

Great School Framework case study: Science through stories

Focus Area

Science through Stories is a project comprising a cluster of workshops for targeted parents/carers and children working together in school. It is offered to all Reception children as they begin their learning journey at Woolenwick Infant and Nursery School. Storytelling and selected texts are used as a gateway to explore scientific concepts, introduce scientific vocabulary and test theories.

Rationale

Woolenwick Infant and Nursery School is based in Stevenage, a town renowned for its ground-breaking work in the field of science – from GSK's pharmaceutical research to the Mars Rover developed by Airbus Defence and Space for the ExoMars Mission. Several of our parents are employed scientists, who regularly offer science-based learning opportunities in school. We continue to offer a science-rich curriculum laying strong foundations and igniting a passion for scientific enquiry so that children may one day pursue careers in STEM.

Our approach to teaching science is founded on enquiry-led, hands-on investigation and exploration. The craft of story-telling has a strong presence at Woolenwick Infant and Nursery School and it is used as a teaching and learning strategy across the curriculum. Our children love listening to stories, no matter how many times they have heard them before.

To capitalise on the children's enjoyment of stories and their natural curiosity, awe and wonder about the world around them, we linked storytelling and science together. There is a synergy between stories and science, giving scientific learning a meaningful context, inviting children to discover the science hidden within them. Selected, quality stories complement our science teaching, stimulating our young children's scientific enquiry and developing knowledge and skills.

Aims

- To empower parents who can perceive science teaching to be challenging because of their lack of subject knowledge and may not know how to engender the children's natural curiosity.
- To increase the parental engagement of 'hard to reach' Reception parents and carers.
- To develop an understanding of science as an enquiry-rich subject rather than one with a plethora of scientific knowledge.

Background context

The curriculum offer at Woolenwick Infant and Nursery school has arisen from dialogue with the pre-schools of Reggio Emilia in Northern Italy where the child is at the centre of the learning. Educators actively listen to the child and respond to extend thinking and develop a sense of curiosity. Children take the learning in a direction that stimulates and engages them.

One example:

Children began the academic year with a whole school project aimed at raising the profile of science. An animal skull was discovered on the site during building works. This provocation stimulated an engaging, cross-curricular project that lasted the whole year. The project was called 'Look What We Have Found.'

The children were given no information about the skull: they were simply presented with it. Fascination and curiosity drove the direction of the children's lines of enquiry and deepened the level of learning, encouraging scientific investigation; children described themselves as 'real' scientists; making observations, carrying out research, discovering new facts and drawing their own conclusions.

We wanted to capitalise on the children's natural curiosity and scientific enquiry to engage their parents and carers. We devised *Science through Stories* in response – a collaborative project where child, parent and teacher co-construct the learning.

The story

The *Science through Stories* workshops were designed and led by the Science Leader in dialogue with other educators. Stories were selected to explore scientific concepts that linked to class learning, developed thinking skills and allowed the families to hone learning dispositions such as resilience, resourcefulness, teamwork, risk-taking and reflection.

Educators modelled to parents ways to develop the children's scientific thinking skills. By asking questions, thinking critically, experimenting, explaining and reasoning, educators taught the principles of hypothesis, testing theories and scientific reasoning.

The first cluster of workshops began in the autumn term of 2016. We selected a group of boys who needed some support settling into Reception for a variety of reasons.

At first, the parents of these children were invited to attend hour-long sessions with their child. The parents were offered a morning session which started soon after drop-off or an afternoon session which began an hour before home time. Giving this flexibility supported parents with work commitments.

Educators persisted to engage the targeted parents and carers through letters, phone calls and even finding the parents on the playground to promote the workshops and ensure parental commitment.

The same group of parents and children attended the workshops over a four-week period, each week having a planned scientific focus. Learning was sequential, each new workshop building on the previous learning. Each session began with a story as a hook into the learning. Selected stories were no more than ten minutes long. Some were told using props, material and drama, whereas others were read from a book or performed by shadow puppets. Some stories were invented to fit the focus of the scientific enquiry, whereas others were well-known children's stories.

At the end of the four weeks, another group of parents were invited to attend. Targeted families were disadvantaged, vulnerable or traditionally 'hard to reach.'

As the workshops developed, so did the popularity and before long many of the Reception parents were asking when it would be their turn to be invited to attend.

From September 2016, *Science through Stories* became part of our universal offer for all Reception children and their families, alongside other enrichment packages such as phonics, reading and maths workshops.

The project is in its fourth year. In the first year, 76% of the Reception parents attended the four-week block of workshops, increasing to 88% engagement in 2019. Whilst 12% of parents did not take part (travellers or working parents), 100% of children took part, the 12% supported by educators.

Impact

Year on year, all children involved in the project have made at least the expected three steps of progress throughout Reception in the Prime areas of *Communication and Language* and *PSED* as well as in the Specific Area of *Understanding the World*.

The chart below highlights the significant progress that has been made in these areas of learning year on year.

Steps of Progress

	2016		2017		2018		2019	
	At or above Expected Progress	Exceeding Expected Progress	At or above Expected Progress	Exceeding Expected Progress	At or above Expected Progress	Exceeding Expected Progress	At or above Expected Progress	Exceeding Expected Progress
C and L	91%	35%	92%	62%	95%	68%	93%	56%
PSED	86%	31%	98%	82%	100%	90%	93%	53%
UW	87%	36%	98%	70%	100%	77%	93%	59%

In October 2017, the school was judged by OFSTED to be outstanding. The report highlighted the impact of the 'Science through Stories' project:

The quality of teaching in all subjects is stimulating and interesting. Teachers join subjects together. For example, the 'Science Through Stories' project developed pupils' literacy skills as well as their science skills. This also involved parents in their children's learning very effectively.

We were awarded the Silver Primary Science Quality Mark Award in September 2017; at the time, this was the highest accolade possible for an Infant School to achieve. The impact of this project supported this achievement.

Originally *Science through Stories* was aimed at promoting parental engagement for Reception parents and carers, but it has become so much more than that.

Parent/carers comments:

"After the workshop about light and shadows, I found Harry in his bedroom experimenting with light." Harry said, "If I put my hand in front of my torch it blocks the light because light travels in straight lines."

"We both really enjoyed the 'Science through Stories' group yesterday. Thomas couldn't quite believe that he got to make a proper volcano and we had lots to talk about after school as it really helped with his natural curiosity on a variety of levels."

"The group is a great idea and a really creative and fun introduction to a fantastic subject. I look forward to what we will be learning next week."

"The Science lesson was brilliant. Both Lucas and I enjoyed it and he keeps talking about things that he has done for days afterwards and we often do the experiments again at home. He's now using words like hypothesis, prediction and experiment."

"All he wants for Christmas is a torch and a lab coat. He doesn't stop talking about science."

Children's comments:

"I'm going to be a rocket scientist when I grow up."

"My mummy said she's going to take me to the Science Museum when it's the holidays so I can learn more science."

"It's alright if your prediction wasn't right because then you will learn."

"Did you know that Isabelle's parents are scientists? I didn't know that normal people could be scientists!"

Reflections/evaluation

It has fostered a passion for science for both the parents and children. It has demonstrated to parents that STEM learning is fun and has given them ideas for easy experiments to do at home. Importantly, it has engaged them in conversations that stimulate scientific enquiry, providing an opportunity for a deeper level of questioning and conversation, using scientific vocabulary.

The sessions have also become a way to incorporate other areas of learning to support parents to help their children with phonics, storytelling and writing.

The project has allowed us to build positive relationships and identify the barriers parents experience in supporting their children's learning. This has enabled us to gently support these families in other ways.

The passion for STEM continues to grow for both children and parents. Parents have supported two cohorts of children to enter and present discoveries for the First Lego League Junior STEM challenge set by the Institution of Engineering and Technology (IET).

Children had the opportunity to explore real-life issues such as water conservation and space travel, in conjunction with the 50th anniversary of the first moon landing. Previously, children had met astronaut, Buzz Aldrin.

Children presented their discoveries to an audience of scientists, engineers and other participants.

Such friendly competition ventures support all budding scientists and engineers to develop their enquiry and problem solving skills, alongside building characteristics of effective learning, such as teamwork, respect, perseverance, creativity and confidence.

The Science Leader, in her role as an SLE, works closely with The University of Hertfordshire as a STEM facilitator for STEM Learning, delivering CPD sessions and writing articles for the newsletter.

The relationship between The University of Hertfordshire and Woolenwick Infant and Nursery School continues to evolve. The Science Leader continues to make a valuable contribution to the University's STEM team, currently planning a support package for schools to deliver Science as part of the recovery curriculum, due to the COVID-19 pandemic.

COVID-19

The children have felt personally connected to the pandemic, its presence heavily in the news and a hot topic of conversation within families at home and in school. It was the ideal opportunity to consider the science and the importance of good hygiene. Capitalising on this interest, keyworker children have had the opportunity to make hand gel in school.

Next steps

We plan to continue to deliver *Science through Stories* to the Reception parents year on year.

We plan to extend to include KS1 parents as children move through the school.

We are continually looking for new stories with hidden science waiting to be discovered to foster curiosity and scientific thinking.

We will continue our collaborative work with the University of Hertfordshire.

We continue to gather evidence towards the Primary Science Quality Mark Outreach Award.