Summer 2021 *Issue 12*

Why & How?

The Primary Science Teaching Trust Newsletter

Supporting excellent teaching and learning in primary science

Free to access for all

Inside this issue:

CONTENTS

Click to jump to article

WELCOME

Welcome to the 12th issue of the Primary Science Teaching Trust's termly newsletter, Why and How?

For over a year restrictions have disrupted children's education, but we hope these restrictions will reduce in the coming months. Science teaching has in many schools been disrupted significantly, in favour of literacy and numeracy. As ever, the PSTT is here to help, with lots of free to access resource materials and advice available to all UK primary teachers.

In this issue, we share details of PSTT Regional Mentor Kate Redhead's comprehensive support for primary science **curriculum planning** and assessment following the pandemic, which includes a video of advice and an accompanying slide presentation. The difficult times have also presented opportunities; PSTT Regional Mentor Claire Seeley assesses the impact of online continuing professional development from her experiences organising the recent **East of England Primary Science Festival** with colleagues from the Suffolk and Norfolk Science Learning Partnership in College Fellows'Activity. You can also read about some fabulous projects being undertaken by College Fellows in **Project Updates** and learn more about other Fellows in our **College Snapshots**.

Our **Starters for Science**, a series of 16 videos to support teachers to get started with practical science enquiry is now available in Welsh. We are extremely grateful to PSTT Fellow Haf Hayes, who has recorded voiceovers for the videos, along with translations of the text. Other Free Resources available to download are regular features: a **Picture for talk**, featuring

Why & How? is the brand name of the Primary Science Teaching Trust
12 Whiteladies Road · Clifton · Bristol · BS8 1PD · Tel 0117 325 0499
Email info@pstt.org.uk · Web www.pstt.org.uk · Connect with us

DOWNLOAD ALL ISSUES FOR FREE AT: www.pstt.org.uk/what-we-do/why-how-newsletter

Click to go back to contents

a spiny leaf cutter and From PSTT's own collection, a sample unit from **'I can explain': Hot and Cold**.

Children are increasingly aware of the impact that climate change is having on the planet. For **Climate Science**, we are pleased to launch a new resource authored by PSTT Regional Mentor Ruth Shallcross, **Spot the Difference**, which will help children explore important issues and potential solutions comparing between through pictures with scaffolded questioning.

Another regular feature, **I bet you didn't know...** explains the recent work of Dr. Phil Cox, who considers how the morphology (size, shape and structure) of red squirrels' jaws and dentition may have impacted their survival in the UK. PSTT College Fellow Dr Alison Trew presents his work in a primary-friendly article and accompanying teacher guide, to enable children to explore this cutting-edge science themselves. We have focused on this research in particular because it provides an interesting introduction to an exciting opportunity for primary schools to participate in Dr Cox's current research and to explore their own investigations into squirrels, supported by a **Royal Society Partnership Grant**. You can read more about this opportunity **here**.

In **News** we are absolutely delighted to be able to congratulate 4 PSTT College Fellows who have recently authored books – do take a look at these publications from Paul Tyler and Bryony Turford, Fran Long and Jules Pottle. We also highlight the recent reports from **SEERIH** and **OFSTED**, which consider the importance of deepening children's understanding in science, evidence of factors that contribute to high-quality school experiences or mean these are lacking. We know that many of our readers will be pleased to hear that TTS Group have restocked popular PSTT resources: **Standing on the Shoulders of Giants**, **The Molliebird** and **Titanic Science**. The PSTT is also pleased to introduce resources from the Geological Society, the WWF, the Natural History Museum, the Royal College of Pathologists and Leicester City in the Community in a series of **free-to-access webinars** during the summer term.

In our **Collaborator Update** we share some further outcomes from the Exploring and Exemplifying Creativity project led by Oxford Brookes University, on this occasion through interviews with experienced scientists, who share experiences of their own primary science education. We also draw your attention to Edition 15 of STEM Learning's **Primary STEM Learning Magazine** which contains an article about supporting children's mental health by taking science outdoors written by College Fellows Nathan Williams, Maria McGrory, Elaine Stockdale, Nicola Bolton and Alison Eley. Finally, we provide an update on the project **Primary Science Capital**: a whole school teaching approach, which is co-funded by PSTT and the Ogden Trust. PSTT Fellow Katharine Pemberton describes some of the benefits that the approach is having in her school. The project is led by researchers at the Institute of Education, University College, London and King's College, London.

We encourage you to check out **Key Dates** for the term. **The Great Science Share for Schools** is a notable event this term; please do visit their website and if you have not done so already, sign up to take part.

Don't forget that we value feedback from our readers so please do continue to keep us posted about what you find most useful and interesting, and please do share it with anyone who has an interest in primary science.

Prof. Dudley Shallcross
CEO

Ali Eley
Outreach Director

Dr. Sophie Franklin
Research Director

Sue Martin
Programme Director

Peter Sainsbury
Cluster Director

NEWS

Dudley Shallcross' retirement

The Trustees of PSTT wish to announce that the CEO, Prof. Dudley Shallcross will be retiring from this post on February 28th 2022. The Trustees thank Dudley for all his contributions and they will release a more detailed acknowledgement nearer to the retirement date. Click **here** for updates.

New PSTT webinar series

PSTT is pleased to be launching a new webinar series titled '**PSTT introduces...**'. The PSTT appreciates that primary science teachers need access to a wide range of resources to enable our children to develop their understanding of science and working scientifically skills and to see themselves as future scientists. We know that there are many organisations that aim to support primary teachers in this way and this term, we are pleased to work with a number of them to introduce and share their and our resources.

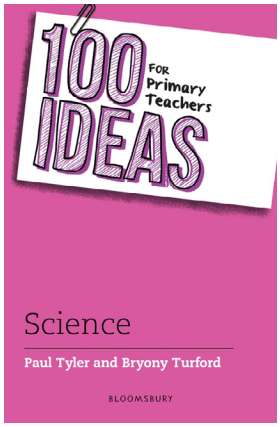
This term, PSTT introduces ...

- **The Geological Society**, with the PSTT's Ruth Shallcross on 12th May
- **The WWF**, with the PSTT's Ruth Shallcross on 19th May
- **The Natural History Museum**, with the PSTT's Ruth Shallcross on 9th June
- **The Royal College of Pathologists**, with the PSTT's Kulvinder Johal on 16th June
- **Leicester City in the Community** (LCitC), with PSTT's Sarah Eames on 30th June

Click here for further information. Make sure you are signed up to our mailing list for updates: **https://pstt.org.uk.**

PSTT Fellows' books

We are delighted to share news of books authored by our PSTT College Fellows, Paul Tyler, Bryony Turford, Fran Long and Jules Pottle. Congratulations to each of them.

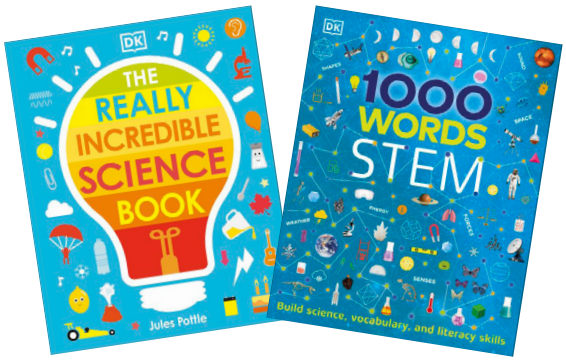


100 Ideas for Primary Teachers: Science is packed with exciting ideas to engage pupils in all areas of primary science. This easy to read book covers everything from practical ideas to teaching strategies and building science capital to essential resources.

Paul and **Bryony** cover the key areas of biology, chemistry and physics, providing detailed activities to demonstrate scientific concepts and link science to other curriculum subjects. Science leaders will also find lots of ideas to develop their whole school approach to science. Each idea, activity and investigation is ready to use and easy to follow for all primary teachers, regardless of their level of confidence in teaching science.

Can you imagine a world without bees? Did you know that dung beetles are awesome recyclers? Insects pollinate, recycle and are an important food source for many animals – they're tiny but mighty superheroes of the animal kingdom.

Inspired by her work with entomologists on the British Insect Collection at the Oxford Museum of Natural History, **Fran** has co-edited an anthology of 'wild and wonderful' poems, **The Bee is not Afraid of Me**, that will educate and excite youngsters about the fascinating world of insects. The book is full of activity ideas and facts and is designed to be a creative resource for teachers that aids cross curricular learning.



Jules has been working with DK Books over lockdown and beyond. She has provided the text and page titles for a picture dictionary entitled **1,000 Words: STEM**, aimed at 3-7 year olds but also useful as a tool for EAL.

Another title, a pop-up board book called **The Really Incredible Science Book** will be released on 3rd June. This engaging book follows the early primary science curriculum, with a few extra topics to extend learning, so that 5 to 8 year olds feel supported and excited when they meet science subjects in and out of class. Jules had great fun choosing the topics, writing the explanations and working out how the pop-ups might work so that children can interact with the book to try out science investigations.

Jules has also created 15 videos for home learning which are now available on DK Books YouTube channel, entitled **Stay Home Science Lab.**

Starters for Science - now all available in Welsh!

We are delighted that our resource, Starters for Science, is now fully available in Welsh. The set of sixteen five-minute videos, created to support teachers to get started with practical science enquiry, have Welsh language text and voiceovers in Welsh. We are very grateful to PSTT Fellow Haf Hayes for her excellent translation and voiceover work.

The **overview** and the **supporting teacher notes** are also available in Welsh. These documents and all the videos are available for FREE download **here**.

TASGAU SY'N TANIO

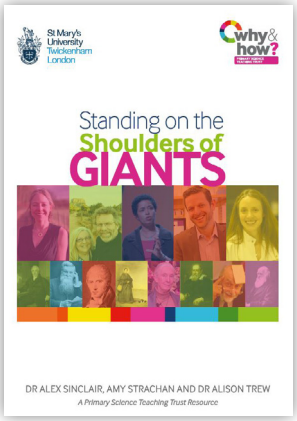
SEERIH and OFSTED reports

One of PSTT's Academic Collaborators, **The Science and Engineering Education Research and Innovation Hub** (SEERIH) at The University of Manchester together with **The Ogden Trust** and Science Across the City have published a research report on the 10 Key Issues with Children's Learning in Primary Science in England (March 2021). This report, which can be accessed **here**, offers pertinent insights into the national context of primary science education, highlighting how far too often primary pupils' science learning involves 'fun activities' that do not deepen understanding of the associated scientific concepts. By prioritising 'wow' moments without clear reference to any curricular goal, there is risk that primary pupils don't fully embrace the opportunities for meaningful science learning.

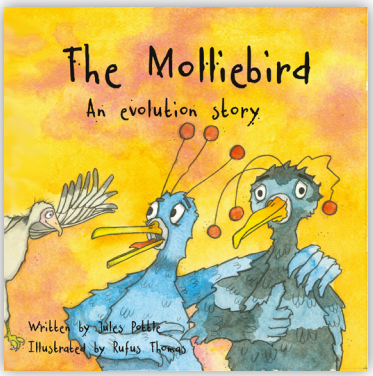
The report has been cited in the latest OFSTED **Research Review Series**: Science. The review identifies factors that can contribute to high-quality school science curriculums, assessment, pedagogy and systems and will inform a subject report due out in June 2021. Dr Lynne Bianchi, SEERIH Director & Senior Lecturer (University of Manchester) says, *"OFSTED's research review spotlights the issues that continue to influence children's learning of science in primary schools. We are at a point of change and this background evidence inspires us to reflect with senior leaders on next steps in whole school science improvement. We are very pleased to see that our research has contributed to this review, which focuses attention on purposeful practical work in primary classrooms."*

PSTT resources back in stock

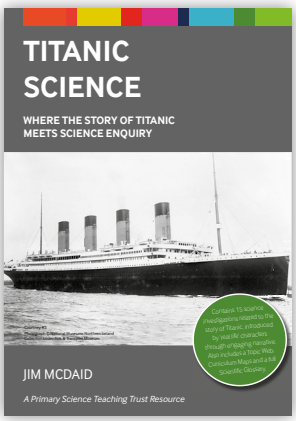
Good news - **Standing on the Shoulders of Giants**, **Titanic Science** and **The Molliebird** are all now back in stock with TTS-Group. Please do let people in your networks know they can now place orders for these resources.



Click here to purchase



Click here to purchase



Click here to purchase

CLIMATE SCIENCE

Spot the Difference

Ruth Shallcross works full time for the Primary Science Teaching Trust as Regional Mentor for London and the South East. She is currently leading the development of PSTT's Climate Science Project 'Educating for a Future'

ruth.shallcross@pstt.org.uk

Welcome to our new climate science resource - spot the difference. The activities are designed to encourage the use of observation and visual literacy skills using images that show either the effects of climate change or a related solution. Our approach is that it is important to be honest with children about what is happening to our world in an age-appropriate manner, and to focus on sharing solutions with them as well as talking about problems.

In the activities, the teacher guides the children to compare the two images and spot the differences between them. Through scaffolded questioning, the teacher can support the children to explore and discuss what is happening, why it is happening and the possible impact.

HOW TO RUN THE ACTIVITY:

1. Display the pairs of images to the children.
2. Provide any brief context that is required. The teacher notes will be useful for this. Take care not to explain what has happened between image 1 and image 2 as this is the focus for the children.
3. Invite the children to describe what they can see in image 1, what they can see in image 2 and what the differences between the two images are. Partner talk is effective here.
4. Use the suggested questions (or your own) to prompt children's reasoning and deeper thinking.

ADDITIONAL RESOURCES AND INFORMATION

Glaciers
New Zealand Glacier visualiser
Glaciers then and now
Polar Explorers Pack
Effect of melting glaciers in Alaska

Polar Bears
World Wildlife Fund resources
Polar bears and climate change
Polar Bear International Resources

Reforestation
Trees for Life Charity
Woodland Trust education resources
Practical Action Regreen the desert
Alan Watson Featherstone

Eco-Anxiety
Climate Psychology Alliance

Activity 1

Melting glaciers - The Pedersen Glacier

TEACHER NOTES TO SET THE CONTEXT:

A glacier is a large area of thick ice formed on land by many years of snowfall which has not melted and instead forms ice. Glaciers remain frozen from one year to the next and they flow slowly over the land due to their weight. If they reach the sea, pieces can break off and become Icebergs. The images below show the Pedersen Glacier that sits on the western side of Alaska in Kenai Fjords National Park. The glacier was formed in the little ice-age (1350 - 1850), a geological period when mountain glaciers in a number of locations expanded.

Images courtesy of NASA: 1917 photo captured by Louis H. Pedersen; 2005 photo taken by Bruce F. Molnia

QUESTIONS TO SUPPORT THE CHILDREN TO MAKE COMPARISONS:

How do you know this is the same view? What features can you see that identify it as the same view?

What are the differences that you notice in the pictures of Pedersen Glacier in 1917 and 2005?

What causes ice to melt?

What conditions does grass need to grow?

What do you think caused the change in the glacier and the surrounding landscape over this time?

What could the effects of this be?

What problems might melting glaciers cause?

FURTHER BACKGROUND INFORMATION FOR TEACHERS:

Glaciers are melting due to climate change leading to global heating. Sometimes melting ice forms a glacial lake. If melting increases and these lakes overflow, they can release huge volumes of water and cause catastrophic flooding. Glaciers store around three quarters of the world's fresh water. When a glacier disappears completely this can mean a loss of freshwater supplies to communities. From 1951 to 1986 the Pederson Glacier retreated steadily but slowly at 20 metres per annum (m/a) (706 m in total) and from 1986 to 2005 at a speed of 23 m/a (434 m in total). By 2015 the glacier had retreated 2600 m since 1994. This is a speed of 125 m/a which is much faster than before.

Activity 2

Melting sea ice: why is this a problem? - Polar bears

Please note: these images may cause children to feel distressed and teachers should exercise their own judgment about whether or not it is appropriate to show them to the children they are teaching.

TEACHER NOTES TO SET THE CONTEXT:

Polar bears mainly inhabit the Arctic Circle, subsisting on a diet of seals and other prey. Polar bears spend most of their time on sea ice and it is from the ice that they hunt for seals. When seals come to the surface at holes in the ice, they become prey to the polar bears. With their sensitive sense of smell, polar bears are able to detect the smell of a seal's breath when they exhale. This enables them to catch the seals. Polar bears also stalk seals that are resting on the sea ice. Both methods involve sea ice.

Image from Wikimedia Commons, courtesy of Andreas Weith

QUESTIONS TO SUPPORT THE CHILDREN TO MAKE COMPARISONS:

What are the differences you can see between the two polar bears?

What do polar bears need to be healthy?

Which polar bear do you think looks healthy and why?

What do you think the unhealthy polar bear is missing? What might have caused this?

Is there a solution for the unhealthy polar bear?

How is the health of polar bears related to the melting of polar ice?

What are ways that polar bears could adapt to the melting of sea ice to survive?

FURTHER BACKGROUND INFORMATION FOR TEACHERS:

Arctic sea ice keeps the polar regions cool. The ice melts and forms with the seasons; however, global heating has upset this balance and the thickness and extent of the sea ice is decreasing. Polar bears depend on ice to hunt for their food. As a result of habitat loss caused by climate change, polar bears are unable to find enough food and are now classified as a vulnerable species. To date, the impact of global heating has impacted the Arctic most. Polar bears' dependency on sea ice makes them highly vulnerable and we are yet to see how they adapt to their changing environment. Some studies suggest that the Arctic could be ice free in the summer by 2050.

Activity 3

What can we do to help the planet? - Reforesting

TEACHER NOTES TO SET THE CONTEXT:

The images that follow show the same view at Coille Ruigh, Glen Affric in Scotland. This was home to red deer who were overgrazing the Scottish Pine seedlings (95% of the seedlings had grazing damage) which was preventing them from reaching mature growth. In both images, Scots Pine snags are visible. Snags are standing dead or dying trees. For example, 9 year old trees were on average just 8.5 m high. By building a fence around the area to prevent red deer from entering, the Scottish Pines were allowed to naturally regenerate. This project is a partnership between the charity Trees for Life and Forestry Commission Scotland.

Photos with kind permission of Alan Watson Featherstone https://alanwatsonfeatherstone.com/

QUESTIONS TO SUPPORT THE CHILDREN TO MAKE COMPARISONS:

How do you know this is the same view? What features can you see that identify it as the same view?

What are the differences that you can see between Coille Ruigh in 1989 and 2020?

Why do you think there are so few trees in the photograph from 1989?

What do you think has happened in the years in between?

What impact do you think the differences have on wildlife?

FURTHER BACKGROUND INFORMATION FOR TEACHERS:

Much of Scotland, like most of Britain, was once densely forested. Caledonian Forest was the temperate rainforest which once covered much of Scotland. The mission of the charity Trees for Life is to rewild the Scottish Highlands by enabling the restoration of the Caledonian Forest. Some of this work involves planting trees or, as in the case of Coille Ruigh, allowing an area to naturally regenerate. Amongst other aspects of their work is the introduction of red squirrels to new forests and studying the feasibility or reintroducing lynx to the Scotland Highlands.

Click here to download the images from this article

IMAGES COURTESY OF NASA: 1917 PHOTO CAPTURED BY LOUIS H. PEDERSEN; 2005 PHOTO TAKEN BY BRUCE F. MOLNIA

IMAGE FROM WIKIMEDIA COMMONS, COURTESY OF ANDREAS WEITH

PHOTOS WITH KIND PERMISSION OF ALAN WATSON FEATHERSTONE HTTPS://ALANWATSONFEATHERSTONE.COM/

FREE RESOURCES

Pictures for talk in primary science

Click here to download these images.

A picture can be a very good stimulus for children to engage in effective talk in science. Using pictures is an inclusive approach which facilitates high levels of participation. Pictures can also be used as a starting point for inquiry. The discussions the children have will generate questions that they want to investigate.

Asking the children carefully chosen questions about the picture will support them with learning to:

- construct explanations and link their ideas with evidence
- make confident challenges to the ideas of others
- explore scientific terminology and use it with genuine understanding

Pictures for talk in science activities are designed to be very open ended and usable with any age of children. The activities can be done as a quick ten minute starter, or extended into a longer and more in-depth lesson.

WHAT TO DO

Download the image on page **15** by following the link and either display on a whiteboard or give out printed copies. Ask the children to discuss, in groups of three, the following questions:

CAN YOU SEE AN ANIMAL IN THIS PICTURE?

WHAT DOES IT LOOK LIKE? WHY DOES IT LOOK LIKE THIS?

This is a spiny leaf insect. They are native to Australia and can grow to be as long as 20 cm. Their body and leg segments resemble leaves and they also curve their bodies to accentuate their leaf-like appearance. Their bodies are covered in thorn-like spikes for defence and for camouflage. Spiny leaf insects can be green, like this one, but they can be a creamy colour and many are brown which gives the appearance of a dead leaf (see the picture below). They don't bite or sting but they can spray an odour which deters predators.

Other questions to generate and promote thinking and explaining:

What do the animals' legs and its body remind you of?

What might want to eat this animal?

How does the animal stop other animals eating it?

How many legs does it have? What kind of animal do you think it is?

What do you think it eats?

FOLLOW-ON DISCUSSION IDEAS

Have a look at other pictures of insects that camouflage themselves by looking like leaves or twigs. Discuss the features of the insect, and the similarities and differences between them all. Use the questions above to prompt the discussion. Here are three pictures you might want to use. Large versions can be downloaded by clicking on the image on page **15**.

Accreditaion - Pavel Kirillov from St.Petersburg, Russia, CC BY-SA 2.0 <https://creativecommons.org/licenses/by-sa/2.0>, via Wikimedia Commons

CLICK TO DOWNLOAD IMAGES

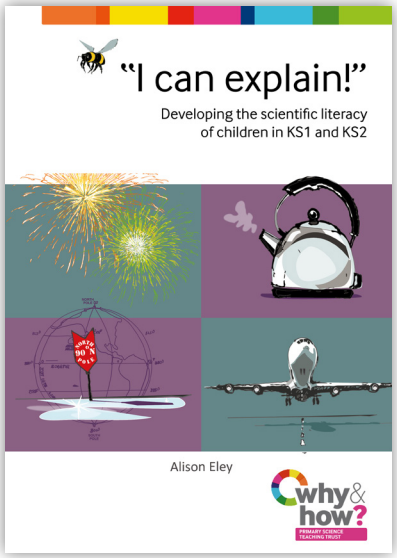
FREE RESOURCES

from PSTT's own collection

Free sample 'Hot and Cold' unit from "I can explain!", a highly accessible approach to introducing and developing scientific understanding through group talk. The resource contains beautifully illustrated, high-quality picture cards and language prompts to facilitate rational discussion. The comprehensive and easy to follow teachers' guide supports teachers to develop new strategies for confidently leading discussion in science.

WORKING IN SMALL GROUPS, CHILDREN DEVELOP THE SKILLS TO:

- Support their ideas with evidence
- Learn effectively through group talk
- Make confident challenges to the ideas of others
- Change their minds on the basis of new evidence
- Explore scientific concepts and develop deeper understanding



Click here to download the FREE sample 'Hot and Cold' unit.

For more information about 'I Can Explain!' click here.

Ali Eley, Outreach Director at the Primary Science Teaching Trust, is the creator of 'I Can Explain!'.

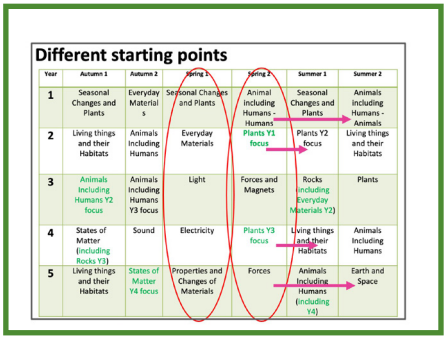
ali.eley@pstt.org.uk

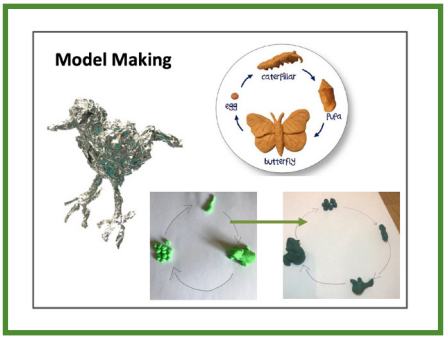
FREE RESOURCES

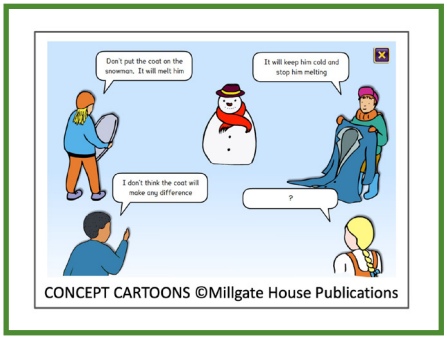
Curriculum planning for 2021/2022

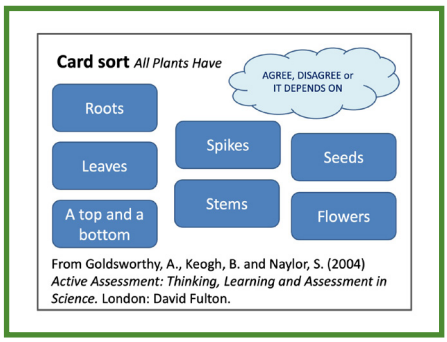
PSTT Regional Mentor, Kate Redhead, shares an approach to mapping the science curriculum for 2021/2022. This comprehensive video and accompanying slides provide guidance for whole school curriculum planning following the disruption to schools caused by the COVID-19 pandemic. The approach offers guidance, considers different starting points for topics, and shares formative assessment strategies for establishing children's understanding.

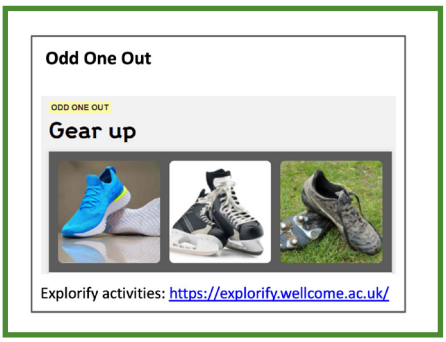
Click here to watch the video and download the slideshow











Kate Redhead is the PSTT Regional Mentor for the Birmingham and Midlands areas.

kate.redhead@pstt.org.uk

I BET YOU DIDN'T KNOW...

Red squirrels adapt to food they eat

Dr Alison Trew, PSTT Area Mentor and Website Resources Developer, links **cutting-edge research** with the **principles of primary science**

alison.trew@pstt.org.uk

Red squirrels (Figure 1A) used to be common across Great Britain, but their numbers started to decline in the 1920s. Today, red squirrel populations are only found in a few areas of Great Britain. Possible reasons include a loss of woodland habitats, the introduction of the eastern grey squirrel (Figure 1B) to England in the late 1800s, and squirrel pox virus. Now that the remaining British red squirrel populations are isolated from each other, scientists are interested in finding out whether there are any differences between them. This might help us to understand why some populations have survived when others are now extinct. It might help *conservationists* to protect threatened populations and to reintroduce populations in new regions successfully.

QUESTIONS CHILDREN MIGHT LIKE TO CONSIDER:

- Why do you think numbers of red squirrels have decreased?
- What might happen if red squirrels become extinct?
- Do you know of any other endangered species in this country or elsewhere?

HOW ARE RED SQUIRRELS AND GREY SQUIRRELS DIFFERENT?

Red squirrels (*Sciurus vulgaris*) and grey squirrels (*Sciurus carolinensis*) are different species (Figure 1). This means that they cannot produce baby squirrels (offspring) together. Red squirrels are *native* species which means that they occur naturally in Great Britain and they are usually found in coniferous woodland or heathland. They like to eat hazelnuts, pine cones and seeds. Grey squirrels are *native* to the oak-hickory woodlands of the eastern United States. They are much larger than red squirrels and are commonly seen in woods, gardens and parks across the UK. They also like hazelnuts but they will eat other seeds such as acorns.

Figure 1. A, Red squirrels have a reddish-brown coat with a pale underside and large ear tufts. B, Grey squirrels have a silver-grey coat with a brownish face and pale underside and smaller ears.

QUESTIONS CHILDREN MIGHT LIKE TO CONSIDER:

- If grey squirrels are not native to Great Britain, how did they arrive in the UK?
- How was the population established?

WHAT DID THE SCIENTISTS WANT TO FIND OUT? WHY?

Because UK red squirrel populations live in different habitats such as coniferous woodland, moorland and heathland (Figure 2), they could be eating different types of foods. Scientists have shown that the structure of an animal's jaw can develop differently depending on the animal's diet. In areas where only hard food is available (e.g. Northern Scotland where it is mostly pine cones), squirrels with stronger jaw muscles will be more likely to survive and pass those stronger muscles on to the next generation. In areas where food is less hard (e.g. Formby where peanuts are provided), it will be less important to evolve stronger jaw muscles and the associated bone structures.

Dr. Philip Cox and his colleagues wanted to find out whether the separated UK populations of red squirrel had jawbones that were *morphologically* different from each other - this means differences in their appearance such as the size or shape. And, if differences were found, they wanted to know how this might affect the squirrels' bite force.

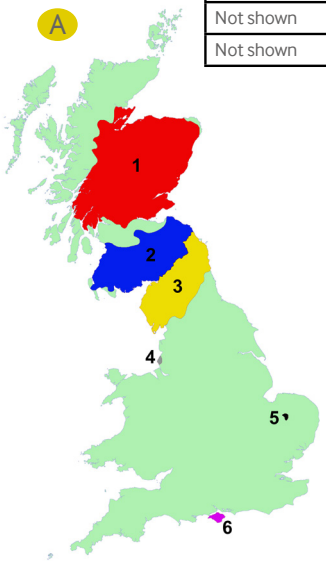
Figure 2. A, coniferous woodland is characterised by evergreen trees with needles rather than leaves and cones rather than flowers. B, heathland and moorland habitats are covered by low-growing woody plants such as heather. Moorland refers to heathland in mountainous regions and is generally cooler and damper.

*Figure 3. A, Map showing British red squirrel populations analysed in this study. B, Table showing key for map and the number of samples of red squirrel skeletons from the different regions. *Red squirrels are now extinct in Thetford.*

B

Key	Region	No. Skeletons
1	Northern Scotland	83
2	Southern Scotland	18
3	Northern England	48
4	Formby (Liverpool)	29
5	Thetford (Norfolk)*	11
6	Isle of Wight	9
Not shown	Jersey	22
Not shown	Germany	38

A



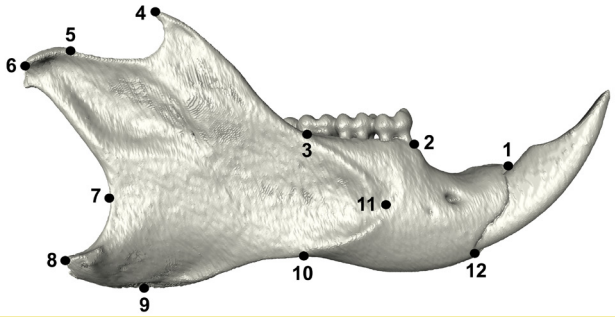
QUESTIONS TO DISCUSS WITH CHILDREN:

- What foods do you think would be available for squirrels living in different habitats such as coniferous woodland, heathland, or moorland – see Figure 2?
- What type of teeth/jaw do you think the squirrel would need to eat different types of food such as hazel nuts, acorns, small seeds, fruit or berries?

HOW DID THE SCIENTISTS COMPARE SQUIRREL JAWBONES?

258 red squirrel skeletons were obtained from the National Museums of Scotland with information about where each one had come from (Figure 3). None of the animals were killed especially to be part of this study or to go into the museum collections. They all died in the wild and were collected by researchers and volunteers. Half of the lower jawbone (*mandible*) was photographed and 12 points on each jaw image were identified (Figure 4). Using computer software to measure the distances between these points, the sizes of the squirrel mandibles could be compared. By looking closely at the distances between the points where the three main jaw-closing muscles are attached, the scientists also calculated the ability of those muscles to produce forces needed for biting.

Figure 4. Image of the right side of the lower jawbone of a red squirrel (side view) showing the 12 landmark points used by scientists to compare size and shape of different jaw bones.



HOW DO THE JAWBONES OF RED SQUIRREL POPULATIONS DIFFER?

The Formby and Jersey populations of red squirrels had a shorter jaw-closing muscle (the *temporalis* muscle). You also have a temporalis muscle – you can feel this muscle move if you put your fingers on the sides of your head, just next to your eyebrows, and clench your teeth. This muscle was also shown to be weaker in the Formby and Jersey populations than in the other red squirrel populations. These populations may be less efficient at incisor gnawing than the other squirrel populations. This

is interesting because the Formby and Jersey populations receive a lot of extra food from humans, such as peanuts. The scientists suggest that differences in diet could have a role in causing the differences in the structure and function of the red squirrel's jawbones.

WHY ARE THESE RESULTS IMPORTANT?

These results are valuable for the conservation of red squirrel populations in Britain for two reasons:

Providing extra food has been really important in the survival of some red squirrel populations. However, feeding squirrels with softer food could be an issue if the squirrels move to another site where seeds and nuts are harder.

Methods to protect species in the wild often rely on the introduction of new individuals that have been bred in captivity. If diet can affect the size and strength of the jawbone, then breeders must provide a diet that is similar to what is available in the release sites.

WHAT DO YOU THINK THE SCIENTISTS SHOULD NVESTIGATE NEXT?

This research only looked at the structure of the lower jawbone so further studies might include investigations on the skull. Dr Cox and his team are going to use chemistry to analyse the squirrel jaws and teeth to see what those squirrels were eating when they were alive.

The skeletons used in this study were collected between 1994 and 2006 which is not a long period when looking at changes in populations. Dr Cox's research group will collect more specimens from a longer timeline.

As computer software is always being updated, scientists will have better modelling systems in the future. Dr Cox and his colleagues will use a special kind of computer modelling (the same method that is used to virtually crash-test cars) to understand how hard squirrels can bite.

There is uncertainty about the origins of some of the British populations of red squirrels. For example, the Jersey population of red squirrels was probably brought in from France and southern England in the 1880s and the Formby population was brought here from Europe (possibly Scandinavia) in the first half for the 20th century. To learn more, scientists plan to carry out genetic studies to look at differences in the DNA of different populations.

Scientists will want to combine all these approaches to understand more about how red squirrel populations adapt to different habitats. What they find out might help increase populations in Great Britain and might inform conservation methods for other threatened species. You might like to think about what you would study next if you were a scientist leading this research.

WHAT COULD CHILDREN INVESTIGATE?

- Are there any squirrels living in your local environment? Are they red or grey?
- What foods are available for small mammals and birds to eat in your local area?
- Are some foods easier to eat than others? How do you know?

Children could carry out a nature survey to find out some of the answers to these questions. The Teacher Guide that accompanies this article describes investigations which children can carry out to find out more about adaptation, habitats and conservation.

GLOSSARY

conservationist
someone who works to protect the environment from the damaging effects of human activity

endangered species
a type of animal or plant that might stop existing because there are only a few of that type left alive

mandible
lower jawbone

native
a species that occurs naturally in a region or ecosystem, no human intervention brought the species to the area or influenced its spread to that area

THE PAPER THAT INSPIRED THIS WORK WAS:

Morphological and functional variation between isolated populations of British red squirrels (Sciurus vulgaris).

By P. G. Cox[1,2] , P. J. R. Morris[3], J. J. Hennekam[2] & A. C. Kitchener[4,5].

Published in Journal of Zoology 312 271–283 (2020) https://doi.org/10.1111/jzo.12829 last accessed 23.04.21

1. *Department of Archaeology, University of York, York, UK*
2. *Hull York Medical School, University of York, York, UK*
3. *School of Geosciences and Department of Integrative Biology, University of South Florida, Tampa, FL,USA*
4. *Department of Natural Sciences, National Museums Scotland, Edinburgh, UK*
5. *Institute of Geography, School of Geosciences, University of Edinburgh, Edinburgh, UK*

PARTNERSHIP GRANT OPPORTUNITY

Squirrels Research Project

THE ROYAL SOCIETY

why & how? PRIMARY SCIENCE TEACHING TRUST

The Royal Society Schools Engagement team, working with the Primary Science Teaching Trust, is currently providing an exciting opportunity for primary schools to become involved in a research project that has a schools' citizen science component, along with the potential for schools to develop their own projects from this.

THE PROJECT

Dr Philip Cox, a Royal Society funded researcher, is carrying out a project *Red vs grey squirrels in Great Britain: the importance of diet*, to explore the differences between the red and grey squirrels that live in Great Britain, and will uncover the reasons for the dramatic decline of the native red squirrel population over the last 150 years.

This project is looking at the ecology of squirrel populations (including their feeding habits and the physical characteristics of grey and red squirrels). Included is a citizen science aspect, with simple opportunities for children to contribute to data collection for the project. We are looking for schools who have a red squirrel population close by, but you can still add to this research if your local squirrels are very much of the grey-coated variety!

We would like to encourage schools (with either or both local red and grey squirrel populations) to develop your children's own investigation ideas related to Dr. Cox' project with support from a **Royal Society Partnership Grant**.

The Partnership Grants scheme is a fantastic way to acquire funding (up to £3,000) to carry out research in your school and this particular project makes the process much simpler for the following reasons:

- We already have a senior STEM partner who will be overseeing the research (meaning that schools have a lot more flexibility to find someone local to help with this project, for example from a local Wildlife Trust, the National Trust or other local support group)
- We will be able to provide a project rationale to support your application
- We will be doing a great deal of the planning for you (in terms of the investigations and the equipment list)
- You will be working collaboratively with other like-minded teachers – so this is a great opportunity if you are new to STEM engagement
- The team at the Royal Society will be supporting you at every stage to make your application successful

This new initiative will give students a unique opportunity to contribute to real world research and to understand better the processes involved. Working with the PSTT and Dr Phil Cox, this pilot project will involve up to 20 primary schools (or middle schools) looking at the ecology of red squirrel populations across the UK.

HOW MIGHT YOU DEVELOP AN IDEA?

Each month, the PSTT publishes ***I bet you didn't know...*** articles on our website to enable primary schools to engage children with cutting edge research in the classroom. In this issue of Why&How, we look at Dr. Phil Cox' 2020 research paper: *Morphological and functional variation between isolated populations of British red squirrels (Sciurus vulgaris)* – presenting this as **IBYDK... Red squirrels adapt to food they eat**.

Each IBYDK... article has an associated teacher guide with a presentation and practical ideas that can be used in the classroom. You will find a teacher guide for this issue's article online at pstt.org.uk.

We look forward to writing another article in the future to share the conclusions of this project. How amazing would it be for your children to have contributed to this research?!

We really hope that the proceeding article will inspire your children to ask lots of questions about the feeding habits of squirrels, whether red or grey, enabling you to propose an investigation for them to take their ideas further with support from a Royal Society Partnership Grant.

JUST A FEW IDEAS... YOUR CLASSES MIGHT LIKE TO:

- set camera traps to observe local populations of red and grey squirrels in order to discover their feeding habits
- collect, identify and catalogue food samples
- find out the forces needed to crack food items, considering dentition and jaw strength of squirrels

THERE WILL BE OPPORTUNITIES TO:

- collect data for the research (samples bags will be provided)
- meet Dr. Phil Cox and pose your own questions
- take part in online workshops with your classes
- receive additional funding to create a video diary of your project
- involve different classes with different investigations to contribute to the project

If you're not sure where to start, the Royal Society Schools Engagement team is keen to help and has some ideas too! If you would like to get involved in this project, contact education@royalsociety.org.

MEET THE SCIENTIST

Dr. Phil Cox carries out his research at the University of York. Much of his work is concerned with looking at the skulls of mammals and how these have been shaped by adaptations and evolution. In particular, he has looked in detail at rodents' specialised teeth and the muscles used that enable them to eat.

He is currently working on a project focusing on evolution of different populations of British red and grey squirrels and how differing diets have led to adaptations that may have affected their survival.

THE ROYAL SOCIETY

Sign up for the Royal Society UK teachers newsletter

By signing up you will have first-hand access to the latest opportunities and resources available for use in the classroom. Whether it is accessing funding opportunities via our Partnership Grants Scheme, accessing funded CPD, or using the Brian Cox School Experiments, the Royal Society Education Outreach team are committed to supporting teachers to undertake experimental work and problem solving activities across the STEM subjects.

BRIAN COX SCHOOL EXPERIMENTS

A series of six simple experiments covering subjects from clean water to melting chocolate. Each experiment comes with resources and four short videos to support the teacher through set-up, the scientific method and health and safety. One of the videos shows the real world context of the science being investigated – a great way to get your pupils enthused. To obtain a free copy of all 24 videos and related resources, please email your contact details to education@royalsociety.org

PARTNERSHIP GRANTS SCHEME

Funding of up to £3,000 is available to enable pupils across all Key Stages to carry out investigative projects in all STEM subjects. The funding, which is used to purchase equipment not normally found in UK schools, must be applied for in partnership with a STEM professional (from research or industry). To find more information about the scheme, visit: royalsociety.org/partnership

UK teachers newsletter

Keep up to date with all our resources, events and funding opportunities.

Sign up today

THE ROYAL SOCIETY

Image: © JGalione.

PSTT COLLEGE SNAPSHOT

Meet six of our **College Fellows** who share some quick thoughts and suggestions for teaching primary science.

Nathan Williams

Kent - Broadstairs

Year 3 teacher and curriculum lead

Year of award: 2019

BEST SCIENCE ACTIVITY FOR BUILDING CHILDREN'S COLLABORATION AND CONFIDENCE?

Our year 4 children have to design and build a working torch as part of their electricity unit. They work in small groups and have to work to a design brief. It's the perfect opportunity to discuss, share and support each other through a real life context.

MOST USED PIECE OF EQUIPMENT IN YOUR SCIENCE CUPBOARD?

Our pond camera and trail cameras are used regularly by our children to monitor our wildlife areas. They love to see the animals up close and see how the environment changes throughout the year through time lapse videos, as do the staff!

BEST STEM VISITOR YOU HAVE HAD IN YOUR SCHOOL?

As part of our 'Lunch with a scientist' week the children met with a plastic surgeon. She explained her role and even shared some pictures of her before and after operations. She answered questions honestly and inspired all the children, so much so that they still talk about it today. "I want to fix people just like she does." – year 3 child.

Janet Barnet

South Shields

Primary Science Quality Mark senior regional hub leader

Year of award: 2012

MOST USED PIECE OF EQUIPMENT IN YOUR SCIENCE CUPBOARD?

A set of hand lenses for each classroom (rather than stored in the science cupboard) is versatile and maximises impromptu opportunities for observing closely. TIP: Store individually in little bags to help prevent scratches!

MOST RECOMMENDED BOOK FOR SUPPORTING TEACHING IN SCIENCE?

I bought 'Active Assessment' at my first primary science conference back in the late 90s and it really did transform my classroom practice. **Millgate House** resources are great, especially concept cartoons, science enquiry games and the look, think, talk books.

BEST STEM VISITOR YOU HAVE HAD IN YOUR SCHOOL?

The best STEM visitor by far was a cosmologist from Durham University outreach who 'blasted off' on an amazing interactive journey through space in the darkened hall. The authentic images and children's questions afterwards were stunning.

Nicola Connor

Livingston, West Lothian

RAISE Primary Science Development Officer

Year of award: 2019

MOST RECOMMENDED BOOK FOR SUPPORTING TEACHING IN SCIENCE?

The book I would recommend is "100 ideas from Primary Teachers: Science" by Paul Tyler & Bryony Turford. It is a great book full of practical ideas. It also gives the fundamentals to consider when teaching, and makes links with English and maths.

BEST STEM VISITOR YOU HAVE HAD IN YOUR SCHOOL?

A parent who had a food science background. She wanted to have a practical input with a class as well as talk about her role. We planned a lesson and children carried out aspects of her job as part of the discussion.

Molly Fletcher

Hull and East Riding

Director of Curriculum and Learning

Year of award: 2019

MOST USED PIECE OF EQUIPMENT IN YOUR SCIENCE CUPBOARD?

Data loggers - they can be used in a range of topics and year groups from measuring the amount of reflected light to temperature and measuring heart rate. The children love using them!

BEST STEM VISITOR YOU HAVE HAD IN YOUR SCHOOL?

A physics professor from Hull University came to speak to the pupils about space. He pitched the talk perfectly and really inspired the pupils. He has also helped lots of other schools in our cluster and even provided online sessions.

Ian Griffiths

Shard End, Birmingham

Deputy head and science lead

Year of award: 2019

BEST TIP FOR RAISING THE PROFILE OF SCIENCE IN YOUR SCHOOL?

Completing the **Primary Science Quality Mark** really opened my eyes as to what I was already doing well, but also things that could be changed or improved. A science fair is also an amazing way boost the profile of science. The **Royal Society** provide some really insightful knowledge, pitched at the right level for children but also the adults attending.

MOST USED PIECE OF EQUIPMENT IN YOUR SCIENCE CUPBOARD?

Our rocket launcher is used lots as it creates real enthusiasm in lessons. We use it in year one to celebrate bonfire night, and then all the way through to year six and even at events for parents.

Vicki Peake

Stoke-on-Trent, Staffordshire

Director of Learning and overseeing science.

Year of award: 2012

MOST USED PIECE OF EQUIPMENT IN YOUR SCIENCE CUPBOARD?

I use an 'everyday items' box a lot – this box contains a good mix of items including milk bottles, yeast, flour, plastic cups, balloons, the list goes on... I think it is vital to use as many everyday items as you can in practical lessons as it may inspire our children to investigate at home.

MOST RECOMMENDED VIDEO FOR SUPPORTING TEACHING IN SCIENCE?

I use David Attenborough's videos, many of which are available on YouTube. One useful tip is to get the children to make their own science documentaries and QR code them for younger children!

COLLEGE FELLOW ACTIVITY

East of England Primary Science Festival

During the pandemic, the PSTT, like virtually all organisations providing continuing professional development in education, moved to delivering online support opportunities for educators. As hopes grow that we will be able to return to some face-to-face activities over the next year, Claire Seeley, PSTT Regional Mentor for East Anglia, considers the impact of providing CPD online at the East of England Primary Science Festival, which was held online from 1st-11th February 2021.

CLAIRE REPORTS:

For two weeks at the beginning of February, PSTT and the Suffolk & Norfolk Science Learning Partnership jointly hosted the East of England Festival of Primary Science. Over the fortnight, more than 1500 individual teachers attended the event from across the UK. The idea built upon other successful online conferences and offered teachers a series of 17 workshops, across the fortnight covering everything from Early Years education to Climate Science, Space and Outdoor learning, alongside curriculum design and assessment and cross-curricular links.

The sessions were led by many leading practitioners from the primary science education community, including our PSTT Regional Mentors and collaborators, Bath Spa University, The Great Science Share for Schools, the Primary Science Quality Mark, alongside NFU Education, CIEC, STEM Ambassadors, CLEAPSS & St Marys University, Twickenham, all of whom kindly donated their time and expertise to the festival.

We were keen to remove the barriers that prevent teachers from accessing high quality CPD. One such barrier is being able to be released from the classroom, so the sessions ran from 4-5 pm, thus allowing the maximum number of teachers possible to attend. It was clear this was a helpful strategy: 331 schools were represented at the festival, with lots of teachers who had not done so before accessing primary science CPD. A key barrier for many schools is cost. Many teachers shared with us that an online format was the only way they would be able to access science CPD; where schools are able to support CPD requests, they typically send science leaders rather than other teachers. One teacher commented, "Thank you. If there had been a cost involved, it is not CPD I would ordinarily have been able to access." Another said, "I know the presenter commented that it was a shame we were not in a room and able to interact etc, but I know that I wouldn't get the opportunity to go to courses etc during school time in the same way - so appreciate courses that are on zoom. It is much easier to organise."

In terms of overall engagement, it was particularly pleasing to note that 62 schools that had not been involved with the PSTT or the SLP in East Anglia previously were represented at the conference. At a national level, an online format enabled many teachers/ schools to participate in opportunities that would have been out of reach if held face-to-face.

Whilst some teachers attended for a specific session, one third of those participating in the festival attended more than one session, on different days. One reported, "I came away with some lovely new ideas to try and a sense of belonging to a wider primary science community." This was a common feeling echoed by many of the teachers present, making the festival worthwhile in itself. As teachers, we are all connected by our passion for education and our desire to improve the life chances of our learners; digital CPD allowed that to happen in a time when we all need to foster a spirit of interconnectedness and belonging to a wider community.

PROJECT UPDATE

Small college projects

Some PSTT Fellows are currently leading a small project, either in their own school or working with a small number of other schools or PSTT Fellows. Here we share summaries of four of these.

KATHRYN HORAN: SCIENCE IN STORIES

Following a visit to Science on Stage, Kathryn was motivated to explore the potential for using a range of well-known stories as starting points for science. Asking the children to think critically about parts of the story encourages them to ask questions that they can discuss and/or investigate. For example:

- Jack and the beanstalk: How fast do beans grow? Can someone climb up a beanstalk?
- Rapunzel: Would hair be strong enough to climb up?
- Cinderella: Could a shoe be made of glass? Would a pumpkin make a good carriage?
- Princess and the Pea: Can you feel a pea under a mattress?
- Goldilocks: Does a big bowl of porridge cool down faster than a small bowl?

Kathryn is particularly looking at how this approach supports children to question claims and to think critically about what they read and if this is evident in other areas of their work, both in science and across the curriculum.

LUCY BLACKMORE: WHOLE STAFF DEVELOPMENT

Lucy is working with teachers in her own school to build a better and shared understanding of how children learn science. She is working alongside each teacher to support them to deliver effective science lessons and to help them identify their next steps for their own professional development in science. A resource will be collated that can be used across the school to help non-science specialists in particular, and it will also be shared across Lucy's PSTT Cluster.

TOM JONES: SECRET GARDEN

With the school being in a highly urban area and currently having no green space of its own, Tom is creating a secret garden on the school site to give the children better access to a natural environment. Tom will share his findings about how to meet the challenges of creating a green space in an entirely hard surface setting. He will be looking at how the children engage with the new garden, and what impact this has on their learning.

ALISON TREW: EYFS SCIENCE WEBSITE PROJECT

Alison is working with a small group of PSTT Fellows who teach in the Early Years Foundation Stage (EYFS). The purpose of this project is to create a new PSTT webpage for EYFS practitioners across the UK. The webpage will provide a bank of teaching strategies, activities and investigations, to promote science teaching and learning in the EYFS. The resources will be suitable for the EYFS curriculum in England, Wales, Scotland and Northern Ireland. We hope that the new webpage will be live in September 2021, so keep an eye on PSTT's Facebook: **@primaryscienceteachingtrust** and Twitter: **@pstt_whyhow.**

COLLABORATOR UPDATE

Oxford Brookes University

Colleagues at Oxford Brookes University are delighted to be sharing further outcomes of their PSTT funded project, 'Exploring and Exemplifying Creativity'. In this part of the project Dr. Sarah Frodsham and Prof. Deb McGregor describe outcomes from interviews with experienced scientists that explored what they thought about creativity.

THESE CONVERSATIONS INCLUDED DISCUSSION ABOUT:

- How they 'saw' the scientific research they carried out as creative
- What they reflectively recollected about their school science lessons and home experiences that led them to becoming scientists, and
- Some of the things they thought might be (re)considered in school science for future generations to excite and better support their interest in, and passion for, science

The outcomes of these conversations are shared through a new website, 'Professional Scientists' Recollections of their Creative Educational Experiences'.

The website contains illustrative audio clips, or soundbites, which exemplify a range of creative educational experiences, as described by twenty four real scientists (**click here** to enter the site). Each soundbite will describe one of the following:

- What appears to have motivated scientists to want to become a scientist
- The school experiences (primary, secondary and as an undergraduate) that appear to have been influential
- Experiences beyond school that appear to have been influential, and finally
- What scientists say schools could pay more attention to

These excerpts are all from conversations with real practising scientists, each of whom had published at least 15 peer reviewed papers in the last 6 years. The scientists are from three geographical locations (Oxford, Manchester and London Universities) and they were each interviewed about their own creative educational experiences.

The website has been designed to help teachers appreciate what creative educational experiences look like from the trained scientists' perspectives. Some examples of what you will find on the website:

WHAT APPEARS TO HAVE MOTIVATED SCIENTISTS TO WANT TO BECOME A SCIENTIST?

"I always liked the level of uncertainty that was inherent in it [Geology]. There was a lot of stuff to really get your teeth into because the answers weren't known."

"I wanted to go to foreign countries and... study the animals and... that kind of thing. So when we went abroad on holiday... I take my little notebook and try and find animals and do all this kind of stuff."

Click here for more example soundbites in this category.

WHAT SCHOOL EXPERIENCES (PRIMARY, SECONDARY AND AS AT UNIVERSITY) APPEAR TO HAVE BEEN INFLUENTIAL?

Primary school: *"So it was... One of these 15-minute slots of science for schools on the radio... they would go through this... every week there was a little activity... At the end of the week they would tell you what to bring for the next week. ... I can remember I was the only kid... who brought the things and sat and did it with them."*

Secondary school: *"...they [the teachers] were always willing to answer questions... I certainly felt if you wanted to go and ask... why that was, they definitely would listen to you. They were accessible..."*

University: *"...we always were allowed to hand it [homework] in groups. So, you sit together with your friends and you try to work out the solutions to the problems, and then a group of two or three could hand in a single solution. So, that already teaches you to collaborate."*

Click here for more example soundbites in this category.

WHAT EXPERIENCES BEYOND SCHOOL APPEAR TO HAVE BEEN INFLUENTIAL?

"I really loved science fiction... I spent my early teens reading about exploring the solar system... Later on, I started reading more sort of science essays ... Isaac Asimov used to write a monthly essay on ... a huge range of different scientific problems... they exposed me to a lot of different ways of doing things as well, so beyond what you might come across in the school curriculum but different concepts."

"I was... being looked after by my grandparents, we just wandered around and we named flowers [laughs] and we sniffed flowers and we counted cows and we saw what colour they were."

Click here for more example soundbites in this category.

WHAT SCIENTISTS SAY SCHOOLS COULD PAY MORE ATTENTION TO?

"I think it would be useful, sometimes... to have some... sessions where finding the right approach was more important than being able to do a particular approach."

"...if you really see it, you do it for yourself and then you think of it. Of course, you have to be aided by someone who is trained, who maybe points you in the right direction initially... but I think it's much more effective if you do it yourself really."

Click here for more example soundbites in this category.

Dr. Sarah Frodsham is a Senior Lecturer, Research Associate, Research Convener and Ethics Officer at Oxford Brookes University. Her research focuses on creativity at different moments and in different places in science education, from primary school through to being an eminent scientist working at an academic institution.

Professor Deb McGregor taught in schools in the Midlands, holding posts of responsibility in Biology, Science and ICT. She has also worked as an LEA advisory teacher and taught in university for twenty years. Deb has written books and articles related to thinking skills, creativity, metacognition, reflective practice, science teaching, learning and leadership.

WIDER COLLABORATIONS

STEM Learning

STEM Learning's Annual Primary Magazine

The 2021 edition of the STEM Learning magazine is now available. It is full of the latest insights and research in teaching STEM subjects to primary pupils. In what's been a challenging 12 months for all involved in education, the magazine celebrates how teachers have adapted and improvised, and the lasting impact that this innovation will have in the classroom.

PSTT is pleased to have contributed to the magazine with an article about supporting children's mental health by taking science outdoors. Written by PSTT Fellows **Nathan Williams, Maria McGrory, Elaine Stockdale, Nicola Bolton** and **Alison Eley**, the piece offers multiple suggestions for making the most of the positive effects that being outside has on children's emotional and cognitive functioning. Ideas range from practical science suggestions to how to maximise outdoor learning when you have minimal outside space.

Copies of the primary magazine have been sent to all primary schools in England. The magazine is also available to read on the STEM Learning website:

WIDER COLLABORATIONS

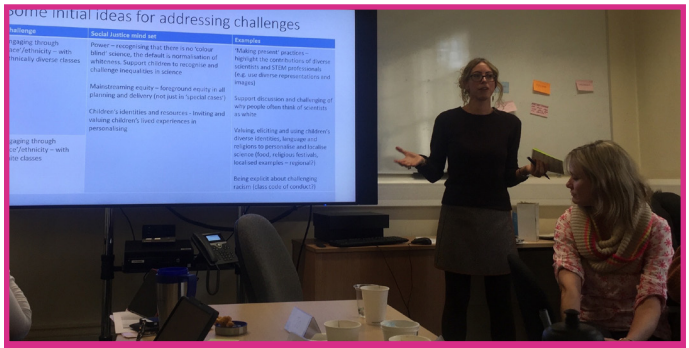
Science capital

Primary Science Capital: a whole school teaching approach.

The Primary Science Capital project, led by researchers based in the **Institute of Education in University College, London and King's College, London** started in September 2019 and is now in its final phase. The two-year project co-funded by **The Primary Science Teaching Trust** and **The Ogden Trust** aims to develop primary teaching practices which use a science capital approach to enable children from diverse backgrounds to engage meaningfully with science. The approach is being co-developed by primary teachers across England.

Six Primary Science Teaching Trust College Fellows and four Ogden Trust Teaching Fellows have been actively involved in this exciting process. In the last year, despite the difficulties that have arisen due to COVID, these Fellows have developed innovative ways of 'cascading' the approach beyond their own classrooms. They have all mentored one teacher colleague and conducted professional development sessions for teachers in their schools to make the approach more sustainable for their own school community. The final handbook with detailed explanations of the model, examples of lessons and of successful cascading within schools, and teacher testimonies will be launched in October 2021.

Teachers sharing project progress with Dr Heather King



Professor Louise Archer leading a workshop session with the project teachers

Katharine Pemberton, one of the PSTT Fellows involved in the project, explains the benefits of the approach and the impact of sharing it with a teacher it in her school.

"Sharing the science capital project with another teacher in my school has really helped me to see how powerful it is as a teaching approach. Through explaining the model, I began to recognise how the different elements of the approach, such as broadening what counts and starting with child, have become more of a habit in my own planning and how this has improved the dynamic and interactions in science lessons in my own class.

The teacher I am working with has noticed that children who wouldn't normally take a lead role in lessons, developed the confidence to share their ideas, as they knew that any idea would be valued. She commented on how much she had enjoyed re-thinking her planning with the child, rather than the scientific facts, as the starting point. We have both feel that the process has reminded us of the way we wanted to teach when we first trained for the job."

KEY DATES

Primary Science Capital: a whole school teaching approach

Project launch Week beginning 18th Oct

Further details to follow

ASE Online Conferences 2021

17th - 18th June 2021 — **Summer Online Conference**

24th - 25th June 2021 — **Futures Online Conference**

Great Science Share for Schools

15th June 2021 — #GreatSciShare

This year's **Great Science Share for Schools** has a theme of Climate Emergency and it's not too late to register to join in! As a sponsor of the event, PSTT is pleased to support four Great Science Share for Schools Regional Champions across the UK.

Click here to find out more.

Get connected and use the hashtag #GreatSciShare

Twitter: **@GreatSciShare**
Email: **greatscishare@manchester.ac.uk**

sharing
&learning

excitement
&exploration

discovery
&delight

investigating
&questioning

www.pstt.org.uk

The Primary Science Teaching Trust (formerly the AstraZeneca Science Teaching Trust) was fully endowed with a grant from AstraZeneca PLC

why & how?
PRIMARY SCIENCE TEACHING TRUST

Why & How? is the brand name of the **Primary Science Teaching Trust**
Tel 0117 325 0499 · **Email** info@pstt.org.uk · **Web** www.pstt.org.uk
Primary Science Teaching Trust · 12 Whiteladies Road · Clifton · Bristol · BS8 1PD