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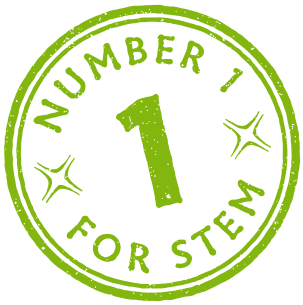


Primary STEM LEARNING

Dahl the champion of the STEM world

Whizzpopping ideas for your lessons

STEM LEARNING

Welcome

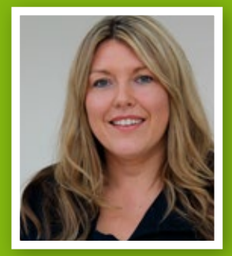
As the new Editor in Chief of the STEM Learning magazine, I'd like to welcome you to this autumn 2017 issue.

We've been working on our new suite of free online CPD for 2018 which looks at the science of learning. We couldn't think of anyone better to help us with this than Paul Howard-Jones, Professor of Neuroscience and Education at the University of Bristol, and expert on the TV series The Secret Life of Four Year Olds.

It has been an incredibly powerful experience having teachers and researchers come together to explore effective learning while developing this CPD. We all know that it can sometimes feel like wading through treacle when trying to select the right activity, resource or pedagogical approach from the wealth of material available. It is very empowering being able to make informed choices about what you do in the classroom, knowing that they are backed up by research.

If you've ever wondered about the science behind why a particular strategy you've used has more impact on your pupils' learning than another, then I'd invite you to join us on this CPD when we launch it next year. We'll unlock the secrets of your pupils' brains and show you how to maximise the learning for everyone in your classroom.

I find it fascinating what you can learn from working with children, and how that feeds into the support we offer teachers and others working in schools. This issue of our magazine is packed with tried-and-tested ideas that will support your subject knowledge, leadership and practical skills at every stage of your career. So, start the new term feeling informed, refreshed and secure in the knowledge that what you choose to do will make a positive impact and a difference to your pupils.



I hope you enjoy this first magazine of the new academic year.

Fran.

FRAN DAINTY, HEAD OF CONTENT AND STEM EXPERTISE, STEM LEARNING

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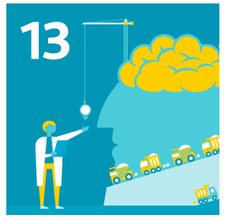


CPD LISTING

Seeing the world differently

by LYNNE SCOTT 〉 Primary School Teacher, Sandwood Primary School, Glasgow

I'm passionate about science, but as we all know, it's not easy to find the time or resources to fit it in. So when I saw a poster about Explorify, a free new programme by the Wellcome Trust, I was curious to see what was on offer.

With other resources, you have to make time to look through beforehand and really prepare for the lesson. The first email popped into my inbox on a Friday; I was prepared for a long, detailed lesson plan. But there wasn't one. A simple link to an easy, six-step activity was all I needed to look at. One more click took me to a 'classroom view' that threw up a range of amazing images, and all I had to do was show them to my class and get them talking about it. That was it. A straightforward click and barely ten minutes of prep.

It might be simple, but I was really excited. I could see straight away that this was a different approach. Explorify had the potential to encourage questioning, observation, comparing, wondering and discovery. It would stretch what pupils think about science – that it is more than just potions and explosions.

The children loved it. Zoom In, Zoom Out uses fantastic close-up images of things like plants, planets, materials and animals but brings a whole new perspective. What If? really fired up their imaginations and got them asking all sorts of questions. Problem Solvers involved group working, so the pupils put their teamwork skills to the test as well.

As the weeks went on, I really began to see improvements in many skills throughout my class. The children became more observant, as they began to notice more detail when we were looking at images. They drew more comparisons between things, and became more accurate with their predictions, using more reasoned observations, drawing on past knowledge. Watching their eyes widen and their mouths drop at the wonder of nature was an absolute pleasure – Explorify really encourages pupils to see the world differently.

There's such a great mix of activities throughout Explorify, some were more hands-on, some were discussion-based, but they were all incredibly easy to do, and did not require any expensive materials. It was easy to do an activity each day because it was so quick to drop into lessons. Part of the beauty of Explorify is that the materials they provide (photos and video) are of fantastic quality, so if the activity was the same, I didn't even need to do any prep – just load it up and go. And because all the activities can easily link to the curriculum, Explorify provided easy and quick opportunities to introduce topics, further and consolidate the learning, and provide some assessment too.

Children can be really inspired by science and Explorify provides an excellent platform to teach it regularly. Most importantly, this programme helps you to explore the many traits of being a scientist. It really does spark the children's curiosity and whets their appetite for such a wonderful subject.

DEVELOP YOUR PUPILS' ENTHUSIASM FOR SCIENCE 〉

Start Explorifying now!
■ https://explorify.wellcome.ac.uk/

Creating a buzz and raising the profile of primary science
■ www.stem.org.uk/rp117

Embedding working scientifically in the primary curriculum
■ www.stem.org.uk/ny030

Computing assessment

by DAVE GIBBS 〉 STEM Computing and Technology Specialist, STEM Learning
@adgibbs

Some years ago Ofsted focused a report on ICT, with assessment of the subject coming in for particular criticism.

To paraphrase:

- it's too easy to focus on the outcomes of a task at the expense of assessing the learning that takes place in the process
- it's too easy to focus on assessing pupils' skills in using particular software instead of assessing their knowledge and understanding
- if pupils have worked with a partner or in a group to complete a project, how can you assess each individual's learning?

The challenges of assessment haven't changed, but the new landscape presents a great opportunity to rethink assessment and make it fit for you and your school.

There is an abundance of age-appropriate online learning systems for programming, many of which lead children through progressively more challenging tasks. This assessment by outcomes can be informative, but may evidence hard work or lack of distraction as much as ability.

So how should learning be assessed? Tests of programming skill or subject knowledge? Probing computational thinking or wider problem-solving ability? Julian Wood, Deputy Headteacher at Wybourn Primary School, Sheffield, and course leader for our primary assessment course, describes a few basic principles underpinning the approach to assessment:

- assessment is for learning but also supports teaching
- assessment is about what children know, understand and can do
- assessment reveals children's attitudes and social engagement in computing
- assessment should be made through naturally-occurring classroom activities

Phil Bagge, Computing Inspector/Advisor at Hampshire Inspection and Advisory Service, talks about formative assessment. A Computing at School (CAS) project that might support this is quantum assessment, a growing collection of crowd-sourced, multi-choice questions. These might be employed as formative questions – checking understanding or skill part-way through a lesson.

And as children move through school what does progression look like? A common approach is to pin down age-related expectations. While mastery of the whole curriculum is the ultimate aim, schools must decide how to plot out that journey.

A possible roadmap is offered by the CAS progression pathways, useful for long-term planning and sometimes used for assessment. Some teachers have even converted these 'they can' statements to child-friendly 'I can' descriptors that get children involved in their own learning while providing a useful cross-check for the teacher.

When you're making your own plans for assessment, remember Julian Wood's suggestion that assessment should:

- be accessible and understandable to children, to allow them to self and peer assess
- be manageable and sustainable
- be meaningful for teachers
- provide clear guidance for progression
- identify gaps and inform next steps in learning
- be adaptable for any school regardless of technologies available

SUPPORT FOR YOUR COMPUTING ASSESSMENT 〉

Primary computing resources
■ www.stem.org.uk/mp/comp-resources

Assessment and progression in primary computing
■ www.stem.org.uk/cy032

Ideas for developing thinking and reasoning skills

by RACHEL JACKSON Primary Specialist, STEM Learning

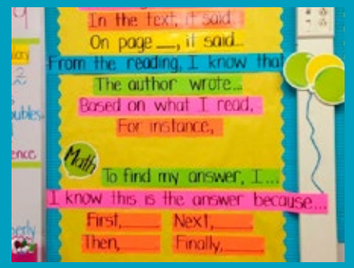
The development of thinking and reasoning is key to deepening children's understanding of all subjects, helping them to see connections and apply their skills and knowledge to solve problems.

Teacher questioning is key to developing reasoning as key questions test understanding and further questioning can probe the depth to which an idea or concept is understood.

CPD TO SUPPORT YOU

- Mastery in primary mathematics
  www.stem.org.uk/my002
- Extending thinking and talking in primary science
  www.stem.org.uk/ny001
- Promoting thinking and talking in primary science
  www.stem.org.uk/rp116

GETTING THEM TO EXPLAIN WHY



Many children find explaining 'why' quite tricky. Often children provide something quite simple. In maths they might say, "I just knew it", in science they might just say what they observed, eg the ice melted, the temperature went up. This prompts teachers to ask for further explanations such as, "Can you explain why?" or "Please show your reasons for this", when giving feedback.

Children may struggle with this as they may not know what is required. Scaffolding of explanations using sentence starts or prompts can help. Modelling a good explanation to a problem or puzzle is also a good idea as this provides the basis for a child's own extended explanation.

IDEAS FOR THINKING AND REASONING

1

Finding the odd one out is a great activity, especially when there is more than one correct answer. Here it is the child's justification of their answer that is important, rather than the answer itself.

2 Another strategy is to **provide a statement such as, "What if it was always summer?"** and ask them to come up with some positives, negatives and interesting points related to the statement. These questions can be related to any subject and really get children reasoning and thinking creatively.

3 **Ask children to challenge what others say** or encourage them to think again about their own ideas.

4 A great strategy in mathematics is to **investigate if a statement is sometimes, always or never true.**

Examples are:
- if I add an odd number to an even number I get an odd number
- a fraction always has a lower numerator than denominator
- if I multiply a number the product is always larger than the original number

Children have to **show evidence to support their statement and most importantly explain their choice**. If there is disagreement then this challenge will help develop understanding across the class.

5 Give children **time to develop their own strategies** and suggest their own way of doing it.

6

Sharing with the class how they intend to approach the problem is a useful strategy as everyone can see all the approaches and possibly adapt their intended approach as a result.

7 Ask children for further examples to support statements, for example "find examples of two numbers that when added make ten".

8

Ask children to **sort a set of objects or numbers and say why they have sorted them so**; they might even be able to sort them into different groups.

9 **Checking if answers are correct and appropriate to the context** uses reasoning. This can be done by estimating answers first then checking their answers, or by carrying out the inverse operation showing that they are thinking about the maths. Looking at the context of the question in relation to the answer is important.

For example, if asked how many buses are needed to transport 45 children when a bus can carry 30 children, is it appropriate to have half a bus? Why not?

These are just a few ideas to develop thinking and reasoning. Many don't involve a big change, but are simply building on effective questioning to support children in coming to a deeper understanding.

Meeting the teachers' standards

by AMY STRACHAN
@SIMMSPriScience
Senior Leader in Primary Science, St Mary's University, Twickenham

Feel like you are juggling balls and spinning plates whilst balancing on one hand? Trainee teachers have to do this non-stop.

When our trainee teachers come back to university after their placements, they become so animated with the tales of the exciting science investigations that they have witnessed: the fascination of using rubber gloves filled with fat to represent whale blubber insulation, the excitement of germinating bean sprouts and the energy instilled by investigating balloon rockets. Unfortunately, all too often, the creativity and awe of science can sometimes be lost in the midst of standard files and target setting.

I am forever receiving emails from students asking for lesson activities or display ideas for specific areas of the science curriculum. With the STEM Learning website, I now have a clear way to guide our trainee teachers with more consistency. I simply send them a link to the relevant bank of resources or readings that they can use. Using the Chinese proverb, I feel that I am not feeding them the fish, but giving them the tools to catch their own.

www.stem.org.uk/mp/teachers-standards

Science, art and writing

by KAREN BRUNYEE
@TravellingKaren
Professional Development Leader, STEM Learning

The world of science is such a creative place but do we always celebrate this? The themes of observing closely, asking questions of our environment and creating solutions in new and exciting ways are skills that are shared across the study of art, English and science in equal measure. In an increasingly crowded primary curriculum, the ability to bring these subjects together is very powerful indeed.

The SAW Trust – science, art and writing initiative – aims to break down traditional barriers between the arts and sciences and inspire artistic and scientific endeavour. The idea behind the SAW project is to engage children with real science through looking at photos linked to science themes. Children then explore the artistic elements of the pictures through recreation and creative writing before sharing the science knowledge elements of the pictures.

For example, in one school, children were shown electron scanning microscope pictures of sand during their study of coastal habitats. They were not told what the picture was and worked together to gather as many adjectives as they could to describe the picture. Some children also made stories about the elements they thought they saw in the picture. They then created free verse describing the picture. Asking the children to draw comparisons between everyday objects and what they see is helpful as they are then able to use similes and metaphors in their work.

Artwork was then created through different media, recreating either the whole picture or aspects of it that the children liked. Only after all this creative work is the picture revealed for what it actually is. With sand, the children were then able to look at it themselves under the class microscope and explore why it looks like that. How is it created? Why are there so many colours?

There are so many themes available to cover through a SAW project and I've yet to meet someone who isn't intrigued with looking at close-up pictures of things. A simple internet search for your current topic of study will reveal a plethora of pictures to use and the SAW Trust website has some great ideas and case studies to help you.

NATIONAL BUG BUSTING DAY

What about looking at monstrous head lice and gigantic nits in close-up during the upcoming National Bug Busting Day on 31 October 2017 and then recreate them in giant form for an amazing minibeast zoo.

PUT THE SUPPORT UNDER THE MICROSCOPE

- SAW inspires artistic and scientific endeavor
  www.sawtrust.org
- Improving maths and English through science
  www.stem.org.uk/ny036
- Creative, cross-curricular primary science
  www.stem.org.uk/ny008
- Making powerful connections between primary literacy and science
  www.stem.org.uk/rp114

Raise the profile of STEM at your school

by BEEJAL PAREKH
@CRESTAwards
Education Manager, British Science Association

Science, technology, engineering and mathematics (STEM) enrichment activities are not only exciting and engaging for children, but can also help raise the profile of STEM subjects at your school, giving children the chance to participate in hands-on practical investigations and enquiry-based learning.

Many primary school teachers tell us that the children in their school perceive science as 'doing experiments' and often do not recognise scientific topics in their lessons. Enrichment activities can raise the profile of STEM subjects at your school by highlighting to children when science is taking place, and helping them to understand that it's not all about explosions!

STEM enrichment can support children to put into practice transferable skills such as observation, thinking, reasoning and communication. The knock-on effect is a space for children to be innovative and creative, and to develop their problem-solving skills.

By encouraging students not to view STEM subjects as learning facts and doing experiments, but as sharing ideas and asking questions, you can help to develop a culture of 'everyday science' in your school, bridging learning and supporting cross-curricular education.

CREST AWARDS – A FUN AND EASY WAY TO RAISE THE PROFILE OF STEM SUBJECTS

The CREST Awards scheme is the British Science Association's flagship education programme, providing science enrichment activities to inspire 5 to 19 year olds.

There are six CREST Award levels, allowing children to progress through the scheme throughout their education. For primary schools we suggest CREST Star, SuperStar and Discovery.

Across all the levels the CREST Awards support children to solve real-life STEM challenges through practical investigation and discussion. This enables enquiry-led learning, encouraging pupils to learn by solving a problem or answering a question, rather than simply following instructions or being presented with information by a teacher. The emphasis is on the process, not on finding a 'right' answer.

There are all kinds of different challenges, to suit a variety of topics and skills. Resources range from investigating how to make the best cup of tea and experimenting with shapes and sizes of bubbles, to building bridges and minibeast hunts.

SUPPORT YOUR CREST AWARDS WORK WITH A STEM AMBASSADOR

If you want to set up a STEM Club to support your CREST Awards activities you can work with your local STEM Ambassador Hub to find a STEM Ambassador who could visit your school to help your pupils.

Or you could search the STEM Learning website to find a STEM Ambassador who fits the different challenges that you choose. For example, a chemist could support the Muddy mess activity or an engineer could help older children build and programme a 3D printed robotic arm for the Robotic arm-maker club activity.

Whatever activity your children are inspired by, there's a STEM Ambassador ready to support you.

TAKE ON THE CREST AWARDS

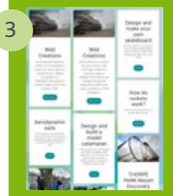
Start your CREST Awards journey online
- https://bsa.fluidreview.com/

Connect with a STEM Ambassador (or two!)
- www.stem.org.uk/mp/stem-ambassadors

Free support to set up a STEM Club
- www.stem.org.uk/mp/stem-clubs

GETTING STARTED

The British Science Association have re-launched their CREST Star and SuperStar Awards, with new look resources and an online entry platform. Students who complete the awards can now receive a certificate and iron-on fabric badge to recognise and reward their achievement.

1. Create a CREST account online at bsa.fluidreview.com
2. Download and print the CREST Star or SuperStar passport for your group.
3.  Complete any eight Star or SuperStar challenges from our resource bank – for each completed challenge give pupils a sticker for their passport.
4. When your class has filled all eight challenge spaces in their passport, log in to your CREST account and tell us which challenges you have completed.
5. Once you pay the entry fee (£1 per student in the UK) you will receive a CREST Star certificate and iron on badge for each participating child in the post.

Enterprise Week 2017

by SARAH MYERS 〉 STEM Ambassador Liaison Lead, STEM Learning

Get involved with Enterprise Week 2017 in November with some easy STEM-related ideas and challenges to discover the young entrepreneurs in your school.

PLAN A PARTY

In this problem solving activity children choose and carry out a range of calculations in order to plan a Christmas event (but it can be any kind of party!). The party has to suit a particular number of people and fit within a specific budget so they have to make decisions by looking at realistic pricing options such as per-person, according to group size or related to time.

The party theme can also be extended into other curriculum areas such as persuasive writing and poster design.
■ www.stem.org.uk/rx34j2

THE FIVER CHALLENGE

Group your pupils into small teams and give them a £5 investment. They have to develop ideas of things they can make or create (cakes, biscuits, book marks, phone cases etc) which can be sold to generate more income. The profits can be used to grow the business or be donated to charity.

BRILLIANT BATHS AND LUSCIOUS LIP BALMS

Group your pupils into teams to make products that they can sell at your school's festive fair. STEM Ambassadors are great partners for this project: chemical engineering STEM Ambassadors can help with recipe development and how to scale up production; product design STEM Ambassadors can help with packaging design.

The STEM Learning resource library has a simple recipe for bath bombs.
■ www.stem.org.uk/rxwdg

FRUIT TO SUIT

Set up a healthy eating tuck shop in school which is managed and staffed by the pupils. This activity will help them to learn about managing stock, planning and ordering and will develop their numeracy skills. The project also improves their understanding of the importance of healthy eating.

Access support through the Fruit to Suit initiative.
■ www.fruittosuit.co.uk

SUPPORT FROM STEM AMBASSADORS 〉

STEM Ambassadors can work with you to support enterprise activity in your school.

Go to our website to request an Ambassador and find out more about Ambassadors near you.
■ www.stem.org.uk/mp/stem-ambassadors

GET INVOLVED 〉

Join the discussion
■ www.stem.org.uk/primary-community

Mastery in primary mathematics
■ www.stem.org.uk/my002

Engaging science in key stage 1
■ www.stem.org.uk/rp109

by CAROLE KENRICK 〉 Scientist and Inventor in Residence at the Gillespie Primary School, Founding Member of the Chartered College of Teaching

Big idea: develop science capital

Four years ago the King's College London launched the ASPIRES report and, since then, it has become the single piece of research I discuss the most with others, and think about most often.

The ASPIRES team tracked pupils' career aspirations from age 10 to 14, and their findings were decidedly mixed. In good news, most pupils in the UK enjoy science. But on the flip side, only a minority (about 15%) are interested in being scientists. This is a stark reminder that enjoyment is important – but not sufficient – if our goal is to inspire a future generation of scientists and to make them more representative of the population as a whole. To help explain this disparity the researchers introduced the idea of 'science capital', which pupils develop by gaining "science-related qualifications, understanding, knowledge (about science and 'how it works'), interest and social contacts (eg knowing someone who works in a science-related job)".

For the past three years I have worked as the Scientist and Inventor in Residence in a primary school. My role is mostly extra-curricular but I also support my colleagues with the curriculum, and I have found the idea of science capital a helpful framework for planning lessons and enrichment. I ask myself "how can I build science capital?" and break it down into four categories:

1. developing a deep knowledge and understanding of the science content
2. explicitly embedding 'Working Scientifically' so that children know what science is and what scientists do
3. relating the content to the children's interests by building their questions into the curriculum
4. teaching children about a diverse range of scientists and a range of scientific careers and, where possible, inviting scientists and engineers into school

Points one and two helpfully fit with the subject content and 'Working Scientifically' strands of the curriculum, but it takes a little more thought and planning to embed points three and four. One recent example is my Year 3 lesson about healthy eating, which I planned around two questions that the children had asked their teacher at the start of the topic. "Why do we need to eat different foods?" and "Which foods are good for your brain?" Instead of learning objectives, I started the lesson with their questions and returned to them at the end of the lesson. I also told the children about my friend Fred, who is a sports nutritionist, and asked them to put themselves in his shoes when advising a client about what foods to eat.

The results of pupil surveys are promising – at the start of this year a third of our Year 6 class expressed an interest in becoming a scientist, twice the national average according to ASPIRES. In addition, nine out of ten Year 6 pupils at my school look forward to their science lessons, compared with just over half nationally.

THINK BIG WITH OUR SUPPORT 〉

STEM Ambassadors
■ www.stem.org.uk/mp/stem-ambassadors

STEM Clubs
■ www.stem.org.uk/mp/stem-clubs

Science capital
■ www.stem.org.uk/rxem8e

Dahl the champion of the STEM world

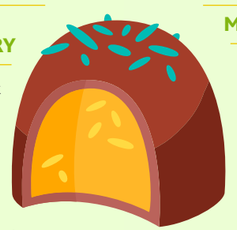
by KAREN BRUNYEE Professional Development Leader Primary STEM. STEM Learning
@TravellingKaren

Roald Dahl's stories have inspired generations of children, filled with extraordinary ideas, whimsical worlds and unbelievable inventions.

The characters we meet face challenges in which they need creativity, imagination and perseverance to solve – skills we'd love to nurture in the children we teach.

Charlie, George, Matilda, James and Danny all find themselves in situations where they have to use their intelligence and imagination to overcome problems, which can lend themselves so fantastically to STEM lessons. On 13 September 2017 it is Roald Dahl Day so why not try some of these 'whizzpopping' ideas in your STEM lessons.

CHARLIE AND THE CHOCOLATE FACTORY



Dahl's most well known book lends itself easily to many investigations. Exploring different 3D nets for packaging the chocolates or using chocolate blocks whilst displaying fractions are great maths activities. What temperature does different chocolate melt at? How does the taste change after melting? Can we design packaging that prevents melting?

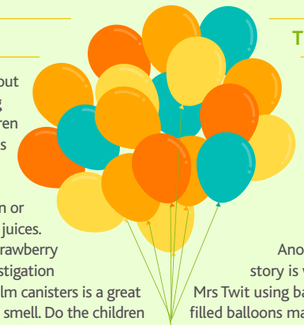
There is a lovely research opportunity to see how manufacturers in hot countries deal with the issue of chocolate melting. Can they design a new chocolate bar to sell at school and work out the costings?

MATILDA

This story leads to a fantastic opportunity to work with profits and costs. Mr Wormwood explains how he cheats car buyers by adding sawdust to silence the gearboxes. Can children work out his costs and the profits received from his fraudulent cars?

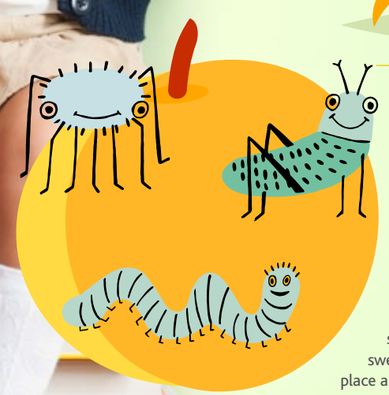
The Roald Dahl website has some fantastic questions to lead their maths exploration.

THE WITCHES



The terrifying witches sniff out children using their amazing sense of smell. Let the children explore their different senses and find ways of confusing them, such as holding the nose when tasting cinnamon or adding confusing colours to juices. Blue lemon juice or green strawberry juice anyone? A simple investigation where spices are placed in film canisters is a great introduction to the sense of smell. Do the children know what they are? Do they like them? Which are the strongest?

JAMES AND THE GIANT PEACH



James meets different minibeasts whilst travelling in the giant peach which leads to an exploration of the different animals and their natural habitats and diets. What size are they naturally? How much would they need to grow to be the size in the story? To allow the children to observe swelling, just as the peach did, they could place a gummy bear in water and watch it grow as it absorbs the water.

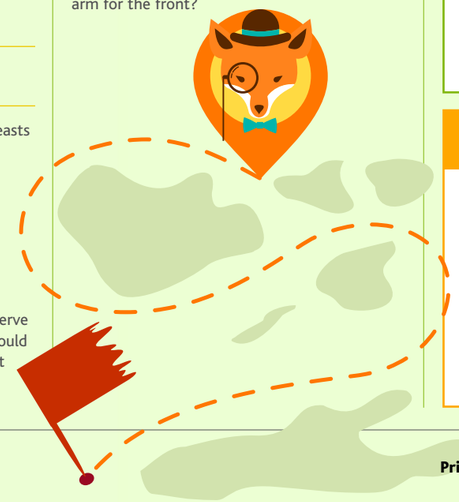
THE TWITS

Mrs Twit feeds her husband worms instead of spaghetti. This can lead to an investigation of changes of materials – make spaghetti worms using drinking straws and jelly. Yum!

Another memorable section of the story is when Mr Twit tries to stretch Mrs Twit using balloons. In the story 60 helium filled balloons make her fly but how many would he actually need? Dr Ryan Marks, an engineer at Cardiff University, worked out that a normal balloon can lift 5.5g. If Mrs Twit weighed 70kg how many would you need? The children could investigate their estimates with small toys and party balloons.

FANTASTIC MR FOX

Mr Fox enlists the help of his family and animal friends to escape the terrifying farmers in this classic tale. Working within Scratch children could design an escape path for the fox family, avoiding the diggers, guns and floods the farmers use to try to kill them. This story also leads to control activities where the children could design an escape vehicle to navigate through the underground tunnels, perhaps incorporating a digging arm for the front?



ESIO TROT

Alfie the tortoise does not grow in this charming story of love between two neighbours. The upstairs neighbour, in a bid to impress his love interest, starts to replace Alfie every night with larger and larger tortoises. This makes for a lovely sorting activity where children order different tortoises depending on mass and length. It's also an opportunity to explore the use of tessellating patterns on tortoise shells. The contraption used to scoop the tortoises is a perfect opportunity to explore levers and pulleys, with the children designing and building their own tortoise retrieving device.

MORE INSPIRATION ONLINE

- Read the full article, with more ideas, online ■ www.stem.org.uk/mp/roald-dahl
- Teach science through stories ■ www.stem.org.uk/mp/stories
- Teach science through cross-curricular topics ■ www.stem.org.uk/mp/topics
- The home of Roald Dahl ■ www.roalddahl.com/home/teachers

CPD TO INSPIRE

- Supermarket science ■ www.stem.org.uk/rp125
- Creating a buzz and raising the profile of primary science ■ www.stem.org.uk/rp117
- Creative, cross-curricular primary science ■ www.stem.org.uk/ny008

Our top picks for your calendar...

STEM INSPIRATION AWARDS
4 OCTOBER

Discover the incredible work taking place across the UK to enrich young people's experience of STEM subjects as we celebrate this year's winners.

■ www.stem.org.uk/recognition

WORLD SPACE WEEK
4-10 OCTOBER

Discover a whole world of possibilities with World Space Week. This year's theme is 'Exploring New Worlds in Space', and ESERO-UK has a host of exciting resources to help your Space Week rocket to success.

■ www.stem.org.uk/esero

WORLD TEACHERS' DAY
5 OCTOBER

Every day, teachers around the world do amazing work. World Teachers' Day is your chance to celebrate this. Whether you have been a teacher for years, or are just starting out – get the recognition you deserve.

■ We'd love to know how you're celebrating, let us know @STEMLearningUK

ANTARCTICA DAY
1 DECEMBER

Explore Antarctica with our range of resources created for the Polar Explorer programme. Your pupils can use mathematics and science skills to plan an Antarctic expedition or discover the sights and sounds of penguins, seals and other wildlife.

■ www.stem.org.uk/mp/polar-explorer

Let's take a peek at what people have been tweeting:

The McVitties
@TheMcvities
Follow

Had an amazing two days at @STEMLearningUK, so inspiring! Can't wait to try out all the wonderful ideas.

scdIYESC
@scdIYESC
Following

Delighted to see evidence of positive impact @STEMclubs We support >30,000 #YoungEngineers in >1,400 schools across Scotland! #STEMScotland

Amanda Mutch
@MrsAMutch
Follow

@STEMLearningUK look at what we made 😝 completely out of lego!!

Sarah Peake
@SarahPeake12
Follow

@STEMAmbassadors - It's official!! Very excited I'm fully inducted as a STEM Ambassador #STEM #Skills #UpSkill

10:53 AM - 7 Jun 2017

Explore our CPD

We are the UK's largest provider of subject-specific CPD for teachers and support staff. Our CPD has an impact on you, your pupils and your school:

- improved quality of subject teaching
- raised profile of STEM subjects
- greater motivation and engagement in lessons

You can access our CPD nationally, locally and online. See what the year could hold for you www.stem.org.uk/cpd

All fees and award values are valid for state funded schools and are correct at the time of print (August 2017). See www.stem.org.uk for fee paying schools and the latest information.

100% DISCOUNT

100% DISCOUNT AVAILABLE

We are offering a 100% discount on the activity fee for a range of our spring term National STEM Learning Centre CPD, to help more state-funded schools benefit:

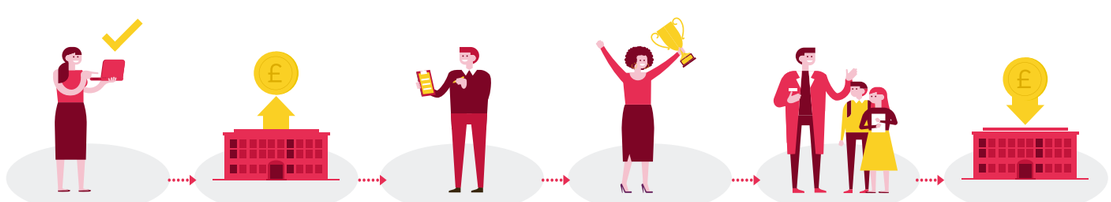
- find the CPD with a yellow circle in the listing
- when booking online use the code SPRING18PRI
- pay the VAT (which as a state-funded school you may be able to claim back)

Some courses also still offer an ENTHUSE bursary. This offer is only available for state-funded schools and only for the courses marked in the CPD listing.

For more details please see the website: www.stem.org.uk/cpd

Our ENTHUSE bursary-funded residential courses are run at the National STEM Learning Centre in York.

Teachers and others working in state-funded schools in the UK are eligible for these bursaries which can be used to contribute to covering the cost of course fees, supply cover, travel, accommodation, or equipment for your school.



1. BOOK – Book your CPD

2. PAY – Your school pays the course fee

3. PLAN – Complete intended learning outcomes and your action plan

4. ATTEND – Attend your CPD and complete your evaluation

5. REFLECT – Embed new ideas in the classroom and see increased impact

6. REIMBURSED – Your state-funded school is reimbursed with the ENTHUSE bursary

COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

POWER UPS, EXTRA LIVES AND ZOMBIES – ENRICHING THE KS2 CURRICULUM THROUGH GAMES CREATION

Develop from creating simple programs to the exciting world of computer games creation, enabling you to provide exciting and engaging activities around game creation with your pupils.
- Your school receives: £600 ENTHUSE bursary
- Activity fee: £600 (ex VAT)
- 29 January 2018 (2 days)

www.stem.org.uk/cy005

BRING MARS EXPLORATION INTO THE PRIMARY CLASSROOM

Discover how to create authentic challenges relating to space exploration, including basic engineering, computer programming and scientific investigation. Activities will reinforce applied maths skills and develop literacy.
- Your school receives: £300 ENTHUSE bursary
- Activity fee: £300 (ex VAT)
- 20 February 2018 (1 day)

www.stem.org.uk/cy010

DATA HANDLING WITH ICT

Help your pupils understand the process of data handling and discover how it relates to other subjects.
- Your school receives: £300 ENTHUSE bursary
- Activity fee: £350 (ex VAT)
- 15 January 2018 (1 day)

www.stem.org.uk/cy013

DESIGN AND TECHNOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

PRIMARY DESIGN AND TECHNOLOGY: LEADING AN EFFECTIVE DESIGN AND TECHNOLOGY CURRICULUM

100% DISCOUNT AVAILABLE*

Gain a deeper understanding of the aims of the curriculum, develop your own subject knowledge and identify the role subject leaders play in developing a whole school approach to teaching the programmes of study for key stage 1 and 2.
- Your school receives: £1,400 ENTHUSE bursary
- Activity fee: £1,300 (ex VAT)
- 18 January 2018 (4 days)

www.stem.org.uk/ty011

TEACHING ENGINEERING IN THE PRIMARY CLASSROOM

Give engineering a real relevance for the primary classroom by looking at the skills that engineers use to do their jobs and how you can apply these in your day to day lessons to enhance science, maths, IT and literacy.
- Your school receives: £700 ENTHUSE bursary
- Activity fee: £600 (ex VAT)
- 12 January 2018 (2 days)

www.stem.org.uk/ty005

USING DESIGN AND TECHNOLOGY TO ENHANCE ENGLISH AND MATHEMATICS IN KS1 AND KS2

100% DISCOUNT AVAILABLE*

Explore how design and technology projects can be used to provide meaningful contexts for English and mathematics lessons, improving teaching and learning in all three subjects.
- Your school receives: £600 ENTHUSE bursary
- Activity fee: £700 (ex VAT)
- 08 March 2018 (2 days)

www.stem.org.uk/ty030

USING IPADS, CHROMEBOOKS AND OTHER TABLET DEVICES IN THE PRIMARY CLASSROOM

100% DISCOUNT AVAILABLE*

This CPD activity is a guide to using your mobile device in the classroom. It is suitable for teachers and teaching assistants who are users of iPads, Chromebooks, Android or Windows based devices.
- Your school receives: £700 ENTHUSE bursary
- Activity fee: £600 (ex VAT)
- 26 February 2018 (2 days)

www.stem.org.uk/ty015

ROBOTICS IN EDUCATION: A CONFERENCE FOR PRIMARY AND SECONDARY SCHOOLS

The Robotics in education conference will provide a full day of hands-on robotic activities for any member of staff involved in primary or secondary education.
- Your school receives: £100 ENTHUSE bursary
- Activity fee: £80 (ex VAT)
- 09 February 2018 (1 day)

www.stem.org.uk/ty249

Leading an effective primary design and technology curriculum

- develop your subject knowledge and skills
- discover new resources to inspire your pupils
- explore tried and tested practical strategies
- link to other subjects including English and mathematics
- support colleagues to deliver an inspiring curriculum

"Very useful, hands-on sessions with loads of practical ideas for future practice."

100% DISCOUNT AVAILABLE*

Use the discount code **SPRING18PRI** when booking. You just pay the VAT and can also apply for a £100 ENTHUSE bursary.

*Offer available for state-funded schools and colleges only.

Book today at www.stem.org.uk/ty011

FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD • CPD LISTING

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

MASTERY IN PRIMARY MATHEMATICS

Explore what mastery is and how it can be used to challenge pupils and develop confidence in effective planning for mastery.

- Your school receives: £600 ENTHUSE bursary
- Activity fee: £650 (ex VAT)
- 11 January 2018 (2 days)
- www.stem.org.uk/my002

"I found the whole course very useful and all parts linked very well. The tutor has been amazing and seeing her planning and how it linked together was great. Creating my own plan and then being able to discuss it with others was great."

- Charlotte Ellis
Hedon Primary School

TEACHING PRIMARY MATHEMATICS FOR NEW AND RECENTLY QUALIFIED TEACHERS

Explore current good practice, engage with practical resources to support learning and develop your assessment for learning skills.

- Your school receives: £900 ENTHUSE bursary
- Activity fee: £750 (ex VAT)
- 19 April 2018 (3 days)
- www.stem.org.uk/my006

SCIENCE

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

100% DISCOUNT AVAILABLE*

CREATING A BUZZ AND RAISING THE PROFILE OF SCIENCE

Explore enriching activities and resources to help you prepare for science week.

- Your school receives: £1,050 ENTHUSE bursary
- Activity fee: £900 (ex VAT)
- 29 January 2018 (3 days)
- www.stem.org.uk/ny045

100% DISCOUNT AVAILABLE*

CREATIVE, CROSS-CURRICULAR PRIMARY SCIENCE

Encourage creative approaches to curriculum planning and discover innovative methods of communication through science.

- Your school receives: £1,400 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- 26 February 2018 (4 days)
- www.stem.org.uk/ny008

DEVELOPING EXCELLENCE IN KS1 SCIENCE AND MATHEMATICS

Engaging mathematics and science strategies to support progression and deepen understanding in your primary school.

Your school receives: £600 ENTHUSE bursary
Activity fee: £600 (ex VAT)
15 January 2018 (2 days)
- www.stem.org.uk/ny055

DEVELOPING EXCELLENCE IN LOWER KS2 SCIENCE AND MATHEMATICS

Gain confidence in planning a progressive and engaging lower key stage 2 curriculum.

- Your school receives: £600 ENTHUSE bursary
- Activity fee: £600 (ex VAT)
- 05 March 2018 (2 days)
- www.stem.org.uk/ny056

DEVELOPING EXCELLENCE IN THE EARLY YEARS FOUNDATION STAGE

Aimed at science subject leaders and early years practitioners, this very practical CPD activity will help identify and demonstrate good teaching and learning.

- Your school receives: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- 05 February 2018 (4 days)
- www.stem.org.uk/ny012

100% DISCOUNT AVAILABLE*

EMBEDDING WORKING SCIENTIFICALLY IN THE PRIMARY CURRICULUM

Practical science is essential for inspiring children and teachers alike. You will develop practical strategies to enhance your pupils' confidence and learning in primary science.

- Your school receives: £900 ENTHUSE bursary
- Activity fee: £900 (ex VAT)
- 12 March 2018 (3 days)
- www.stem.org.uk/ny030

EXTENDING THINKING AND TALKING IN PRIMARY SCIENCE

Increase your confidence in teaching science and develop methods to stimulate curiosity, discussion and thinking in the primary classroom.

- Your school receives: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- 17 January 2018 (4 days)
- www.stem.org.uk/ny001

CPD NEAR YOU

Browse dates and venues online

ASSESSMENT AND PROGRESSION IN PRIMARY SCIENCE

Effective assessment for learning leads to raised attainment. Identify how you can integrate and embed assessment practices into your science teaching.

- Browse dates and venues online
- www.stem.org.uk/rp102

CREATING A BUZZ AND RAISING THE PROFILE OF SCIENCE IN YOUR SCHOOL

You will leave full of practical ideas to enrich primary science in your school. You will be inspired to enthuse your pupils about the thrill of scientific ideas and enquiry.

- Browse dates and venues online
- www.stem.org.uk/rp117

DEVELOPING THE ROLE OF THE SCIENCE SUBJECT LEADER

Explore strategies to help you audit and lead science in your school, understand your role more fully and be able to identify and promote effective primary science.

- Browse dates and venues online
- www.stem.org.uk/rp101

ENGAGING SCIENCE IN KEY STAGE 1

Try out ideas for practical science that can be used with young children to develop a range of scientific skills and explore opportunities to promote children's social skills.

- Browse dates and venues online
- www.stem.org.uk/rp109

LINKING CORE SUBJECTS; SCIENCE AND MATHEMATICS

Maximise your pupils' opportunities to develop their numeracy skills and improve attainment in science by planning lessons in which children effectively handle data.

- Browse dates and venues online
- www.stem.org.uk/rp113

MAKING POWERFUL CONNECTIONS BETWEEN LITERACY AND SCIENCE

Explore the curriculum links between science and literacy and how to develop literacy skills to improve the quality of children's written explanations in science.

- Browse dates and venues online
- www.stem.org.uk/rp114

"Excellent subject knowledge. Well planned and led with enthusiasm and clarity. Fully met my expectations and more."

- John Letts
St Ethelbert's Catholic Primary School

PRIMARY CONFERENCE

Our primary conferences always provide outstanding learning opportunities linked to topical developments in primary science teaching alongside time to talk and share ideas with other primary practitioners.

- Browse dates and venues online
- www.stem.org.uk/rp124

PRIMARY SCIENCE SUBJECT LEADERS' NETWORK

Learn about the latest local and national initiatives in science and keep abreast of developments within the subject.

- Browse dates and venues online
- www.stem.org.uk/rp121

PROMOTING THINKING AND TALKING IN PRIMARY SCIENCE

Consider the key elements of thinking, talking and communicating in science and develop these skills to create an effective learning environment in your classroom.

Browse dates and venues online
- www.stem.org.uk/rp116

RAISING ATTAINMENT IN PRIMARY SCIENCE

Move good lessons to outstanding by identifying and exploring issues relating to raising attainment in your school.

- Browse dates and venues online
- www.stem.org.uk/rp103

STRENGTHENING SUBJECT UNDERSTANDING IN...

Focus on the big ideas in primary science, helping you make a difference to children's learning by identifying and challenging misconception.

- Browse dates and venues online
- www.stem.org.uk/rp112

SUPERMARKET SCIENCE

Discover a bank of easy to use ideas that you can take away with you to enable your pupils to conduct experiments and have fun.

- Browse dates and venues online
- www.stem.org.uk/rp125

TAKING SCIENCE OUTSIDE

Create exciting and inspiring investigations using your outdoor environment that will motivate and engage your pupils to learn.

- Browse dates and venues online
- www.stem.org.uk/rp111

TEACHING SCIENCE IN EYFS

Increase your confidence in using a range of approaches and assessment strategies to meet children's needs in early years.

- Browse dates and venues online
- www.stem.org.uk/rp120

USING APPS TO SUPPORT LEARNING IN THE PRIMARY CLASSROOM

Build your confidence in using apps and ICT to enhance pupils' engagement and achievement in science.

- Browse dates and venues online
- www.stem.org.uk/rp137

USING COMPUTING AND DATA LOGGING TO SUPPORT SCIENCE

Gain hands-on practical experience using digital technologies in science and be able to decide on the best use of the technology and integrate them into your science lessons.

- Browse dates and venues online
- www.stem.org.uk/rp115

WHY CHILDREN NEED TO WORK SCIENTIFICALLY AND HOW THEY CAN

Improve children's outcomes through effective teaching of scientific enquiry.

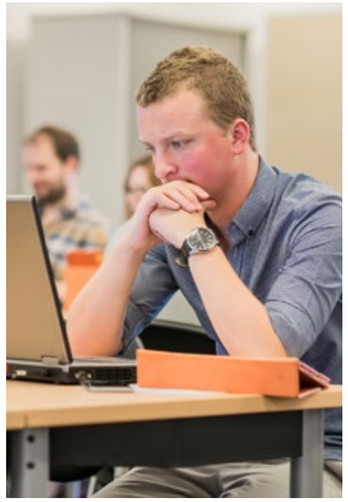
- Browse dates and venues online
- www.stem.org.uk/rp107

WORKING SCIENTIFICALLY IN THE PRIMARY CURRICULUM - PUPIL LED INVESTIGATIONS

Explore a range of techniques to draw out pupil ideas and develop strategies to inspire and incorporate these into your science lessons.

- Browse dates and venues online
- www.stem.org.uk/rp108

ONLINE



ASSESSMENT FOR LEARNING IN STEM TEACHING

Explore the theory and science behind effective assessment for learning.

- Activity fee: free
- 29 Jan 2018 (6 weeks)

■ www.stem.org.uk/ne701

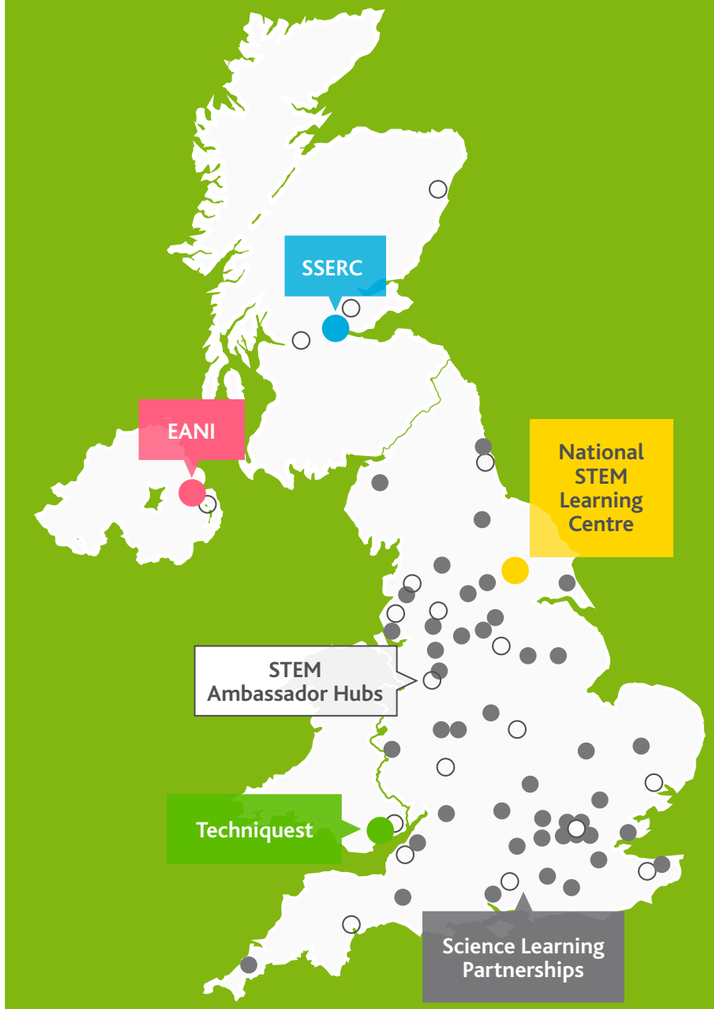
GETTING STARTED WITH PRACTICAL SCIENCE FOR PRIMARY TEACHERS

Explore a range of techniques to deliver primary science in an engaging and practical way. Discover the different types of enquiry and learn how to embed them in science teaching. You will trial activities and think about the impact they have upon the learning of your pupils.

- Activity fee: free
- 26 Feb 2018 (3 weeks)

■ www.stem.org.uk/ne708

High quality support for teachers across the UK



You can access support from the National STEM Learning Network locally, nationally and online to meet the professional development and enrichment and enhancement needs of your department, school or network.

www.stem.org.uk

What will they learn this week?

Offer a richer experience of STEM subjects to your pupils with a STEM Club

- increased enthusiasm for STEM subjects
- improved practical and teamwork skills
- an understanding of STEM jobs

Free support to set up or develop your STEM Club

www.stem.org.uk/mp/stem-clubs

Exploring STEM subjects outside the curriculum

STEM CLUBS

New STEM Ambassadors digital platform

It will soon be easier than ever before to engage with a STEM Ambassador with our new digital platform which will be launched this September.

A more streamlined experience:

- connect faster
- access free resource packages
- share experiences
- be inspired by real-life experiences

"Our work with STEM Ambassadors has really inspired us as a school to take STEM forward in a bold way"

– **Anna Travis**
Manchester Creative Studio School

Explore, inspire, transform – a faster way to connect with STEM Ambassadors.

www.stem.org.uk/stem-ambassadors