

Exploring the wonders of the botanical world:

■ Rachel Simpson

A visit to Durham University's Botanic Garden inspired a group of future science subject leaders to develop the use of educational visits when planning science topics in primary education. It raised an important question: When is the best time for a field trip in a sequence of lessons?

'Bubblewrap!', 'Polystyrene!', 'Honeycomb!' These metaphors were spontaneously generated to describe the appearance of a water hyacinth's buoyancy structure, found in the hothouses at Durham University's Botanic Garden. However, the metaphors were not uttered by eager school pupils, but by my group of enthusiastic undergraduate Primary Education students, who are currently undertaking a module to develop their science leadership skills. We had ventured out of our University lecture room to consider how educational visits could help children to develop their understanding of plant life. Whilst studies of animals seem to spark an immediate interest in primary-aged pupils, we need to work harder to help children to engage with the amazing adaptations of plant species. With benefits of learning outside the classroom being well documented, and the raised profile of biology in the primary National Curriculum, our field trip was timely as we considered ways to stimulate children's curiosity about plant life.

In the hothouses, the first task was to identify potential hazards and consider ways to minimise risks when bringing a class of school pupils to the

Botanic Garden. Being in the environment enabled the students to realise the importance of carrying out a pre-visit inspection to conduct an accurate risk assessment. Children could be similarly involved with developing risk assessments by examining photographs of the venue before the visit. I have found that children quickly become experts at identifying potential risks, including ones that do not occur to adults, as they consider the forthcoming visit from their own viewpoints.

After compiling a risk assessment, the student group then stepped into the shoes of primary-aged children. During an initial exploration, they discovered the leaf-curling defence mechanism of *Mimosa pudica*, the water-repellent qualities of the water lotus leaf, and the intriguing markings of the Venus flytrap. This led to a discussion that linked the structure and function of plant parts, which is crucial to introducing children to plant adaptations and supporting with answers to their 'What...?', 'Why...?' and 'How...?' questions.

Further discussions and observations took place in the desert-like environment of the hothouses, where the incredible adaptations of a range of cacti were considered, including highly modified silver leaves, water-retaining stems and long shallow root systems. As we moved next door, the full sensory experience of a mist of rain introduced us to highly adapted rainforest plants, including vines that make use of their tall, sturdy companions for support and to reach sunlight, and a variety of plants with large leaves and waxy cuticles. However, the magnificent carnivorous pitcher plant took centre stage, as we considered its impressive leaves, modified into jug-like structures to lure and trap unsuspecting animals.



Finally, to apply their knowledge and understanding, the students sketched and annotated a 'super species' of plant, equipped with a variety of fantastic adaptations so ensuring that it would be perfectly suited to the conditions in either the desert or the rainforest.

Carefully planning a sequence of lessons to ensure that children will gradually build up their scientific understanding is important in any science topic. This visit stimulated an interesting debate about the positioning of a field trip: should it come at the beginning, middle or end of the topic? The question 'Where would you position an educational visit in a sequence of lessons about plants?' led to an interesting debate between the students.

maximising the potential of an educational visit

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Some students thought that the visit at the beginning of the topic would immediately engage children in the learning experience, by stimulating their interest and encouraging them to generate questions about intriguing, unfamiliar plants. These questions could be sorted into those that could be answered back in the classroom, and then introduce the strategies and resources to help children to investigate their questions; for example, research using secondary sources such as reference books or further first-hand observations of plant life. Weaving the questions into subsequent lessons would give the children some leadership of their learning experiences, as they would feel that their questions are valued. During the visit to the Botanic Garden, the children's observations could be recorded and photographs taken. These could be used for an interactive display, which could be added to as the learning progresses and the questions are answered.

Other students thought that the middle of the lesson sequence would be the ideal place for the visit. At this point, the children would have developed some understanding of the relationship between the structure and function of plant parts, possibly by examining plants found in their local environment. They could then link this knowledge to their new observations of adaptations of unfamiliar plants found in the desert and rainforest environments of the hothouses at the Botanic Garden. This would give them the opportunity to apply and make progress in their knowledge and understanding. Follow-up lessons in the classroom could consolidate these new ideas further and address questions raised during the educational visit.

However, a third group decided that the visit would be most appropriate at the end of the topic. At this point,



children could demonstrate and consolidate their knowledge and understanding by applying it to environments such as the desert and rainforest – the features of which would have already been studied in the classroom, using secondary sources. The visit to the Botanic Garden could be used as an assessment of the learning that had taken place during the plant topic. The students in favour of this approach acknowledged that the visit was likely to raise questions and therefore a final follow-up session in school would maximise the learning experience.

A final point that was raised in the discussion about where to place the visit was that this might be an opportunity for any misconceptions about plant life to be uncovered. The students considered the question: *Is it important for these misconceptions to be raised – and addressed – immediately?* Although this implies that a visit at the beginning of the topic would be most useful, as this would

reveal prior misconceptions, a trip in the middle of the lesson sequence could reveal any misconceptions that had developed as the topic progressed.

Whenever it takes place in a series of lessons exploring plant life, all students agreed that a visit to the Botanic Garden would be a highly stimulating, sensory experience for children, as it had been for them. It would enable children to develop their understanding of plant adaptations through first-hand observations and raise their curiosity as they experience unfamiliar species. As future science leaders, this field trip gave the students an opportunity to explore the wonders of species adaptation, and appreciate that this extends beyond animals and into the magnificent plant kingdom.

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