Library of experiences

Ally Bull

This paper provides more detail and practical examples of what is meant by a "library of experiences" in the paper *Primary science education for the 21st century: How, what, why?*

Building a “library of experiences” in our opinion should be a main focus of primary science education. Providing a range of activities for students is central to building this library of experiences but the talk that accompanies the activities is also critical. In this paper, we list a range of activities that could usefully contribute to this “library of experiences” before suggesting how these activities could be focused to maximise student learning. Thinking up activities is “business as usual” for teachers—the more challenging bit is ensuring that students’ attention is directed in ways that lay the foundations for future learning in science.

Useful classroom activities include: growing seeds, sprouting kumara or potatoes; setting up a freshwater aquarium; incubating eggs; watching caterpillars turn into butterflies; looking after classroom pets; setting up ant farms; collecting leaves, shells, rocks, seeds, bark rubbings etc.; exploring simple electric circuits; playing with magnets; observing ice balloons; designing paper planes and parachutes; rolling marbles down ramps and so on. Outside activities would include: playing shadow tag and measuring shadows at different times of the day (or year); developing school gardens (vegetable garden, butterfly garden etc); establishing worm farms; building bird tables and feeders and recording the birds that come and what they eat; making weather stations; adopting a local beach, waterway or park; participating in field trips etc. Virtual field trips e.g. LEARNZ; taking part in surveys such as garden birds or monarch butterfly tracking; getting involved with the Kiwi Conservation Club, BNZ Save the Kiwi trust, Yellow-Eyed Penguin Trust, or the Environmental Monitoring and Action Project (EMAP) etc are other activities that are already familiar to many teachers.

If these activities are really to realise their potential in laying the foundations for future learning in science, teachers need to be clear about the purpose of the activities they are setting up. Is the main purpose for example to build language, develop observation skills, provide background knowledge on a range of topics, or promote curiosity, or a combination of these? The teachers’ role is to structure these experiences and direct students’ attention in line with the purposes they have in mind. We suggest teachers could usefully direct students’ attention to the following ideas:

- *Patterns, similarity and diversity*: Observed patterns in nature guide organization and classification, and prompt questions about relationships and causes underlying them.

- *Cause and effect: mechanism and prediction:* Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science.[1]

Whatever the activity, the teacher can draw students' attention to these ideas by asking questions such as "Where have you seen something like this before?" "How is ….the same or different from…?" "Why do you think that happens?" "What might that be for?"

A simple activity such as going outside and picking up autumn leaves from the ground, and talking about them could stimulate both interest and language development in young children. If the teacher draws students' attention to what is the same and what is different about the leaves and encourages students to group them according to their characteristics, students have the opportunity to start talking and thinking about how patterns in nature guide organisation and classification. If the teacher is aware that this idea is important in science she can then draw students' attention to it again later in other contexts. A collection of autumn leaves could well stimulate a class discussion about why some trees' leaves change colour in autumn (cause and effect). This question Karen Gallas[2] maintains is one of the most successful in promoting "science talks" with young students.

We do not think that school science necessarily has to be a whole "unit" of work. There is a place for "one off" activities as well as involvement in on-going projects.

To sum up then, if teachers are aware of the importance of patterns and relationships (particularly those involving causes and effect), then they could usefully focus many familiar activities so that they better contribute to students developing a sense of what science is about. This approach does not necessarily require teachers to have detailed science content knowledge and it also provides opportunities for teachers to make the most of the opportunities they do have to include science into a crowded curriculum. We think this is a pragmatic way to build primary teachers' confidence and enhance the science learning opportunities for their students.

---

[1] These are the first two of the seven concepts considered central to science by the National Research Council (NRC) on K-12 science education in US schools. National Research Council. (2010). *A framework for science education: Preliminary public draft.* Available at http://www.aapt.org/Resources/upload/Draft-Framework-Science-Education.pdf

[2] Gallas, K. (1995). Talking their way into science: Hearing children's questions and theories, responding with curricula. New York: Teachers College Press.