

EXPERIENCING CHILD-LED SCIENCE IN SCIENCE WEEK

Carol Bostrom shares how child-led enquiry, with children choosing their own questions to research, can work in an infant classroom

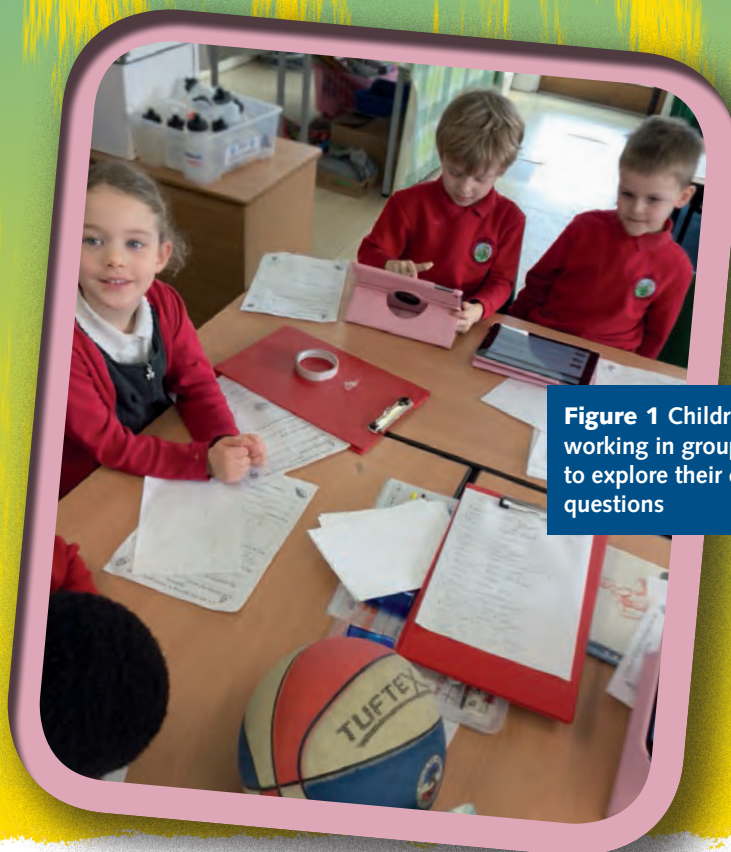


Figure 1 Children working in groups to explore their own questions

When, as a whole school staff, we first heard that during British Science Week we would be allowing 'child-led enquiry', with each child performing their own scientific investigation in relation to their interest or hobby, reactions varied from fear and apprehension to excitement and wonder. My own initial thought was 'I was born to do this!'

My background

I had witnessed plenty of real science taking place, while simultaneously undertaking an Early Childhood Studies Degree at Warwick University, raising my sons and working as a teaching assistant. Followed by a PGCE at Warwick University, with stringent grounding in science by a passionate science tutor and continuous testing, all this had given me confidence in my science subject knowledge. Of course I had my own fears to overcome with respect to 'child-led enquiry', stirred by hearing other teachers' reservations on the practicalities and by only having a few years of teaching

experience. However, I had been trained to overcome obstacles.

It helped that I am a strong advocate of the 'holistic child', as outlined in the Reggio Emilia approach (see end), which I followed with my own children: we should allow children to explore and investigate the world and nurture their natural curiosity. It was important that every child in my class followed a scientific line of enquiry that ran close to their interests and curiosities. Furthermore, each child, regardless of circumstance, should be able to purposely pursue something that had captured their imagination (*Every child matters: Enjoying and achieving*) and collectively contribute to the class and school science week (*Make a positive contribution*) (UK Government, 2003).

I had knowledge, passion, drive and courage – I just needed to think how to begin! In the staff room there was a hum of voices on how to practically facilitate and present their findings for all school stages. The master plan was that this would culminate in an exhibition of the children's individual

work in their classrooms, to be viewed by all the other classes, thus allowing children, cross-phase, to discuss and understand each other's investigations. The subject leader carefully allayed fears as we discussed strategies for overcoming problems.

There is science in everything!

After discussion as a teaching group, it was decided the three year 1 classes (ages 5–6) would be set a week's homework for science. The children had to choose three areas of their own interest or hobby and then compose three questions for investigation for each area. Fortunately, in our school, parental involvement with homework is good.

In the session before science week, I brought into class a rather tatty looking *Giant book of questions and answers* (Sonntag, 2001), overly used by my sons in previous years. As we looked at some questions together, the children were fascinated by the vastness of science, including many disciplines outside the planned curriculum for key stage 1 (ages 5–7). I believe this

Key words: ■ Types of activity ■ Ownership

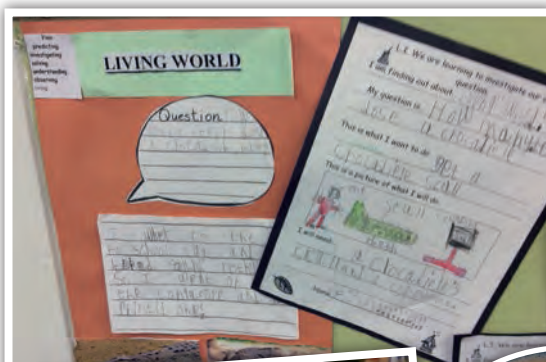


Figure 2 Exploring crocodiles using a simple question bubble and writing frame

It was the seemingly simple questions that provided the most interest, such as 'What do you need to wear for ballet' and 'What is the best drawing technique'. For the child's ballet enquiry, as a teacher, materials and stretchy fabric came to mind. However, her line of enquiry and fascination continued down the

balance and gravity route. For these young children, subject barriers did not exist and grouping things became more apparent to them, as they joined different tables of peers with similar interests. Letting go of the more common investigations and questions is much harder!

Talk for learning

To encourage the children to think about how to approach their investigation, I produced a simple science pro forma, with boxes for illustrating and lines for writing their ideas. One child's question was 'Can a tiger run faster than a car?' and he suggested we could use my car against a real tiger in the playground! I joked that, while I was enthusiastic to support their enquiry, this was a definite no! As the class laughed and we discussed the ramifications, I asked him what he could do instead and he made suitable suggestions. While their spirits were high, I said that the same went for whoever was investigating 'alligators', to which the child quickly replied that it was 'crocodiles' and all they needed was a skull! (Figure 2).

Throughout the investigation, I was astounded at their previous scientific knowledge, good identification of what they needed or wanted to accomplish and the speed at which they were able to solve problems. Moreover, undeterred by obstacles, limited information or 'no free computers', the children helped each other with their understanding, discarding some facts and forging on to find more relevant answers. Throughout the week the children were immersed in thoughtful conversations, expressing and sharing their knowledge, which became an advantage on exhibition day.

We understand each subject has its own language and I felt it was important to raise the profile of the language of science during other lesson times. We did this by (Figure 3):

- printed science words on tables;

- sound cubes to plug together;
- making our own science words;
- including science language in our presentations.

Managing the questions

Some questions were reasonably easy to facilitate by using appropriate equipment, having direct one-to-one support by staff or having the facility of older peers from years 5 and 6 (ages 9–11) to ease the pathway. One child's question was 'How does a sat nav work?' and so I brought in a portable one, plus a large map, and briefly explained how to use it (Figure 4). While we discussed the similarities and differences of navigation, I explained it was an abbreviation for satellite navigation. Then we located an image on the laptop, which modelled the red transmitter beams. Table grouping became an advantage, as further investigation captured the attention of the child looking at 'How far is it to the Moon?', who was on a similar enquiry path. The discussion continued to expand about the space around the Earth, encompassing other children who were caught up in the moment. One investigation led into another.

Practical science experiments

'I want to make something explode!' exclaimed an able member of my class. I asked her what things she would need (with my fingers crossed behind my back!). Fortunately, she asked for several low-risk ingredients including washing-up liquid, salt and cocoa powder; I didn't interfere with her reasoning. Once we had gathered the ingredients, as well as a clear container with a lid, a lab coat and goggles – all listed on her pro forma, several other children came over to the sink to observe. She put the ingredients in the container, shook it vigorously and then paused as we looked at the 'explosion' of bubbles and discussed the findings (Figure 5). She hesitated to take off the lid and I offered. I reassured her that I would not let her perform anything where I felt she would be in danger, but it was good that she considered the risk as a scientist. At the last minute she decided to unscrew the lid herself and she smiled. It reminded me of how scientific discoveries are made from beginning to end, motivated by the scientist's curiosity and by taking the odd risk! Those children observing, who have not yet gained the skills, experience or level of questioning, are still hugely impacted by child-led enquiry of their peers.

There were many more individual



Figure 3 (left above) Children using printed science words to increase their science word reading and spelling knowledge

Figure 4 (right above) Exploring how a sat nav works

widened the children's perspective for creating questions, as I was astounded at the level of their questioning and the range of subject areas, from 'Does a dolphin have teeth?' and 'Can you build a real house out of Lego?' to 'How does a star twinkle?', proving that there is science in everything!

So on Monday morning, armed with A3 sugar paper and a question bubble, the children chose one question from their homework to write down. On reviewing their questions I was able to loosely group the children into table groups and attach a heading for their work, such as football, rocks and climbing, living world, space, Sun and weather.

We discussed at length the importance of drawing or writing information on smaller pieces of paper, collecting printed facts, photographs and diagrams, and sticking these on their A3 paper, ready for the exhibition. I explained how collected evidence shows their investigating journey and scientific understanding. 'What if I don't find anything or I can't answer it?' asked one child. I told him that we would find it out together, as a class.



Figure 5 Dressed for the occasion just in case it explodes!

questions, each with an interesting journey and good outcome:

● **What things do you need to build a hotel?** The application of mathematical knowledge to science understanding was evident even at this early age. Observant technical drawings related to the findings were remarkable – a civil engineer in the making, perhaps?

● **Can a monkey swim?** The class fell silent as a film clip of a swimming monkey with a baby on its back was first seen by a child and her table in raptures of delight, and then on our class smartboard. Those moments are profound.

● **What makes and how do you find emeralds?** (child's words). This child's initial interest stemmed from the Minecraft game and, as he discovered, 'you can really mine emeralds!' The investigation progressed into the natural world. He found out about different locations of mines and what emeralds looked like in their cut and raw form (as an ore). This investigation caught the interest of children from 5 to 11 during the final exhibition.

On reflection

Meaningful, individual science enquiries have a valuable part to play in primary science. The child learns the steps involved in scientific investigation through their experiences and these are self-motivated. Allowing the child ownership to scribe and collate the evidence in their style has great advantages, as sometimes science learning happens immediately and needs no instruction. Obviously, misconceptions need to be explained and often other children are quick to help with this!

If I could do it again, then I would provide the children's groups with more scientific names and possible areas to

research, such as natural world, plants, animals and habitats, materials, seasons and weather, space, computing. For weeks afterwards we reflected on and discussed our first-hand experiences, often with the children having done investigations at home. More importantly, during our science lessons they drew upon their knowledge and observations from science week to make new connections.

References

Reggio Emilia approach: www.reggiochildren.it/?lang=en

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