Foreword

Welcome to this special issue of *School Science Review* on science education and nature.

For many people, one of the silver linings of the past year has been the opportunity to engage with the natural world in their local area. Visits to shops and restaurants have been replaced with walks around parks and woodlands, while stories have hit the news of wildlife benefiting from quieter towns and roads, including wild goats roaming Llandudno and deer walking around East London. Studies such as Natural England's October 2020 *People and Nature Survey* of children have found that the nation's gardens, parks, woodlands and rivers have played a significant role in supporting people's mental health during the coronavirus pandemic, with eight out of ten children reporting that being in nature makes them very happy.

Unfortunately, these benefits have not been realised for everyone, and clear inequalities exist, with the same survey finding that 73% of children from low-income households had actually spent less time outdoors during the pandemic, compared to 57% from households with an annual income above £17,000. This disparity has also been reflected in ASE's own survey of practical science during the first lockdown (ASE, 2020a), which found that the proportion of secondary schools and colleges that had carried out fieldwork over the lockdown period, or planned to do so when schools returned in Autumn 2020, was lower in disadvantaged areas and in schools graded as 'requires improvement' by Ofsted. This finding led to our letter to *The Times* in November 2020 (ASE, 2020b), lending our support for the new Natural History GCSE proposed by OCR, but noting the challenge of ensuring that this proposed new qualification meets the aspiration of being available to all students and not just a privileged few.

All of this points to a greater need for all young people to have opportunities to engage with nature, a challenge that has long been recognised by the ASE in our commitment to outdoor learning evidenced, for example, through our popular Great Bug Hunt competition at primary level and *Best Practice Guidance* on teaching about the environment and sustainability. Indeed, the ASE's new three-year strategy highlights environmental sustainability as one of the key challenges for our time, reflecting young people's needs as global citizens and recognising the role that science education can play in understanding the issues and developing solutions.

In this issue of *SSR*, you will find a wealth of support, guidance and inspiration on how to engage students with nature. As a biologist and ecologist by background, this is certainly a topic close to my heart. I hope you enjoy reading it.

References

ASE (2020a) *New ASE report highlights concerns over practical science post lockdown* (news item). Available at: www.ase.org.uk/news/new-ase-report-highlights-concerns-over-practical-science-post-lockdown.

ASE (2020b) *ASE lends support to principles behind proposed Natural History GCSE* (news item). Available at: www.ase.org.uk/news/ase-lends-support-principles-behind-proposed-natural-history-gcse.

Natural England (2020) *The People and Nature Survey for England: Child Data Wave 1*. Available at: www.gov.uk/government/statistics/the-people-and-nature-survey-for-england-child-data-wave-1-experimental-statistics.

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Editorial

Marcus Grace and Janice Griffiths

The idea for this 'nature-themed' issue of *SSR* was sparked back in the summer of 2020 at a time when the public were so obviously keen to engage with nature and the outdoors as we were coming out of a lockdown period caused by the COVID-19 pandemic. The temporary closure of schools and colleges had flagged up the need for resources that could be adapted for students now being home-schooled, such as the ASE Primary Remote Learning Resources (www.ase.org.uk/resources/remote-learning-resources-primary). This closure also stalled our usual outdoor fieldwork sessions involving our trainee science teachers and pupils from local Southampton schools. However, we recognised the need to continue to promote learning outdoors and make the link with the physical and psychological benefits of being 'in nature', whether through a formal structured environment (such as school) or in an informal way.

We looked to the science education community to provide a broad range of articles for this nature-themed issue. They have provided overarching rationales for promoting connection and engagement with nature

through science education. They have identified the potential danger of losing some of the excellent work already happening in schools and colleges as a result of the long period of home schooling and changes in practice. And they have provided some examples of interventions in initial teacher education and school settings, which provide ideas for integrating nature within the science curriculum.

'Nature' is of course a wide-ranging topic, and we have collected together in this issue an appropriately wide selection of articles. Despite this, we hope you will see that there are many connections and commonalities between them.

Liz Lakin offers us a 'journey through sustainability' and relates this to the importance of biodiversity. It is interesting to view sustainability through the lens of various groups, including teachers and professional environmentalists, and to challenge our own ideas of sustainability.

Marcus Grace, Janice Griffiths and Carys Hughes consider how we can develop 'nature-literate' students who can be more actively engaged with the natural world around them. They also challenge the notion that cognitive aspects of nature engagement are less important than the affective elements, and argue that knowledge and values are both important in nature connectedness.

Melissa Glackin and Kate Greer present us with an up-to-date list of reasons to support teachers in creating a case for residential fieldwork, which was derived from part of a project examining 'learning journeys' of inner-urban school visits to residential field centres in England. They draw from the perspectives of students and teachers in light of the changes to A-level biology assessment and argue that, as post-pandemic resourcing constraints threaten fieldwork, residential visits are more valuable than ever.

Deborah Harvey, Louise Montgomery and Rachel White describe how a one-off intervention involving nature in school grounds boosts children's mood and biodiversity knowledge, and how just an hour a week can also improve their mental well-being. The authors argue that any school curriculum should have room for 'an hour', and the dual benefit to mental health and the environment will be critical for the future of both.

James Pearce-Higgins gives us examples of citizen science projects that can be carried out in schools and colleges, and details some of the impacts of such projects. He suggests that individual projects tailored for schools can be highly effective, but bespoke projects can be difficult to sustain. Teachers may find equal value through taking advantage of existing long-term monitoring schemes, and some schemes may also provide access to long-term data that schools can use for their own teaching purposes.

Yoko Yamamoto brings an international perspective with the idea of 'forest bathing', introducing the perspective of deep ecology, which reflects the traditional Japanese view of nature. This approach was shown to positively affect students' environmental ethics and physical and mental health.

Richard Dawson and Lewis Winks take us on a tour of 3.8 billion years of evolution, and consider how biomimicry can help us to learn from nature's forms, patterns and processes to design a more sustainable world.

Andrew Chandler-Grevatt introduces us to a case study of a 'Moss Safari' activity designed for secondary trainee teachers during lockdown. The online activity had a positive impact, with 97% of participants claiming it enhanced their learning about using a microscope, about using moss as a teaching resource, and about the biodiversity of life in moss. Consider if you could use this activity with your students!

Matt and Sam Weston complete our selection by providing a personal, teacher-led perspective on how learning outside the classroom can impact on otherwise disengaged students. They discuss various examples of activities linked to Forest School and bushcraft approaches, and how teachers can link these to science learning.

As set out in the ASE *Best Practice Guidance on Outdoor Learning* (www.ase.org.uk/download/file/fid/41415), '*Best practice should seek to include… appropriate consideration for health and safety, but this should not be used to prohibit regular use of the outdoor learning environment*'. Accordingly, all activities mentioned in these articles must be fully risk-assessed using guidance from appropriate organisations such as Chapters 6 and 9 of the ASE's publication *Be Safe!* (www.ase.org.uk/bookshop), CLEAPSS (www.cleapss.org.uk), SSERC (www.sserc.org.uk), the Design and Technology Association (www.data.org.uk), schools and other relevant organisations.

We hope that this array of articles has something of interest for everyone. It is certainly timely: Ofsted's recent review of science (Ofsted, 2021) includes both laboratory and fieldwork as features of high-quality science education that '*should take pupils beyond their everyday experiences to develop a sense of wonder and curiosity about the material world*'.

Reference

Ofsted (2021) *Research Review Series: Science*. Available at: www.gov.uk/government/publications/research-review-series-science/research-review-series-science.

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