Why&How?
Magazine

Atumn 2024: **Issue 22**

CAPE:
subject specific climate change education

PSTT's Regional Mentors:
enabling excellence in primary science

Supporting excellent teaching and learning in primary science
Why & How? is the magazine of the Primary Science Teaching Trust

In this issue...

PSTT recommends that before undertaking any of the practical investigations contained in this publication you engage with the guidance and up-to-date advice from your Health and Safety adviser / organisation on how to do so safely.

In England, Wales & Northern Ireland refer to CLEAPSS (cleapss.org.uk) and in Scotland to SSERC (serc.org.uk).

Why & How? is the brand name of the Primary Science Teaching Trust

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Welcome

Welcome to issue 22 of the Primary Science Teaching Trust's termly magazine, Why and How?

In this issue we have a feature on PSTT's **Regional Mentor Programme**, a cornerstone of PSTT's strategy. Read about the impact of the programme to date and how our team of Regional Mentors could support the development of science teaching and learning in your school. The impact of the programme is exemplified with two contrasting case studies. Could your school be the next success story we feature? Get in touch with the team to explore how you could work with PSTT.

In **news** we are delighted to celebrate our latest group of Primary Science Teacher Award winners who received their awards at our recent awards dinner. You can also read about our revised nomination process for the Primary Science Teacher Awards. The results of the Explorify art competition are in! View the winning art works and read about their inspiration. Explorify continues to receive recognition and has been shortlisted for another award. Our College Fellows have been busy! We congratulate two College Fellows who have been recognised for their roles in inspiring students' interest in engineering. Read about a College Fellow's role in shortlisting for the Royal Society's Young People's Book Prize. In further College news, we celebrate four of our College Fellows who represented the UK at Science on Stage in Finland in August.

Sign up for our leadership webinar series in **professional learning opportunities**. The series comprises six sessions covering essential primary science topics aligned to the demands of leadership across the academic year. Each session is hosted by one of our highly experienced Regional Mentor team who all have a wealth of experience supporting leaders to develop primary science. Read about our coming TDTScience training and learn how to register interest for your school or network.

This issue contains our regular section on resources where we are delighted to introduce our new regular **Health and Safety** feature. In this new feature, science leaders will be prompted to consider their approach to risk assessment with key reminders. This issue's **Picture for Talk** provides a seasonal context for quality science talk using murmurations as a stimulus.

In the latest from **Explorify**, read about the new activities to support the teaching of materials, including the materials guides for different primary phases. Learn how the approach taken with the new activities builds on a pilot where Explorify Engagement Leaders worked with a group of teachers to trial the use of Explorify activities for retrieval practice.

Don't miss our **Climate Science** section which features our second article on Climate Adapted Pathways for Education (CAPE). Leigh Hoath and Heena Davis share their rationale for CAPE's vision to equip teachers and school leaders with the knowledge and skills to help all children and young people take climate action and protect the environment. Read about how CAPE is achieving its aims. They share their successes in supporting school subject leaders and school leadership teams to adapt their existing curricula to engage with subject specific integration of climate change education.

In our regular **book review** section, read our recommendations for books to enhance science teaching and learning.

Remember to look at the **key dates** which will help you to organise your primary science calendar for the year.

Please do keep sharing Why & How? with anyone who would like to receive free resources, classroom guidance, and updates from PSTT and other organisations who support primary science.

Primary Science Teaching Trust

News

Primary Science Teacher Award Winner 2024

Primary Science Teacher Awards 2024 Winners

We were delighted to present Primary Science Teacher Awards to this year's winners at our College Conference Awards Dinner on 9th October 2024, and we extend grateful thanks to the Royal Society of Biology, the Royal Society of Chemistry and The Ogden Trust for endorsing one or more of these awards. These outstanding teachers have joined a network of over 200 PSTT College Fellows and we look forward to working with them to develop and disseminate best practice in primary science education.

2024 PSTA winners

Amanda Lambert
Holy Trinity CE Primary School,
Richmond upon Thames

Debbie Powell
Westminster Primary Academy, Blackpool

Devan Davis
Fairview Primary School, Ballyclare

Hannah Wain
St. Chad's CE Primary School, Newcastle-under-Lyme

Peneli Grier
The Ferncumbe CE Primary School, Hatton Park

Royal Society of Biology · Royal Society of Chemistry · IOP Institute of Physics · The Ogden Trust making physics matter

Do you know an amazing teacher of primary science?

Why not nominate them for a 2025 Primary Science Teacher Award?

Fellows of the Primary Science Teacher College

Our Primary Science Teacher Awards are made to teachers who demonstrate **excellent classroom practice** in science and who do outstanding work to raise standards in primary science teaching and learning in their own schools and beyond.

We believe that the collective strength of the PSTT College is dependent on having a diverse mix of backgrounds, experiences and perspectives; we welcome nominations from all teachers, and in particular those from under-represented groups.

If you would like to find out more about the benefits of winning an award, or for guidance on how to nominate a teacher, please visit the Teacher Awards page on our **website**. Nominations are now open and close on 10 January 2025. The online nomination form can be found **here**.

The awards are supported by the **Royal Society**, the **Association for Science Education** and **TTS Group**.

THE ROYAL SOCIETY

ASSOCIATION FOR SCIENCE EDUCATION

tts

Explorify Shortlisted for Teach Award

We are delighted to announce that Explorify has been shortlisted for the 2024 Teach Awards within the primary STEM category. Each year, Teach Awards invites organisations to submit their educational resources for evaluation by a panel of expert judges. This year, Explorify has made it to the shortlist – an excellent achievement that recognises Explorify's role, through its 850+ activities, in improving the quality of primary science education by providing teachers with activities and the supporting background knowledge to teach them effectively. The award winners will be announced later in the autumn.

teach PRIMARY AWARDS 2024 SHORTLISTED

Winning artworks from the Explorify Art Competition

The Explorify Art Competition invited children to create their own piece of artwork to demonstrate their learning in science. They could draw or paint a picture, make a model or a sculpture, create a collage, design a print, or take a photograph. Whatever they chose, they were asked to create something that would spark a conversation about science. Explorify was inundated with entries and the judges were extremely impressed with the standard of these – both in the quality of the artwork and also the depth of thought about the science learning that was being portrayed.

The winning works of art are each being made into a new Start With Art activity that will be published on the Explorify site, ready to be used by more than 140,000 teachers with their classes of children in schools around the world.

Explorify Art Competition age 7 and under category winner

The winner from the age 7 and under category is from Brookhurst Primary School, Warwickshire. They were inspired by their knowledge of marine animals and plants, especially the fact that seaweed and seagrass are completely different living things. The artwork inspires discussion around habitats, adaptations and interdependence. The Explorify Start with Art activity created from this artwork can be seen **here**.

Explorify Art Competition age 8 to 12 category winner

The winner in the age 8-12 category is from Lancing Preparatory School, West Sussex.. The artwork shows a polar bear on a melting ice sheet. The artist showed their understanding of states of matter by melting and solidifying wax to represent the ice sheet. The artwork also demonstrates the effects of global warming, prompting discussion around the impact of melting ice sheets. The Explorify Start with Art activity created from this artwork can be seen **here**.

Explorify's Start With Art activities celebrate creativity and curiosity in children's science learning. Ideal for use in the middle or at the end of a science topic, these activities are a sure-fire way to start children talking, encouraging them to ponder and discuss possible connections between a work of art and what they've been learning about in science. Check out this helpful read to find out more about Start With Art.

David Clark prize award

This year's ERA Foundation David Clark prize was awarded to PSTT Fellow Paul Tyler with highly commended awarded to PSTT Fellow Becki Price.

We congratulate Paul Tyler and Becki Price on their success in the **2024 ERA Foundation's David Clark prize**. This prestigious prize recognises exceptional STEM educators in the UK who have gone above and beyond to inspire students to pursue engineering careers. The prize assesses vision for the students' education, creativity in engaging students, and success in sparking their interest in engineering.

Paul is the STEM and Innovation Lead at Kirkhill Primary School in Glasgow. The judges were particularly impressed with what Paul has done with reimagining specific aspects of the school's curriculum to focus more on engineering, technology, innovation, and sustainability. He has set up and resourced a new STEM Innovation hub for the curriculum redesign, where children carry out design and build projects, and take part in immersive engineering experiences.

PSTT Fellows Paul Tyler and Becki Price

As the science subject leader at the Willows Primary School in Stoke-on-Trent, Becki is committed to building positive perceptions of STEM futures for every child, regardless of gender, socio-economic background, or geographical location. She has created new engineering enrichment approaches in her school and extends her enthusiasm and passion to inspire other schools beyond her own, influencing children and families across the local area.

Royal Society Young People's Book Prize 2024

In August, PSTT Fellow, David Rigmand, was a member of the shortlisting panel for the Royal Society Young People's Book Prize 2024.

The panel, which included Dr Emily Grossman, Chantelle Lindsay and Dr Emrys Evans, and was chaired by Professor Dorothy Bishop FRS, shortlisted 6 STEM books for young people from a selection of over 50 books. These 6 books will be sent out to judging panels made up of thousands of young people in schools, science centres and community groups across the UK who will select the winning book.

The Royal Society's Young People's Book Prize aims to promote literacy in young people and inspire them to read about science. It also supports the writing of excellent, accessible STEM books for under-14s.

Find out more about the prize, including examples of previous books, winners and the Royal Society's annual video competition on the Royal Society **website**.

> Being on the shortlist panel for the Royal Society's Young People's Book Prize was a great privilege. This role offered a unique opportunity to engage with some of the most innovative and inspiring children's science literature available. Evaluating these works allows one to witness firsthand the powerful impact that well-crafted educational books can have on young minds. It is immensely rewarding to identify and celebrate books that not only educate but also instil a sense of wonder and discovery in children.
>
> **DAVID RIGMAND**

PSTT Fellow Nicola Bolton sharing her Bucket School project

PSTT at Science on Stage 2024 What a gathering of Teachers

Science on Stage is a celebration of science across Europe, with the highlight being the Science On Stage festival. The festival takes place every two years, with delegates from across 35 countries gathering together to share ideas and resources.

This year the festival took place from 12 to 15 August, in the oldest city of Finland, Turku. Over 400 delegates from across Europe gathered with common threads: a love of teaching, science, and collaboration.

Delegates apply to be involved in the festival by sharing their innovative teaching ideas (or projects) based around guiding themes:

- STEM for the Youngest (up to 10 years)
- STEM Education for Sustainable Development
- Digital Technologies in STEM Education
- Diversity in STEM Teaching
- STEAM in Education
- Low-Cost Experiments in STEM Education

At each festival, the UK delegation comprises of 11 spaces with the aim being to share these out amongst primary, secondary and HE colleagues. This year, primary science was well represented. Of the 11 projects chosen, 5 were primary and two of these were from PSTT Fellows, Nicola Bolton and Stuart Naismith. PSTT Fellow Emma Crisell joined the delegation as a member of the jury who agree which projects win awards and PSTT Priority Areas Mentor, Kulvinder Johal, joined as the UK Ambassador.

Nicola shared her 'Bucket School' project in the 'STEM for the Youngest' category. She raised interest in Turku with her 'Bucket School Project' being featured in a local newspaper. Stuart Naismith presented his Astrobiology after school club project, which featured in the 'Low-Cost Experiment' in the STEM education strand of the festival.

All delegates joined a stand with a poster explaining their project and prepared practical examples to help explain their project. The aim is to support others to replicate it in their own countries. The project posters are all available **here**.

> The great thing about Science on Stage is the collaboration and energy that teachers bring, amongst our UK delegation but also across the various countries. This year, we took 3 joint projects to Turku. This is where UK teachers have worked together with a teacher from another country on a project, communicating and cooperating with each other.
>
> **KULVINDER JOHAL, PSTT PRIORITY AREAS MENTOR**

Climate Science

CAPE: a vision for teachers and school leaders

CAPE's vision is to equip teachers with the knowledge and skills to help all children protect the environment

Following their article in issue 18 of Why & How?, Heena Dave and Leigh Hoath share their updates on the Climate Adapted Pathways for Education (CAPE) alliance.

Following the Department for Education England's draft Sustainability and Climate Change Strategy announced during COP 26 in November 2021, CAPE produced a report in collaboration with key stakeholders to support effective implementation of the suggested areas into the curriculum (***Hoath and Dave, 2022 – available Resources – Climate Adapted Pathways for Education***). All too often in education we see the latest initiative or agenda being introduced but then a few years later it has moved on, collapsed or we see it reappearing in the years to come. We cannot afford for this to happen with climate change education (CCE) due to the urgency of the matter. The focus on implementation in this first report is essential in mitigating the risks of failing when looking at how CCE can be taught.

CAPE is now an established alliance with members including a number of Multi-Academy Trusts across England, organisations such as ASE, BSA, the Natural History Museum, Earthwatch, Learning Through Landscapes and Chartered College of Teaching, and has patrons from the education sector (Mary Myatt) and the industry sector (Adam Read, Suez).

CAPE's vision is to equip teachers and school leaders with the knowledge and skills to help all children and young people take climate action and protect the environment. Their collective mission is to ensure that teachers and school leaders are supported to:

- Foster collective operational climate literacy among children and young people
- Cultivate a knowledge-rich narrative of climate change, building expert mental models throughout education
- Support children and young people to develop attitudes and behaviours that prepare them to be effective stewards of the planet

The first cohort of the Climate Wise Schools professional development programme

How CAPE is achieving this

CAPE bases its strategic direction on values established from the outset. They have approached their work and actions on:

Being kind and respectful: they know that creating a culture of kindness in our work distributes the joy of problem-solving, creates a safe environment and creates a foundation for equity.

Being evidence-informed: they believe that people who make decisions in education and about the environment need to know what the research says - they know there is a need to equip school leaders and teachers with better insights so that they can understand how human activity is impacting the planet.

Working collaboratively: they will amplify the voices of partners from all sectors and backgrounds working towards solving complex environmental education problems through high-quality evidence-informed approaches - especially those voices that have been historically silenced.

The organisation is supported fully by volunteers – a formal advisory group acting in a governance capacity, expert advisors who support specific developments and the organisations which are part of the alliance lending their knowledge and expertise as needed.

What CAPE is currently doing

Following the successful completion of the first pilot of 'Climate Wise Schools' – a professional development programme with specific strands for subject leaders and school leaders – a second cohort have enrolled on this programme. Overall, it spans 11 months, is formed upon a rigorous framework for developing knowledge, understanding and application, and is ambitious in nature.

CAPE has never been about producing resources – these are abundant already through various means. Instead, CAPE has a focus on supporting school subject leaders and school leadership teams to adapt their existing curricula to engage with subject specific integration of CCE, meeting the needs of the children and young people within that setting and ensuring that this is evidence-informed and high-quality. In order to support with this, CAPE are currently producing curriculum making guidance with science, geography and art being the first of the subjects to be developed. These are being created through collaboration with education experts and subject experts. For example, art is being led by Lyndsey Miles, a fine artist, who is coordinating collaboration between subject leaders in school and the experts within the Tate Modern. The purpose of this co-creation is to examine disciplinary depths when creating meaning curriculum links. The expected publication date of these guides is December 2024 and they will enable curriculum makers to have support with the narrative and 'story' of the concept, how this can be taught whilst taking into account knowledge, self-regulation and collective action, and be sequenced for year groups. They will also consider the broader and important issues of developing an anti-racist and decolonised curriculum, and how to identify and address specific misconceptions.

Meeting the needs of the children and young people within their setting is central to the CAPE approach

What CCE is not

What is often seen in school is the enthusiastic teacher who has an interest in the topic, who runs the eco-council and supports the litter picking and recycling agenda within the school. These activities are often conflated with CCE, and they, quite simply, are not. CCE needs to be learning sequences, be coherent with the curriculum, be localised in order to be authentic for the learners, be principled in terms of quality and ambition, and be enriching – for all children and young people. There are many complexities around diversity and inclusion in relation to CCE. Only by

really thinking through how, where and when it is taught will all learners be able to see the relevance of this to their lives and to see themselves as part of the solution. For example, many of the solutions which are positioned as helping to mitigate climate change are not accessible to many of the population – solar panels and electric vehicles are prohibitively expensive for many of our children and young people's families.

CCE needs to focus on the specific knowledge of climate change in relation to different subjects

The danger with teaching CCE through a thematic approach is that the focus becomes the poster, display or presentation at the end. Without focussing on the specific knowledge of climate change in relation to different subjects, the foundation on which the learning is based potentially lacks robustness.

Teaching CCE is not easy: the science behind it is complex, it takes teacher confidence and secure specific subject knowledge to be able to teach it well, and eco-anxiety is a rapidly emerging mental health concern.

The second CAPE report ***(Hoath and Dave, 2024 available Resources – Climate Adapted Pathways for Education)*** draws upon case studies from the Multi Academy Trusts who have been working with CAPE for the last two years and outlines principles for school leaders and subject leaders when considering the teaching of CCE. The concluding chapter states:

The clear message that our children and young people need to hear is one of constructive hope, which must emerge through the stories we tell within our curriculum and through our teaching practice for CCE. Our dreams for a healthy planet must not be lost and, in the face of a global challenge, we must remain committed to being ambitious for the quality of CCE if we are to effectively equip children and young people for the future.

We would love to hear your feedback on the CAPE reports – please do get in touch once you have read them! There will be a 3rd Cohort of Climate Wise Schools next summer so register your interest with CAPE alliance at **capeallianceuk@gmail.com**

Heena Dave is an ESRC-funded PhD student investigating the pedagogical content knowledge of climate change education. She is the Co-Founder of Climate Adapted Pathways for Education (CAPE) and served as a Senior Curriculum Designer for the Teacher Development Trust. Formerly, she was a Learning Design Manager at Ambition Institute, Head of Science at Bedford Free School and co-authored 'Cracking Key Concepts in Secondary Science'. Prior to this Heena was a Research Manager at the Environment Agency.

Leigh Hoath started teaching secondary science in the late 90s and moved into Higher Education where she has led on science teacher education in 3 universities before she was appointed as Professor of Science Education. She is Deputy Dean for the School of Education at Leeds Trinity University and a consultant to BBC Teach where she created the Blue Planet Live teacher materials and their Regenerators education campaign. Leigh is the immediate past Chair of the Association for Science Education and the cofounder of CAPE – Climate Adapted Pathways for Education – with Heena.

References

Hoath, L. and Dave, H. (2022). *Sustainability and Climate Change Education: Creating the Foundations for Effective Implementation:* Leeds Trinity University and the Teacher Development Trust.

Hoath, L. and Dave, H. (2024). *Implementing Climate Change Education in Schools: Constructive Hope in Action.*

Climate Adapted Pathways for Education and Leeds Trinity University

The first cohort of the Climate Wise Schools professional development programme

Resources

Picture for Talk

Click to download image

Figure 1

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 enquiry. 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 children of any age. The activities can be done as a quick ten-minute starter, or extended into a longer and more in-depth lesson.

Starling Murmuration

What to do

Download the image in figure 1 by following the link and either display on a whiteboard or give out printed copies. Ask the children to discuss, in groups of three, the following questions:

What does this picture remind you of or make you think about?

What do you think it is? Why do you think this?

Can you think of other ideas about what it might be?

After the children have shared ideas about what the picture might be, explain that the 'cloud' above the tree is a collection of birds known as a murmuration. The birds are starlings and the image was taken in Somerset, England.

Share with the children that murmurations are large groups of birds, often starlings, that gather together in the sky before they go to roost for the night. Their swooping and diving create mesmerising, swirling shapes that move across the sky. A murmuration can include tens of thousands of birds. They can be seen all over the UK and the best time to see them is in autumn and winter.

Show the children further pictures of murmurations, or ideally videos. Good images can easily be found through an online search, and for images of murmurations in different parts of the UK, this **website** has a gallery of images catalogued by geographical location. The children might also enjoy looking at these **images** of murmurations where the group of birds makes a shape that itself looks like a bird.

This amazing starlings **video** and also this National Geographic **video** show some dramatic murmurations. They are worth watching to the end as the murmurations become more intricate and exciting through the video. The BBC has two murmuation videos which might also be helpful: one is from **Northampton** and the other from **Norfolk**.

Further questions to generate and promote thinking and explaining:

- Can we estimate how many birds we can see in the picture?
- Why do you think starlings gather in the sky before they go to roost?
- How does this help starlings protect themselves from predators?

Scientists believe that murmurations offer safety in numbers, giving protection from predators like peregrine falcons. It is not easy for a bird of prey to single out and target just one starling from a whirling group of hundreds or even thousands. Experts still aren't completely sure how each starling knows which way to turn without bumping into the others.

How to see murmurations

Throughout November and December, murmurations can be seen in the UK at dusk. This **interactive map** shows where murmurations are likely to be happening, and the Wildlife Trust **website** gives advice about how to see a starling murmuration.

Resources

Get Set For Practical Science

Follow these top tips for getting health and safety off to a flying start in the autumn term.

Practical work helps make primary science, unique and engaging. Below are some tips for you, a subject leader, to make sure your staff and children are ready to tackle meaningful hands-on learning safely.

01

Find out who your health and safety advisor is.

These are the folks that provide your school with risk assessment guidance for STEAM activities, so making sure all staff know who they are is important. In England, Wales and Northern Ireland it's almost certainly CLEAPSS. In Scotland it's SSERC.

CLEAPSS logo

SSERC logo

02

Remind all your staff about the importance of health and safety in practical science.

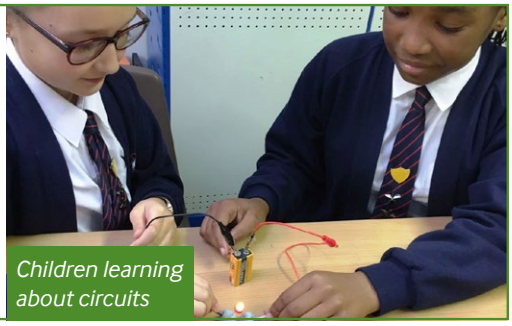
Share the guidance on either the **CLEAPSS** or **SSERC** website which is designed to make the approach **straightforward** whilst helping you to risk assess appropriately for **your** children.

Children engaging in risk assessed practical science

03

Check your resources.

For example, are you using the **right kind** of batteries during circuit work? Are you **storing** them correctly? Check CLEAPSS or SSERC for their guidance.



Children learning about circuits

03

Stay up to date with the latest guidance in health and safety.

Read **CLEAPSS EXPLORE** or **SSERC's Early Years and Primary STEM Bulletin**. Both are an engaging mix of primary activities to inspire and straight forward, empowering, safety advice.

CLEAPSS EXPLORE

SSERC's early years and primary STEM bulletin

Use your health and safety advisor

Check their websites for what you need. If you can't find it, contact **CLEAPSS** or **SSERC** directly

Explorify

Explorify has published new activities to help teach about materials and that are useful for retrieval practice

Explorify has published lots of new activities to help you teach children about materials.

In addition, many of the tried and trusted activities have an updated **Background Science** section and more practical ideas to **Take It Further**. This autumn, new resources will also be published covering light and sound, so watch out for them.

The approach taken with the new activities builds on a pilot where Explorify Engagement Leaders worked with a group of teachers to trial the use of Explorify activities purposefully for retrieval practice[1]. The **pilot's** focus was teeth, digestion and food chains.

Teaching guides

New guides have been published for teachers which identify Explorify activities that are particularly useful for:

- Formative assessment, including identifying prior knowledge and uncovering misconceptions
- Helping teachers with subject knowledge and science enquiry in the classroom
- Retrieval practice once the knowledge has been taught.

The two new guides for materials are for **5 – 7 year-olds** and **7 – 12 year-olds**.

There are also two new glossaries covering the key words children need to learn when studying materials: **Glossary (5 – 7)**, **Glossary (7 – 12)**. These support teaching the difference between words like strong and hard to young children and for older children vocabulary like thermal and electrical insulation.

[1] *www.ase.org.uk/resources/journal-of-emergent-science/issue-25/practitioner-perspective-using-explorify-retrieval*

Property	Definition	Example
Absorbent	Materials that can soak up liquids	Paper, cotton, wool, toweling
Dull	Materials that do not reflect light well	Wood, rubber, cardboard
Elastic	Materials that are springy. They can change their shape by being stretched or compressed when a force is applied and will return to their original shape after the force is removed.	Rubber, a pair of tights
Flexible	Materials that can be bent, folded or rolled.	Leaves, paper, fabric, rubber
Hard	Materials that cannot be easily scratched, dented or forced into a different shape	Diamond, metal

Glossary of terms to describe properties of materials (5 – 7 years)

The new activities and guides are designed for all four UK nations' science curriculums and will support any scheme of work you have in school.

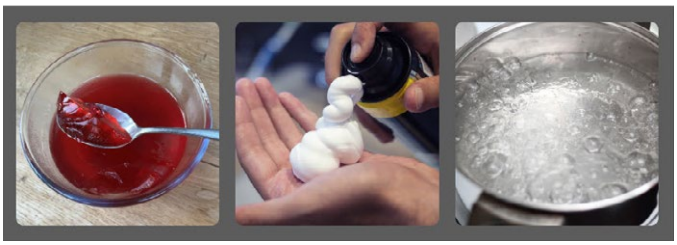
Learning about materials

The guide for 5 -7 year olds identifies the learning focuses and suggests how to approach them in the classroom. The new **Odd One Out A bowl full** features three familiar bowls made of different materials and gets the children talking about the differences, helping to clarify object and material. There are new **Zoom In, Zoom Outs** featuring different materials to get the children identifying and discussing the properties of metal (**Celebrating success**), plastic (**In disguise**), water (**See through**) and rock (**Hard crust**).

Solids, liquids and gases

There are lots of new high-quality activities focussing on solids, liquids and gases, all designed to help children understand their key properties and to tease out common misconceptions. **Pouring fun** has images of sand, water and rice being poured. Which are solids and which are liquids? The **What's Going On? Pouring liquids** has oil, syrup and tomato ketchup moving down a slope. It could prompt children to ask questions and investigate further.

There are two new **Odd One Out** activities focused on the properties of gases: **Gas filled** and **Inflating fun**. Although we can't see air, the **What's Going On?** films **Air in or air out?** and **Wet or dry?** both suggest simple ways for children to demonstrate that it is a material. Sometimes it is difficult to decide if something is a solid, liquid or gas. The **Odd One Out Is it a liquid?** will really get the children thinking and should prompt a rich discussion, which will support deepening memories.

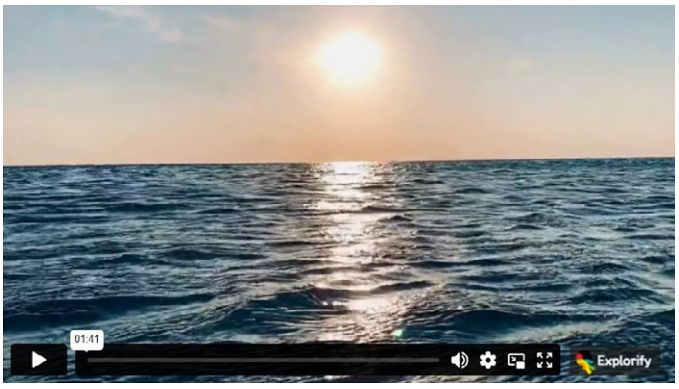


Odd one out activity 'Is it a liquid?'

Changing States

Once children understand the properties of solids, liquids and gases they learn about the process of changing states. The new **Odd One Out Wonderful Water** shows water in all three states. Can the children make the connections? **New Zoom, In Zoom Outs** highlight melting, evaporation and condensation: **Glistening brown** features butter melting on a piece of toast. **Golden wrinkles** is a dried raisin. How many children can make the connection with evaporation? **Shiny patterns** is water vapour condensing on a bathroom tap. Make sure you read the **Watch out for...** sections which help with common misconceptions.

For teaching the Water Cycle, there are two new activities, a **What's Going On? Never ending story** and a **Big Question What are clouds made of?**



What's Going On? activity 'Never ending story'

Reversible and irreversible changes

How can we speed up dissolving? and **Filters or sieves?** are new activities about reversible changes. There are already lots of good activities about changes that are not reversible, so rather than create new activities, we updated the **Background Science** and the **Take It Further** sections. Have a look at **Bright spark** and **3-2-1 lift off!** A new **Who is?** activity links nicely to irreversible changes, **Who is Eunice Newton Foote?** She was the first person to discover that carbon dioxide trapped heat.

Do keep checking Explorify's website as new resources are regularly published. As well as support for retrieval practice make sure you explore **Explorify's Inclusion Hub** and the resources for **Early Years**.

Support

Regional Mentors – Enabling excellence in Primary Science

Teacher engaging in teacher training led by a primary science expert

A key PSTT initiative is the Regional Mentor Programme which began in September 2017.

The team of Regional Mentors provides bespoke support and guidance to schools, groups of schools, Multi Academy Trusts, Initial Teacher Education providers, and other STEM organisations on any aspect of primary science. All our Regional Mentors are primary science experts and PSTT College Fellows.

Regional Mentors are passionate about supporting teachers to engage children with science. All our Regional Mentors have an in-depth knowledge of primary science and extensive experience of supporting others to effectively lead and teach the subject. Fundamental to how our mentors engage with individuals or organisations is by listening to their needs and then tailoring the guidance and support that they provide to meet those needs. Regional Mentors build long-term working relationships, ensuring that the support provided is sustainable for the setting and has a lasting impact.

This ongoing initiative has worked with over 5000 schools and even more teachers from across England and, at times, internationally. The benefits of the initiative were evidenced in a recent survey:

How can a Regional Mentor support you?

- One-to-one science leadership support
- Teacher training
- Curriculum development
- Planning support
- Network meetings
- INSET days

Teachers developing their science subject knowledge

What have schools experienced by working with a Regional Mentor?

- 99% agree that working with a Regional Mentor has made them a more confident and effective science leader.
- 97% agree that working with a Regional Mentor improved their school's science curriculum.
- 94% noticed an improvement in the quality of teaching at their school.*

**Impact data found on this page was collected from 105 educators—including teachers, Science Subject Leaders, and Senior Leaders—who participated in our Regional Mentor Programme from 2018 to 2022 and agreed to be surveyed.*

> Working with a RM has developed my subject knowledge, fine-tuned my understanding of what is expected for each key stage and given me lots of ideas. Most notably, the support has been specific to me (my subject confidence) and my school.
>
> **SUSAN SMITH, SCIENCE LEADER, HOLY CROSS PRIMARY SCHOOL, COALVILLE**

Case study:
Kent Catholic Schools' Partnership

The Kent Catholic Schools' Partnership (KCSP) includes 26 schools across Kent (21 primary and 5 secondary). The primary schools are a diverse mix of rural and urban, single, two and four-form entry and are spread across a large geographical area. The Regional Mentor for the South-East started working with the Partnership in 2019. The work began by meeting with the Partnership's School Improvement Advisors to gain insight into the ethos and aims of the Partnership from which a tailored programme of support was developed:

- In-depth auditing of science at each primary school
- 1-2-1 mentoring with each school's science leader
- Developing a bespoke action plan for each school
- Needs focused one day training for all science leaders
- Cross-school moderation sessions to ensure consistency in assessment
- Termly network meetings for science leaders
- Family enrichment activities at schools (e.g. star gazing evenings)
- Bespoke, intensive support for individual schools, especially those due an inspection

> We have 26 schools across our Trust. The impact of (the Regional Mentor's) work has been incredible. Firstly, our science subject leaders have developed their own subject knowledge greatly. The Regional Mentor continues to support KCSP building on the close working relationship developed with the Partnership's leadership team and science leaders. They are now able to develop all staff within their own setting, leading staff meetings, running workshops, team teaching and modelling good practice. Secondly, teachers' subject knowledge overall has improved significantly thanks to (the Regional Mentor).
>
> **DEBORAH WAKELIN, SCHOOL IMPROVEMENT ADVISOR, KENT CATHOLIC SCHOOLS PARTNERSHIP**

A particular unique success of this work is the annual online science day designed to support KCSP schools to take part in British Science Week. This consists of online engaging science lessons targeted at each Key Stage introducing a scientific enquiry that the children then carry out and report back on. Over 6000 children from every school and class in the Partnership have taken part in these days.

The Regional Mentor continues to support KCSP building on the close working relationship developed with the Partnership's leadership team and science leaders.

They are now able to develop all staff within their own setting, leading staff meetings, running workshops, team teaching and modelling good practice. Secondly, teachers' subject knowledge overall has improved significantly thanks to [the Regional Mentor]. Deborah Wakelin, School Improvement Advisor, Kent Catholic Schools Partnership

Case study:
Junior school in the West Midlands

Over the course of a year, a Regional Mentor worked with a four-form entry urban junior school in the West Midlands. Tailored support saw this school make huge improvements in their science approach. Senior leaders sought initial Regional Mentor support for a new science leader, which began with thorough monitoring of the subject, recognising good practice already in place and using this as a foundation from which to build.

Initial work with the science leader focussed on building confidence before joint delivery of whole staff training sessions focussed on science curriculum pointers and pedagogy strategies; all aimed at sharing a new vision and raising enthusiasm for science. This was followed with year group specific workshops delivered across the year, each focussed on upcoming topics with key learning and teaching strategies at their heart. This was a huge commitment from the whole staff team and a highly successful approach to building teacher expertise and subject knowledge. Alongside topic workshops, science planning was overhauled. The result was a huge increase of staff confidence in science teaching.

This piece of work shifted from confidence building, to a collaborative approach, to building capacity. Initially, the Regional Mentor modelled the delivery of workshops and planning overhauls but gradually, the science leader took a stronger lead in both these areas. Monitoring in the summer term showed a huge increase in teaching confidence and quality of science lessons. A recent Ofsted inspection recognised topic workshops as a strength, and these have become part of the school's regular CPD programme, with other subjects now taking the same approach. Added to this, with Regional Mentor support, the science leader now runs a science network for neighbouring schools and has presented at local science conferences.

To find out more about the Regional Mentor Programme and to request the support of one please visit our **website**.

Primary science leaders network meeting

Bespoke science support for you and your school from the PSTT

The Primary Science Teaching Trust has a team of Regional Mentors who are all primary science experts and award winning teachers. The team provides bespoke support and guidance, either face-to-face or online, to schools, groups of schools, Multi Academy Trusts, Initial Teacher Education providers, and other STEM organisations on any aspect of primary science.

Regional Mentors can provide support either in person or online.

How can a Regional Mentor support you?

- 1-2-1 science leadership support
- Teacher training
- Curriculum development
- Planning support
- Network meetings
- INSET days

PSTT's Regional Mentors

Regional Mentor	Regions Covered	E-mail
Christine Lawson	North-East	chris.lawson@pstt.org.uk
Kathryn Horan	North-West, Yorkshire and Humber	kathryn.horan@pstt.org.uk
Angharad Pass	North-West, Yorkshire and Humber	angharad.pass@pstt.org.uk
Stacey Reid	North-West, Yorkshire and Humber	stacey.reid@pstt.org.uk
Kate Redhead	West Midlands	kate.redhead@pstt.org.uk
Rebecca Ellis	West Midlands	rebecca.ellis@pstt.org.uk
Sarah Eames	East Midlands	sarah.eames@pstt.org.uk
Alison Trew	East of England	alison.trew@pstt.org.uk
Kulvinder Johal	London & South-East	kulvinder.johal@pstt.org.uk

For more information about the Regional Mentor programme and how it could benefit your school, please visit our **website**.

Professional Learning Opportunities

PSTT are delighted to be offering a Primary Science Leadership webinar series beginning this term and scheduled to run half termly over the course of the academic year.

The webinars are designed to support science leaders with the demands of science leadership covering essential topics such as reviewing your curriculum, assessment, monitoring and moderation.

Details of the full schedule are below:

Teachers engaging in professional learning

Primary Science Leadership Webinar Series			
Title	**Presenter/s**	**Date & time**	**Cost**
Reviewing your primary science curriculum	Kate Redhead	19 November 2024 16.00 – 16.45	£20*
Assessment in primary science - making it manageable and meaningful	Kulvinder Johal & Alison Trew	22 January 2025 16.00 – 16.45	£20*
Effective monitoring in primary science	Kathryn Horan	4 March 2025 16.00 – 16.45	£20*
Different approaches to moderation in primary science	Kate Redhead	14 May 2025 16.00 – 16.45	£20*
Reviewing impact in science teaching and learning - reflection and next steps	Kulvinder Johal	4 June 2025 16.00 – 16.45	£20*

**Webinars can be purchased individually or there is the option to sign up for the series for a discounted price of £80.*

Please see our webinar series **page** for more information. Bookings can be made directly via this **form**.

Be sure to visit our **professional learning page** to catch-up on previous webinars at your convenience.

Professional Learning Opportunities

Primary educators engaging in TDTScience training

PSTT is delighted to be leading the delivery of **Thinking, Doing, Talking Science** (TDTScience) courses across the UK.

> TDTScience values and develops children's higher order thinking and restores science as a creative subject where children take part and drive the learning.
>
> **TDTSCIENCE COURSE PARTICIPANT**

TDTScience is an inclusive approach to teaching primary science which has been shown to significantly improve children's attainment and attitudes. TDTScience is based on over 20 years of educational research and pulls together a range of established good practice. It is one of the sources for the Education Endowment Foundation's 2023 Improving Primary Science guidance report. The TDTScience course is an Education Endowment Foundation 'promising project'.

The TDTScience programme is:

- An interactive 4 day training programme
- Suitable across the primary age range
- Spread across the academic year

The TDTScience programme supports teachers to:

- Develop their existing good practice
- Develop creative & challenging science lessons
- Develop all children's knowledge and understanding through higher-order thinking skills

PSTT will be offering TDTScience courses across the UK in 2025. Please sign up to our **mailing list** to be kept informed.

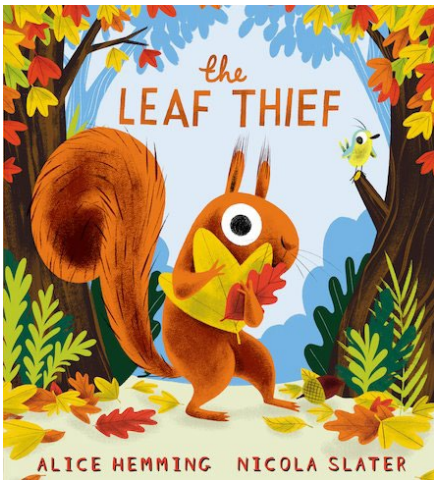
To express interest in attending a course in your region, please complete this **form**.

Download an overview of the TDTScience approach

To find out more visit: **tdtscience.org.uk**

If you have any questions about the course, email: **tdtscience@pstt.org.uk**

Book Reviews



Children's Book Review: **The Leaf Thief – Alice Hemming**

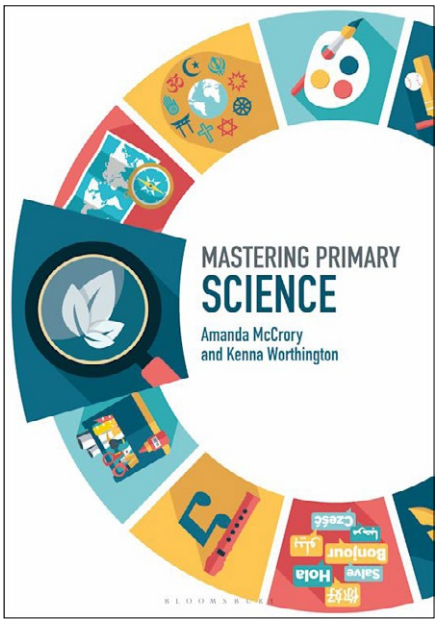
From the comfort of their nest, the main character, Squirrel, loves counting leaves and enjoying their colours. However, Squirrel realises that leaves are going missing but doesn't understand why. Convinced that there is a leaf thief on the loose, this makes Squirrel cross! Luckily, Bird is on hand to help solve the mystery.

Younger primary children will delight in joining Squirrel's journey to understand what happens to leaves in autumn.

This is an excellent picture book to support the teaching of seasonal change whilst also celebrating nature with different woodland animals featuring in the adventure. The final two pages of the book share an explanation of what happens in autumn across the world. Look out for the upcoming books in the series.

Teacher Book Review: **Mastering Primary Science**

Amanda McCrory & Kenna Worthington



Mastering Primary Science introduces both trainee and practising teachers to primary science by first clarifying their understanding of science. This begins with an exploration of the nature of science and an invitation for the teacher to reflect on what science means to them. Teachers are then invited to consider how their understanding of science and their understanding of primary science interrelate and compare so they can consider 'what does it means to be scientific in the primary classroom?'. This question is explored through considering the effective teaching of process, or enquiry skills, and conceptual understanding in science lessons. From this foundation the book then takes the reader on a journey through the essentials of primary science teaching. The book covers a range of topics such as assessment, developing skills, practical science, promoting curiosity, the practicalities of teaching primary science and current developments in primary science.

Through case studies, readings, examples of children's work, and reflective questions, teachers are supported to consider how to work scientifically across the whole primary age-range whilst also considering the nature of science and what this can look like in the primary classroom. The authors are clear that teacher subject knowledge in science holds great importance but so too does their understanding of how to teach science or 'pedagogical approaches to teaching science concepts'.

Whilst the book uses the contexts of the English and Welsh curricula to explore primary science, there is a wealth of content which can be applied to any science curriculum context and ideas which could be adopted in any science topic. Teachers who engage with this text will be challenged to interrogate both their understanding of primary science and how to secure its place in the curriculum as an 'irresistible' subject.

Key dates

1 NOVEMBER 2024
World Ecology Day

7 NOVEMBER 2024
Outdoor Classroom Day

27 NOVEMBER -5 DECEMBER
National Tree Week

29 NOVEMBER 2024
Royal Society Partnership Grants application deadline

10 JANUARY 2025
PSTA nominations close

9-11 JANUARY 2025
ASE Annual Conference University of Nottingham

5-11 FEBRUARY 2025
Child Mental Health Week

3 MARCH 2025
World Wildlife Day

7-16 MARCH 2025
British Science Week

pstt.org.uk

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Primary Science Teaching Trust

Why & How? is the brand name of the **Primary Science Teaching Trust**
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