

# Raising Levels of Interest in Plant Science.

## *Introduction*

My colleagues and I have grown increasingly aware that many of our A-level Biology students are un-inspired by the plant-based parts of the current A-level specification. Our department has tried to address this issue in several ways, including the incorporation of practical activities developed by SAPS into our schemes of work. These practicals are certainly engaging, really do work and encourage the students to think. Further opportunities for our department to address the problem of student negativity towards plant science arose when I attended the Gatsby Plants Undergraduate Summer School as a teacher delegate in 2010. ([http://www.gatsbyplants.leeds.ac.uk/ss\\_previous.html](http://www.gatsbyplants.leeds.ac.uk/ss_previous.html)) Our Biology department decided that my participation in this course could provide insight into contemporary plant science research and help with the development of teaching resources that could inspire and engage students with plant science. One of the resources that I developed, entitled *Investigating Leaf Surface Temperature*, has proved to be particularly useful in raising levels of interest in plant science to a very wide audience. The practical was developed with the support of SAPS (Science and Plants for Schools) and the National Science Learning Centre and used an Enthuse Award to purchase a class set of apparatus necessary for the practical.

## *Why develop this practical?*

The Gatsby Plants Summer School allowed the teacher delegates to participate in contemporary plant science practicals and lectures. All were thought-provoking and encouraged the review of current teaching practice. Inspired by the sessions, the teacher delegates were supported in producing a new teaching and learning resource relevant to current post-16 biology specifications that would engage the students with plant science and potentially motivate future plant scientists.

The practical that I developed was inspired by an ecophysiological investigation that the summer school students carried out into the responses of plants *in-situ* to changing environmental conditions. The students made observations and asked interesting questions, then gathered data to help them to answer the questions. I decided this approach would work well with post-16 students and set about devising a practical that would allow students to see for themselves that plants are living organisms that respond rapidly to changes in their environment.

## *The Practical*

The practical investigation that I devised is designed to be used as the opening lesson of the transport in plants section of the A-level specification. It aims to engage the students in an investigation-based introduction to this topic rather than one based on theoretical content. The simple investigation asks "What happens to the surface temperature of leaves if petroleum jelly is applied to their lower surfaces?" When the students have planned their investigation and used infrared thermometers to gather data to help them answer this question, the next question to pose is "What is the likely cause of this difference?" The practical, entitled *An Investigation into leaf surface temperature* can be found on the Science and Plants for Schools website at:

<http://www.saps.org.uk/secondary/teaching-resources/281-an-investigation-into-leaf-surface-temperature>

## *Establishing and sharing the practical with colleagues*



The investigation is now incorporated into the scheme of work for AQA AS Biology, BIOL2 at Sir John Deane's College. Its versatility has allowed it to be used in its original context and as part of a circus of plant physiology practicals. I and my colleagues use this practical to introduce plant physiology to our AS students, using supermarket Basil plants (because we begin teaching this section in the spring, before plant growth outside is well established) and a class set of infrared thermometers, paid for by the Enthuse award. The practical's appeal to the participants lies in the quite amazing speed of the response of the leaves to the application of the petroleum jelly to the underside of the leaf and in the use of cheap and simple infrared thermometers, instruments that most of our students haven't yet encountered in their scientific careers. The students enjoy using the infrared thermometers to rapidly generate large quantities of data that they can process, analyse and use to synthesise hypotheses. The short clip shows how the investigation is encouraging the students to think, display curiosity and hypothesise through the discussion and exchange of ideas. The practical allows the students insight into the rapid responses of plants to environmental changes, challenging the widely held view that plants "don't do anything".



*A-level Biology students investigate leaf surface temperature.*

<https://www.youtube.com/watch?v=mUAetAH93Cw>

The practical resource is also widely used by the SAPS team. I have demonstrated the practical with SAPS at the 2011 ASE meeting at Reading University and the 2012 NW England ASE meeting at MMU. I have also run lab sessions at three *Train the Trainer* events that SAPS have organised at the Sainsbury Plant Science Laboratory, Cambridge University (February 2012, July 2012, February 2013), where Secondary Biology PGCE course tutors have been introduced to the practical. The SAPS team also asked me if I would write a report of my experience of the Gatsby Plants Summer School and subsequent development of the leaf surface temperature investigation and submit it for publication. The article, entitled *Raising levels of student interest in less popular areas of the biology curriculum: can teacher CPD help?* was published in the journal *School Science Review*, volume 94 number 348 in March 2013

## *Conclusion*

Plant science is vitally important to all our futures and Biology teachers have a very important part to play in inspiring future generations of plant scientists. Developing the leaf surface temperature practical, establishing it within the curriculum at Sir John Deane's College and making full use of opportunities to share the potential of the investigation with other science teachers nationally has enabled my department to make progress in its aim to raise levels of interest in plant science among A-level Biology students.