

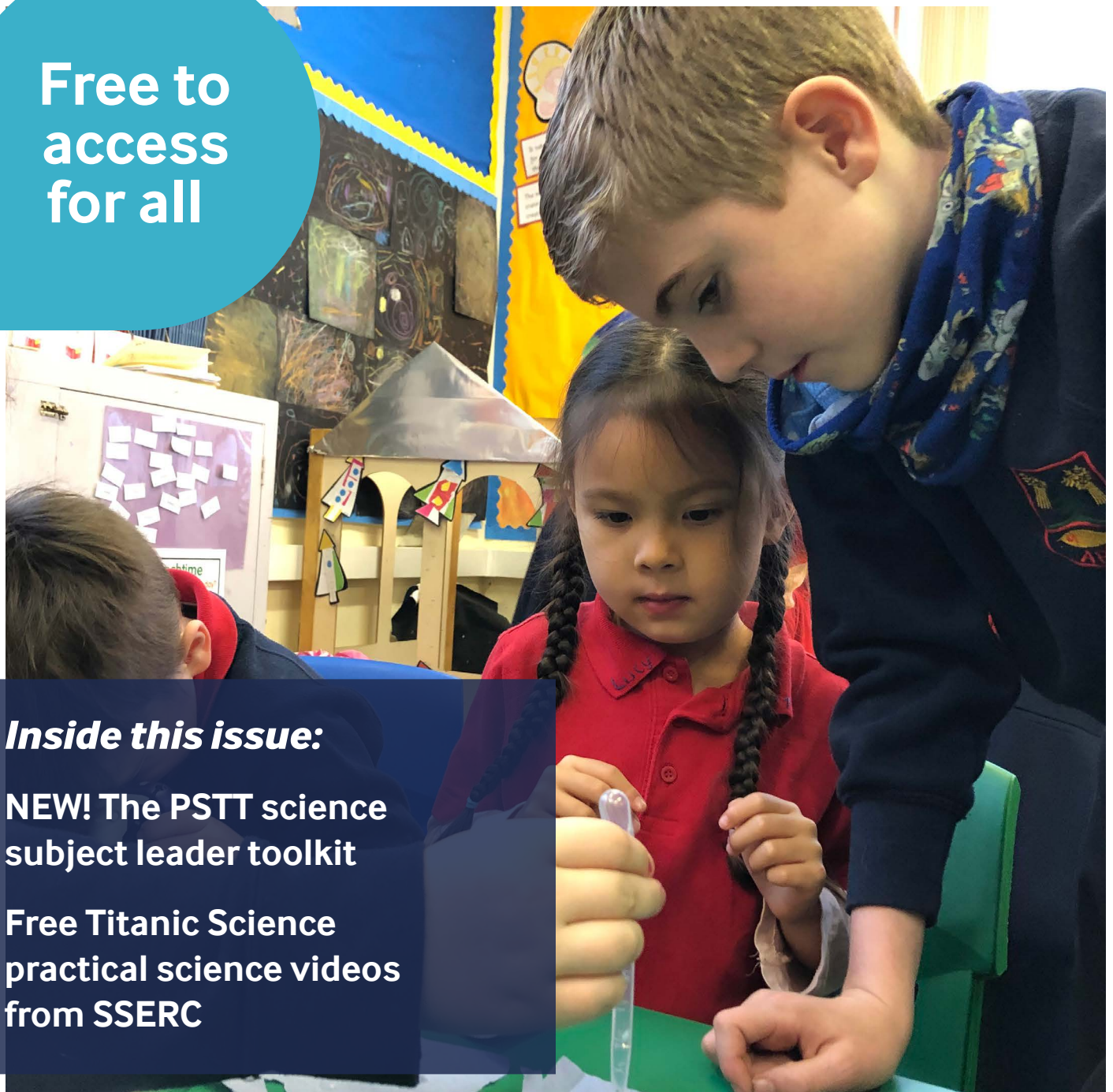
Why & How?

Autumn 2020 Issue 10

The Primary Science Teaching Trust Newsletter

Supporting excellent teaching and learning in primary science

Free to
access
for all



Inside this issue:

**NEW! The PSTT science
subject leader toolkit**

**Free Titanic Science
practical science videos
from SSERC**

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WELCOME

Welcome to this bumper issue of the Primary Science Teaching Trust's termly newsletter, **Why and How?** This newsletter is for anyone who has an interest in primary science.

In **News** we are delighted to share that Dudley Shallcross, CEO of PSTT, has been recognised by the American Chemical Society for his outstanding contributions to chemical education. We welcome two new Trustees to the PSTT board. We also highlight our new extremely popular Regional Mentor Webinar Series as well as our new CPD resources, which include planning for recovery as schools return to 'normal', support for science subject leaders, and ideas for innovative practice. Finally, we include a report about our well-attended primary science conference, delivered in partnership with STEM Learning.

Our **Climate Science** section focuses on climate psychology and offers insights for teachers in how to support children with eco-anxiety. PSTT is delighted to be working with Caroline Hickman from the Climate Psychology Alliance and we are grateful to her for sharing her time and expertise.

Our resource section is packed. It has a **Picture for Talk**, and to coincide with Outdoor Classroom Day on 5th November we have included a **Free sample trail from Let's Go! STEM Trails**. We also bring you TWO of our newest resources, both released since the last issue of the newsletter.

The Primary Science Teaching Trust (PSTT) is not liable for the actions or activities of any reader or anyone else who uses the information or the classroom materials in this publication. PSTT assumes no liability with regard to injuries or damage to property that may occur as a result of using the information or materials contained in this publication.

PSTT recommends that a full risk assessment is carried out before undertaking any of the practical investigations and activities contained in this publication.

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Our **Science for One** series consists of activity sheets to support teachers with providing practical science lessons while respecting restrictions around mixing groups, and where access to central resources is limited. Originally designed in response to the need for children to work on their own, the activities work equally well with children working in groups. The activities can also be done outside. We are delighted to be launching Series 2 of **Science at Work**. We are creating two page activity sheets about past scientists or people who worked in science related jobs, and opportunities to 'meet' them will be available to book through Spectrum Drama.

Our **Subject Leader Toolkit** is designed primarily to support new science subject leaders. It is also a rich resource for anyone wondering how to raise the profile of science in their school or wanting supporting resources and ideas for good science leadership.

This issue includes a special update on the work of our **Regional Mentors** who give bespoke support to schools to help them improve their science provision. With the programme now in its fourth year, some of our Regional Mentors share experiences from their work with schools.

In the **I bet you didn't know** article, PSTT College Fellow Alison Trew shares research into the atypical backbones that some animals have, and how these have confused scientists. Based on the rarely seen hero shrew and its unusual spine, this article suggests how children might be encouraged to consider adaptations to environment and animal survival.

PSTT College Fellows have continued to share best practice and resources across their primary science networks. We bring some of these to you in our **College Snapshot** section, and Cath Milne shares her experiences of her class taking part in the **Young STEM Leaders Programme** in Scotland.

PSTT's **Citizen Science project** includes a set of resources to support primary teachers to explore the topic of air pollution with children using real data. See the **Project Update** section for details of this exciting initiative and to access the resources.

In our **Collaborator Update** we are delighted to share the launch of a series of videos made by the primary team at our partner organisation SSERC. The videos illustrate practical science enquiry in the context of the story of the Titanic. We also share a short update from PSQM and the latest issue of the ASE's Journal of Emergent Science which includes a wealth of papers describing research that underpins good primary science practice.

A group of our Fellows are also Explorify Champions. In **Wider Collaborations** these Fellows describe how they make the most of Explorify in their schools. We also bring news of our new Primary Science Enhancement Award for Initial Teacher Education. The scheme has been created in collaboration with ASE and PSQM and is currently in its pilot phase.

Key Dates to note include the PSTT webinar series, the ASE annual conference (online), and the Great Science Share for Schools. We would also like to draw your attention to the Primary Science Teacher Award deadline for nominations - 8th January 2021.

Our newsletter offers practical support, news and updates about PSTT and our projects and research. We value feedback from our readers so please do continue to keep us posted about what you find most useful and interesting in our newsletter, and please do keep sharing it with anyone else who would like to receive practical classroom support, news and PSTT updates.

Prof. Dudley Shallcross
CEO



Ali Eley
Outreach Director



Dr. Sophie Franklin
Research Director



Sue Martin
Programme Director



Peter Sainsbury
Cluster Director





NEWS

➔ Awards for Prof. Dudley Shallcross

It is with great pleasure that we recognise two recent achievements for PSTT's CEO, Prof Dudley Shallcross.

Dudley has been awarded the American Chemical Society's 2021 George C. Pimental award in Chemical Education. This Award recognises "outstanding contributions to chemical education". It is given annually by the American Chemical Society and sponsored by Cengage Learning and the ACS Division of Chemical Education. George C. Pimentel, was an American chemist and chemical educator who taught at the University of California, Berkeley. The illustrious list of past awardees included three Nobel Prize winners (Pauling, Hoffmann and Seaborg)

The award citation reads: 'For innovative contributions to the teaching of Chemistry (Science) from Elementary School to Postgraduate study and in promoting Chemistry to prospective students and the public.'

Dudley will receive the award in March 2021 at the ACS meeting in San Antonio, Texas.



In July 2020, Dudley became the President of the Education Division of the Royal Society of Chemistry and he will hold this role for the next three years. We know that Dudley is keen to see the Royal Society of Chemistry continue its support for chemical education (science in primary school) across the whole learning landscape and to support teachers at all education levels. He has pioneered virtual laboratory environments as a tool to support, and not replace practical work, through his work as a co-Director of Bristol ChemLabS, a Centre for Excellence in Teaching and Learning, and such environments will play a vital role in the coming years, as we deal with COVID-19 and its aftermath. Dudley is a strong promoter of the chemical sciences and he is keen to see that the subject is recognised for its positive contributions to the enhancement of life and sustainability of the planet.



➔ New Trustee Announcements

We are pleased to welcome two new Trustees to the PSTT: Patrick Hand and Paul Shuter.

Patrick's focus as a Trustee will be on the investments the Trust oversees, utilising his considerable experience in stockbroking and investment fund management to benefit the Trust where he can.

As a former teacher, Paul has extensive experience of curriculum development, has authored textbooks and has been a Chief Examiner. He spent 20 years working in educational publishing and for the last ten years has run a publishing consultancy business, developing book and digital projects for publishers and arts institutions.



PSTT Trustee: Patrick Hand



PSTT Trustee: Paul Shuter

➔ PSTT/STEM Learning Conference

As part of our support for teachers during the summer term, PSTT partnered STEM Learning to provide a free-to-access online Primary Science Conference in July 2020. Covering a wide range of topics across all science subjects and providing innovative sessions for teachers from EYFS to upper primary, 20 webinar sessions, 13 of which were delivered by PSTT Fellows, were provided in this packed, 1 day conference.

We were delighted with the many responses of the 300 delegates who attended and their interesting and positive interactions with each of the speakers.

"I just wanted to say a massive thank you to the fantastic presenters - for their time and the resources they have shared - thanks also to yourselves as organisers, it was a really fascinating and inspirational day!"

We even had a message from Johannesburg thanking Sarah Eames for the resources she shared (play dough science) – our reach was international.

➔ PSTT Webinars

This term, PSTT is offering a series of free webinars delivered by our Regional Mentors and suitable for all teachers of primary science. See pages **23-25** for more information.

➔ PSTT launches new CPD resources

PSTT works closely with teachers in schools throughout the UK to ensure we provide the support they need to develop as classroom teachers, in subject leadership, or to improve whole-school practice. Most recently, we have launched **new continuing professional development resources**, to assist teachers in planning for recovery as schools return to the 'new normal', in auditing schools' science provisions, and in supporting innovative practice.

Having received numerous requests from teachers concerning lost teaching and learning time during the pandemic, PSTT Regional Mentor Kate Redhead provides an online video webinar and additional resources to help with **Recovery Planning**. Kate considers a step-by-step approach and explores strategies that teachers and schools can employ to ensure coverage of knowledge and skills for each year group.

Our new **Subject Leader Toolkit** is designed to help science subject leaders evaluate whole school provision, starting with a **Subject Leader Self-evaluation Tool**. It includes a wealth of information and associated resources for teachers to download, whether there is need for staff training, curriculum development, assessment, enrichment activities, or much more. For more detail on these resources, **click here**.

Dr Alison Trew considers ways that teachers can use cutting-edge science research in the primary science classroom in a **new online CPD session** to support PSTT's I bet you didn't know... resource. Alison demonstrates activities from two of the teacher guides (classroom presentations) that support teachers using the articles in the classroom.



CLIMATE SCIENCE

Supporting children with eco-anxiety



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'

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Last year we introduced a climate science section to our newsletter. So far we have included teaching resources and ideas for cross-curricular approaches to support children's engagement with climate science. In this issue our focus is climate psychology and eco-anxiety.

The psychological effects of the climate and biodiversity crisis are increasingly well understood and the resulting impact on children's mental health is now well established (Burke et al., 2018; Trott, 2020; Clayton, 2020). Children's eco-anxiety can manifest itself in a range of ways including depression and anxiety, sleep disorders and phobias, all of which can adversely affect happiness, engagement and achievement at school. Teachers have an important role to play in helping children acknowledge and deal with their feelings about the climate crisis. This is not an easy task and many teachers may feel ill-equipped to do this. PSTT has been working with the Climate Psychology Alliance to develop resources and training to support primary teachers to provide appropriate and effective help for children dealing with eco-anxiety.



Ruth Shallcross, Regional Mentor for PSTT, has interviewed Caroline Hickman from the Climate Psychology Alliance. We share some of this conversation here, with grateful thanks to Caroline for her insights and advice for primary teachers about how they might support children with eco-anxiety.

Ruth: What is climate psychology?

Caroline: Climate psychology is about supporting people with anxiety about the climate emergency not to become overwhelmed. We need to accept rather than deny reality so that we take action. It's not too late to take action but it is urgent. It's what I term 'both and' – as it's both terrible and there are actions we can take.

Climate psychology is also about eco-psychology – about looking at the relationship between the individual and the planet. It's about healing the split between humans and nature. We've become disconnected from and lost sight of our dependency on the natural world. Humanity needs to be reconciled with our interdependency on nature and understand that what we do to the planet will impact on us.

Ruth: What is eco-anxiety?

Caroline: Eco-anxiety is something that has come into wider public consciousness recently, but it's important to recognise that it's been around for decades. It used to be primarily felt by conservationists, by environmentalists, by scientists working in the environmental field who were aware of the increasing magnitude of the problems that we are facing. They were speaking out but, in spite of the science, were witnessing a lack of action.



Now what we're seeing is eco-anxiety coming into broad public awareness as the climate emergency accelerates. It's an emotionally healthy response to the reality of what we're facing in the environment. I would worry about people that are not emotionally responding to what is going on. Anxiety is often the first emotional response to threat. Our feelings of vulnerability lead to anxiety. Then the anxiety will often traverse into feelings of depression, despair, panic, anger, rage, guilt or grief. It can move into those other emotional responses and then full circle again.

Currently I'm trying to reframe eco-anxiety as eco-empathy because you only feel eco-anxiety if you care about the state of the world. It shows that you're connected, you care about the plight of the planet as well as humanity. That's empathy. That's compassion. Eco-anxiety can be reframed in a positive way by saying that anxiety is a gateway to feeling eco-empathy, eco-compassion and eco-concern.



Ruth: Should we protect young children from the scientific evidence about the climate crisis?

Caroline: I think we have to start by asking, 'What does it mean to protect children?' As a psychotherapist and social work lecturer, my professional life is about the importance of protecting children from harm.

So what does it mean to protect children today, given the changes that we're facing collectively as humanity? To conceal frightening facts from young children is now the opposite of protection. In fact, I think that's now an abandonment and betrayal of the children's need to be informed educationally, emotionally and relationally about their changing world. If we don't give them this information, what we're doing is we're setting up a terrible schism or split in terms of children's mental health because we're lying to them. We're telling them the world is one way while the evidence in the world tells them it's the other way. Children are aware – they're online, they're seeing news and TV programmes, they're finding out for themselves.

Ruth: Why are we seeing a rise in eco-anxiety amongst young people?

Caroline: There is a rise in eco-anxiety in young people because they are very connected; they care, they're informed and they're exposed to media. In all forms of media there are messages about the devastation of the planet. Young people are starting to see the immediate impact of the climate emergency.

When I was talking to a 10 year-old, I clearly wasn't communicating to him properly that I understood his perspective. He got quite cross with me, quite rightly. He said, "Caroline, you don't understand. For me, I've grown up as a 10 year-old with no expectation other than polar bears will be extinct. That's my normal. I've grown up knowing this. You had decades of enjoying polar bears as part of the ecosystem." I had to say to him, "You're right. It's really hard for me to understand that. I didn't have that normal. This is your normal."



I've heard this from older teenagers as well, that they've grown up with this awareness. They never had space in life to imagine anything else. I think what we've got to do is imagine and empathise what it's like for young people to grow up with this knowledge that this is their normal.

Ruth: How do we support young people with these difficult emotions?

Caroline: We need to acknowledge and show understanding for the difficult feelings they are experiencing because they're growing up in this world, their normal. As adults we need to say sorry and then say how do we find solutions? Children need to see adults modelling how to tolerate difficult feelings and not collapse.

We also need to allow them to release their feelings of frustration, anger and despair that they may be feeling because they're growing up in this world. We have to really emotionally meet them, because what we all need is to be seen, to be heard, to be understood, then we don't feel alone. We should not be leaving children to feel alone with this.



Ruth: How should teachers approach eco-anxiety in schools?

Caroline: Teachers need to communicate a clear message that it's OK to feel this way. It's also OK if you're not feeling this way. It's important to overtly give children permission to feel whatever it is they're feeling, to show that there is space for feelings in the classroom. As adults we can guide children to understand that those feelings don't need to dominate, but they also shouldn't be excluded from the classroom.

When introducing the climate emergency to children, I would always distance it slightly by talking about the climate crisis or the impact on animals – whales or bees, for example. ***I would never begin by asking children how they feel about the climate crisis.*** These are huge emotions to process. We need to build up to that point.

Incorporating talking about feelings into the daily classroom culture helps it become part of the school day, and to become ordinary and embedded. This allows children to become tuned in with themselves and verbalise – I feel angry/sad/joyful. If it's a session once a week, nobody's going to want to talk about feelings then. This is about building emotional intelligence in these children.

Teachers can use various techniques - games, stories, models, puppets, drama and art - to give children permission to feel and have a place for feelings in their education. For example, children can draw their feelings.

Ruth: Can you give an example of a 'both and' in your own response to the climate emergency?

Caroline: An example of my 'both and' would be about both feeling hope and despair. I have hope. I'm an optimist. I am inspired by what a lot of youth activists are doing. Simultaneously, there are times I connect with my despair about what we've done and what we've lost. Both those feelings, emotional responses are really important. I want to feel both because both are real, both are true.

REFERENCES AND FURTHER READING

- Burke, S., Sanson, A. and Van Hoorn, J. (2018) The Psychological Effects of Climate Change on Children, *Current Psychiatry Reports* 20 (35), Springer
- Clayton, S. (2020) Climate anxiety: Psychological responses to climate change, *Journal of Anxiety Disorders* 74
- Taylor, M. and Murray, J. (2020) *Overwhelming and terrifying: the rise of climate anxiety*, Guardian article 10.02.20 (click here to access)
- Trott, C. (2020) Children's constructive climate change engagement: Empowering awareness, agency, and action, *Journal of Environmental Education Research*, 26(4), 532-554

FURTHER RESOURCES

Educating for a Future - Climate Psychology and Eco-Anxiety Course

Last term, in collaboration with the Climate Psychology Alliance, PSTT hosted some online training for primary teachers about supporting children with eco-anxiety. This two session course explored the emotional impact of facing the climate and ecological crisis, and how to identify, make sense of and support 'eco-anxiety' in children so they are able to learn effectively and with emotional resilience. We are planning to repeat this course in the near future. Further information will be available soon on our website – please **click here** or join our mailing list to ensure you receive details of the course when they become available.

The Climate Psychology Alliance -
www.climatepsychologyalliance.org

Climate Psychologists -
www.climatepsychologists.com

Catastrophe or Transformation -
podcast series of conversations about the climate crisis
www.climatepsychologyalliance.org/podcasts/370-3-talking-with-children-about-climate-change

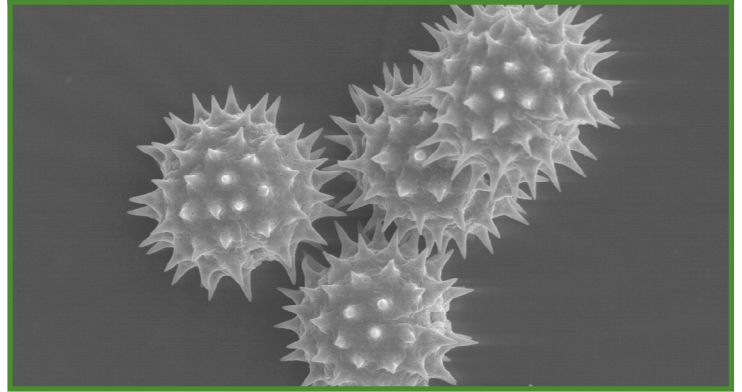
See also the **Climate Science resource page on the PSTT website** – please visit for updates as we are in the process of adding new material www.pstt.org.uk/resources/curriculum-materials/climate-science

Caroline Hickman is a psychotherapist who teaches at the University of Bath & is a member of the Climate Psychology Alliance (CPA) for whom she leads on development of therapeutic outreach services, offering workshops in schools, counselling groups and universities. With CPA she is creating 'Climate Crisis Conversations - Catastrophe or Transformation': a series of podcasts about climate psychology and eco-anxiety. Caroline works with parent groups, youth activist groups and as a psychotherapist with people dealing with eco-anxiety. She is currently researching children and young people's feelings about the climate and biodiversity crisis using a psychosocial free association methodology to uncover and explore different stories, narratives and images around our defences against the 'difficult truth' of the climate and bio-diversity crisis, and our hidden and 'less conscious' feelings about climate anxiety.

FREE RESOURCES

Pictures for talk in primary science

Scanning electron microscope image of pollen grains from a sunflower. The grains are very small – a line of 100 of them would measure 1cm!



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 10 by following the [link](#), and either display on a whiteboard or give children printed copies. Ask the children to work in groups of three to discuss the following questions:

WHAT DO YOU THINK THESE THINGS COULD BE?
WHY DO YOU THINK THIS?

After an initial discussion, tell the children that the picture is of grains of pollen from a sunflower and that they have been magnified so we can see them close up. Ask them to think about how the pollen is transferred from one flower to another; at this point, you might want to show them a picture of a sunflower and a bee – see 'sunflower and bees' and 'close up bee and sunflower'. The latter

shows the bee touching the pollen on the stamens. Ask the children to look again at the pollen grains and to discuss what pollen grains need to be like in order to be transferred by the bee from one flower to another.

FURTHER QUESTIONS TO GENERATE AND PROMOTE THINKING AND EXPLAINING

Why do you think they have spikes?

What else might they be like?

Why is the bee visiting the flower? What does it want?

In what other ways is pollen spread from flower to flower?

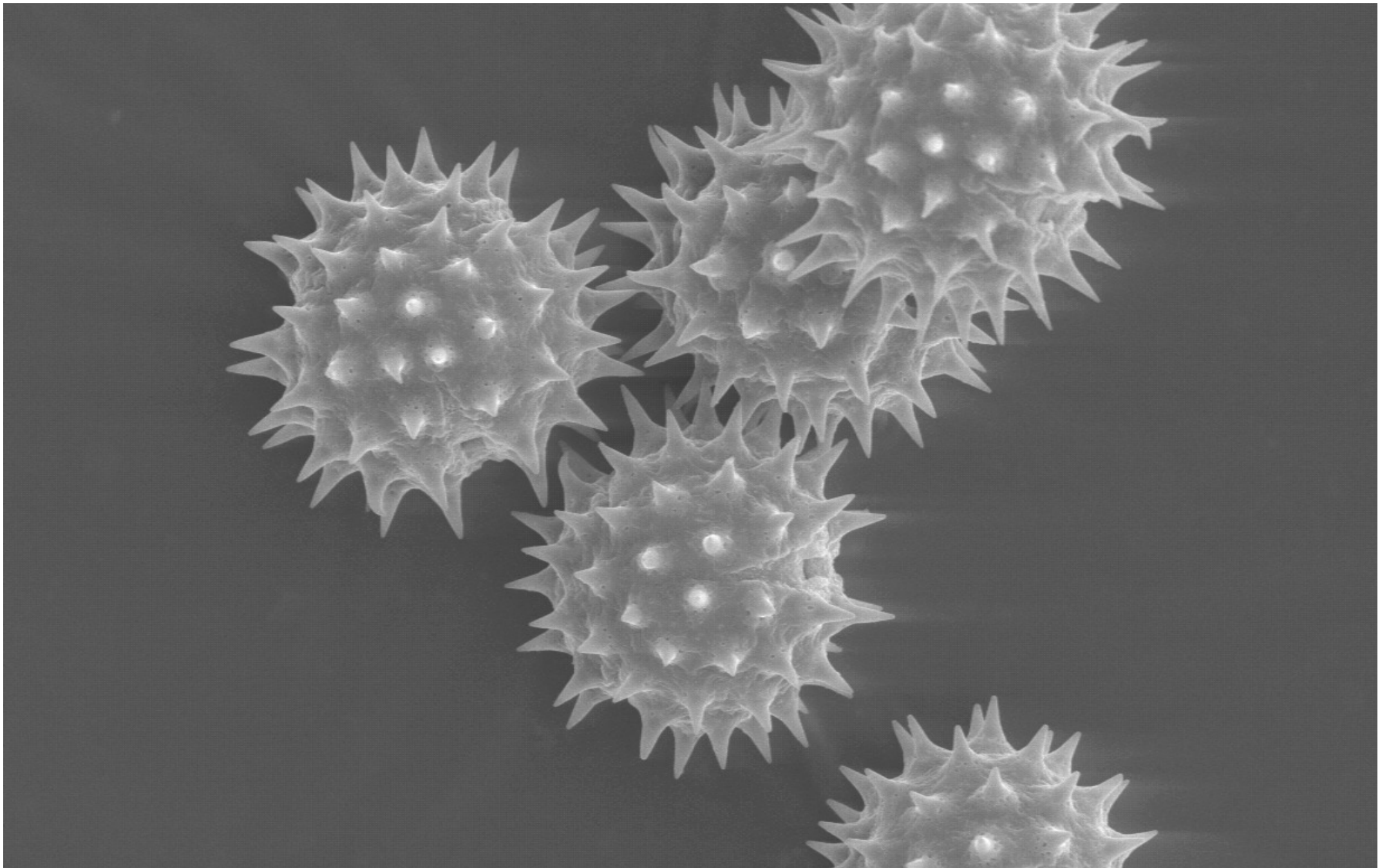
If pollen is spread by wind, what do you think the pollen grains would be like?

Sunflower and bees



Close up bee and sunflower





[CLICK TO DOWNLOAD IMAGES](#)

FREE RESOURCES

From PSTT's
own collection

LET'S GO! STEM TRAILS

A holistic way of looking at science, TECHNOLOGY,
ENGINEERING AND MATHS using the local environment



To coincide with Outdoor Classroom Day on 5th November 2020, we bring you TWO free samples from our popular book, 'Let's Go! STEM Trails'.

Developed by PSTT Fellow Jeannette Morgan, 'Let's Go!' trails draw on the natural and built environment to provide meaningful learning experiences for children. Each trail encourages children to become more aware of their surroundings and to develop responsible attitudes towards looking after them. Each STEM trail is based on a particular topic or area of science, maths, engineering or technology. The trails encourage the children to identify the links between these subjects and to recognise how scientists, mathematicians, engineers and technologists might work together. All the trails can be easily adapted to suit the locality of the school and the needs of the children.

The first FREE trail, 'Let's Go! and 3D Shapes' has a maths focus. It can be completed in the school building and playground. The version included in this newsletter is for younger primary children (aged 4-7).

The second FREE trail, 'Let's Go! Historical Buildings' explores how building materials have changed over time. The trail encourages the children to think about how technology has improved building materials and what sort of challenges engineers have faced over time.

Outdoor Classroom Day is a global movement to celebrate and engage in outdoor learning and play, both at school and at home. Over 9 million children have taken part in the movement so far and any school can join. The Outdoor Classroom Day Movement has freely available

general resources, and on two days a year, additional resources are offered to support teachers with a special learning outside day. The next Outdoor Classroom Day is on 5th November 2020. Click **here** to find out more, to access resources and to join the movement. In response to the global pandemic, they also have advice about how schools and teachers can support children to go outside to play and explore.

Please visit our website to find out more about 'Let's Go! STEM Trails' and the original book in the series, 'Let's Go! Science Trails'.



Jeannette Morgan is a Fellow of the Primary Science Teaching Trust, author of Science and STEM Trails, and science subject leader at Chidham Parochial Primary School, Chichester. She runs the PSTT Southbourne Locality Cluster. She is also a Space Ambassador and part time independent primary science consultant with webpage www.curriculumoutdoors.com

INTRODUCTION

The aim of this Trail is for children to identify common 2D and 3D shapes in the environment. The children will investigate a number of key concepts associated with shapes, including their names and properties and whether they are regular or irregular. They will observe how they are used and where they are found. This Trail may be completed in your school and playground, or you could compare and contrast your school and its grounds with locations beyond the school to give children a wider experience. This is also an opportunity to assess what children already know and identify their next steps. This Trail links with a variety of topics, such as 'Homes' or 'Buildings', or may be used to make a maths lesson on shape more relevant or interesting.

CONCEPTS/OBJECTIVES EXPLORED

- Identify and name common 2D and 3D shapes.
- Use mathematical vocabulary linked to 2D and 3D shapes.
- Describe their properties, including number of sides, faces, corners, edges, etc.
- Understand the terms regular and irregular.

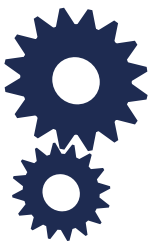
KEY VOCABULARY

Shape
 Square
 Cube
 Rectangle/Oblong
 Cuboid
 Triangle
 Pyramid
 Triangular prism
 Circle
 Sphere
 Cone
 Cylinder
 Pentagon
 Hexagon
 Straight
 Curve
 Corner/Right angle
 Edge
 Side
 Face



LOCATION

- 2 locations in the school building
- 2 locations in the playground
- 2 locations beyond the school grounds



SCIENTIFIC SKILLS

- Observing
- Recording
- Collecting data
- Presenting results
- Drawing conclusions based on evidence

INVESTIGATION TYPE

- Exploration
- Survey
- Classification



RESOURCES AND PREPARATION

Each group needs:

Digital cameras
Clipboards
Pencils/pens
Paper or tally chart proforma
Flat shapes
3D shapes
Sound buttons or tablet computer for recording responses

- Ask the children to identify suitable locations in and around the school, e.g. playground, where they are likely to find examples of a variety of shapes. Ask them to justify their reasons.
- Ask the children to predict what shapes they think they might see and why?
- If the intention is to use the Trail to assess the children's current understanding of shape (e.g. the names and properties that are known), this may be done on the Trail.
- If the Trail is to be used to determine how the children can apply their knowledge of shape, ensure that any key vocabulary or concepts are taught in advance.
- Some children will need support, such as examples of common shapes or a shape identification sheet.



ON THE TRAIL

WHAT TO DO

- **Activity 1:** Walk around as a class, looking for shapes within the environment. Some shapes may be found in isolation, whereas others may be within or part of a structure. Ask key questions 1 – 3.
- **Activity 2:** Ask the children to choose a shape and find 3 examples in the environment. They should either record or photograph these (ensuring the flat shape/vocabulary card is in the photograph). Ask them to look for examples that are different sizes and made of different materials.
- **Activity 3:** Ask the children to look for shapes that have the following properties and record or photograph them (you can add to this list or modify it depending on the age of the children):
 - A straight line (or edge)
 - A corner (or right angle)
 - A circular edge
 - A shape with 3 sides and/or a 3D shape with a triangular face
 - A shape with 4 sides and/or a 3D shape with a square/rectangular face
 - A shape with 5 sides and/or a 3D shape with a pentagonal face
 - A regular shape
 - An irregular shape
 - A shape with an acute angle
 - A shape with an obtuse angle
 - A shape with the greatest number of vertices.
- **Activity 4:** Ask key question 4. Children could complete a tally chart of common 2D and 3D shapes.
- **Activity 5:** Ask key questions 5 and 6. Ask the children to photograph or record the most unusual shape they can see.
- Ask key question 7.
- Go to a new location and repeat, or finish the Trail in school.



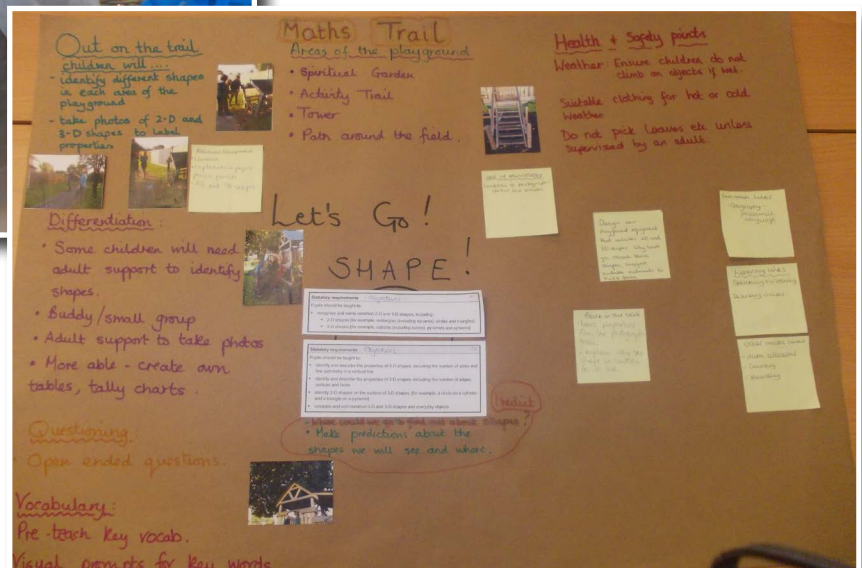
KEY QUESTIONS

- 1 Can you name each of the shapes we can see?
- 2 Can you tell me something about the shape you can see?
- 3 What are the properties of this shape?
- 4 What is the most common shape we can see?
- 5 What is the most unusual (irregular) shape you can find?
- 6 Why is it unusual – what are its properties?
- 7 What shapes didn't we see?



BACK IN THE CLASSROOM

- Discuss what shapes were seen and why some shapes were regularly found and others were not.
- Ask the children to record the properties of their shapes on post-it notes, attaching these to their photographs or drawings.
- Ask the children to create graphs or pictograms using data collected, answering the questions: Which were the most common/least common shapes? How do you know that?
- Children could use their knowledge of the shapes seen in the environment to design a structure related to their topic.





HISTORICAL BUILDINGS

DO OLD BUILDINGS USE THE SAME MATERIALS AND SHAPES AS NEWER ONES?



INTRODUCTION

The aim of this Trail is to encourage children to look at historical buildings, comparing and contrasting these with modern ones, so they can see how buildings have evolved over time. They will look at both the materials and shapes used to make the building and think about how technology and engineering were different in the past. How were construction problems solved without the use of cranes, other modern technology or tools? This Trail was originally completed by children doing a Tudor topic in school, studying Tudor houses at a local museum; however, the principles investigated could be applied to any historical building in other history topics. By looking at a common building, such as a house, the children were able to draw on their experiences of modern day buildings to ask their own questions about historical ones. Buildings used for other purposes could also be considered on this Trail.

KEY VOCABULARY

Materials
Property
Hard
Transparent
Flexible
Rigid
Natural
Brick
Stone
Lime
Mud
Wood
Wattle
Daub
Stone
Thatch
Shape
Rectangle
Square
Triangle
Hexagon
Angle
Right angle
Construction
Foundation
Walls
Roof

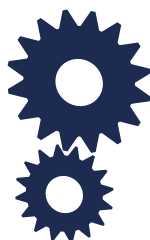
CONCEPTS/OBJECTIVES EXPLORED

- Materials can be used in a variety of ways.
- Materials are chosen for specific purposes depending on their properties.
- There are similarities and differences between common materials.
- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.



LOCATION

- Any historical building or location, e.g. museum, church, cathedral, Tudor house, castle, Roman villa



SCIENTIFIC SKILLS

- Observing
- Measuring
- Recording
- Collecting data
- Presenting results
- Drawing conclusions based on evidence

INVESTIGATION TYPE

- Exploration
- Survey
- Classification
- Changes over time



RESOURCES AND PREPARATION

Each group needs:

Digital camera
Clipboards
Paper or proforma to record the answers to questions
Pens/pencils

- Science – look at modern day equivalents of the building you are visiting. Look at pictures; discuss what construction materials have been used and why these materials have been chosen.
- Technology – discuss how technology has improved building materials, and modern living. When were the materials invented? Who created them?
- Engineering – what is the purpose of the building and how do the children think it was constructed? What problems might the builders have faced?
- Maths – ensure that children have a good knowledge of 2D and 3D shapes, and can name these. What shapes can be seen/are used in modern day buildings and why? Remind them of key vocabulary and explain that shapes will be looked at inside and outside the building; could be used for patterns or tessellations and in furniture, etc.



ON THE TRAIL

WHAT TO DO

- Look at a building of interest and discuss both the construction materials and the shapes that can be seen in use. In their discussions about materials, ensure that the children look at the roof, walls, windows, window frames, doors, door handles and other small features. When looking at the shapes that have been used in constructing this building, ask the children to identify and name common 2D and 3D shapes.
- Work in small groups. Each group focuses on one common material and one shape (e.g. wood or glass, rectangle or triangle) and identifies and records information: where they have seen it; how frequently; how many different types of objects or buildings it has been used to make. Children should record using writing, drawing and photographs.
- As a class, discuss why these materials were chosen for this building and how they are different from or similar to those seen in buildings today. Ask key questions 1 – 4.
- Discuss why the shapes were chosen for this building and how the shapes chosen make the construction stable. Ask key questions 5 – 7.
- Ask the children to find out how the building was built (either using information displayed or by asking a member of staff). Can they see any evidence that would help them to answer this question? Can they find out what technology was used to make the building (e.g. the development of tools or practices like glass-making)? What engineering or problem-solving was needed at the time the building was constructed?



KEY QUESTIONS

- 1 How have building materials changed or developed through time?
- 2 What materials are available now that were not when this building was built? E.g. plastic in uPVC windows, etc.
- 3 Is there evidence that the building has been restored or mended using more modern materials?
- 4 What is this evidence?
- 5 Have the shapes used in this type of building changed over time?
- 6 Are there any unusual shapes or structures in this building that are not seen commonly today? E.g. domed roof, spire, etc.
- 7 What is the function of these shapes?



BACK IN THE CLASSROOM

- Look at how materials used for buildings and internal features have changed/developed over time. Children could make a poster of how the materials used to make buildings have been developed, when they were first used and their modern day equivalents, if any.
- Children could make a model of their historical building, thinking about materials they would use and how to construct it.
- Look at tessellations and patterns in the building and investigate this with other shapes, both regular and irregular. Children may also have their own investigation ideas.





FREE RESOURCES

Science for One -
Further ideas

SCIENCE FOR ONE

Ideas for doing **practical science** while **respecting social distancing**
Each activity is based around **one easy to obtain resource**

Encouraging dialogue and building skills through practical primary science now poses more challenge due to the constraints of bubbles and resource sharing. However, practical science and all the benefits it offers is still something that can be safely planned and carried out in the primary classroom.

PSTT's **Science for One** series consists of activity sheets to support teachers with providing practical science lessons while respecting restrictions around mixing groups, and where access to central resources is limited. Originally designed in response to the need for children to work on their own, the activities work equally well with children working in groups. The activities can also be done outside.

Each activity sheet is based around **one easy to obtain resource**; often these are junk or recyclable and single-use. Some activities require paper, pens, pencils, rulers and scissors. Any additional resources needed are minimal and should not be difficult to provide. Activities explore different curriculum-linked science topics and suggestions are given for three age ranges. Each activity includes links to interesting follow-up ideas, which can be used in school or shared as a home-based activity.

Many of the activities are exploratory or involve trial and improvement, so opportunities for discussion are important for the children to make progress with thinking and explaining. If the children are working independently with their own equipment, they should be encouraged to talk in pairs or groups about what they are doing.

HOW SCHOOLS ARE USING SCIENCE FOR ONE

Science for One has supported a range of collaborative and practical science in schools.



The Science Leader at Hollyfield Primary has used the resource both at school and home with her own children where it generated a discussion about the features of different types of minibeasts.

"Making mini-beasts using tin-foil. A lovely activity that my boys enjoyed, creating their own versions of known creatures!"

Janet Morris, Sutton Coldfield



Children at St Augustine's School in Coventry have maintained social distance whilst exploring structures using the Straws resource. Children began with the 3 straws and then added others, each time discussing how it changed the overall height of their structure and what adaptations they needed to make.



Year 1 children at Ashurst Primary made some fantastic foil models of their favourite animals using the Science for One resource. They compared and contrasted the key features of their creations.



Year 3 and 4 children at Grenoside Primary made solar ovens, which led to some great scientific discussions about reflection, as well as melting and changes of state.



This home-learner used straws to create Flying Tornadoes. She predicted a narrower collar would be lighter and should fly further and she realised that she would need to carry out more flights to decide if her prediction is true.

Because of its simplicity and versatility, Science for One has had national acclaim. During an @primary_sci twitter discussion at the recent online Ogden Trust conference, it was named as the **'favourite resource discovered over lockdown'**.

Science for One consists of 8 activity sheets which can be downloaded **here**. They are based around the following resources: cardboard box, drinking straw, foil, playdough, egg box, cup, coat hanger, plastic bottle. The activity sheets also provide a framework for teachers to create their own practical science enquiries using resources that schools can safely and easily access.



SCIENCE FOR ONE – FURTHER IDEAS

SOME STARTER SUGGESTIONS FOR OTHER RESOURCES THAT COULD BE USED

Resource	Additional resources needed	Hook or prompt to engage the children	Starter questions	Further questions
PAPERCLIP	<i>Magnets</i>	Alisha says large magnets will pick up more paperclips. Oliver thinks the size of the magnet does not matter.	- Does the size of a magnet affect how many paper clips it picks up? - What is the longest chain of paperclips a magnet can hold?	- Can different materials block magnetism? - Do magnets work in water?
ELASTIC BAND	<i>Open containers</i>	True or false? The tighter an elastic band is wrapped around an open container, the lower the sound when the band is plucked.	- Does the tightness of the band affect the pitch the sound? - Does the tightness of the band affect the volume of the sound?	- Does the size of the container affect the pitch of the sound? - If the container contains different materials, does the sound change? - If you use more elastic bands, how could you play a tune?
COIN	<i>Selection of materials (e.g. foil, paper, plastic)</i>	Jonah says he can find a way to make a coin float on water. How would he do this?	- Can a coin float if it is placed on a flat piece of material? - Which materials allow a coin to float on water?	- Do all plastic materials allow a coin to float? - What do materials that allow a coin to float have in common?

SCIENCE FOR ONE WAS CREATED BY KATE REDHEAD AND ALI ELEY



Kate Redhead
Regional Mentor



Ali Eley
Outreach Director

Before starting any Science for One activities we recommend that you **refer to our website** for safety notices, including up to date guidance from CLEAPSS.



Science at Work Series 2

Meet scientists from the past and the present
Learn more about people who do jobs that use science

In this new series, PSTT is creating two page activity sheets about past scientists or people who worked in science related jobs, and opportunities to 'meet' them will be available through Spectrum Drama. The activity sheets include information, links to find out more, and spaces for children to write and draw, and to record questions they would like to ask the scientist.

How to 'meet' Mary Seacole – key information:

- Session date and times: 23rd November at 10.30, 12.00 and 13.30
- One school per session and schools can include as many children as they wish
- Children's questions for Mary can be sent to Spectrum Drama in advance of the session

Only three sessions available, so book quickly to avoid disappointment! If demand is high Spectrum Drama may offer further sessions. Please visit their website for updates about this.

Note that children's questions cannot be submitted to PSTT; all arrangements for meeting Mary Seacole need to be made by schools contacting Spectrum Drama direct. Any questions about the process for booking a session to meet the scientist should also be addressed to Spectrum Drama.

Download the Mary Seacole activity sheet [here](#).

SCIENCE AT WORK

All about **Mary Seacole**

WHAT DID MARY SEACOLE DO?

During the Crimean War, Mary Seacole worked as a nurse and a doctor. She took Mary King's class, leading her mother and sister, and played piano. She was a Jamaican, and she was the first woman to be a nurse in the British Army. She was also a doctor, and she was the first woman to be a doctor in the British Army. She was also a doctor, and she was the first woman to be a doctor in the British Army. She was also a doctor, and she was the first woman to be a doctor in the British Army.

Mary Seacole and Florence Nightingale

During the Crimean War, Mary Seacole worked as a nurse and a doctor. She took Mary King's class, leading her mother and sister, and played piano. She was a Jamaican, and she was the first woman to be a nurse in the British Army. She was also a doctor, and she was the first woman to be a doctor in the British Army. She was also a doctor, and she was the first woman to be a doctor in the British Army. She was also a doctor, and she was the first woman to be a doctor in the British Army.

Did it make sense to photograph it?

Yes, it is a very famous photograph of Mary Seacole, taken in London in 1870. It is a very famous photograph of Mary Seacole, taken in London in 1870. It is a very famous photograph of Mary Seacole, taken in London in 1870.

FIND OUT MORE

Visit Mary Seacole Trust. Lots of information and pictures to look at. Visit Mary Seacole Trust. Lots of information and pictures to look at. Visit Mary Seacole Trust. Lots of information and pictures to look at.

Find out more about the challenges Mary Seacole faced in a lesson plan.

You might like to read **The Wonderful Adventures of Mr Seacole** in the book club.

Curry's

FIND OUT MORE ABOUT SCIENCE AT WORK

Science at Work Series 1 is a set of six activity sheets to accompany videos in which past scientists (played by an actor) and present scientists talk about their work and answer questions submitted by children. There is a two page activity sheet for each scientist with information about them and what they do, plus lots of links to related topics and activities. Children are encouraged to think of questions they would like to ask the scientist and although there is no longer an opportunity for them to send these__ in, the children are quite likely to hear the scientist answer the same or a similar question when they watch the video.

Click here to download the Series 1 activity sheets and watch the videos.

PSTT has been pleased to work collaboratively with Spectrum Drama on a number of Science at Work activities. However, it should be noted that the links above to Spectrum Drama's website are provided for information purposes only and that PSTT does not have any input into, or control over, Spectrum Drama's website, content, resources, experiences for schools, or any of the services it provides, nor does PSTT have any financial agreement with, or commercial interest in, Spectrum Drama. Whilst we hope that you enjoy your school's experience with Spectrum Drama, PSTT is not responsible for, and does not endorse, the services Spectrum Drama provides and accepts no liability in relation to, and is unable to comment on, those services or any arrangements made between any school and Spectrum Drama.



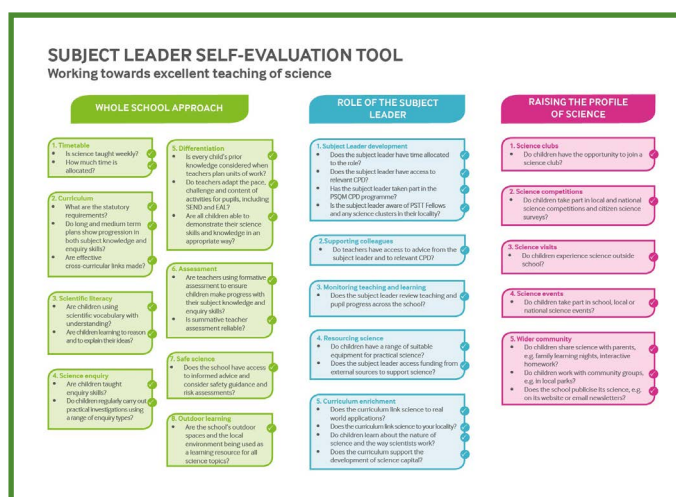
FREE RESOURCES

Subject Leader
Support

Are you a science subject leader in your school and wondering how to raise the profile of science? Have you just been given the role of subject leader for science and wonder where to start?

Taking on the role of science subject leader can sometimes feel daunting, even for experienced teachers with previous responsibility for other subject areas. Whether you are new to the role and are not sure where to start, or have been leading science for a while and want some specific advice, the new **Subject Leader Support pages on the PSTT website** offer extensive support. The resources are organised into three sections: developing a whole school approach, the role of the subject leader, and raising the profile of science in across the school.

The **Subject Leader Self-evaluation Tool** is a downloadable resource that will enable you to audit the science provision in your own setting and to formulate a manageable action plan.



The Subject Leader Self-evaluation Tool introduces three areas for subject leaders to consider:

Whole school approach

This section describes practices to embed across the school.

Role of the subject leader – this explains why schools need a subject leader and suggests how subject leaders could develop science teaching and learning across their school through the provision of relevant training for staff, monitoring processes, resources, and activities for curriculum enrichment.

Raising the profile of science – this provides guidance on extracurricular science activities that could enhance children's learning and enthusiasm for science.

Each area is divided into sections that can be reviewed individually, making evaluation of science teaching and learning processes clear and manageable. Three tabs on the Subject Leader Support webpage, corresponding to

these three areas, provide easy access to information, guidance for further development, and links to useful resources. A fourth tab provides access to free downloadable resources that may be useful for subject leaders including a pupil voice questionnaire, a teacher questionnaire and a list of funding opportunities for primary science.

Further support for developing leadership of primary science

The Primary Science Quality Mark (PSQM) is a CPD programme that provides schools with a framework and professional support for developing teaching and learning and leadership in primary science. PSQM enables schools to raise the profile of science and to celebrate excellence in science provision. Subject leaders taking part are supported through working with others in a local hub which is facilitated by an experienced hub leader. Click [here](#) for further information or contact Melissa Nice on PSQM@herts.ac.uk



THE PSTT REGIONAL MENTOR PROGRAMME

Established in 2017, PSTT's Regional Mentor Programme was set up to provide practical help for teachers who, for various reasons, have been unable to access the support they need to develop the science provision in their schools as they would like. As an organisation, we responded to a clear demand, particularly from teachers who had been given responsibility for leading science and lacked confidence to do so effectively.

As the Programme moves into its fourth year, we have asked some of the Regional Mentors to share experiences from just a few of the many requests they have received.

Kate Redhead discusses her experience with one of the many schools with which she has worked. She comments: *One of my favourite things about the Regional Mentor role is that every school is different, and that for a period of time, I have the privilege to work alongside the school team to support moving things forward. This has particularly been the case at Paganel Primary in West Birmingham, where a new Headteacher got in touch initially for support on establishing where science was in school, appointing a subject leader and deciding on priorities. With no science leader and QCA schemes in use, there was a lot to do and an awareness that action was needed swiftly but this needed to be appropriate and manageable for the staff team.*

The science leader and headteacher worked tirelessly to encourage teachers to make changes that would work for their school; implementing a revised and enriched curriculum, supporting staff and making science a subject that the children look forward to. As a mentor coming into the school, what I was able to offer was a fresh look on what had become a rather neglected subject and ensure support and guidance was there to access resources and training to bring about change.

Key to impact here has been the ability to support over time. Now with an established science leader, a progressive curriculum and a science lab in school, Paganel has recently had a successful Ofsted visit with science recognised as a strength.

"Science has moved from an area of concern to a real strength in school. We've been approached within our consortium to share how we've impacted this change and, when things change nationally, Kate will be providing training to the group."

- Head Teacher



"Working with Kate has given me the confidence to introduce an entirely new approach to science at Paganel. I have been introduced to inspiring and incredibly useful resources to support teachers with planning and delivering science and now the majority of our lessons at Paganel have a practical focus."

- Science Subject Leader





Kulvinder Johal expresses similar sentiments. She notes: *All schools are striving towards the same rich outcomes for their pupils. My role is in making a difference to a school by helping on their particular journey to improvement. I am a critical friend.*

In one school, Science had been mentioned in the last Ofsted report as an area for improvement. The key issue was identifying whether the scheme they were using covered all the science national curriculum; there were huge gaps. Once the subject leader could see this, we were in a position to reconfigure the science curriculum. Science was also referred to as 'Topic', recorded only in a topic book and was part of topic work on the timetable. We discussed that it was a core subject and needed a raised profile and a clear place on the timetable. The subject leader felt empowered and able to speak to her SLT and this led to whole school change. So, from just a few meetings, we had a confident, empowered, strong subject leader, who could see where she needed to get to and felt she had the support behind her to make improvements. In my role, I was able to give her that clarity, support and direction. To support and develop her confidence further, we have planned and delivered CPD to staff and planned a science day together. When the school was due to have a 'Mocksted' and as the subject leader had made so much visible, tangible progress with science, it was chosen as one of the deep dive areas. I was asked to work with the colleague, to prepare and guide her, and give her confidence as she had not faced an inspector in that way.



"With the Science, they were pleased with the way the planning was looking from the curriculum to the teacher planning and how that translated from the teaching to the children... From a personal point of view, Kulvinder has given me more confidence and information to draw on for the future visit and an idea of how that might pan out

next time! I'm sure there will be times in the near future that Kulvinder's services will be requested again, so that I can work with you on things that they suggested to improve on!"

- Science Subject Leader

Ruth Shallcross, who as part of her role is also a consultant trainer for the National Literacy Trust, shares an example of working with a number of schools in London with a specific focus on science and English projects.

Ruth notes: *As most primary educators know, supporting children to develop a scientific voice can be challenging due to the unique demands of scientific communication. These projects use creative strategies to first understand the science subject knowledge and then to acquire the vocabulary and grammatical structures required for effective spoken or written communication.*

In one school, I worked with years 1 – 6 to create science schemes of work which worked alongside English lessons. For example, this involved linking a year 5 topic on life cycles and with non-chronological reports. The approach was for the content learnt in the science lessons to deepen and enrich the quality of the scientific writing produced in the English lessons.

"Working with Ruth was a wonderful experience. I learnt to organise regular lesson plans into clear categories which mapped out my knowledge, vocabulary and outcomes in such a simple but effective way. I don't think I would teach science with a writing project differently again. The planning strategies I developed during this process allowed me to not only teach science clearly and in an exciting way for the children, but I grew more confidence in myself which always leads to wonderful lessons."

- Year 4 teacher, North London

"I found working with Ruth hugely inspiring. Her enthusiasm and creative ideas, coupled with an organised and meticulous approach, meant that our planning was perfectly aimed towards the needs of our children. The children were all engaged in the whole writing process and I was impressed how all abilities were confident in using scientific vocabulary with purpose in their writing. The outcomes were really high quality and they will never forget about asexual reproduction."

- Year 5 teacher, North London

Tom Holloway has significant experience of delivering support to multi-academy trusts (MATs). The Xavier Catholic Education Trust is a MAT which consists of 11 primary schools and 3 secondaries schools based in Surrey and Sussex. Tom Holloway started working with this Trust in the last academic year. Initially he ran a half-termly network meeting for Science Leaders that focused on sharing latest best practice and teaching ideas, then providing CPD for individual schools within the MAT. This often consisted of working with groups of teachers to plan outstanding science lessons and delivering training at staff meetings. During the school lockdown he has continued to provide support to schools via a series of webinars.

This academic year, Tom is continuing to provide support to Xavier primary schools and science leaders. This includes helping to develop a whole-MAT approach to science moderation and working with the Xavier secondary schools to develop a project to support the transition of Year 6 children into Year 7. Tom is also now working with the Teach South East Primary SCITT (which is part of the Trust) to provide training for SCITT students.

"We have been working with Tom for the last year and it has transformed science learning and teaching in our schools. Tom has helped to support Science subject leaders and has shared excellent science resources and planning to improve practice and offer bespoke support to each school. Teachers have found a new passion for teaching science and are well equipped to deliver the science curriculum to a high standard. Tom is so engaged and enthused by science which has motivated all our science leaders and provided them with outstanding CPD!"

- Trust Primary Development Lead

Like so many others, our Regional Mentors have adapted to current circumstances by providing the majority of their support online. As part of PSTT's wider support for schools in these difficult times, we are pleased to announce that our Regional Mentor team will be offering a series of webinars, starting in late October. The six webinars focus on different aspects of science teaching and leadership for which teachers frequently ask for assistance. Mindful of the current circumstances that schools are facing, these webinars will be **freely accessible to primary teachers throughout the UK**. Each webinar will be delivered 'live' to ensure teachers have an opportunity to interact fully with our Mentors and will be suitable for all classroom teachers, whether or not a science subject leader. Click **here** for more information.

2020 WEBINAR DATES AND TOPICS:

21 October – Ruth Shallcross - English and Science

4 November – Kate Redhead - Outdoor Learning

11 November – Tom Holloway - Maths and Science

18 November – Kulvinder Johal - Cross-Curricular Planning

25 November – Claire Seeley - Teachers' Questions

2 December – Sarah Eames - Science Subject Leadership

All webinars will begin at 4 pm and last around 45 mins to 1 hour (max).

If you would benefit from advice from any of our Regional Mentors, please contact the PSTT office.

OUR REGIONAL MENTORS



Sarah Eames
East Midlands



Kathy Schofield
Wales



Claire Seeley
East Anglia



Tom Holloway
London and the South East



Kulvinder Johal
London and the South East



Kate Redhead
Birmingham and Midlands



Ruth Shallcross
London and the South East



I BET YOU DIDN'T KNOW...

Some mammals have unusual backbones



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

Morphology, in biology, is the study of the size, shape, and structure of animals, plants, and microorganisms and of the relationships of their constituent parts. Comparing the structure of animal bones with their function and motion helps scientists to understand how animals are adapted to their environment and how they might adapt to changes in their environment.

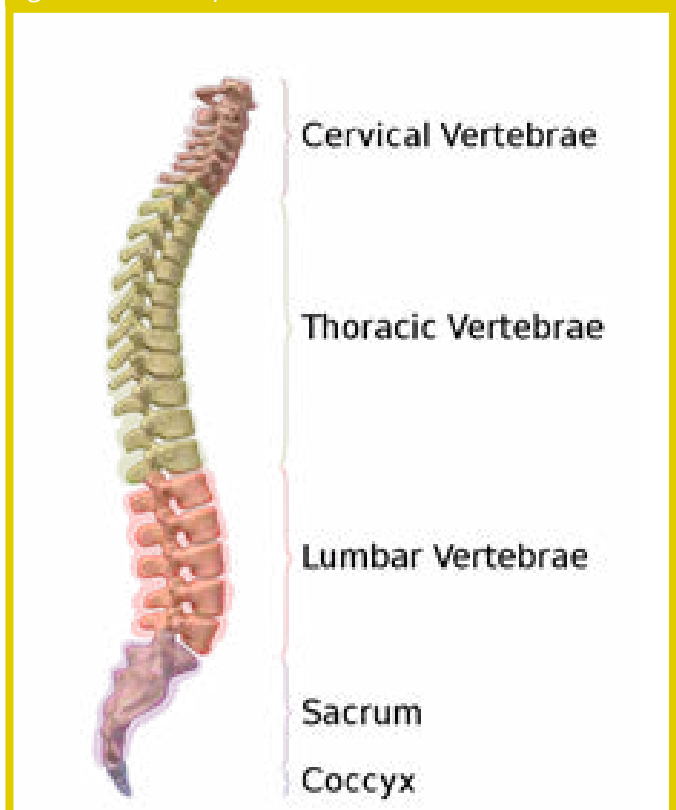
We know that different shaped bones in our bodies have different functions: the skull protects our brain, our ribs protect our heart and lungs, large bones in our legs and arms can carry heavy loads, smaller bones in our hands and feet allow us to manipulate tools.

Questions for children to consider:

- If both our skull and ribs protect important internal organs, why are they so different?
- Why are there so many bones in our backbone (Figure 1)?
- Can you think of examples of how the size and shape of an animal's bones are suited to its behaviour or to its habitat?

Sometimes scientists find structures (morphologies) in living organisms that they cannot explain. The hero shrew is a large shrew (12-15 cm) that lives in the forest undergrowth in the centre of Africa and is rarely seen by humans (Figure 2). It has a spinal column unlike that of any other known vertebrate. Most of its backbones (vertebrae) are covered in finger like bumps called tubercles. The bumps from one vertebra interlock with the bumps of the adjacent vertebra forming a dense

Figure 1. The human spinal column has 33 small bones (vertebrae).



https://en.wikipedia.org/wiki/File:Segments_of_Vertebrae.svg
CC BY-SA 4.0
DrJanaOfficial

column (Figure 3). Scientists already know from previous studies that the bottom of the spine behaves as a single rigid bar. As a result, this shrew has an odd walk with its spine flexing in a snake-like manner. Researchers have observed an animal for several months but have been unable to explain a use for this unusual spinal column. The function of this modified spine is mysterious.



Figure 2. A hero shrew (*Scutisorex somereni*) and a partial skeleton showing the enlarged backbone.



https://commons.wikimedia.org/wiki/File:Scutisorex_somereni_Skelett.jpg
CC BY-SA 3.0
Peter Spelt

To try to find out why this shrew has such an unusual backbone, evolutionary biologists, Stephanie Smith and Kenneth Angielczyk, measured the external and internal features of vertebrae of two species of hero shrew (known simply as hero shrew and Thor's hero shrew) and compared these with the spine of a closely related shrew of a similar size (goliath shrew), which has a more typical mammalian spine.

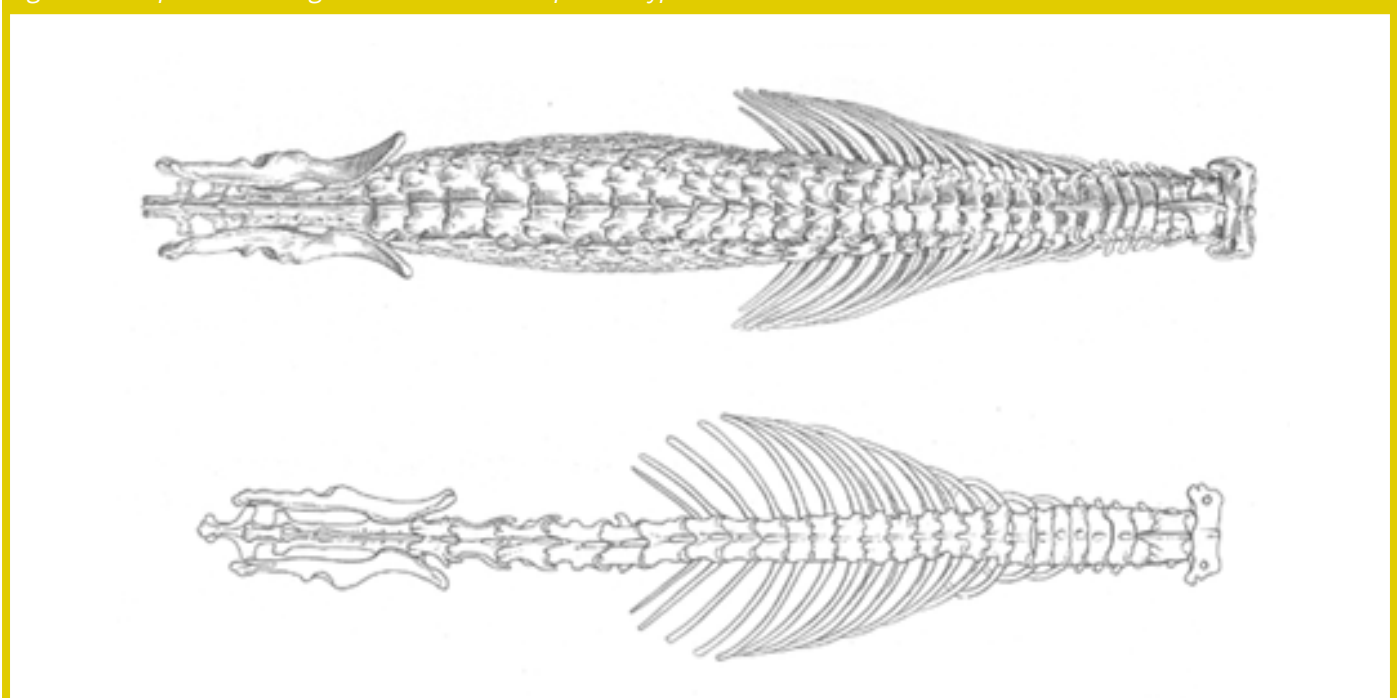
Firstly, adult specimens of twenty shrews from the Field Museum of Natural History in the United States were x-rayed and images of the vertebrae were created using computer programmes. Using these images, the scientists investigated the external structure of the vertebrae: they measured the sizes of individual vertebrae and counted the number of tubercles on the surfaces of each vertebrae.

They found that the different species of shrew had different numbers of vertebrae in the region between the neck and bottom of the rib cage (the thoracic region) (Table 1) but have a similar total spinal column length. The numbers of tubercles on the vertebrae were on average higher in a hero shrew than a Thor's hero shrew but in both species the numbers on each vertebra increased from position 1 (nearer the head) to position 15-17 (nearer the tail).

Table 1. The number of thoracic vertebrae in different species of shrew.

Species	Number of samples	Number of thoracic vertebrae
Hero shrew	13	23-25
Thor's hero shrew	3	22
Goliath shrew	4	19-20

Figure 3. The spine and rib cage of the hero shrew (top) and a typical shrew (bottom).





The scientists also measured features inside each vertebra. The main portion of a vertebral bone, the body (Figure 4), is made of a spongy form of bone containing rod-shaped structures called trabeculae. The structure of the trabeculae can provide information about the physical loads that a bone can withstand in a live animal. The scientists hoped that comparing the trabecular bone structure of the hero shrews and the shrew would help them to understand the function of the hero shrew's spine. They found that the number of trabeculae were higher in both hero shrews (highest in the hero shrew) compared to a goliath shrew. Also, the thickness of the trabecular is greater in the hero shrews than the goliath shrew and mostly increases through the vertebral column in hero shrews, whereas it decreases in the goliath shrew.

From their studies, the scientists concluded that the spines of both hero shrews had evolved to withstand more frequent and greater forces than the more typical spine of the goliath shrew, with the hero shrew having developed a more extreme modification than the Thor's hero shrew.

Although these results do not solve the mystery of how the hero shrew uses its unusual spine, the methods that the scientists have used could be useful for understanding how other small mammals experience forces, and for tracking the evolution of characteristics in extreme vertebrates.

Questions for children to consider:

- Why do you think the hero shrew has a thickened backbone?
- Do you think the hero shrew has an advantage over other shrews that have more 'normal' backbones?
- What would it be like for a human to have vertebrae with many tubercles? How would this change how we move? What advantages/disadvantages might we experience?

Figure 4. Superior view (looking down) of one human thoracic vertebra showing wing-like projections which muscles and ligaments attach to, a hole in the centre which the spinal cord passes through, and a large area of spongy bone called the body.



GLOSSARY

Mammal – a warm-blooded vertebrate animal that has hair or fur, females that produce milk for feeding their young, and (typically) gives birth to live young

Species – a group of living organisms capable of breeding and producing young

Trabecula(e) – rod or pillar-shaped structure(s) that provide support within an organ, for example in bone

Tubercle - a small rounded projection, especially on a bone or on the surface of an animal or plant

Vertebra(e) - small bone(s) forming the backbone, with a hole through which the spinal cord passes

Vertebrate - an animal with a backbone or spinal column

The research paper that inspired this work was:

Deciphering an extreme morphology: bone microarchitecture of the hero shrew backbone (Soricidae: Scutisorex).

By Stephanie M. Smith and Kenneth D. Angielczyk.

Proceedings of the Royal Society of Biology (2020) 287: 20200457.

<http://dx.doi.org/10.1098/rspb.2020.0457> Accessed 4.8.20

Both authors work at the Field Museum of Natural History, Chicago, USA.



PSTT COLLEGE SNAPSHOT

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

Kathryn Horan



West Yorkshire



Teacher & Independent Consultant



Year of award: 2016

Most used piece of equipment in your science cupboard?

Our USB microscope gets a lot of use because it's just so versatile. Whether we're getting a closer look at something in the curriculum (such as plants, materials or our food) or just taking a closer look at something that we are curious about, the children love using it and it always sparks lots of questions.

Most enriching off-site science event?

Visiting a local park to look at the plant and animal life, the materials used in different places or forces in action always works really well. They're often so close by that no expensive transport is needed. The children love accessing a familiar place as part of their school day and I've found that they often revisit the area with their family afterwards, share their learning and discover new things that they love to talk about back at school.

Best STEM visitor to school?

We had a visitor in from a local university who worked on some engineering challenges with our children. She did a great job of making them aware of what engineering actually is and how relevant it is to our everyday lives. Even a year later, pupils could still talk about what they had done that day, as well as the science behind it, and some of them even expressed an interest in becoming engineers when they grow up. It is worth contacting your nearest university or further education college to see what they can offer.

Jenny Lister



London



Science Teacher



Year of award: 2018

Most used piece of equipment in your science cupboard?

Hand-held microscopes. Without a doubt, for any age of child (or adult) these can engage and encourage anybody to properly observe what is around them. Looking at hair, skin, carpet and clothing is just incredible and so easy to do. My other favourite pieces of equipment, not used as much but always on display, are my telescope and vintage microscope.

Most enriching in-school science event?

I ran a star-gazing event for all the children in my school, inviting families and the local community to come as well. Children arrived in pyjamas, were read space-themed stories in fairy-light decorated classrooms, then had some hot chocolate and star-shaped biscuits before going out into the playground to star-gaze using binoculars and telescopes.

Best STEM visitor to school?

Members of the Education and Outreach team at the Royal Astronomical Society. Every single child was captivated by what they talked about.



Mark Lynn



Buckinghamshire



Science co-ordinator



Year of award: 2013

Most used piece of equipment in your science cupboard?

The Earth ball - a great resource for teaching Earth and space, and easier for children to handle than a globe.

Most enriching off-site science event?

The workshops at the Royal Institution workshop are a fantastic opportunity for all keen young scientists. Many of their events are livestreamed so they are available for schools not within reach of London.

Best STEM visitor to school?

We had a visitor from Bloodhound Land Speed Record. They were able to share great insights into engineering and the children could see how engineers apply science to what they do. Bloodhound education has free resources for schools.

Lisa Newton



Lancashire



Class Teacher & Science Lead



Year of award: 2007

Most recommended book for supporting teaching in science?

The PSTT resource, 'Standing on the Shoulders of Giants'. The activities in it are brilliant for teaching different scientific concepts while giving the children opportunities to find out about a range of older and contemporary scientists and how they work to shape our world.

Most enriching off-site science event?

Our local beach! It's a great place to go and look for different kinds of rocks and materials and is a great contrasting habitat to our school grounds.

Best STEM visitor to school?

A few years ago we were lucky enough to get a microbiologist to come and visit us - she was a super role model for children to help dispel the myth of scientists being males in white lab coats and she brought with her lots of microscopes and interesting things to look at under them. She made a topic that could appear to be quite difficult and dull really exciting and accessible to everyone. The children were really engaged and got a lot out of the visit.



Lorna Stevenson



Northern Ireland



Senior Teacher



Year of award: 2014

Most used piece of equipment in your science cupboard?

The TTS Easi-Scopes are a favourite which never make it back to the science cupboard. They are so easy to use and I love to watch children's reactions as they see the images.

Most enriching off-site science event?

A science trip doesn't have to involve a long journey, it can be anywhere in the locality near your school. We like taking children to a forest or park which they may have previously visited for a walk or to play, but the learning opportunities beyond this are endless, and it is such an easy way to get children outside.

Best STEM visitor to school?

A local farmer! It hadn't occurred to the children just how much science is involved in agriculture, from the gases released when mixing slurry, to choosing the correct fertiliser to help crops grow, to animal husbandry.

Toby Tyler



Greater Manchester



KS1 Teacher



Year of award: 2013

Most recommended website for supporting teaching in science?

The 'Unleash' networks on Facebook are brilliant for ideas, resources, discussions and opportunities in primary science. They are a great support for teachers, particularly those working in early years. There are always new ideas being added and teachers value being part of a supportive community.

Most enriching off-site science event?

A local disused green space (the site of an old golf course and factory) which is a short walk from our school. When the children start to look more closely at a local alternative environment they identify an extraordinary range of wildlife right on their doorstep. It brings everything from the classroom to life and has tangible links to their community.

Each of our College Fellows has won a Primary Science Teacher Award. Fellows are instrumental in the dissemination of best practice from the work of the Trust. They develop many creative and innovative ideas that the PSTT shares through resources, articles, webinars, conferences etc. To find out more about College Fellows in your area, please click [here](#).



COLLEGE FELLOW ACTIVITY

Cath Milne has been a PSTT Fellow since 2015 and is a P5 teacher at Avoch Primary School, Ross-shire in the Scottish Highlands.



PSTT Fellow Cath Milne explores the Young STEM Leader Programme (YSLP) and its impact on her P4/5 class (8-9 year olds) at Avoch Primary School in the Highlands of Scotland, which has recently completed Level 2.

The YSLP in Scotland is a government-funded programme led by SSERC and piloted across Scotland with over 70 centres taking part (centres typically being a primary or secondary school, community or youth group). It was borne from the 2017 Strategy for STEM Education and Training, which identifies the need for STEM education to equip young people with the skills necessary for future industry and to close equity gaps in participation and attainment in STEM. The pilot introduced and tested the Curriculum for Excellence (CfE) Second Level and Scottish Credit and Qualifications Framework (SCQF) Level 6 versions of YSLP, whilst the remaining four levels were under development.

Young people have the chance to inspire, lead and mentor their peers through the creation and delivery of STEM activities, events and interactions within education establishments or local community groups. The aim is to develop young role models with an interest in STEM.

At all levels, there are 4 core elements to the programme:

1. DISCOVER

This section is about young people discovering the importance and meaning of STEM.

My class talked to school visitors and relatives with careers involving STEM, including in less traditional settings, such as an electrician, a mechanic, a beautician and even a shop keeper talked about working with money!

Part of the Discover element also concerns negative STEM stereotypes and how to positively challenge them – with my class, I used the ideas from **Improving Gender Balance Scotland** produced by Education Scotland.

2. INSPIRE

For YSLs to lead others in STEM activities, it is important that they understand the skills required to inspire and how to make their mentoring experiences inspirational. For this part of the programme, children are required to research an inspirational person, group or event.

For homework, my class researched a person/team (not necessarily STEM-related) who they found inspiring. We gathered information on what it was about these people that made them inspirational and used this knowledge to think about how they could be the same!

3. CREATE

The children have to plan a STEM activity, event or interaction. They explore how to select a purposeful activity, how to plan, bearing safety in mind, how to organise resources and how to structure effective learning. These are big, powerful asks of a class of 8-9 year olds, but with guidance and support we know that our children achieve amazing results.

Older children mentoring younger children





My class decided that they would like to mentor the P1 class. They were given time to research appropriate, fun activities. They decided that any activity should be simple, not take too long, be fun, and have a clear STEM learning intention (and be cheap – my addition to the mix).

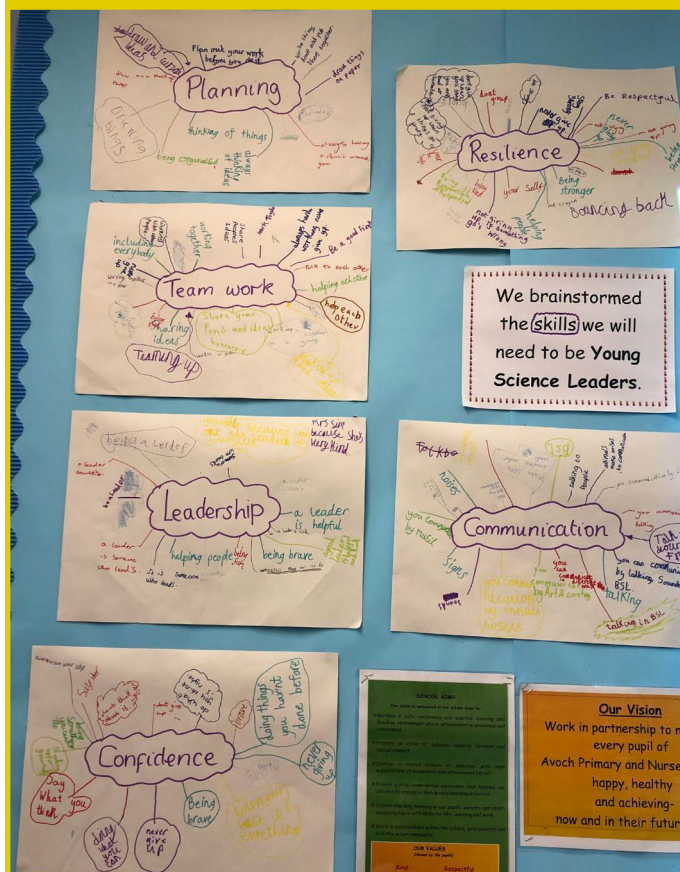
Once they had voted on the favourite 3 activities, the class completed trial runs with one group pretending to be P1s. They practised what they would say, how they would structure activities into small steps, how they would ensure safety of the younger children and how they would keep them on task - they felt very grown up and enjoyed thinking about how old and wise they had become.

A useful part of our planning was spending a couple of afternoons playing with the P1s, learning what they could do, what they understood and how to get the best from them. We discovered that a 45 minute session (once a week) was a good length to hold younger children's attention.

4. LEAD

Before we began our practical sessions, we explored the skills, qualities and behaviours of a good leader. My class were able to talk about leaders they knew, such as the Headteacher, Brownie Leader and football coach.

Considering skills, qualities and behaviours of a good leader



Then they were ready to be unleashed onto the P1s....

The 3 chosen activities were: building O-winged gliders, absorption and growing gel crystals and an outdoor session looking at minibeasts.

Behind the scenes, the P1 teacher and I divided the 2 classes into small groups, matching children that we thought would be good for each other. The children stayed in the same groups for each activity, so that they got to know each other well. The joint sessions went really smoothly as a result of all the background preparation. My class were very organised, acted very responsibly and enjoyed leading the younger class through the sessions. The P1s thought it a real treat to work with the older children. It was lovely to see some of the shy, quieter children coming out of their shell and confidently guiding the younger children through each session. It was a great success for both classes.

Guiding younger children through the activities



Was it worth it?

Yes! I will definitely do it again..... the log book (that must be completed by every participant) and support notes are all easy to follow and self-explanatory. There are brilliant resources on the YSLP website that are being added to all the time. The programme is extremely flexible and doesn't have to be done in a classroom setting. From start to finish, the whole process probably took my class about 30 hours, over the year, including class discussion, research, trial runs and working with the younger class. As always, the SSERC team were extremely helpful and supportive.

Each of the 4 parts comes with a digital badge and then a certificate on successful completion of the programme. The children of both classes got a great deal out of it. It was lovely to see the confidence and enthusiasm with which my class mentored the P1s and the bond that developed between the 2 classes.



PROJECT UPDATE

Citizen Science -
Air Pollution
Research

Climate change and surface air quality are two of the most pressing global concerns as we move through the 21st Century. The impact of air quality on human health is well documented as is the disproportionate impact on the health of the very young and very old. PSTT has published a set of resources to support primary teachers who are interested in climate change and want to explore the topic of air pollution with children (ages 9-11).



PSTT's Air Pollution Research resources will enable children to develop their science enquiry skills and maths skills whilst learning about air quality and air pollution, namely:

- **Asking questions** that can be answered by exploring real scientific data;
- **Making predictions** using existing knowledge of human behaviour and air quality;
- **Setting up enquiries** - delving into the UK Air Data Archive database to investigate pollutant levels in their area and across the UK;
- **Developing maths skills** - calculating mean averages, plotting graphs, and interpreting line graphs and scatter graphs;

- **Using spreadsheets;**
- **Interpreting and communicating results** - using trends in data from different cities in the UK and from different years;
- **Evaluating** - reflecting on issues surrounding climate change and identifying further questions for enquiry.

Through working on the suggested investigations and setting up some of their own, it is hoped that children will appreciate the sources of air pollutants, the impact of air pollutants, why scientists measure air pollutants; and how we might reduce the effect of air pollution in the future.



The UK's Air Data Archive, one of the most extensive in the world, is run by the Department for Environment, Food and Rural Affairs (Defra), a UK Government department. It contains some 400 million data points. Therefore, a project that utilises this amazing UK resource and allows primary school children, their teachers, parents, carers and other stakeholders to learn about and carry out investigations into air pollutants is a great starting point for a **citizen science project**.

There are many potential and exciting investigations that can be undertaken. For example, what is the most polluted day in the year? Figure 1 shows the levels of four pollutants at Marylebone Road, London, measured in the first part of November 2018. You will see that the most polluted day is usually around Bonfire Night (5th November).

The Air Pollution Research resource enables primary teachers without previous knowledge of air pollutants to embark on exciting citizen science projects with children by providing:

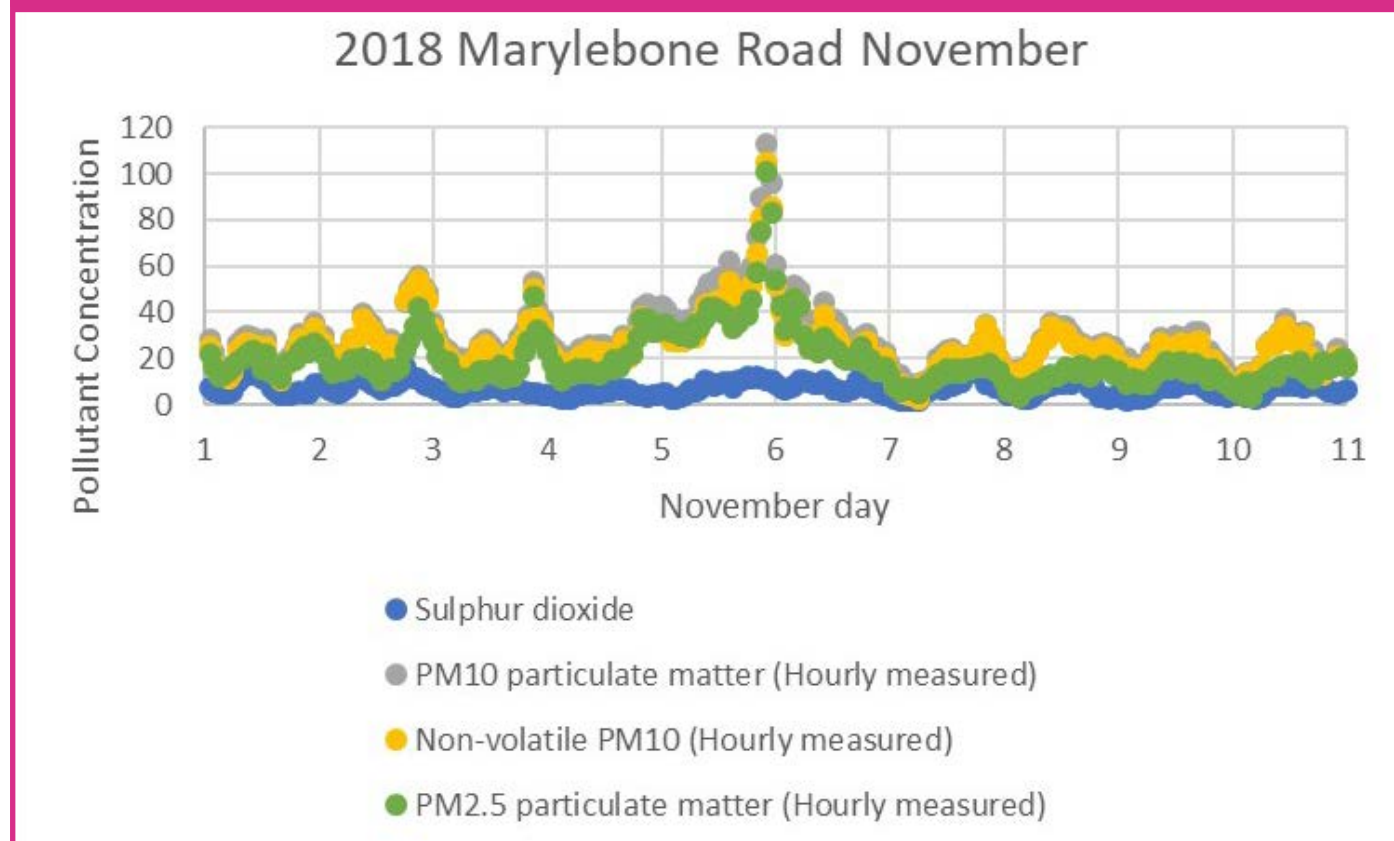
- A series of **classroom PowerPoint presentations** introducing children to atmospheric pollution and explaining how to interpret air quality data in the

form of tables and graphs. There are notes on each slide giving background information and answers to questions that teachers may want to ask the children;

- **Pre-prepared data sets** from Belfast, Cardiff, Edinburgh, London, and a rural site for five years between 2010 and 2018 which children can use to carry out their own investigations;
- **Guidance for teachers on using the UK Air Data Archive** to access local data so that children might investigate the levels of atmospheric pollutants nearer to where they live;
- **Meet the Scientist profiles** of current climate scientists which can be shared with children to demonstrate that science is carried out by a diverse range of people;
- Background information and further reading on air pollutants for interested teachers.

[Click here to access PSTT's Air Pollution Research Resources](#)

Figure 1: Graph displaying levels of four pollutants at Marylebone Road, London in November 2018





COLLABORATOR UPDATE

SSERC and
PSQM



SSERC

The story of the Titanic is an exciting context for practical science investigation. PSTT's Titanic resource, written by PSTT Fellow Jim McDaid, provides a step by step guide for teachers to carry out engaging cross-curricular science enquiry.

The primary science team at SSERC has created a series of short videos to illustrate practical science activities based on the story of the Titanic.

Sending distress signals: Heather Bowie shows how to make and test a rocket launcher



Surviving the cold water: Hayley Sherrard shares a range of ideas for investigating thermal insulation

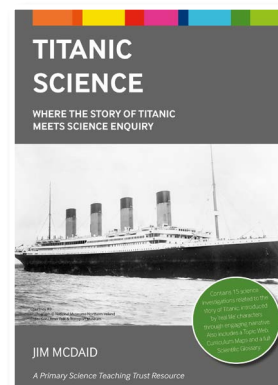


Get ready for launching: making a paddle boat and investigating what might make it go faster



**Please click
here to watch
these videos**

**For more information
about the Titanic
resource, please
click here.**



Primary Science Quality Mark

The Primary Science Quality Mark team has had a very busy six months. 172 schools achieved quality marks in May, having submitted just as lockdown began: an heroic achievement! Hundreds of subject leaders from schools currently participating in PSQM took part in online webinars throughout the summer term, as well as in the very popular online Festival of Primary Science Teaching and Learning, which included session led by PSTT Fellows and Regional Mentors. PSQM Round 20 began in October 2020 with over 500 schools attending online training with their hub leaders. PSQM has a new revised framework, with resources and procedures designed to reduce subject leader workload, develop leadership capacity and embed an evaluative development cycle in schools. Recruitment for Spring 2021 opens shortly - please register your interest [here](#).



COLLABORATOR UPDATE

Journal of
Emergent Science

The Journal of Emergent Science (JES) is an open access biannual e-journal designed to bridge the gap between research and practice.

JES complements the ASE's professional journal, Primary Science, and is supported by the Primary Science Teaching Trust (PSTT). JES focuses on research and the implications of research for practice and provision of science (including health, technology and engineering) for young children from birth to 11 years of age. JES welcomes contributions from its audience of early years practitioners, primary school teachers, teacher educators and researchers.

CONTRIBUTING TO JES

Dr Sarah Earle, the new editor of the Journal of Emergent Science (JES), invites you to share your practice in this free online publication. A wide range of contributions are welcome and JES now has some new categories of shorter articles:

- Original research: both small-scale practitioner research and larger projects welcome (maximum of 3000 words, excluding references)
- Research review: summary of a larger project or perspective piece reviewing current research in the field (maximum of 2500 words, excluding references)
- Research guidance: utilising relevant examples to provide support for practitioner research (maximum of 2000 words, excluding references)
- Book and resource reviews on early years science and research are also welcome

To feature in the first issue of 2021, first drafts are needed by mid-late November. Past issues can be seen [here](#), and further details about writing for JES [here](#). Do get in touch with Sarah at primary.science@bathspa.ac.uk if you would like any further information.



Issue 19 of JES, published July 2020 is available [here](#)

You might also be interested in the latest issue of Science Teacher Education

Issue 88 of Science Teacher Education, published in September 2020, includes an article that describes two resources that support the study of the work of historical and contemporary scientists in primary schools. Using a science capital lens, PSTT Fellows Alison Trew, Kate Redhead and Ruth Shallcross explore the benefits of these approaches and their potential to address inequalities in post-16 science uptake. We are grateful to the Association for Science Education for making this article open-access. Please click [here](#) to download it.





WIDER COLLABORATIONS

Support for Initial Teacher Education

 The Association for Science Education



PSTT is developing a **Primary Science Enhancement Award scheme for Initial Teacher Education (ITE)** that we hope will eventually be open to any trainee teacher wanting to increase their experience and understanding of teaching and learning in primary science.



The scheme will support the trainee teacher to undertake additional activity and development in primary science during their ITE phase. It will draw on rationales, processes and resources developed by the **Primary Science Teaching Trust's Teacher College**, the **Primary Science Teaching Trust's Cluster Programme**, the **Primary Science Quality Mark**, and by **Stranmillis College, Belfast** (who developed their own primary science accreditation scheme for their student teachers - click [here](#) for more information)..

The scheme aims to support trainee teachers to develop increased competence and confidence to teach science. While trainee teachers will have had some science input during their initial teacher education phase, the science component offered by the different routes into teaching varies considerably, with the result that newly qualified teachers might start their career having had anything between a few hours of input in science to having undertaken a science specialism course. The scheme also offers an insight into the role of the science subject

leader, and it gives the trainee teachers confidence and enthusiasm for one day taking up a position of leadership in science.

We are delighted that the **Association for Science Education (ASE)** and the **Primary Science Quality Mark (PSQM)** are collaborating with us on this scheme. Trainee teachers participating in the scheme will develop awareness of the value of ASE and PSQM as well as PSTT; we very much hope that this means they will stay engaged with these organisations throughout their teaching careers, and make the most of all that this supportive science community has to offer.

Due to the disruption caused by covid-19 to schools and ITE providers, we are running a small pilot of the scheme this year with four ITE providers: Plymouth Marjon University, the Somerset SCITT, St. Mary's University and the University of Hertfordshire. We plan to widen the scheme to other providers in 2021/22, although of course this is dependent on outcomes from the pilot.

To find out more about the Primary Science Enhancement Award for Initial Teacher Education, please visit our website for a short summary of the scheme. There is also an online form for initial teacher education providers to complete if you would like to be notified when the scheme becomes more widely available, or if you would like to register your interest to take part in the scheme in September 2021.



WIDER COLLABORATIONS

PSTT Fellows working with Explorify



PSTT Fellows and Explorify Champions

As part of the vital work of supporting teachers around the UK to improve their science teaching, several PSTT Fellows also act as Explorify Champions. An Explorify Champion commits to staying up to date with the latest changes to Explorify, uses it effectively in school, shares it regularly within their networks and with new audiences where possible. All the PSTT Fellows/Explorify Champions play a key role in spreading the word about Explorify to schools in the UK, but more importantly they use their expertise to ensure teachers can embed it in their practice and that it has a genuine impact.

We asked these PSTT Fellows and Explorify Champions for their advice about how to maximise the impact of Explorify in school. Here are some of the things they said.



Carla Bennett uses Explorify to:

ENGAGE THE WHOLE SCHOOL

Explorify is, "great for assemblies (although not at the moment), on the website or Facebook for children and their families to guess what the picture might be, and to explore whole school

themes linked to current issues, such as viruses. There are lots of different aspects which link to different learning styles, such as hands on, visual, auditory and creative topics to suit all learners."

SUPPORT ALL SCIENCE TOPICS

"We have mapped out the Explorify tasks/opportunities into a mapping grid so that staff are fully aware what they can plan in to meet each objective."

Sarah Eames uses Explorify to:

DEVELOP SKILLS ACROSS THE WHOLE CURRICULUM

"I link it to literacy, justification, explanations, reasoning. Whilst I'm doing the register/or as they come in from the playground they might think about which one is the odd one out and all the reasons why. (We have more settling time as everyone washes their hands for 20 seconds!)"



SHOW HOW REAL SCIENTISTS WORK AND THAT THEY MIGHT CHANGE THEIR MINDS

"With year 5 a couple of years ago, we realised that if the children were doing a Zoom In Zoom Out and were wrong early on they just gave up and weren't interested. So we used talk partners and on whiteboards wrote three things it could be, zoomed out and asked whether their suggestions still applied. Did they want to add one or cross one out? We discussed how scientific evidence changes in light of more evidence. It kept all the children engaged and prevents right and wrong."

Robin James uses Explorify to:

SUPPORT LESS-CONFIDENT TEACHERS

"I've shown it to an NQT colleague who could immediately see how it would help her introduce science in an interesting way."



ENGAGE EVERY CHILD IN THE CLASS

"At this difficult time, it's provided a very clear demonstration where social distancing makes it hard for all children to have a go. Slo-mo film really helps children to concentrate on what's going on."



Kulvinder Johal uses Explorify to:

CREATE STARTING POINTS FOR HANDS-ON, PRACTICAL SCIENCE

"When there are gaps in responses, misconceptions, poor use of vocabulary or lack of

understanding, teachers can do a practical to show clarity and improve understanding. If there are disagreements - there may be an opportunity for an investigation. Some activities lead into practicals, like problem solvers."

SUPPORT LESS-CONFIDENT TEACHERS

"It has helped be a scaffold for them, a prop to stand behind. They have the background knowledge in the activity so that gives them confidence. Its easily usable and they feel comfortable with it. The open questions also mean that they do not always have to have one definitive answer, which would/may have scared less confident teachers."

Ruth Shallcross uses Explorify to:

SUPPORT LESS-CONFIDENT TEACHERS

"Explorify supports the development of teacher subject knowledge in a non-threatening way. In a free school I have been working with where the teachers are unqualified, one teacher was so enraptured with the content on Explorify as amongst the first science CPD she had received that she regularly spent until 2am on the site!"

SPARK THE CHILDREN'S INTEREST

"I love the wonder of certain Zoom In, Zoom Outs (the bat with the tick is a favourite), and the What's Going On? videos (the popcorn!) are fantastic for sparking awe & wonder. The What Ifs? are such fantastic discussion topics (we couldn't see colours). I am always surprised by the ideas either staff or children come up with. The Big Questions (Does hot chocolate have to be hot?) are often a much more interesting take on a standard activity."



Jenni Monach uses Explorify to:

SUPPORT ASSESSMENT IN SCIENCE

"I have used some activities (e.g. Odd One Out) as a way of seeing if children can use what we have learnt to

explain. They may start by looking at colour or size but later on will often apply the knowledge they have acquired during a topic such as which will float or sink."

DEVELOP THE CHILDREN'S TALK SKILLS

"My classes have always really enjoyed guessing and explaining why. With the Zoom in Zoom out pictures, I really like the way children have to justify their ideas and use scientific language and a varied vocabulary – it encourages great talk."

Caroline Skerry uses Explorify to:

ENCOURAGE EVERY CHILD IN THE CLASS TO HAVE A GO

"It gives great background science; it's a really good speaking and listening tool too. The children engage because they know there is no wrong answer and it's about the discussion and thinking."

SUPPORT SCIENCE LEARNING OUTSIDE OF TIMETABLED SCIENCE LESSONS

"I often use Explorify in PSHE time and as a 15 minute filler after lunch."



Taking it further...

PSTT Fellows in the South West have been busy identifying links between the huge treasure trove of PSTT resources and several Explorify activities. We have used this work to add to the Take it further sections on some of our activities. These provide even more ideas for teachers to build on the discussions and questions that the activities have generated.

If you have any questions or comments about what you have read, or if you would like to become an Explorify Champion, please get in touch with Tom Barton on t.barton@wellcome.org

explorify.wellcome.ac.uk/

www.facebook.com/groups/explorifystaff

@ExplorifySchool



KEY DATES

PSTT Webinars



21st October -
9th December
2020



Free event!

This term, PSTT is offering a **series of free webinars delivered by our Regional Mentors** and suitable for all teachers of primary science. See pages **23-25** for more information.

ASE Annual Conference



6th-9th
January
2021



Online event

Great Science Share for Schools



15th
June
2021



#GreatSciShare

As a sponsor of the Great Science Share for Schools, PSTT supports four Great Science Share Champions across the UK. PSTT encourages all primary schools to take part in the next GSSfS, which is now confirmed for 15th June 2021.

Click here to find out more.



Get connected and use the hashtag #GreatSciShare

Twitter: @GreatSciShare

Email: greatscishare@manchester.ac.uk

Primary Science Teacher Award Deadline



8th
January
2021



Nominations
are open via the
PSTT website

Do you know an outstanding, creative and innovative primary science teacher who not only supports science in their own school, but also supports teachers more widely? Our annual awards recognise their contributions to the development of primary science provision throughout the UK.

Don't forget that the deadline for nominating primary teachers for a Primary Science Teacher Award 2020 has been extended to 8th January 2021. **Click here to nominate a primary science teacher.**



sharing
& learning

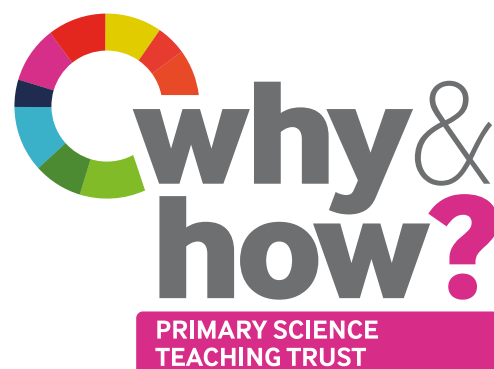
excitement
& exploration

discovery
& delight

investigating
& questioning

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