

# BEYOND THE CLASSROOM – Outdoor learning and science education



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This quote from the introduction of Charles Darwin's "Origin of Species" is perhaps the ultimate argument for outdoor science. If we examine the process by which Darwin came by the theory of evolution by natural selection, there is a fascinating process in action. During his employment as a naturalist on the "Beagle", Darwin made numerous detailed observations which he recorded diligently, collecting specimens to help him to continue the work when back in England. Using the results from his "outdoor science" Darwin developed the elegant theory of evolution by natural selection which is the central plank of modern biology. The nature of science is precisely that process – of making observations of the real world and developing theories which fit the observations and allow predictions to be made and the theories further tested.

If we look at the development of scientific theories in this way it is easy to make the argument for teaching science using the outdoors. In teaching young people to understand and enjoy science, the world beyond the classroom is essential. If we limit a student's experience of science

*"When on board HMS Beagle, as naturalist, I was much struck with certain facts in the distribution of the inhabitants of South America, and in the geological relations of the present to the past inhabitants of that continent. These facts seemed to me to throw some light on the origin of species -- that mystery of mysteries, as it has been called by one of our greatest philosophers."*

to the classroom, we lose the connection with the real world and the opportunity for young people to emulate Darwin in observing in nature what can be described by scientific theory and explanation.

Another example of outdoor science in action is my own observation of the solar eclipse that was total in Cornwall in August 1999. I was actually on holiday in Italy, and unlike the weather in Cornwall on that day it was bright and sunny. At the time of the eclipse, which was partial in that country, it could be clearly observed by looking at the image of dappled sunlight through the leaves on the trees as it fell on the paving surrounding the pool. Each image had an eclipse shaped "bite" out of the circle of the sun's image, thus demonstrating that normally dappled sunlight is made up of many images of the sun, and that when there is an eclipse, this image changes. I found that observation incredibly exciting as it brought the scientific explanation of the eclipse to life as well as demonstrating the principle of the camera obscura.

So, if we deny young people the opportunity of developing an interest in science through relating their classroom based studies to the real world, we do them a great disservice. As illustrated above with an example from physics, many aspects of science can be usefully demonstrated by

experiences beyond the classroom and it requires just a little imagination and a willing teacher to bring science alive in this way. The full residential field trip is at one end of the spectrum of outdoor science experiences and this has additional social benefits as well as the opportunity to carry out longer experiments, but outdoor science can also be much more informally organised to very good effect.

There are barriers, however, to using the outdoors even in a low key way. These are less marked in primary schools where it is relatively easy to use the school grounds (whether rural or urban) effectively to do science compared to secondary schools. Primary schools can be more flexible about their curriculum as the exit of one class for an hour doesn't disrupt the entire school timetable. Secondary school teachers may consider that outdoor science involves onerous arrangements for a residential field trip but a scientific principle can be investigated or demonstrated with minimal disruption to the school day with some creative thinking and forward planning.

The recent report on Outdoor Science produced by the Association for Science Education's Outdoor Science Working Group makes a number of recommendations which highlight the benefits of using the outdoors to complement classroom science. Among these

are suggestions which would help teachers at the beginning of their careers to become confident in using the outdoors for teaching science. Mainstreaming outdoor science in this way, so that it becomes part of a science teacher's repertoire, alongside practical experiments in the laboratory, will help students to relate the science they learn about in the lab or the lesson to science in the real world. This will help them to be excited and engaged with science and make them more likely to continue their studies.

The pressures on initial teacher education and professional development, not to mention school budgets and technical support could, in these straitened times, put pressure on teachers and schools such that the use of the outdoors in science for regular observations and experiments or in the context of a longer field trip, reduces. This would be very unfortunate for the development of young people's learning in science.

## References

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