

Moving from 'wow!' to 'why?'

Danielle Hearne from the Zoological Society of London finds the wow in the simplest activities



Figure 1 The wow of what once lived!

At ZSL (Zoological Society of London) our purpose is to inform, inspire and empower people to stop wild animals going extinct. An essential element of our education sessions is hands-on activities to engage and inspire children with the natural world (Figure 1). In recent years, there has been a push to increase practical science for primary pupils, and changes to the National Curriculum in England in 2014 placed a renewed emphasis on children working scientifically while developing a range of science enquiry skills.

In her keynote speech at the January 2018 Association for Science Education Annual Conference, Amanda Spielman, Ofsted Chief Inspector, stated 'We should be uncomfortable with the idea of practical science being mainly about motivation. Yes, children should find experiments fun and motivating, but making sure children finish practical tasks having learned something or having consolidated what they have just been taught, is most important.' Practical work should excite and inspire; these 'wow' moments are repeatedly cited by children as the most memorable and often initiate a lifelong love of science. However,

in order to enthuse and equip children to follow careers in science, an understanding of the underpinning science knowledge, gaining transferable skills and highlighting the relevance of the science to their own lives must be intended outcomes.

Finding the wow in the simple

Great wonderment and knowledge can be provided through simple activities. At ZSL, being hands on with an amazing array of specimens from the natural world (loaned to us by HM Revenue and Customs) never fails to amaze children and bring learning to life. Touching a real tiger skin, elephant tooth or whale vertebrae provides just as big a wow, if not bigger, than any chemical reaction! Back in your classrooms you may not have an elephant tooth, but the look of wonder on a child's face from examining items they have found under a microscope (such as soil, seeds, flowers, feathers or empty snail shells) is priceless – sand is a super example. Children can then apply enquiry skills such as observation and classification while consolidating knowledge of topics ranging from materials through to animals including humans.

Allowing enough time to understand children's preconceptions and to challenge misconceptions is key for forming solid science knowledge. A wow in our habitats and adaptation sessions might be the fact that an okapi can retract its eyeballs into its head to protect them in the dense rainforest. Children often have the misconception that animals adapt in response to their environment, but they need to understand that the animals with the adaptation had an advantage over those that didn't, so were more likely to live longer and to reproduce. Some of their offspring will inherit the same adaptation and will then have a better chance of survival than an animal without it. Using questioning and discussion to determine and dispel these misconceptions will enhance and extend children's understanding.

Time to reflect

Providing enough time and support for children to form conclusions is essential.



Figure 2 Equipping them with the knowledge and enquiry skills to become independent investigators

Have you dedicated a whole lesson to concluding? At ZSL, children can examine secondary research from our worldwide scientists, such as the effects of climate change on African hunting dog populations, collect their own data through a giraffe behaviour study or even use information learned about animal classification to examine and identify objects from the natural world (Figure 1).

In your classroom you could use data from another class's investigation or a fabricated set of data. Starting with results allows children to practise interpreting data and consider what conclusions can be drawn and how this relates back to an original investigation question. It can support children in spotting anomalies in data and suggesting why these might occur.

Questioning data, and knowing that there are sometimes exceptions to our prior knowledge, ultimately creates better scientists. Including some 'curve balls' in your classroom learning will help children develop these skills. For example, children learn that mammals usually give birth to live young; however, the echidna and platypus both lay eggs. Using activities like 'odd one out', where children explain why they believe one of four items (such as animals, objects or statements) is the odd one out, can help to draw out this understanding.

Inspiring for the future

As Aristotle (384–322 BC) once said 'Educating the mind without educating the heart is no education at all'. However, ensuring that children make the journey from 'wow' to 'why', by equipping them with the knowledge and enquiry skills to become independent investigators, is essential in harnessing that early inspiration and developing this through secondary school and onto STEM-related careers.

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