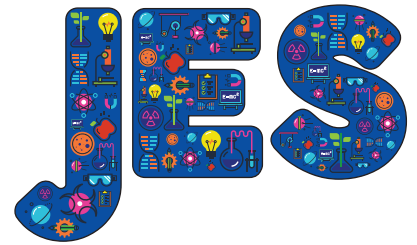


Science Days leading to Science Weeks: Why have them?



● Michele Grimshaw ● Nina Spilsbury ● Peter Sainsbury ● Paul Tyler
● Kathy G. Schofield ● Naomi K.R. Shallcross ● Dudley E. Shallcross

Abstract

Dedicated days to science, extending to week-long events (Science Weeks) can have myriad positive impacts on science teaching. A short review of the literature concerning days or longer time dedicated to science is provided, followed by some short case studies of work generated by primary school teachers. The aim of this article is to start to marry practice-based work in schools with the wider research base. Here, we look at the impact of Science Days/Weeks on: community links, whole school teaching, changing the attitudes towards science and the myriad experiences that science can afford.

Introduction

In the second of this new style of paper for *JES*, we are seeking to take teachers' experiences in school, through case studies, action research etc. and set them in the context of the wider research literature. There is no attempt to make the teachers' contributions definitive (i.e. these are teachers' reflections), but instead we link themes that emerge from their experiences with known research in the field. In this article, we will focus on the use of dedicated Science Days/Weeks. In the UK there is a national Science Week (<https://www.britishtscienceweek.org/>) in March each year, which is a focal point for science activities. However, in primary schools it can be difficult to bring in science-based organisations and people in that particular week, as there are so many groups wanting to have a visit. Other activities on a regional and national basis exist, such as the Great Science Share (<https://www.greatscienceshare.org/>), which is a day of science in June each year. However, these activities can be run at any time of the year to suit the school and there are many benefits to running a Science Day/Week at a primary school, including:

- A day through to a week dedicated to science raises its profile in the school and the community, and can connect the school with its neighbourhood and further afield (e.g. Dillon *et al*, 2005);
- Depending on the type of dedicated science time, a dedicated science experience may bring local and national experts from different areas of science, engineering and medicine into the school to share their experiences and expertise (e.g. Stem Ambassadors in the UK: <https://www.stem.org.uk/stem-ambassadors>). These experts may be parents or other relatives of schoolchildren and might increase investment in the school or represent local or national organisations that may become long-term supporters of the school (e.g. Harrison *et al*, 2009);
- If there is a show-and-tell evening or event, this can bring in members of the family (e.g. fathers) who may not often come into the school (e.g. Watts, 2001);
- Teachers have an opportunity to work together on projects and planning in science and, in many cases, activities can cut across year groups;
- Science Days/Weeks can promote and share best practice in teaching across the school, not only in science;
- Local themes and focal points can be used, as well as national and international events. It has been noted that primary school children show knowledge and skills that are not always displayed in a classroom, when they have the opportunity to work as they do out of school and on topics of interest to them (e.g. Masingila *et al*, 2011; Morgan *et al*, 2017);
- Children can be encouraged to share their cultural variations around a science theme (e.g. Grimshaw *et al*, 2019); and



- These dedicated times engage boys and girls and, as we shall see (Thompson, 2014), are particularly good for children from minority groups. If there is no formal assessment, these times can allow children and teachers to engage, explore and learn in different ways.

Case studies

In this section, Fellows of the PSTT College (Shallcross *et al*, 2015) reflect on their experiences of dedicated Science Days/Weeks.

Case Study 1: Evolution of an annual Science Day

It is important to note that a Science Week is not the necessary first objective: establishing a Science Day may be a sensible starting point. A Fellow reflects on being a newly appointed Science Subject Leader:

In my first year, I wanted to engage the staff in practical science. I emptied the resources cupboard, planned activities for all year groups, enlisted the Year 6 (age 11) pupils to run stalls and timetabled each class with their teachers to have time in the hall to discover and explore what was available to use for practical science. I split the day into two parts suitable for each key stage, so the teachers were in no doubt as to what they could use for future planning in their own classrooms. This worked well, as teachers were unaware of the resources and their capacity to be used for practical science.

The following year, I moved the experience on further by swapping classes with the Year 6 teacher, one afternoon a week for 4 weeks after SATs, to allow the Year 6 pupils to plan their own stalls. We began the day with an assembly, inviting Governors and parents to come along and get involved, and this was planned and led by the Year 6 pupils. Once again, pupils visited the stalls as a class and experienced age-appropriate activities. This increased the confidence of the Year 6 pupils in their ability to plan and execute practical investigations.

The next year, we used the same format as the previous one, but this time we started with the theme of 'Water' to give the Year 6 pupils a greater challenge and encourage them not to replicate previous activities. Practical Action resources

helped the pupils to plan their assembly, setting the scene for the importance of water across the world (see <https://practicalaction.org/schools/search/Water/tags:ks1,ks2>). This approach to developing a Science Day gradually over time with established staff in a relatively small school worked well. The Day became embedded in the school calendar and each year staff became more and more involved, until the whole day was given over to science and each class produced displays related to the theme chosen by the Year 6 pupils for that particular year. We have run the day at the end of the spring term instead of during the UK National Science Week in March, so that we could utilise the outdoors (e.g. Grimshaw *et al*, 2019).

Case Study 2: Ethnicising Science Weeks

Organising a Science Week with a different theme each year is always a challenge. It must tick many boxes, such as not being too onerous for an overworked staff, and be engaging for our pupils, and so on. For our school, where most children have an Asian heritage background with varying degrees of spoken and written English, finding a topic that would encourage parents and carers to come into school and take an active role in the science curriculum was a challenge.

After a science lesson one day, I was commending one child who had been particularly on task and was able to help his/her group reach an understanding about the scientific concepts involved. When I told the child that s/he was definitely a scientist of the future, s/he said, 'Muslim people don't do science'. Eager to disprove this, I set about looking on the Internet for examples of Muslim scientists. The 1001 Inventions organisation is an international science and cultural heritage organisation, which raises awareness of the creative golden age of Muslim civilisation that stretched from Spain to China (<http://www.1001inventions.com/>). There had been an exhibition in London at the Science Museum in 2010 and this has since toured the world.

The following areas formed the basis of the exhibits and interactive experiments (see Figure 1):

Home: The thousand year-old inventions that still shape everyday life;

Market: How influential ideas spread through travel and trade;



School: Learning, libraries and their links with the past;

Hospital: How ancient approaches to health have influenced today's medicine;

Town: Why East and West share so much architectural heritage;

World: The explorers of a thousand years ago; and Universe: How ancient astronomers expanded our view of the universe.

The 1001 Inventions website provides a wealth of downloadable resources and information about different scientists. Each class had a practical task to complete and had to make an information board about the product and the scientist who had influenced its development.

One of the main features of the 1001 Exhibition was a giant model of the clock built by the engineer Al-Jazari over 800 years ago. This automatic Elephant clock used water technology – a great example of the Muslim origins of modern automation and robotics. It also celebrated the diversity of contributions to scientific discovery by having, as part of its design, the use of Greek scientific principles, an Indian timekeeping device, an Indian elephant, an Egyptian phoenix, Arab mechanical 'men', a Persian carpet and Chinese dragons.

The whole school was set the task of making a model of the clock as a competition to be completed at home. The week started off with a whole school assembly showing the film that accompanied the exhibition, *The Library of Secrets*. This made a big impact on the pupils and created a sense of excitement about the week ahead. We also set a quiz based on the scientists upon whom we were focusing to send home for families to research together.

At the end of the week, we had a family celebration day (see Figure 2), where each class showcased their activity and their display board to explain their task. There were mehndi and calligraphy workshops, with contributions from a local cosmetics company who came and made bath bombs with the parents and children. The local college also sent some of their health and beauty students to give manicures. The event finished with a celebratory meal cooked by some of the parents.

Figure 1: A Science Week based on the 1001 Inventions project, highlighting Muslim contributions to science.



The impact on pupils and parents was quite extraordinary. Pupils spoke with pride about the discoveries of the scientists they had researched and science as a career seemed to be more of an option. Parental feedback was so positive, breaking down barriers for some parents who hadn't really engaged with school events before. We also had a high percentage of female relatives attending. Recognising the impact of Muslim culture on science is something that has been lost in translation over the years. The 1001 Inventions resources allow these discoveries to be celebrated and given the recognition they deserve. Therefore, it is possible to run ethnicised Science Weeks (Days), and the impact on the whole school and local stakeholders is marked.



Figure 2: An exhibit from the celebration evening from the Science Week based on the 1001 Inventions project.



Case study 3: Tapping into the science within a school community

Like many schools, our Science Weeks are valued as an integral part of the school's calendar and we have been running them for many years. Why do we continue to do so when the curriculum is so full, and time is of a premium? How does this one week become more than just one week only, and not be viewed as a box-ticking exercise but, instead, as a key event that has lasting impact?

Put simply, Science Weeks are enormously engaging, raise the profile of the subject well beyond their duration and can affect more than the immediate school environment. One approach that illustrates these benefits is best termed 'Tapping into the science within the school community'. We often, quite rightly, identify the need to enrich children's experience and knowledge of science; the term 'science capital' (e.g. Archer *et al*, 2015) has become a key development focus in schools. Science Weeks offer a superb collaborative opportunity to find and celebrate the science that one's school community has to offer – a 'Whole School Science Capital' resource. Writing and talking to parents and the school community well in advance, and asking them to be part of Science Week, has led to some amazing contributions. Over the years our school community has provided our children with:

- ❑ A tank/artillery gun, complete with 20' barrel and caterpillar tracks;
- ❑ A scale model steam train, the track extending around the playground;
- ❑ Large scale ropes and pulleys used by small groups of children to pull a 4x4 vehicle;
- ❑ Local farmers providing livestock, including hens' eggs and chicks, sheep and horses;
- ❑ A helicopter landing on the school playing field (one very cold winter day, one very cold Ofsted Inspector);
- ❑ Local hospital surgical teams enhancing hygiene and prevention of infections;
- ❑ Sharing a parent's Art skills by linking between Art and science through exploring light and shadow;
- ❑ Revealing the strength of paper in a workshop on engineering by bringing in a section of a Chinook's rotor blade (inside, they are made of paper);

- ❑ A genuine Enigma machine, upon which we were all allowed to make our own coded messages; and
- ❑ The landing of a group of parachutists on the field.

Some of the most rewarding outcomes have been hearing comments such as 'Wow, is that your dad?' and 'I didn't know your mum did that!' as well as new volunteers, seeing the variety and encouraged by the excitement, emerging to offer input into the curriculum at other stages of the year.

Although we may be very fortunate, we recognise that each school's context is different. However, by asking your school and wider community and giving those in it encouragement and offering support, you can tap into the science on your doorstep, with some outstanding results.

Summary

Peterson and Treagust (1998) and other researchers have noted the value of problem-based learning approaches to science teaching at primary school in general. Themes and challenges (as noted previously) are a great way to scaffold a Science Day through to a Science Week. There are myriad potential themes and challenges that can be used. In addition, such days and weeks:

- ❑ Raise awareness of science within the school community and value children's backgrounds and connections;
- ❑ Recognise and encourage parental and community involvement, which can be extended or built upon; and
- ❑ Reinforce that science is everywhere, and the variety of societal links, both explicit and implicit.

In this paper, we have highlighted some of the benefits of dedicated Science Days through to Science Weeks. We would welcome your comments on this article. If you are a primary school teacher and have Science Day/Week experiences that you would like to share, we plan to write a follow-up paper in a future edition, which collates these reflections and comments. If you want to run a Day or Week, or if you disagree with elements of the article, we would like to hear from you too. Please e-mail [PSTT at info@pstt.org.uk](mailto:info@pstt.org.uk)



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Michele Grimshaw, Nina Spilsbury and **Kathy Schofield** are retired primary school teachers, Fellows of the Primary Science Teaching Trust College and Area Mentors for PSTT.

Paul Tyler is a primary school teacher and Fellow of the Primary Science Teaching Trust College.

Naomi Shallcross is a primary school learning assistant.

Peter Sainsbury is acting Cluster Director of the Primary Science Teaching Trust and a Fellow of Primary Science Teaching Trust College.

Professor Dudley E. Shallcross is a Professor of Atmospheric Chemistry at the University of Bristol and also CEO of the Primary Science Teaching Trust.

E-mail: dudley.shallcross@pstt.org.uk.

