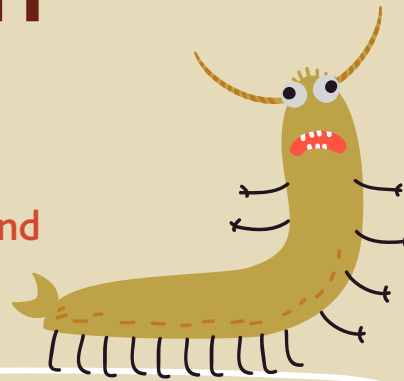


primary **stem** LEARNING

We're going on a **bug** hunt

Top tips for rolling up your sleeves and getting your hands dirty this term



5 Myth busting with STEM Clubs

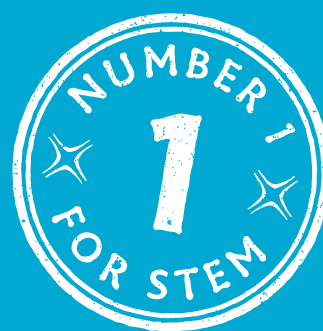
12 Developing primary STEM expertise

18 High quality CPD



Welcome

When was the last time that anyone said 'well done, you're doing a great job and making a real impact on everyone you are working with' or 'the fact that you go the extra mile makes a real difference - keep it up'?



In such a fast paced environment, acknowledging and recognising the impact that you and your colleagues have can often be lost amongst getting everything else done. Just a simple well done in private can be enough to lift spirits or a public announcement in the staff room for a particular achievement makes a real difference.

We all know what a massive impact genuine praise and recognition has on the young people we teach. What we say can be a great motivator and an important factor in raising self-esteem and helping them achieve their potential. So why is it any different for the adults who support young people?

To be formally recognised for how hard you've worked at improving the way you support your pupils is a great feeling. Not only is it fantastic to add to your portfolio and raise your own profile, it's a real confidence boost and motivates you to keep working at being better. As teachers we all aim to encourage the young people we teach to be active learners, be aspirational and to celebrate success. By engaging in CPD and marking your progress with reward and recognition you are being a role model for young people.

In light of this, we want each of you to take the opportunity to say well done to a colleague or to formally nominate them for a recognition award. They could become one of our growing number of prestigious STEM Educators - teachers, teaching assistants and anyone making a positive impact in education. It could be someone who really invests in developing themselves and sharing what they learn with others. Or an inspirational leader in STEM who ensures colleagues get the opportunity to develop themselves and be the best they can be.



Whether it's appreciating your own value as an educator or those you work with, let's start really recognising the impact our work has - after all, that's why we do it!

Fran.

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

Contents

FEATURES



- 5 Myth busting with STEM Clubs
- 6 An amazing Shanghai adventure
- 8 Together is better
- 10 Exploring the psychology of learning

ARTICLES



- 4 Tools of the trade
- 9 We're going on a bug hunt
- 12 Developing primary STEM expertise
- 13 Science on your door step - learning by doing
- 14 You're never too young to be hacked

CPD LISTING

COMPUTING

- 19 General
- 22 Online

CROSS CURRICULAR

- 19 General
- 22 Online

DESIGN AND TECHNOLOGY

- 19 General
- 22 Online

MATHEMATICS

- 20 General
- 22 Online

SCIENCE

- 20 General
- 22 Online

STEM INSIGHT

- 22 Placements



Tools of the trade

by **DAVE PARRY** D&T and art advisor, CLEAPSS

When you think about children making progress with STEM skills, what comes to mind?..drawing tables, presenting data, carrying out a fair test? Have you ever thought about the children's ability to use tools? For example, how confident are they at using a knife, a drill or a saw?

CLEAPSS are known as the people who 'do risk assessments' but our real aim is to promote and support practical work, in all its forms. For us, this means helping children work independently on projects using the tools they need to succeed. To achieve this they need to experience using tools from an early age, after all this is how progression works. As with all aspects of the curriculum, the key is to get children working with tools, and on projects, that are age and stage appropriate.

As an example let's think about teaching children how to use knives safely through technology activities.

When planning to teach your children how to use knives think about:

- what previous experience do they already have of using knives?
- how developed are their manipulative skills?
- how mature are they?
- which size of knife is suitable for the children's hand size?

Once you have thought this through, consider what type of project is appropriate. Introduce children to knives from an early age, for example using plastic knives to spread soft cheese or cut soft fruits. As their strength and dexterity improves they can be introduced to knives with metal blades in more demanding projects such as using general kitchen knives to prepare harder vegetables. Increasing strength and dexterity will mean that children can be taught to cut with greater accuracy, for example chopping vegetables into sections, then in to sections of the same size such as quartering apples.

Mastering the use of a knife is often the gateway to children being able to use other cutting equipment, such as saws to cut hard or resistant materials including thin sections of timber. They would again start with strength and dexterity and move toward accuracy.

This 'holy trinity' of strength, dexterity and accuracy applies to using all tools.

So what about the risks? Any practical activity comes with risk; it's the nature of the beast. CLEAPSS' aim is to help you to give children as much independence as possible while keeping the risks as low as practicable.

The CLEAPSS primary website includes model risk assessments for all primary appropriate tools as well as a variety of D&T and art projects. Our advice includes information about the levels of supervision needed for different tools and projects. Once you've read our guidance, ask yourself "how does this apply to my children and their abilities"? You may need to adjust what we suggest to take these factors into account. If in doubt, or for further help, contact CLEAPSS via the helpline.

If you're looking for inspiration or need some advice about tools and D&T projects visit our website www.cleapss.org.uk.

CPD FOR D&T

Teaching engineering in the primary classroom
www.stem.org.uk/ty005

Myth busting with STEM Clubs

by **JOANNE MITCHELL** Project Coordinator – STEM Clubs, STEM Learning

Have you ever wondered whether Rapunzel and her prince could have climbed down the tower using her hair? Or whether the Gingerbread Man needed a dry suit to let him swim across the river? How about helium balloons floating your house away? These questions and more are being myth busted in the newest activity resources designed for STEM Clubs.

Pupils aged 7 to 11 can explore movie facts and fairy tale myths through STEM projects that test whether any of it is actually possible. Using imagination, creativity and scientific skills, pupils set about resolving some of the most well-known 'facts' to appear on TV, in the movies or in stories. On their journey of discovery pupils will learn how to design and create an invisibility cloak, how hoverboards really work and just how forced perspective enables actors to shrink and grow.

Each exciting set of activities brings STEM subjects to life, allowing pupils to discover the joy to be had in a STEM Club. Club leaders have the comfort of knowing that each activity comes with comprehensive guidance notes, listing resources, how long the activity takes, instructions on how to run it and of course how to differentiate for pupil abilities. There are eight activities in each set, which are designed to support learning over half a term. For the pupils there are guidance sheets that come complete with project observation notes, enabling them to fully record their problem-solving skills.

These fun-filled introductions to STEM subjects offer you the ability to support curricular learning through after school clubs, where pupils can learn at their own pace, stretch their abilities and understand how STEM subjects affect the world around them. With a newly launched Best Practice Handbook and STEM Ambassadors available to offer support, there is no better time to discover the enjoyment to be had in a STEM Club.

Look out for future activity sets:

- animal adaptations
- future world
- extreme elements
- sounds amazing!
- space explorers

www.stem.org.uk/STEM-clubs/featured-resources

SUPPORT FOR YOUR STEM CLUB



Establish or invigorate your STEM Club with our free resources
www.stem.org.uk/mp/STEM-clubs



Look out for local events near you
www.stem.org.uk/STEM-clubs/support



An amazing Shanghai adventure

by JANET SPITTALS

Deputy Head Teacher, Primary Maths Specialist Teacher, Amotherby Community Primary School



Imagine the recipe – 70 primary mathematics teachers from all over the country; the National Centre for Excellence in the Teaching of Mathematics (NCETM), the Department for Education and the government curriculum innovation unit all mixed together for two weeks in Shanghai.

What could possibly go wrong? How would we benefit as individuals? How would the pupils that we teach benefit? These are some of the questions we discussed on our flight out.

FIRST IMPRESSIONS

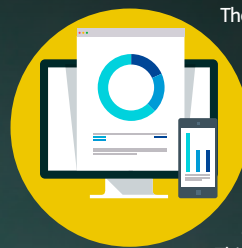
The first thing you notice when you enter the schools in Shanghai is that the pupils are keen to learn and expect to be taught. The teachers are well prepared and focused on the small steps of learning for 30 precise minutes. The attention to detail in planning is staggering and is supported by the use of PowerPoints. No small stone is left unturned and any misconceptions are planned for and explained rather than responded to. Interaction within the class is lively and the pupils are engaged with games and challenges. Marking is kept to a minimum and the pupils are assessed throughout the lesson. The classrooms are functional spaces with no 'decoration', no sign of pre-prepared displays, only pupils' work.

GROUP DISCUSSIONS

As a group we discussed what we had seen every evening as an informal Teacher Research Group (TRG). This was invaluable as we gained an insight into more than one school.



WHAT IS DIFFERENT TO THE UK AND HOW CAN THIS HELP US?



The Shanghai schools have state textbooks and software which support planning and ensure that every pupil in every school moves at the same pace. One suggestion from our group was that teachers within the UK have something similar that allows for coherence and variation but is not as prescriptive as we saw in Shanghai. This would not only support, but also allow teachers to use their expertise to teach.

There was much discussion about workload within Shanghai and the UK. As teachers we were often greeted with disbelief from our Chinese counterparts about what we did every day and I was often told that I must be a superwoman! To which I would laugh and reply, "No, I'm just a primary teacher!"



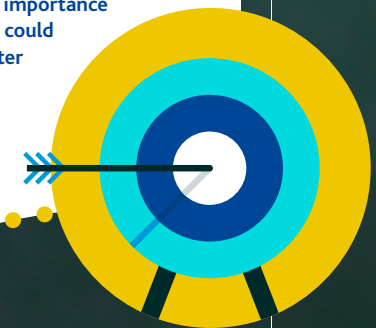
Lessons within the schools are often observed by other teachers and this form of CPD is seen as a supportive process rather than a critical one. I was lucky enough to be part of a regional TRG in one school where 40 teachers observed a showcase lesson on algebra. The simplicity of the concept was conveyed through a real-life context (cans of Coca-Cola) that the pupils could relate to and the journey of the lesson was in planned, coherent steps.

WHAT DID I LEARN FROM THE EXPERIENCE?

- 1 Attention to detail in planning is critical.** Planning needs to be flexible and meet the needs of all the pupils. This means being willing to change planned lessons in response to the needs of your class. Also carefully planning the use of representation and structure – that you use to support the maths and the understanding that you want to get across.
- 2 Bar modelling has had the biggest impact on my practice and the practice in my school and the TRG schools which I support.** Teaching this as a model helps children to see the maths in many different contexts from addition and subtraction to fraction, ratio and proportion.
- 3 Marking is only useful if it is done within the lesson and pupils are part of the process.** Why spend hours writing comments in books that Year 1 and 2 pupils cannot read? For whose benefit?
- 4 The culture in China is to see maths as an essential life skill** that is to be grown and cultivated throughout education.

Within my own school, we are growing mastery slowly from key stage 1 and into key stage 2. It's not easy and it doesn't always go smoothly, but we are trying to ensure that everyone on this journey no longer accepts that some children cannot do maths. It is hard and it challenges everything we have been taught as a profession through the last two frameworks, but the results are amazing.

Teachers are empowered! Pupils are enthused! Parents understand the importance of maths. What could possibly be better than that?



START YOUR JOURNEY >

- Mastery in primary mathematics
www.stem.org.uk/my002
- Teaching primary mathematics for new and recently qualified teachers
www.stem.org.uk/my006
- Primary mathematics resource packages:
www.stem.org.uk/primary-maths

Together is better

by **SAMANTHA MAHER** Teaching School Lead, Oadby Learning Partnership

The Oadby Learning Partnership is a collaborative group of schools with an established network of science leads keen to raise the profile of science within their schools. We agreed that to improve attainment we needed to promote the use of enquiry based learning to inspire both teachers and pupils.

The focus of our Partnership is to raise attainment and engagement in science for girls and pupil premium children.

We have done this by providing high quality CPD for our teachers and leadership development for the science network. We have always provided CPD for our staff but this gave us a focus and drive towards enquiry based learning. We are also developing links with local employers to help us to create exciting experiences for the children.

A highlight of the Partnership was a science conference that we hosted at the beginning of year two. The aim was to instil into our teachers a passion to plan and deliver enquiry based learning in their science lessons and to provide them with exciting ideas to take back to their classrooms.

provided high quality CPD that got cascaded to staff meetings and then those people took the lead on the conference day."

It is clear through pupil surveys, feedback and data that the work has had a positive impact on the targeted children. It's had a hugely positive impact on all of the schools. Our pupils are now more involved in science than they ever were.

Natalie agreed: "We now have girls saying they want to be scientists and they want to work in particular STEM industries."

However, our work does not end here. We are continuing to build on the work we have begun. We would like to further involve local businesses and industries in our schools to provide our children with a rich and exciting STEM education and increase pupils' aspirations for employment into the field of STEM in the future. Initially we had seven schools in the Partnership but as other schools have heard about what we are doing, they have joined us and contribute financially as they can see the impact we can have by working together.

WORKING TOGETHER

Apply for your own ENTHUSE Partnership
www.stem.org.uk/mp/enthuse-partnerships

Access bespoke support from your local Science Learning Partnership
www.stem.org.uk/mp/science-learning-partnerships

Why children need to work scientifically and how they can
www.stem.org.uk/rp107

In 2015, after a successful application to STEM Learning, we were privileged to become an ENTHUSE Partnership.

The teaching staff from the Partnership schools attended the conference, which was opened in a spectacular fashion by Neil Monteiro and the aid of fire. As a science communicator, Neil's passion was contagious and the teachers were hooked. The science leads facilitated enquiry based workshops in the afternoon. This provided teachers with hands on experiences and the opportunity to share good practice across schools and year groups.

Natalie Hackett, Headteacher at Fernvale Primary School, one of the schools in the Partnership, said: "The funding from the ENTHUSE Partnership

We're going on a Bug hunt

by **FRANCISCA SCONCE** Outreach and Engagement Executive and STEM Ambassador, Royal Entomological Society
[@FranciscaSconce](https://twitter.com/FranciscaSconce)

Have you joined the Great Bug Hunt yet? The annual competition is back for 2018 and is a great way to get your pupils to explore outside, develop working scientifically skills and appreciate insects; 'the little things that run the world'. Here are some top tips for how you can run the Great Bug Hunt in your school.

EXPLORE A LOCAL HABITAT WITH YOUR CLASS

The school playground or garden, local park or nature reserve provide the perfect environment to go discovering in. Hunt for bugs by turning over rocks and logs, looking underneath leaves on trees and bushes, searching through leaf litter and dipping in fresh water. Your visit could be on Thursday 17 May, which is Outdoor Classroom Day, when schools all around the world take their lessons outdoors.

LOOK CLOSELY AT WHAT YOU FIND

Take equipment such as collecting tubes or pots and lenses or sheet magnifiers. White trays can help in spotting bugs emerging from soil and leaf litter. Fine mesh nets are best for pond dipping. Older learners can try using identification keys such as fold out guides from the Field Studies Council or Open Air Laboratories (OPAL). Ensure the children know how to look after the bugs they collect and return them carefully to their original home.

RECORD WHAT YOU FIND

Ask your pupils to write down what invertebrates they find and where in the habitat. Older learners should appreciate how invertebrates are affected by habitat management and by seasonal and global change. They could create Top Trumps type cards detailing facts about their chosen invertebrate.

DRAW YOUR FINDINGS

Make a class project using the results and link to relevant curriculum topics. Children could draw pictures or write stories and poems about the habitat visit and what they saw. Older learners could draw diagrams of their observations and look up details about insect lifecycles and what they feed on.

ASK A STEM AMBASSADOR TO HELP

Contact your local STEM Ambassador Hub and find a STEM Ambassador who could run a session about insects or come with you on the habitat visit.



The Great Bug Hunt is a competition for all primary groups. It is run by the Association for Science Education in partnership with the Royal Entomological Society.

The deadline for entries is 15 June 2018.

SUPPORT FOR ADVENTURERS

- Find a STEM Ambassador
www.stem.org.uk/mp/stem-ambassadors
- Bug count - what bugs are living near you?
www.stem.org.uk/rxzb2

GET OUTDOORS WITH OUR CPD

- Working scientifically in the primary curriculum
www.stem.org.uk/rp107
- Using your outdoor learning environment
www.stem.org.uk/rp111
- Join the Great Bug Hunt
www.stem.org.uk/great-bug-hunt


Exploring the psychology of learning

by **TIM JAY** Professor of Psychology of Education, Sheffield Hallam University

As a teacher I worked with lots of children and young people who really struggled with maths. Now, as a researcher, I am starting to understand that lots of the difficulties experienced by those children will have begun with a weak foundation in their understanding of number. Exploring the psychology of learning can help us see how the groundwork for understanding number concepts is formed, and help us to create better learning opportunities for children.


Children discover a lot about numbers from everyday activities, such as counting when walking up the stairs. Research by Klibanoff et al shows us that informal number talk in the early years is a really important source of learning, but what is really taking place in a simple everyday activity like this?

FROM REPETITION TO UNDERSTANDING




Learning about numbers and counting takes a long time! First of all, children start to recognise that number words are a special category of word that say something about the world that adults think is important. They learn over time that they have a fixed order. At some point, children will start to say the number words along with their parent when climbing the stairs – but crucially they won't necessarily be linking the words with the stairs yet (ie they are not yet counting). Eventually, after many, many repetitions of this activity, children link the words and the set of stairs they are climbing, making sure they say one number word for each stair. Finally, they learn that the last number they say, when they reach the top of the stairs, is the quantity of stairs that there are. This whole process can take months and years to complete.

LEARNING AND DEVELOPMENT ARE NON-LINEAR



They do not happen in a continuous, gradual way. Just like children have physical growth spurts, Giedd et al have found that it's the same in the development of the brain. Studies of the shape and structure of developing brains have shown that different regions of the brain develop at different rates, and peak at different ages. The different skills that children use when they are counting up the stairs (including gross motor skills, spatial skills, social skills) will develop at different times and at different rates. They all need to come together for children to make sense of number and counting.

INDIVIDUAL DIFFERENCES




There are substantial individual distinctions among children in their number learning. These have several sources, including both genetic and environmental factors. In any classroom there will be a wide variety of levels of all of the foundational skills (verbal, visual, spatial, quantitative) required for learning. It is really important that teachers have a store of activities that children can engage with at different levels of understanding. Counting rhymes (especially those with actions) are great because children can take part at a wide variety of counting proficiency.

WHAT DOES THIS MEAN FOR THE PRIMARY CLASSROOM?

Older children still need to experience a range of activities that involve numbers in multiple modes and representations. In a study published last year (Jay and Betenson, 2017), we found that 6 to 7 year old's finger sense (the ability to coordinate a sense movement of the fingers – necessary to use them effectively as a tool for representing and manipulating number) was often holding back their mathematical development. An intervention mixing finger training activities with number games (involving dominoes, dice and so on) was successful in improving children's counting and arithmetic skills. More generally, mathematics learning in the primary classroom should continue to promote connections between different concrete, abstract and symbolic representations of number, so that children develop a flexible understanding.

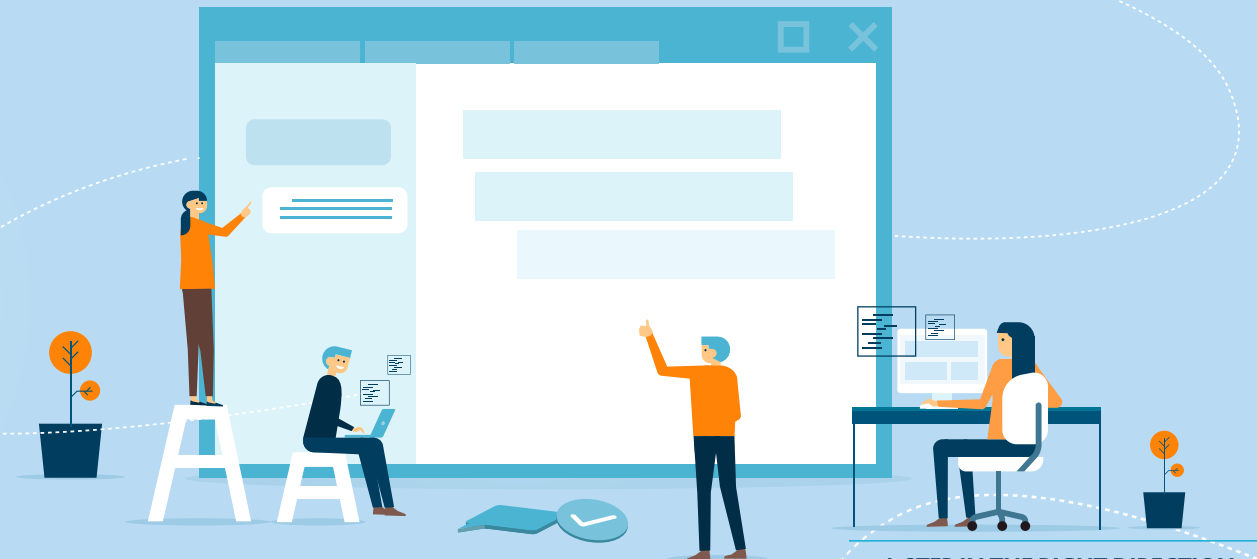
When we start to think about the kinds of activities that children experience day-to-day that contribute to their mathematics learning (counting up the stairs being just one of many, hopefully!), we see that they may be as important as much of the actual classroom teaching that children engage with. An understanding of the psychology of number learning brings home the idea that a sound understanding of number is a long-term project that depends on several skills and understandings coming together through a variety of experiences. Teachers can use this understanding to think about how day-to-day activity can help develop a sound foundation of number knowledge on which to build.

CPD FOR GREATER UNDERSTANDING

 Delve into the science of learning
www.stem.org.uk/ne709

Developing primary STEM expertise

by **TANYA SHIELDS** Primary STEM Lead, STEM Learning



In her speech at the Association for Science Education annual conference, Amanda Spielman (HM Chief Inspector) highlighted the need for a renewed focus on the curriculum. The next phase of her research will take an in-depth look at the primary science curriculum and this will feed into the new inspection framework for 2019.

This is news that I welcome wholeheartedly. Schools will need driven and determined subject leadership that puts scientific enquiry at the heart of science teaching to ensure science thrives.

Having studied for a Bachelor of Education in Primary Science it was no surprise that I would eventually become a primary science leader. But for many this natural career progression is not quite so straightforward. Time and time again we meet teachers who tell us how they were 'given' the role because no one else wanted it!

SO HOW DO TEACHERS MAKE THE TRANSITION FROM CLASS TEACHER TO SUCCESSFUL SUBJECT LEADER?

Teachers do not need a background in science. In fact some of the best subject leaders we have worked with have had relatively little experience of the formal scientific world. The common characteristic of our best subject leaders is their enthusiasm and natural curiosity about how things work. The role of the subject leader is to support colleagues to understand the importance and relevance of science in our lives.

Wellcome recently published a document defining primary science expertise. Whilst the statements do not provide a statutory list of dos and don'ts for leading science, they do provide science teachers and leaders with a description of the expertise needed to fulfil their roles. These include keeping up to date with broad developments in science and science education, being aware of key areas such as health and safety, understanding the existence of unconscious bias, developing a whole-school vision for science, monitoring pupil progress and accessing continuing professional development (CPD) where needed.

Why not use the document to identify the skills and attributes you already have and where you could focus your professional development or that of your colleagues.

FOCUSING ON EXPERTISE

Read the full Wellcome report
www.stem.org.uk/rxexnb

A STEP IN THE RIGHT DIRECTION: CPD FOR NEW AND EXISTING SCIENCE SUBJECT LEADERS

NEW TO TEACHING SCIENCE

Teaching primary science: getting started
www.stem.org.uk/ne708

NEW TO LEADING SCIENCE

Developing the role of the science leader
www.stem.org.uk/rp101

RECENTLY ESTABLISHED SCIENCE LEADER

Help! How do I lead primary science?
www.stem.org.uk/ny037

EXPERIENCED SCIENCE LEADER

Developing the experienced primary science leader
www.stem.org.uk/ny003
www.stem.org.uk/rp101

SUPPORTING OTHERS

ENTHUSE Partnership
www.stem.org.uk/mp/enthus-partnerships

Science on your doorstep – learning by doing

by **RACHEL GODFREY** Skills Development Coordinator, Royal Horticultural Society

Exploring the wonders of nature can be very powerful and dovetails into the science curriculum beautifully. So get outside and encourage your pupils to really look at what is living on their doorsteps.

STEM Learning has been working with the Royal Horticultural Society on the Campaign for School Gardening. The activities below will help you get your learners into the truly multi-sensory environment of the great outdoors and start them on a memorable journey of discovery in science.

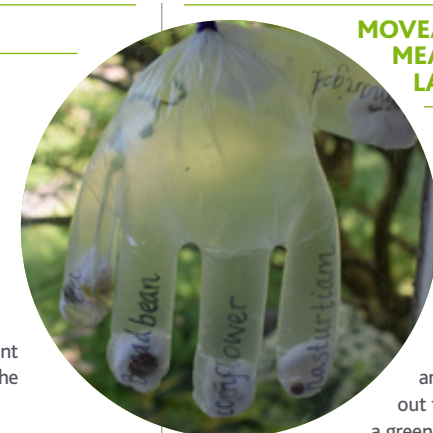
MINI WORMERY



Cut the top off a large clear plastic bottle and make a mini wormery with layers of sand and soil. Then embark on the fun task of discovering the best way to collect worms to add in to the top. Stamping feet, soaking the ground with water and forking the soil should work, but if all else fails resort to a combination of techniques whilst singing the 'There's a worm at the bottom of the garden...' song! Seeing how these fascinating creatures mix up the layers as they move around will help your young learners to see worms differently and begin to understand why we need them in our gardens. Don't forget to provide worm food of grated carrot, vegetable peelings, dead leaves and shredded newspaper – delicious!

HANDY GARDENERS

With longer days and the weather starting to warm up, spring is the perfect time to get seeds growing. Discover the propagation process by getting your class making handy gardeners' greenhouses created from clear plastic gloves stuck to a window pane. Using a piece of damp cotton wool pushed into each finger as growing media, experiment with five different seeds and find out which will win the germination race.



MOVEABLE MEADOW AND LAWN LETTERS

The lawn surface can become a blank canvas for exciting secret messages! Create your own movable meadow by growing grass in a classroom tray and use it to check out the effect of starving a green plant of light.

GROW YOUR CURRICULUM WITH FREE RESOURCES

-  Rocket science
www.stem.org.uk/rx3g35
-  RHS Campaign for School Gardening
schoolgardening.rhs.org.uk/resources
-  Exploring the outdoors with the early years foundation stage
www.stem.org.uk/ny060

Grow a tray of grass by following seed packet instructions. You can either grow this outside, covered with a net to stop hungry birds, or inside. Alternatively use a small piece of turf – remember to water your grass regularly. Use scissors as your mini lawnmower to keep the grass trimmed.

Plants need to make their own food by photosynthesis using water, carbon dioxide and light. Place cut out shapes or letters on top of the grass, and leave for a few days. The reduced light will stop the plant making food or producing the green colour – when you remove the objects a turf tattoo is temporarily left behind.

You're never too young to be hacked

by **DAVE GIBBS**
@adgibbs

STEM Computing and Technology Specialist, STEM Learning

Cybersecurity conjures images of hooded hackers, spy-geeks and international intrigue, but is simply a vital part of everyday life. Its teaching is a big deal in secondary schools but can, and should, it be interesting to younger learners? With ever-younger children leaving behind digital footprints this is too important to leave until later.

When you check for the secure 'lock' before entering your details into a website, create a new password or update your laptop, you are practising cybersecurity. Our secure behaviours have become second nature, driven by our desire to stay safe and maintain privacy while navigating the digital landscape. Children also expose themselves to risk each time they use web technologies. Raising their awareness and making a habit of safe practices is important, but making cybersecurity seem relevant can be a challenge.

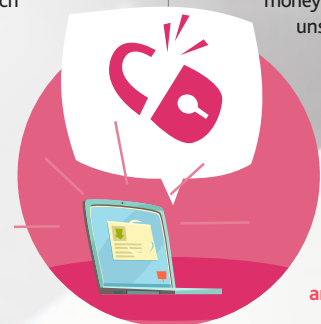
Here are five ways to do it.

1. Choose a celebrity and write down everything that the children know about them. Do they share their phone number? Their home address? Why not? **Explore personal information and the reasons for keeping it out of the public realm.** A diagram of concentric circles is a handy way of arranging information, from PIN numbers and other private information at the centre, through information that would be shared with trusted family and friends, such as an address, to publicly available information such as a middle name.



2. Spam emails can be persuasive. Try presenting some to your class, and ask what their response would be. Spam is often badly written, so why not critique one as a literacy exercise? Pupils could be encouraged to write their own as part of a story. There are lots available online, and probably in the spam folder of your email!

3. Leave a mystery box on the table when the children arrive, and deny any knowledge of it. Then, debate whether it should be opened. What might it contain? It might be a gift, or a poisonous animal! Ask the children what information they would like before they open it, such as the sender's identity. Tell them a stranger's name is on the box, accompanied by a tempting letter – does this change their opinion? **Emails from unknown people, with untrusted attachments, present similar risks and should be handled with great care.** And your mystery box? The contents are up to you!






4. URL hijacking or typosquatting, relies on spelling mistakes in web addresses that lead the browser to an unintended destination. Ask children to spell a popular – but challenging – website name, and take a look at the variations. They could even make up their own sneaky twists on web addresses.

5. Cybersecurity and online safety are closely related. For example, 'freemium' video games aren't usually criminal in nature, and so might not be a cybercrime risk. Many allow in-app purchases, however, and have presented some nasty shocks to parents. Make racking up (imaginary) bills into a maths challenge – how much could you inadvertently spend in 15 minutes, the time a window is often left open after a password has been entered? Investigate how the game can be secured to prevent this from happening. Compare with phishing scams and other ways that money can be taken from unsuspecting users.

Cybersecurity, like the rest of computing, has far-reaching links into other areas of the primary curriculum. Make computing relevant to pupils, as well as fellow teachers, and raise its profile across school.



SUPPORT TO LEAD YOUR COMPUTING CURRICULUM >

-  Leading the new primary computing curriculum
■ www.stem.org.uk/cy004
-  Assessment and progression in primary computing
■ www.stem.org.uk/cy032
-  Bring a cybersecurity STEM Ambassador into your school
■ www.stem.org.uk/mp/stem-ambassadors

STEM-SPIRATION at our summer conferences



COMPUTING

In partnership with Computing at School, explore going further with Scratch, planning a programme of study, effective assessment, micro:bit, and Barefoot computing workshops.

• 25 June 2018
■ www.stem.org.uk/cy007

SCIENCE

Helping teachers and leaders inspire pupils, develop cross-curricular approaches and tackle the science curriculum.

• 26 June 2018
■ www.stem.org.uk/my007

MATHEMATICS

In partnership with Maths Hubs Yorkshire Ridings, discover ways of developing fluency, reasoning and problem-solving to support the development of mastery.

• 27 June 2018
■ www.stem.org.uk/my007

LOCAL SCIENCE CONFERENCE

You'll find a conference on your doorstep too, run by your local Science Learning Partnership.

■ www.stem.org.uk/rp124

CALENDAR

Our top picks for your calendar...



EDITOR'S
TOP
PICK

WORLD TURTLE DAY 23 MAY

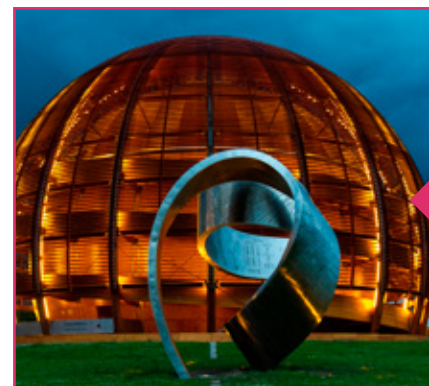
World Turtle Day is the perfect chance to teach children about the wonder of turtles and their habitats. Discover a range of turtle-y engaging resources to enthuse your pupils.

■ www.stem.org.uk/blog/bringing-world-turtle-day-classroom

WORLD ENVIRONMENT DAY 5 JUNE

Teaching pupils about the importance of looking after the environment is crucial to the future sustainability of the planet. Whether you look at everyday issues, such as recycling, or decide to focus on wider issues like climate change, we have a range of resources on our website to support you.

■ www.stem.org.uk/cxezvn



STEM INSPIRATION AWARDS OPEN APRIL 2018

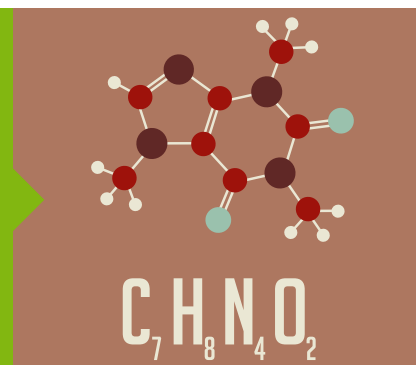
Enter our free award scheme designed to celebrate individuals and organisations working to inspire young people in STEM subjects. Categories include STEM leadership and Inspirational STEM engagement project. Winners are invited to attend an exclusive visit to CERN.

■ www.stem.org.uk/ms/stem-inspiration-awards

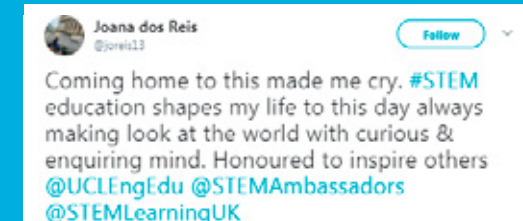
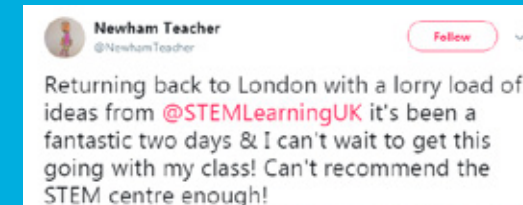
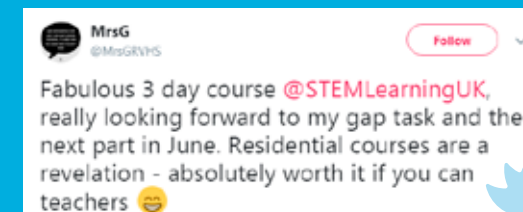
WORLD CHOCOLATE DAY 7 JULY

World Chocolate Day is coming. Not only is this a great excuse to indulge, it can also be a fantastic way to engage pupils with the world of STEM. Whether you look into the structure of chocolate or the engineering careers available in the industry, why not celebrate World Chocolate Day?

■ www.stem.org.uk/cxezns



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



Follow us @STEMLearningUK and let us know what STEM related things you're up to!

Discover CPD that has an impact

We support over 170,000 teachers, reaching more than 2 million young people, every year. Why not join us this year and plan your perfect CPD to help you develop in your role and support your pupils more effectively.



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

Participating in our CPD will have an impact on you and your pupils:

- over 80% of those who work with us improve the quality of their STEM teaching
- more young people pursue STEM careers as a result of our support
- disadvantaged pupils are even more likely to benefit from our support

Find out more about the impact of our CPD at: www.stem.org.uk/mp/impact

- look out for the CPD with a yellow circle in the listing
- when booking online use the code AUTUMN2018PRI
- 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.

All fees and bursary values are valid for state-funded schools and are correct at the time of print (March 2018). See www.stem.org.uk/cpd for other fees and the latest information.

Our ENTHUSE bursary-supported 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.



COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included

ASSESSMENT AND PROGRESSION IN PRIMARY COMPUTING

Explore how to secure positive assessment practices in the computing curriculum. Investigate different methodologies for making judgements on progress and develop your decision making around appropriate next steps for learning.

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 18 October 2018 2 days
- www.stem.org.uk/cy032

LEADING THE NEW PRIMARY COMPUTING CURRICULUM

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 computing.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 8 October 2018 4 days
- www.stem.org.uk/cy004

"The access to the online resources, iPads, Makey Makey kits and handouts have all provided beneficial and tangible materials to bring the course up-to-date, informative and relevant for my professional context. The course has developed my initial understanding of the computing lead role and through the use of Curriculum Innovations resources enabled me to develop this understanding further, providing me with a plethora of resources to take back and use in school."

- Luke Coulson
Subject leader
Cedar Children's Academy

CROSS-CURRICULAR

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included

EXPLORING THE OUTDOORS WITH THE EARLY YEARS FOUNDATION STAGE

Explore how to develop outdoor provision and use the outdoors to support learning across mathematics, understanding the world, communication and language, expressive arts and physical development.

- Money back: £700 ENTHUSE bursary
- Activity fee: £500 (excl VAT)
- 2 October 2018 2 days
- www.stem.org.uk/ny060



DESIGN & TECHNOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included

HANDS-ON ROBOTICS FOR KEY STAGE 2 WITH THE CRUMBLE CONTROLLER

Find out how the Crumble Controller can bring hands-on robotics into your classroom

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 13 November 2018 2 days
- www.stem.org.uk/ty029

"I found the full training very useful. I had no prior learning on Crumble. This course allowed me to start simple. I learnt how to set up the kit, send simple algorithms and then build on my learning. The following day we progressed onto Crumble playgrounds. Having this time, allowed my understanding to become secure and confidence of the subject and use of equipment to grow."

- Jenny Hindson
Teacher
Eastfield Primary School



HELP! HOW DO I LEAD PRIMARY STEM?

New to leading primary STEM? Explore the basics of creating a vision for STEM, audit current provision and develop strategies to raise the profile of STEM in your school.

- Money back: £1,400 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 9 October 2018 4 days
- www.stem.org.uk/ny061

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

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.

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 28 November 2018 2 days
- www.stem.org.uk/ty015



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

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 key stage 2.

- Money back: £1400 ENTHUSE bursary
- Activity fee: £1300 (excl VAT)
- 8 November 2018 4 days
- www.stem.org.uk/ty011

TEACHING ENGINEERING IN THE PRIMARY CLASSROOM

Find out how engineering can be used as an exciting context for primary lessons and help inspire the young engineers of the future.

- Money back: £700 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 19 November 2018 2 days
- www.stem.org.uk/ty005

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

ASSESSING, MODERATING AND TRACKING PRIMARY MATHEMATICS

Start with assessment theories then investigate different methodologies for making progress judgements and decisions around next steps for learning.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,000 (excl VAT)
- 8 November 2018 4 days
- www.stem.org.uk/my032



HELP! HOW DO I LEAD PRIMARY MATHEMATICS

Explore the mastery approach to mathematics, develop your skills knowledge and change the way the subject is taught in your school.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,000 (excl VAT)
- 27 September 2018 4 days
- www.stem.org.uk/my004

MASTERY IN PRIMARY MATHEMATICS

Discover how the mastery approach can be incorporated into primary mathematics lessons.

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 20 September 2018 2 days
- www.stem.org.uk/my002

TEACHING PRIMARY MATHEMATICS FOR NEW AND RECENTLY QUALIFIED TEACHERS

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

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,000 (excl VAT)
- 11 October 2018 4 days
- www.stem.org.uk/my006

SCIENCE

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

ASSESSING, MODERATING AND TRACKING PRIMARY SCIENCE

Ideal for teachers who want to familiarise themselves with the current expectations around assessment and children's progress in science.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 5 November 2018 4 days
- www.stem.org.uk/ny032

**"All brilliant!!
Resources for
staff, ideas, links
and websites."**

- Leona Dutton
Teacher
Thornton Primary School

DEVELOPING AN OUTSTANDING PRIMARY SCIENCE STEM CURRICULUM

This CPD activity will give you either a starting point or springboard to practical advice and a range of approaches for developing a primary science curriculum.

- Money back: £1,400 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 6 December 2018 4 days
- www.stem.org.uk/ny044

DEVELOPING THE EXPERIENCED PRIMARY SCIENCE LEADER

Explore best practice and interact with research at local, national and international levels.

- Money back: £3,150 ENTHUSE bursary
- Activity fee: £2,250 (excl VAT)
- 10 December 2018 9 days
- www.stem.org.uk/ny003

EMBEDDING WORKING SCIENTIFICALLY IN THE PRIMARY CURRICULUM

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

- Money back: £900 ENTHUSE bursary
- Activity fee: £900 (excl VAT)
- 15 October 2018 3 days
- www.stem.org.uk/ny030

HELP! HOW DO I LEAD PRIMARY SCIENCE?

Develop strategies to embed your vision for primary science with support to help you raise the profile of STEM in your school.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 27 September 2018 4 days
- www.stem.org.uk/ny037

IMPROVING PROGRESS IN ENGLISH AND MATHEMATICS THROUGH INSPIRATIONAL SCIENCE

Supporting primary teachers, we will help you to develop your pupils' mathematics and language and literacy skills through inspirational science.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 12 November 2018 4 days
- www.stem.org.uk/ny036

SUPPORTING SEND PUPILS IN PRIMARY SCIENCE

Focusing on aspects of differentiation and adapting practical tasks for children of all abilities. Sessions will be led by leaders in special needs education.

- Money back: £900 ENTHUSE bursary
- Activity fee: £750 (excl VAT)
- 21 November 2018 3 days
- www.stem.org.uk/ny043

TEACHING PRIMARY SCIENCE OUTDOORS

Primary science subject leaders and teachers will learn to develop engaging outdoor science lessons to support pupils' progress.

- Money back: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (excl VAT)
- 17 September 2018 4 days
- www.stem.org.uk/ny009

"This was by far the most useful CPD I have ever attended. I was somewhat apprehensive about having to travel to the National STEM Learning Centre and spend a valuable two days outside of school. However this has been an invaluable experience."

- Claire Williams
Subject leader
Donnington Wood Infant School and Nursery Centre

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 science 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

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 ideas into your science lessons.

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

ONLINE

MANAGING BEHAVIOUR FOR LEARNING

Transform your classroom by making small shifts in your own behaviour. Develop the habits of effective behaviour managers and explore how to manage difficult confrontations. Led by Paul Dix.

- Activity fee: free
- 17 September 2018 5 weeks

■ www.stem.org.uk/ne700

TEACHING PRIMARY SCIENCE: GETTING STARTED

Tackle practical work in primary science, discover new techniques and develop your confidence.

- Activity fee: free
- 5 November 2018 3 weeks

■ www.stem.org.uk/ne708

PLANNING FOR LEARNING IN STEM TEACHING

Improve your planning and tailor activities to create assessment and feedback opportunities for your pupils.

- Activity fee: free
- 12 November 2018 5 weeks

■ www.stem.org.uk/ne710

TEACHING PRIMARY SCIENCE: HUMANS IN SPACE

Identify opportunities across the curriculum to use space as a context for learning and engage children in practical activities.

- Activity fee: £27 (excl VAT)
- 24 September 2018 3 weeks

■ www.stem.org.uk/ne002

STEM INSIGHT PLACEMENTS

A unique opportunity to experience careers in a modern industry or leading university. Placements are complemented by a one-day CPD at the National STEM Learning Centre in York.

HIGHWAYS ENGLAND (DT, ENGINEERING, MATHS)

Discover the STEM careers behind England's motorways and how they keep us moving.

- Money back: £1,000
- Activity fee: £250 (excl VAT)
- Dates throughout year, Bristol

■ www.stem.org.uk/ty855

IBM (COMPUTING)

Join UK-leading organisation IBM for a placement where you can immerse yourself in the world of STEM outside of the classroom.

- Money back: £1,000
- Activity fee: £250 (excl VAT)
- October 2018, London

■ www.stem.org.uk/ty813

NETWORK RAIL (ENGINEERING, MATHS, COMPUTING)

Discover the range of STEM-related careers that run and improve our railway track, bridges, viaducts and more.

- Money back: £1,000
- Activity fee: £250 (excl VAT)
- Dates throughout year, various locations

■ www.stem.org.uk/ty837

NORTHERN GAS NETWORKS (DT, ENGINEERING)

Explore the many and varied roles in this exciting organisation and the skills needed for each.

- Money back: £1,000
- Activity fee: £250 (excl VAT)
- Dates throughout year, Leeds

■ www.stem.org.uk/ty850

Are you Ofsted Ready?

Bespoke science CPD at your school

Your local Science Learning Partnership is the ideal partner for in-house professional development. With an increased focus on broad and balanced curriculum, science will be inspected in greater depth. We will help you by:

- identifying your CPD needs
- tailoring the content of science CPD activities to your needs
- supporting you in developing your staff in working scientifically
- reducing costs by providing one session for all members of a school or multi academy trust



Connect with your local Science Learning Partnership
www.stem.org.uk/mp/science-learning-partnerships

See it, do it, teach it!

Immerse yourself in the world of STEM



Experience STEM in the real world by taking part in a placement with a leading UK STEM employer or university department. The perfect opportunity to support your pupils' learning with real life experiences and to ignite in them a lifelong passion for science, technology, engineering and mathematics.

FIVE REASONS YOU SHOULD TAKE PART IN STEM INSIGHT:

1. gain real-life experiences to contextualise your lessons
2. get up to date STEM-related careers knowledge
3. develop links with a local employer or university
4. we work with you to give you exactly what you need
5. it is bursary supported

[STEM Insight] inspired me to have the confidence to go beyond my own expectations, and achieve results which, quite frankly, have astounded me.

— Rose Russell,
STEM Insight participant

Get involved: www.stem.org.uk/mp/stem-insight

LEVEL UP



OUR RECOGNITION PROGRAMMES HELP YOU ACHIEVE A NEW LEVEL IN YOUR SCHOOL

STEM EDUCATORS

Open year-round, this free programme provides a hallmark of quality for educators teaching STEM subjects.

SPACE EDUCATION QUALITY MARK

Is your school using space to enrich the curriculum, and bring STEM to life? This programme develops and recognises schools using space as a context for STEM subjects.

www.stem.org.uk/mp/awards-and-recognition