end. A force is then applied in the centre either using suspended masses or a force meter. The mass or force required to break the fibres gives a measure of strength.

The stiffness of the fibre can also be investigated. Investigating strength and stiffness would extend this investigation for the more able student. The SAPS newsletter number 22, February 2002 describes testing of stiffness and strength. This is downloadable from their website; for details see the weblinks for this activity. However, there is no requirement to go into this amount of detail.

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General note

If the experiments planned by the students are undertaken they will probably ask for clamp stands, clamps, suspended mass carriers, masses, rulers and force meters. Bulldog clips can also be useful.

Requirements per student or group of students	Notes
Stems of mature stinging nettles or other plant stems	Retting plants reek. Consider ventilation when setting this up. When soaking the nettles, it is best to remove all the leaves and flowers – they form a slimy mass as they rot and make the smell of the rotting nettles even worse! Once the nettles have been soaked for about a week (this depends on temperature, in cooler weather it may take longer) all the soft tissue, both outside and inside the vascular bundles will wash away in water. The ring of vascular bundles may need to be opened to wash out the pith within. Other stems can be used for comparison. The easiest to extract and test are celery vascular bundles. These do not need retting. ***Safety*** *Wear eye protection and gauntlet gloves when 'harvesting' the nettles. Wear rubber gloves when immersing the nettles in water to avoid stings.*
Bucket or bowl	Deep enough to completely submerge the stems.
Rubber gloves	
Paper towels	
Eye protection	

Notes