ASEConf2022 – a celebration: Part 2

In the February 2022 issue of EiS, we featured short accounts of some of the sessions at the 2022 online ASE Annual Conference. Please find some more write-ups from the event below:

Exploring the key elements that make an aspirational curriculum

Andy Chandler-Grevatt

The ASE Annual Conference always attracts teachers and educators who are thinkers and the session that I did at ASEConf2022 was geared to such an audience. Curriculum thinking has developed significantly over the past decade. As the Curriculum Editor for Oxford University Press's *Activate*, I explained to delegates how we had developed the Oxford Smart Curriculum and reviewed our science curriculum.

I introduced the features of curriculum thinking, including coherence and sequencing, understanding knowledge, learning and progression, and the idea of a curriculum narrative. I then explored with delegates what would make a curriculum aspirational. This led to me sharing the Oxford Smart Curriculum, which has six pillars underpinned by research evidence and informed by data. These are:

- Awe and wonder
- Coherence
- High expectations
- Responsive teaching and learning
- Learner identity
- Metacognitive learning

I then explained how I had reviewed the existing *Activate* science curriculum. From the six pillars, I did a detailed analysis of the key concepts, how they developed over Key Stage 3 (ages 11-14), looked for gaps, unnecessary repetition and opportunities for exemplifying coherence within and between the sciences and other subjects. I showed extracts of complex spreadsheets illustrating how this process was carried out.

We discussed the idea of 'curriculum narratives' and how they are intended to support teachers to teach, built upon fundamental concepts, identifying and challenging common misconceptions, recognising the complete journey through the key stages. We talked about how we could support all learners to see how science is relevant to them, in society and as part of careers, and how to ensure that all learners can identify themselves in science through inclusive and diverse representation.

This session helped teachers to discuss curriculum thinking beyond just sequencing and coherence and to consider what makes a curriculum inspirational for their students, who will either use science in their lives and work or become scientists themselves. For more information, please visit: https://fdslive.oup.com/www.oup.com/oxed/secondary/Smart/Smart_AQA_Curriculum_Paper.pdf?region=uk

Moss Safari

Andy Chandler-Grevatt

Conference delegates joined Andy on a fascinating live Moss Safari. Armed with just a microscope, a spotters' sheet of the 'Big Five' and the water squeezed from some moss, we spent 30 minutes exploring the microscopic world. Not only did we see nematodes and rotifers feeding, we saw diatoms

gliding about as well as several single-celled organisms. We then discussed our findings and the applications to science education.

Moss Safari is suitable for all ages and the narration can be pitched to the needs and capabilities of the audience. For example, primary school children can consider microhabitats, adaptations for feeding and moving and simple food chains. Secondary school students can observe the internal body systems of the multicellular organisms, the diverse structures of single cellular organisms and adaptations to extreme environments. A-level students can compare the body systems of the multicellular organisms and apply

biochemistry to their adaptations for freezing and dehydration.

The excitement and enthusiasm of the delegates matched that of the science trainee teachers and Year 8 (age 13) students with whom Andy has worked. One of the main aspects of this is 'not knowing (yet)'. The 'Big Five' spotters' sheet helps give (ahem) focus on what to look for. Seeing the organisms for the first time raises curiosity and questions. This leads to wanting to know what they are, what they eat, how they move, and how they survive in the extreme habitat of moss. In addition, there is much that science doesn't yet know about the organisms that we see in moss, with tardigrades and nematodes being model organisms for research.

We also came across a single blue microplastic fibre during our expedition. This illustrated how humans impact all environments, from a drop of water from moss to the vast oceans. Studying the very small has lessons that can be applied to the whole planet.

To do your own Moss Safari, see Andy's blog for details and downloadable resources: https://mosssafari.wordpress.com/

Look out for a Moss Safari centrefold feature in the June issue of the new SSR in Practice journal!

Dr. Andy Chandler-Grevatt is Curriculum Editor for Oxford University, Senior Lecturer at the University of Brighton and Chair of the ASE 11-19 Committee.

Practical primary science ideas with limited resources

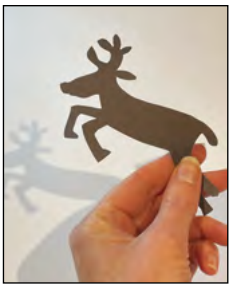
Jo Montgomery

The pandemic has taught us that science is not only important and everywhere around us, but that you can also teach quality practical science at home, in school, in bubbles, in between, online, in-person, close-up and from a distance – and that you can do it with very few resources! In my session for the 2022 ASE Annual Conference, I presented a whole host of fun and engaging, hands-on ideas using easy-to-find household items.

You can encourage children's curiosity, questioning, awe and wonder, working scientifically and enquiry skills, using basic resources. The session took participants through 25 easy investigations using paper – there are many more – and there's an accompanying blog post here: https://drjosciencesolutions.co.uk/2021/05/25/science-investigations-with-only-a-piece-of-paper/

As this hands-on workshop pivoted to online, I made the session even more accessible to all by reducing the resources required further – to little more than a sheet of paper! I illustrated and explained ways in which we can use a piece of paper to investigate and explore different areas of the curriculum, including:

Light



How to use shadow puppets when teaching about light, and plotting the movement, direction, shape and size of shadows to help explain night and day and the rotation of the Earth. You can also make a pinhole camera or project models of constellations. Explore optical illusions with thaumatropes, and refraction of light through water, glass and other materials causing a perceived change of direction.

Properties of materials, absorbency, capillary action and water transport in plants: through paper opening flowers, capillary caterpillars, walking rainbows and even separation of materials using chromatography, children can explore absorption and capillary action. There are many applications for these investigations, including water transport in plants, separation and discovering clues in a crime scene investigation.

Movement, forces and electricity

With a balloon and paper shapes, children can explore static electricity and the effect of charge. By folding shapes and bringing in some cross-curricular DT and engineering, children can create and investigate relative strength, comparing different types of paper and their ability to hold mass: which shapes are best for supporting structures and building bridges? Can they create a horse that 'walks' down a slope, or a caterpillar that moves with forced movement of air? What effect does changing the wing shape or size have on paper planes, hoop gliders or adding aerodynamic nose cones to rockets? This can then be applied to parachutes, or paper spinners and seed dispersal.

By slowing down and keeping things simple, it allows children to focus on developing skills and to wonder.

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