

secondary and post-16 **stem** LEARNING

in this issue

- < VALUE YOUR SUPPORT STAFF 5
- < RECRUITING AND RETAINING TEACHERS 8
- < SCIENCE IS FOR EVERYONE 14
- < HIGH QUALITY STEM CPD LISTING 18



Fire up your students

Making the most of STEM Ambassadors

Get in touch...

We would welcome your feedback on our magazine: feedback@stem.org.uk

VISIT US:

www



www.stem.org.uk

FOLLOW US ON TWITTER:

NATIONAL STEM LEARNING CENTRE



@STEMLearningUK

LIKE US ON FACEBOOK:

f



/STEMLearningUK

STEM Learning operates the National STEM Learning Network, incorporating STEM Ambassadors.

Our work is made possible by the generous support of the Wellcome Trust, Gatsby Charitable Foundation, the Government, our partners in Project ENTHUSE and other funders of related STEM projects.

Welcome

Welcome to the fifth edition of our STEM Learning magazine.

Happy New Year! After all the winter festivities I often feel like I could do with another holiday to get some rest from the celebrations!

What I really love about this time of year is the feeling of renewed purpose – and the sense of a fresh start. So what are your New Year's resolutions this year? This year I'm being inspired by this great quote from Eleanor Roosevelt: "Do one thing every day that scares you."

Isn't it easy to get stuck in a rut? We stick with tried-and-tested methods, because we know they work and they feel comfortable. Maybe 2017 should be the year we all push ourselves to do something different, and try something new.

If you're looking for some inspiration we've got some great ideas to get you started!

Why not add a little 'wow' into your lessons? We've got over 10,000 free resources in our online collection – why not take a lesson or topic and add a new experiment, piece of tech or some games to bring it to life?

Have you thought about setting up a STEM Club? It can be so rewarding to challenge your students to attempt something they never thought they could do. Whether it's repairing a rally car, designing an app or building a satellite in a drinks can, there are so many projects to get your students inspired.

Explore ideas beyond the classroom – and join our STEM Insight programme. Designed to give teachers and technicians time in a university or STEM-related industry, these inspiring placements could change the way you teach and the way you give careers advice to your students.

You could connect with one of our fantastic STEM Ambassadors, and bring them into your school this year. Whether you want their support for your STEM Club, or you are looking for them to inspire your students on what they could be 'when they grow up', STEM Ambassadors are a great way to shake up what your students think about STEM subjects and careers.

You can find more information about all these schemes on our website, www.stem.org.uk, and plenty more ideas to help you make 2017 the year you tried something new – and loved it.

Yvonne Baker

YVONNE BAKER, CHIEF EXECUTIVE, NATIONAL STEM LEARNING NETWORK

14



4



6



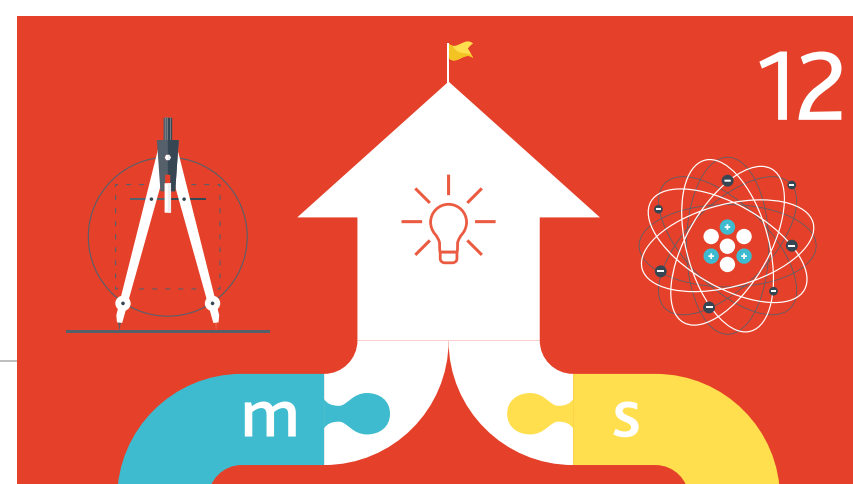
10



5



12



FEATURES

- 4 Mission X: train like an astronaut
- 8 Recruiting and retaining teachers - mission impossible?
- 10 What's next for the BBC micro:bit?
- 14 Science is for everyone

ARTICLES

- 5 Value your support staff
- 6 Fire up your students
- 12 How do you solve a problem like mathematics in science?
- 16 Teaching for understanding

CPD LISTING

COMPUTING

- 20 General
- 26 Online

DESIGN AND TECHNOLOGY

- 20 General
- 26 Online

MATHEMATICS

- 21 General
- 26 Online

SCIENCE

- 22 General
- 23 Leadership
- 24 Biology
- 24 Chemistry
- 25 Physics
- 25 Triple science
- 26 Technicians
- 26 Online

Mission X: train like an astronaut

by **TOM LYONS**
@space_tom

ESERO Teacher Fellow, National
STEM Learning Centre and Network

Every year, hundreds of schools around the world take part in Mission X: train like an astronaut. This international challenge is run by NASA and supported by the European Space Agency and the UK Space Agency.

It is aimed at upper primary and lower secondary schools and involves taking part in physical exercises and learning about the importance of healthy eating and hydration, both on the Earth and in space. Schools earn points for each challenge they complete, which they can submit to the international website. The UK has the largest group of students taking part, with around 400 groups last year which make up more than 20,000 children in the UK.

Manchester Communication Academy explain how their students have engaged in the project: "As part of our Mission X Challenge the whole of Year 7 have been learning about how astronauts stay fit and healthy. To help with the challenge, classroom medics came in for the day and let us use some professional medical and sports equipment to help our students assess their own health and how we could become better astronauts".

A new activity for 2017 requires students to design and make a robotic arm. Students can learn how the International Space Station uses the Canadarm2 to move equipment, supply vehicles and even astronauts around outside the space station. The opportunities to engage students are endless.

Another one of the Mission X activities involves students counting out the equivalent number of sugar cubes contained in soft drinks and confectionery – linking numeracy to healthy eating. There is now even more emphasis within schools for students to take part in physical exercise as part of their school day, after the UK government's recent paper, Childhood Obesity: A Plan for Action. The paper also outlines a reduction in sugar in the foods that students eat.

Astronauts have to exercise for two hours a day to maintain muscle strength and strong bones. Conditions in microgravity mean that the bones and muscles will waste away unless a proper exercise routine is followed – the Mission X challenge promotes the importance of keeping fit, working scientifically and working as part of a team.

GET THE X-FACTOR >

Mission X resources to help you get inspired
■ www.stem.org.uk/mission-x

Learn from the scientists and engineers involved in one of the most important space missions to be launched this decade
■ www.stem.org.uk/esero/cpd

Value your support staff

by **SIMON QUINNELL**
@Quinnell75

National Technician Lead, National
STEM Learning Centre and Network

Support staff fill many important roles in schools and colleges but only a few of these allow them to take a place at the traditional 'chalk face' and directly interact with students' education.

Teaching assistants and technicians are some of the roles where support staff can directly work with teachers on students' learning, but often this is overlooked and not always utilised to maximise impact. So what can you do to ensure your students and members of staff are best placed to improve teaching and learning?

For teaching assistants who are already in the classroom, one of the key development opportunities is making sure their subject knowledge and practical skills are appropriate for the students they support. Teaching assistants are often not given enough subject-specific training so they are unable to support students. STEM-related departments could explore internal or external CPD to train teaching assistants on basic STEM skills to maximise impact and minimise risk. They could also make sure that teaching assistants get to see schemes of work in advance so teaching assistants feel more confident in supporting students and know what's coming up. In some cases general training for teaching assistants will have been provided, but if not, the development of questioning techniques and making sure knowledge is backed up is essential. Often for support staff (and some teachers) it's easier to tell students what you think the answer is rather than questioning them in the right way to develop a response.

If your technicians want to work directly with students, they will often have the skills and

knowledge required but may need some subject knowledge support or confidence to talk to students. For technicians it's the questioning and interaction with students that often needs support and again, like teaching assistants, this could be developed through internal or external CPD. For many departments, technicians that go in and support demonstrations are extremely useful. They can help students operate equipment, act as an ambassador for the subject and have an understanding of the health and safety, and management of practical work to help teachers maintain a constructive learning space.

For teaching assistants and technicians, a more effective role on the front line can help them show how useful their knowledge and skills are which can lead to an increase in students' learning as well as their own recognition.

DEVELOP YOUR TECHNICIANS WITH OUR CPD >

Senior technicians: leadership, training and management:

■ www.stem.org.uk/rp602

National technicians conference:

■ www.stem.org.uk/ny609

Technicians enriching STEM education:

■ www.stem.org.uk/ny615

Fire up your students

by **MANDY QUINTON**

St Clement Danes, Science Learning Partnership West Hertfordshire, Buckinghamshire and Hillingdon

MICHAEL KALVIS

Regional Development Lead, National STEM Learning Network

STEM Ambassadors have helped transform our school STEM Club and have inspired many of our students to continue their science studies.

Last year, STEM Ambassadors helped us run a cyber challenge for our Year 9 STEM Club students. The students were fired up as they worked in teams against the clock to complete a series of science challenges to crack a code. They loved the fun-filled activities and I was delighted to see that all the students went on to choose triple science.

The STEM Ambassadors also brought STEM careers to life by explaining what their jobs involved: one who worked with the latest helicopters brought a real wow factor to the room. Five of our pupils were so inspired that they went on to attend a Royal Institute of Engineering Masterclass, which gave them an all-round experience of what it is like to be an engineer.

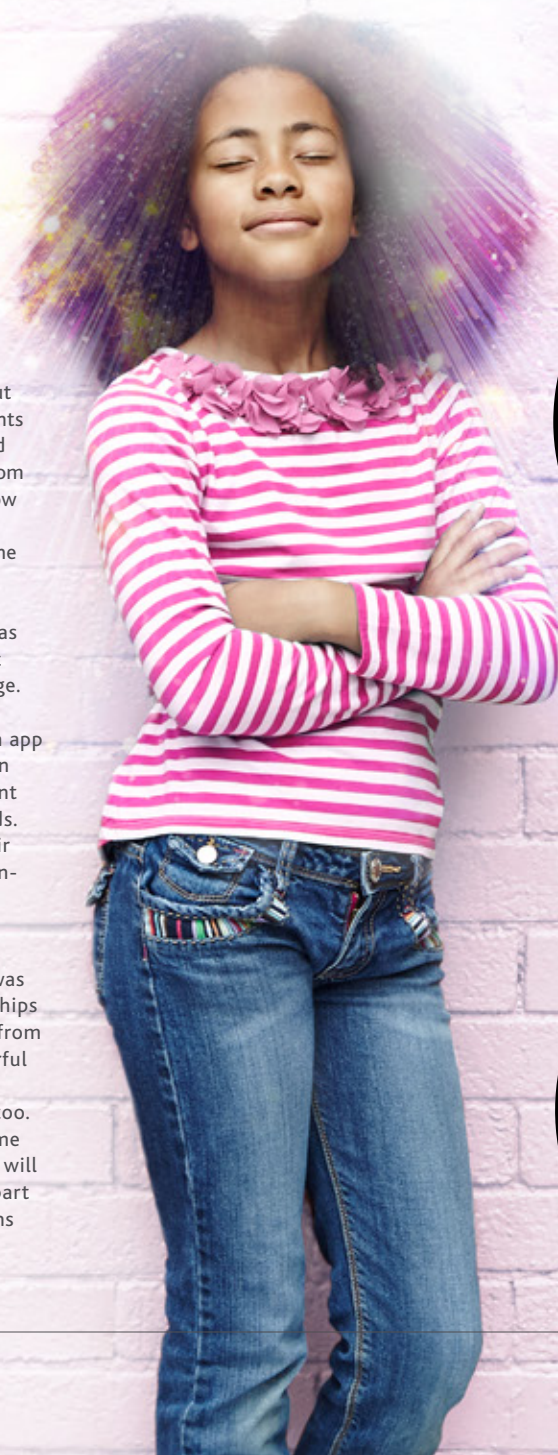
A real highlight for the STEM Club was when a STEM Ambassador arranged for our pupils to visit the Building Research Establishment in Watford. The pupils saw the latest innovations in building design including futuristic environmentally friendly homes – it was the best trip they'd had in years!

A key focus for our school is to encourage girls to go on to study physics at A level and the STEM Ambassadors programme has helped us here too. They paired us with inspiring women who use physics in their everyday work and they took part in a speed networking afternoon. We targeted 30 girls

who were good at science but unsure about choosing STEM-related A levels. The students prepared questions in advance and chatted to each visitor in turn – the buzz in the room was astonishing. Most of these girls are now studying science at sixth form; the event convinced them that science A level was the right choice for them.

Our proudest STEM Club achievement was when students from our school won first prize in the Syngenta Farm Tech Challenge. With a little mentoring from a STEM Ambassador the students constructed an app for the Raspberry Pi. Their winning design helps people reduce their carbon footprint whilst sourcing fresh, seasonal farm foods. Farmers can use the app to promote their ripe produce to people living within a ten-mile radius – reducing food miles.

It was lovely to see this group working together in STEM Club as each student was in a different year group. We saw friendships built and their working relationships go from strength to strength. They won a wonderful box of gadgets as their prize and we got some money to support our STEM Club too. It has been a great chance to stretch some of our most able students. Next year we will encourage pupils of all abilities to take part and plan a series of our own competitions and challenges to identify skills that we have not seen before.



TOP TIPS FOR MAKING THE MOST OF A STEM AMBASSADOR:

- 1 Speak with the STEM Ambassador before your event and discuss what their specialist areas are
- 2 Help them pitch their contributions at the right level by sharing some of the key ideas and terms that students are expected to know
- 3 Invite them to bring some STEM-related kit or gadgets that students can handle to stimulate curiosity
- 4 Get your class to prepare for the visit by asking each student to think of a question to ask the STEM Ambassador
- 5 Consider splitting the class so they can speak to the STEM Ambassador in smaller groups; this can have more impact than a whole class session
- 6 Turn the tables! Get your students to present their STEM ideas convincingly to the STEM Ambassador
- 7 Hang onto your STEM Ambassadors as many are keen to come back and continue the relationship

STEM CLUB SPECIFIC CPD WITH A DIFFERENCE >

Transform your STEM Clubs:
■ www.stem.org.uk/stem-clubs

STEM Clubs in space:
■ www.stem.org.uk/ny627

Supporting iterative and creative design in the classroom:
■ www.stem.org.uk/ty215

See what inspiration a STEM Ambassador can bring to your classroom:
■ www.stem.org.uk/stem-ambassadors

Recruiting and retaining teachers - mission impossible?

by **GILL COLLINSON** > Head of Centre, National STEM Learning Centre
BECCA KNOWLES > Head of Network, National STEM Learning Network
 @knowles_becca

RECRUITMENT

With help from a variety of schemes including teaching internship schemes, many schools facing recruitment challenges are reaching out to ex-students, university students or those early in their career to find and 'grow their own' teachers.

Pauline Henshall from Millais School in Horsham certainly feels internships may be an answer: "Victoria Rothwell was one of a dozen STEM undergraduates who were offered four-week paid teaching internships across...last summer. At first she observed, interacted with the students and helped them if they needed it. As her confidence grew she even planned and led a whole double lesson which she found really exciting".

Victoria says:

"The internship helped me to confirm that teaching was what I wanted to do. It gave me some amazing work experience that will hopefully assist my teaching application".

RECRUITMENT TOP TIPS

- include teaching as a career in your school careers advice and guidance
- provide A level science students with mentoring opportunities for younger pupils if they are considering teaching
- work closely with your local ITT and school direct providers
- consider attending graduate recruitment fairs

AVAILABLE RESOURCE >

Impact of STEM Learning CPD on teachers' retention and careers:
 ■ www.stem.org.uk/rx3dzu

IMPROVE YOUR KNOWLEDGE >

Summer school for newly and recently qualified teachers
 ■ www.stem.org.uk/ny255

With a growing recognition that teachers are the most crucial ingredient to improving student outcomes, recruiting and retaining the very best teachers is a hot topic. With specific subjects, such as mathematics, science, computing, and design and technology having real shortages, schools and colleges need to take a multi-pronged approach to recruiting, and then retaining high quality and effective teaching staff.

RETENTION

However, for many schools, retaining teachers is a far larger problem than recruiting new ones with teachers leaving the profession or moving abroad to international schools where accountability and scrutiny are not as evident.

With 30% of new teachers leaving within five years, the revolving door cannot be slowed quickly enough. Our survey of over 1,000 UK teachers in June 2015 found compelling evidence that schools that invest in their teachers' development see real returns in teacher retention. A high proportion of teachers (61%) stated they were thinking of leaving teaching; however, those teachers who engage regularly with professional development were significantly more likely to stay in teaching than their peers who don't.

Indeed research by Sheffield Hallam University's Centre for Education Inclusion and Research (2012) also supports these findings, reporting that teachers who are re-enthused and upskilled in their subjects by high-quality professional development are more likely to remain in

teaching and seek promotion, enabling them to influence more students positively.

Bury St Edmunds County Upper School Head Teacher, Vicky Neale, is adamant about the importance of supporting her staff with high-quality professional development and she's well aware of the benefit this brings in terms of both retention and recruitment of new staff:

"Our science department is fully staffed. Every week I get job applications... Teachers looking for their next placement see that our school demonstrates the value it places in its science teachers by investing in subject-specific CPD and being part of the Network." Her approach is validated with a motivated staff, virtually no staff turnover and a strong extra-curricular offering across the school. This in a region where science teacher recruitment can be extremely challenging. Effective and continuing high-quality subject-specific professional development should be a central component of all schools' staff retention strategy.

RETENTION TOP TIPS

- coach individuals to support their development particularly in the crucial second and third years of teaching when mentor support has finished
- lower stress from overwork by not leaning on good staff too frequently. Encourage your staff to create a work/life balance
- provide training which reinforces the teacher's sense of worth
- give your teachers leadership opportunities to provide growth outside of their classroom environment
- ensure your team feel valued but do not praise indiscriminately

What's next for the BBC micro:bit?

by **DAVE GIBBS**

@adgibbs

Computing and Technology Specialist, National STEM Learning Centre and Network

The BBC micro:bit is here to stay, proving a massive hit with STEM teachers and children across the UK. One year on from its launch, we take a look at what is happening with this little programmable device and the difference it is making to STEM education.



The BBC micro:bit may not be the first small programmable device but it is one of the simplest to use in schools, needing just a USB connection and a web browser to get started and no software to install. The ease with which the BBC micro:bit can be plugged in, programmed, and played with, has thrilled teachers used to wrestling with hardware and network connections, and fighting to install troublesome software. The freely available programming environments range from Scratch-like blocks for the beginner through to TouchDevelop and JavaScript, all of which are ideal for use across the curriculum, even on touchscreen devices. Computing teachers are flocking to MicroPython and C/C++, enabling rich projects that are suitable for GCSE, A level and beyond. Creating and executing programs for BBC micro:bit is straightforward. Compilation happens in the cloud while the device can also be programmed offline in your browser, on the bus, train or Wi-Fi dead spot.

Ideas for classroom activities have erupted since the launch of the BBC micro:bit. Many of these require nothing more than the device itself, but a growing range of add-on resources is also available. Build a line-following robot, a crane or create your own wearable tech with project ideas from BBC micro:bit partner Kitronik. Prototype circuits with conductive paint or make your own pocket pet with fun activities from ScienceScope and Technology Will Save Us.

Students can even make music with BBC tutorials helping them to emulate their favourite artists such as Little Mix and Meghan Trainor.

Add a battery pack and the BBC micro:bit becomes mobile; use Bluetooth Smart and you can connect most mobile devices and unleash their capabilities. With even the simplest block programming language students can remotely control a device's camera or media player, send sensor-triggered alerts or make a handy phone finder, signal strength monitor or text message notification system. The Samsung Android app, and iOS app from ScienceScope, make it even simpler to code on-the-go and upload to the device wirelessly.

If you want to investigate more serious applications from the world of electronic engineering, the IET Faraday resources are a great place to start and are available in our resource library. Challenges include flood and theft prevention, safer lighting and better public information systems. With personal health and fitness a national priority, a step counter or heart rate monitor is a great way to demonstrate the role technology can play. They provide the tools, too, for some interesting data crunching in maths and science lessons.

The food we grow and eat is a huge influence on health, too. The Crunch is a massive initiative by the Wellcome Trust, helping young people to learn about what they eat and the effect it has on them and their environment. Included in every 'Crunch Box' posted out to secondary schools during summer 2016 were a set of BBC micro:bits. In October these were used in the Big Food Survey, the results of which are made available for analysis by schools and researchers. The device is a useful survey tool, great for quickly counting multiple variables – see our Bee Survey teacher guide.

As a sensor-rich tool for practical science it is hard to beat; with two BBC micro:bits you have wireless data logging capability, and connecting more

through the internet opens up the potential for collaborative science such as comparing conditions for plant growth in different countries.

To inspire the next generation of engineers, BBC micro:bit teamed up with the Bloodhound Supersonic Car team for the 'Race for the Line' challenge. Seating the device and its on-board accelerometer in a scale model rocket-powered car is a hugely engaging way to learn about forces and acceleration, and reflects how technology is used in the development and testing of all modern vehicles. The challenge returns for its second year, with national finals in June.

So what's next for the BBC micro:bit? The project is being rolled out in many European countries and worldwide, while commercial sales in the UK go from strength to strength. Driving this is the new Micro:bit Educational Foundation, a growing non-profit partnership made possible by organisations including ARM, BBC and The IET, the Wellcome Trust and STEM Learning. It aspires to transform formal and informal learning and encourage digital creativity with this little computer.

GO FURTHER WITH THE BBC MICRO:BIT

Join the BBC micro:bit community group:
www.stem.org.uk/microbit-group

Take a look at the different micro:bit resource collections:

www.stem.org.uk/cx6an
www.stem.org.uk/cx3tra
www.stem.org.uk/rx8z49

Get in-depth knowledge about how to use the micro:bit with our CPD:
www.stem.org.uk/ty231

How do you solve a problem like mathematics in science?

by **ADAM LITTLE & MARK LANGLEY** Professional Development Leaders, National STEM Learning Centre and Network
@SecretPhysicist @mark_sailor

As a science teacher, how often in lessons do you hear students say: "That's not what we do in maths!" or "I was told a line of best fit can't be curved"? In light of the increased mathematical requirements in the new science GCSE, this is an ideal opportunity for schools to build stronger relationships between their mathematics and science departments.

There are many mathematical concepts that students need to be able to apply in scientific contexts: reorganising equations, drawing sketch graphs to illustrate trends and patterns, as well as constructing graphs and interrogating data.

Science enables students to apply mathematics in context, such as seeing where units like metres per second come from, or what an amp actually is. A deeper understanding of the mathematical components in science can also support students with long-answer questions in exams. Understanding the relationships that equations show is essential – such as for light, if the wavelength increases, the frequency of the wave must decrease.

The more frequently that students are exposed to the underlying relationships within science, the better they can

tackle questions, especially when the science is put into a less familiar situation. As exams become less predictable, students will need more support in applying their knowledge. Having a good grip of the mathematics and its application needs practise, and working with your mathematics colleagues can be really useful. Finding out what is taught, in what context and the language used, and importantly, when topics are covered in both science and mathematics, can help both departments work together, with tangible benefits to students and teachers.

Why not use the results from a distance-time practical in a science lesson to plot graphs or calculate the average speed of an object in a mathematics lesson? By working together we can help students to see the relevance and interconnectivity of what they are learning and how the skills they develop are transferable in many STEM-related subjects.

MATHEMATICS ALSO FEATURES HEAVILY IN THE NEW DESIGN AND TECHNOLOGY GCSE.

School Reform Minister Nick Gibb has stated that reforms to the GCSEs will "strengthen their academic rigour and ensure young people are prepared for life in modern Britain..." It is intended that the mathematics content in the design and technology specification is embedded in teaching and learning in a variety of different contexts.

Similarly to science, the required skills have already been taught in mathematics lessons, but performing mathematics in another context can prove a struggle for students. Design and technology and mathematics teachers need to work collaboratively when approaching topics relevant to both subjects; enabling their students to apply mathematical techniques outside of the mathematics classroom.



SEE HOW MATHEMATICS AND SCIENCE CAN WORK TOGETHER >

Visit our mathematical skills in triple science resource collection:

■ www.stem.org.uk/triplescience/maths

Read more about how to use mathematics in science:

■ www.stem.org.uk/maths-and-science

TAKE A LOOK AT OUR MATHEMATICS IN OTHER SUBJECTS CPD:

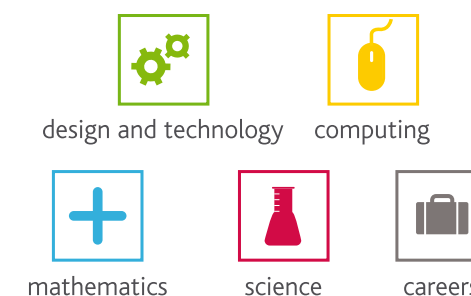
Science in maths or maths in science? Establishing shared understandings and teaching approaches

■ www.stem.org.uk/my214

UK's largest collection of STEM resources

We house the UK's largest set of online and physical resources to support the teaching of STEM subjects.

Over **28,000** resources available in the Library



Over **10,000** resources available on the website



Our dedicated team of subject specialists have collated thousands of resources to support the teaching of STEM subjects for both secondary and post-16 teachers. To make things as easy as possible, each subject has its own dedicated webpage of resources for you to browse at your leisure.

- www.stem.org.uk/audience/ms/secondary-computing
- www.stem.org.uk/audience/ms/secondary-design
- www.stem.org.uk/audience/ms/secondary-mathematics
- www.stem.org.uk/audience/ms/secondary-science

by **JESSIE MYTUM-SMITHSON**
@sciencejessie

Enterprising Science Coordinator, National
STEM Learning Centre and Network



Science is for everyone

There are many concerns that not enough young people are choosing to study science, technology, engineering and mathematics (STEM) after the age of 16.

Research from King's College London's ASPIRES project that surveyed over 31,000 students since 2009, found that whilst students in England find their science lessons interesting, and recognise the value of science, only 15% of young people aspire to become scientists.

Although much time and money has been spent to try and improve the number of young people entering STEM careers, there has been little change in participation rates. The Enterprising Science project – a 5-year partnership between King's College London and the Science Museum, funded by BP – works with teachers to explore ways of building student science capital and ultimately increasing take-up in science. The aim here is to open doors to all sorts of possible job opportunities in both science and non-science related professions. This year STEM Learning is collaborating with King's to roll out the project with a number of teachers across the North of England to develop a science capital teaching approach.

It's a common misconception in students that it's only worthwhile studying science if you want to become a scientist. The more students that have the attitude 'science is for me', the greater the likelihood that they will enter a STEM-related career and this is where science capital comes in. Science capital is like a 'holdall' containing all the science-related knowledge, attitudes, experiences and resources that you acquire throughout life.

So if you can increase the amount in your students' 'holdall' in school, you can do your bit to help build your students' science capital and ultimately help address the shortage in STEM careers. Everyone has a different amount of science capital, the amount of science capital you have will influence the type of job you do, and research shows that students who possess high levels of science capital are far more likely to go into a STEM-related career.

Science capital is a broad concept, but can be broken down further into four categories: literacy; attitudes and values; out of school behaviours; and STEM at home.

Teachers working on the project are building the science capital of their students by working into their lessons elements of teaching that will make the students feel that 'science is for me'. The aim is to elicit information about your students' own experiences, value the everyday knowledge and experiences that students bring, then link and relate science to what matters to students, their families and communities. The science capital approach to teaching shouldn't require more planning, only tweaking your lessons slightly – for example, when teaching about nutrition, it can be useful to use local terminology that your students will understand based on their diets to help with engagement. The specifics will always depend on your class and their experiences.

Other benefits to using the science capital approach to teaching have reported an increased amount of improvement in behaviour management and an increasing number of students feeling that 'science is for me'. One teacher involved in the project had a disengaged student who felt that she wouldn't need science to become a lawyer, focusing on

building the science capital of the student the teacher tweaked his titration lesson and turned it into a forensic lesson and discussed the results as to whether they could be used to put a man on trial for murder. The girl he identified as wanting to be a lawyer finished first in the class and did some of her best work. Teachers have also reported that it helps quieter and lower attaining children to participate more.

ENHANCE YOUR STUDENTS' SCIENCE CAPITAL >

What can a STEM Ambassador do for you?
■ www.stem.org.uk/stem-ambassadors

Take your science capital to the next level: Careers in STEM:
■ www.stem.org.uk/rp226

Practical work summer school
■ www.stem.org.uk/ny217

FIVE IDEAS TO HELP BUILD SCIENCE CAPITAL IN THE CLASSROOM:

- 1 Set homework for your students to watch a science programme with their family and ask them to interview a family member about it
- 2 If you have a sports mad group, talk about how biology is relevant to the students of their sporting heroes, training for a marathon, swimming the channel or rock climbing
- 3 Talk about jobs that involve science skills, not just scientists but other fields of work that involve problem-solving skills, communicating technical information, knowledge of materials or other transferable skills from science
- 4 Set a simple experiment for the students to do at home and bring their results in for a class comparison
- 5 Invite industry into your classroom, have a guest speaker who works with science in their everyday work

GCSE food preparation and nutrition



Need help finding resources for the new food preparation and nutrition GCSE?

- food, nutrition and health
- food science
- food safety
- food choice
- food provenance
- food preparation and cooking techniques

Search for free resources and share your ideas with other teachers.

■ www.stem.org.uk/food-technology

Don't miss out on the next CPD activity: GCSE food preparation and nutrition: teaching food science

■ www.stem.org.uk/ty205

OPINION

Teaching for understanding

by **MICHAEL ANDERSON**
@STEMLearning_MA

Mathematics Specialist, National STEM Learning Centre and Network

Active teaching strategies, effective questioning techniques, use of technology, exploring misconceptions, use of graphical calculators, and use of multiple representations are just as successful when teaching advanced level as in classrooms lower down the school. Participants on the New to teaching A level mathematics summer school experience a range of practical approaches to help meet the demands of the new mathematics A level.

I have been introduced to many new techniques and resources that will help my A level teaching to be more engaging. These will also help to ensure that pupils are developing mathematical fluency as opposed to just rote learning. The tone set in the sessions also helped me to see what the atmosphere in an A level class should be, the high expectations as well as the chance to playaround, make mistakes and pose ideas.

- Nick Causton-Marks,
Harris Academy, 2016
New to teaching A level
mathematics summer
school participant

The summer school is a fantastic opportunity for teachers who are interested in teaching A level mathematics but haven't had the opportunity to experience it during their training. It's an intense week but teachers will leave with a deeper understanding of the concepts that underpin A level mathematics and be armed with a range of different strategies for making lesson more interesting and enjoyable for students.

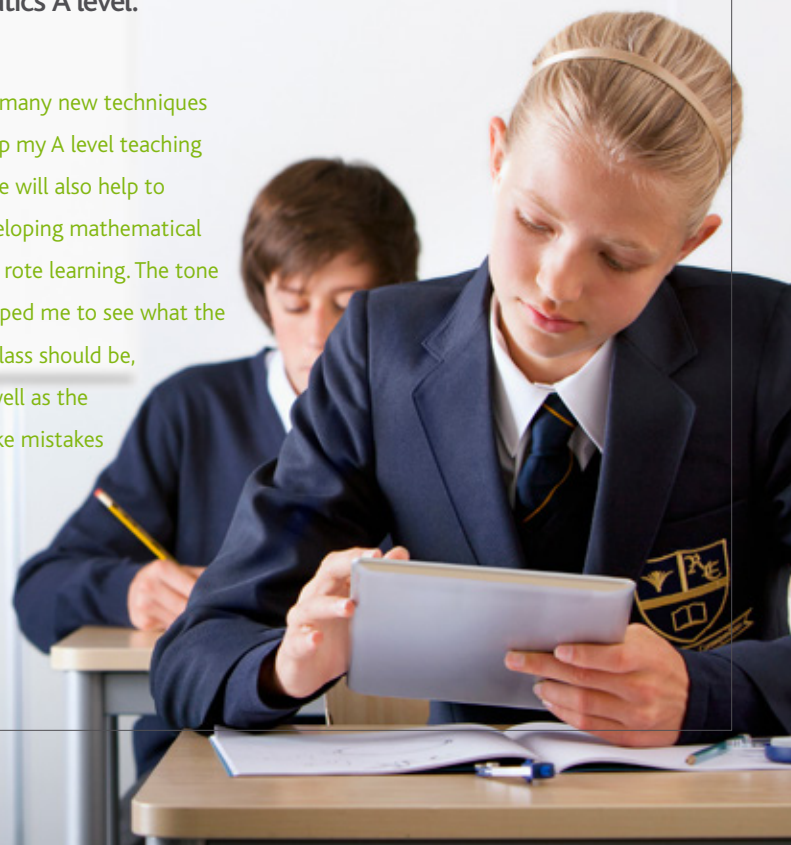
DEVELOP YOUR A LEVEL MATHEMATICS TEACHING >

If you want to explore these strategies attend our new to teaching A level mathematics summer school:

■ www.stem.org.uk/my500

Discover our A level mathematics resources:

■ www.stem.org.uk/lx6jxb



CALENDAR

Our top picks for you to put in the calendar...

FEBRUARY 2017

EDITOR'S
TOP
PICK
CHOICE



LIBRARY LOVERS' MONTH FEBRUARY 2017

Library lovers' month is a four week celebration of libraries of all shapes and sizes! Our Resource Centre, located at the heart of the National STEM Learning Centre in York, houses a collection of thousands of physical resources to support the teaching of STEM subjects.

Whether you're looking for books, gadgets or DVDs, come and browse all that our Resource Centre has to offer!

■ www.stem.org.uk/visit-our-resource-centre

APRIL 2017

ENTHUSE CELEBRATION AWARDS APRIL 2017

Have you had a positive impact on your pupils, colleagues or school as a result of subject specific professional development? The ENTHUSE Celebration Awards recognise and reward this impact.

There are a series of regional award events in March and April, with the shortlisted winners being invited to a high-profile event at the House of Commons in July.

■ www.stem.org.uk/enthuse-celebration-awards

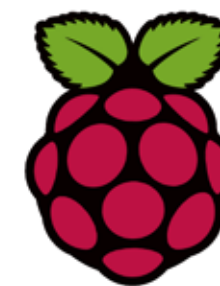
MARCH 2017

BRITISH SCIENCE WEEK 10-19 MARCH 2017

The annual celebration is back again for another year of science-related fun and activities. British Science Week is a fantastic opportunity to engage pupils of all ages with science, technology, engineering and mathematics.

With a range of hands-on activities, quizzes and events taking place all around the UK, now is the perfect time to start planning a science week of your own.

■ www.britishsienceweek.org



WORLD PI DAY 14 MARCH 2017

Celebrate all things mathematics on 14 March – it's World Pi Day! This year, why not bring this annual celebration into the classroom? We have a whole range of Pi-related resources, videos and activities that you can use in any mathematics lesson.

■ www.stem.org.uk/lxhww

MAY 2017

ROLLS-ROYCE SCIENCE PRIZE 29 MAY 2017

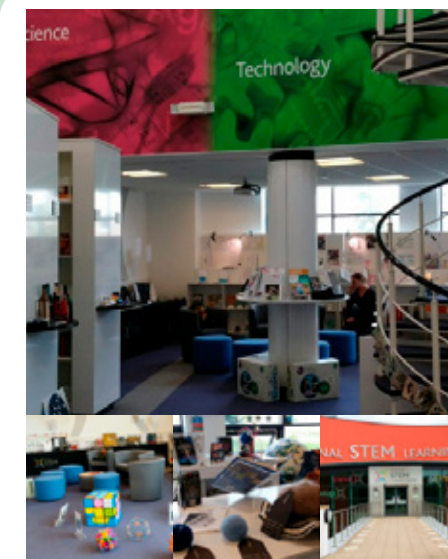
Get help implementing science and mathematics teaching ideas in your school with the Rolls-Royce Science Prize. Open to all schools and colleges in the UK, the competition can be entered either by attending CPD through the National STEM Learning Centre or by completing an entry form.

■ www.stem.org.uk/rolls-royce-science-prize

SOCIAL MEDIA

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

@STEMLearningUK
Followers: 23K



@CodeClubY&H

Such an inspiring place! The amazing library @STEMLearningUK #York

@TeacherChemist

Just had my @STEMLearningUK insight application for a 5 day work placement at BP accepted... woohoo. Looking forward to forging some links

@mathsatschool

Them blooming @STEMLearningUK libraries. You go looking for one classic item, and find 297 other resources you need to see RIGHT NOW! :)

@Kath_Math

How to turn #Boaty into inspiring #STEM classroom activities: @STEMLearningUK @BAS_News @NERCscience @beisgovuk stem.org.uk/polar-explorer

@ScienceMrsA

Just finished great online CPD course on differentiation with @STEMLearningUK - 3rd course this year - highly recommend them all!

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

High quality professional development that has impact

We believe all young people, across the UK should receive a world-leading STEM education. We work towards our vision by making it easy for teachers and others involved in STEM education to access subject-specific, quality-assured CPD, so they can teach effectively and inspire the young people with whom they work.

We have chosen a selection of key themes and activities for you opposite.

We provide high impact, bursary supported professional development for schools and colleges that improves subject, pedagogical and leadership skills and knowledge for people working in STEM education.

You can access our CPD nationally, locally and online by visiting our website for our comprehensive programme of courses:

www.stem.org.uk/cpd

SUPPORTING NEW ENTRANTS TO THE PROFESSION

- A beginner's guide to e-textiles and creating programmable circuits in design and technology.....Page 20
- New to teaching A level mathematics summer school.....Page 21
- Behaviour management in science.....Page 22
- Practical work summer school.....Page 22
- Summer school for newly and recently qualified teachers.....Page 22
- Open Online Courses.....Page 26

SUPPORTING SECONDARY TEACHERS

- Computing Conference with CAS Regional Centre for Yorkshire and Humber.....Page 20
- Developing mathematics skills for the new design and technology GCSE.....Page 20
- Using manipulatives to enhance understanding in KS3 mathematics.....Page 21
- Differentiation: visible progression for all.....Page 22
- Practical plant science and ecology for secondary schools.....Page 22
- Introducing the new science GCSEs.....Page 23

SUPPORTING SUBJECT LEADERS

- GCSE food preparation and nutrition: teaching food science..Page 20
- Preparing to teach mathematics and science content in the new engineering GCSE.....Page 20
- Delivering the latest science curriculum.....Page 22
- Essential skills for new and aspiring science leadership.....Page 23
- Subject leaders network.....Page 23
- Subject specific activities.....Page 24

SUPPORTING POST-16 TEACHERS

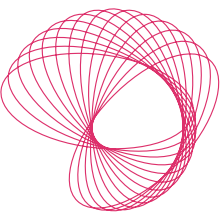
- Developing mathematics skills for the new design and technology AS and A levels.....Page 20
- Effective preparation for examinations.....Page 22
- Leading professional development in science education.....Page 23
- Active approaches in A level biology.....Page 24
- Preparing for practical teaching and assessment in A level chemistry.....Page 24
- Strengthening practical work in physics.....Page 24

SUPPORTING TECHNICIANS TO IMPACT THE QUALITY OF TEACHING

- Design and technology technicians: leadership and management.....Page 26
- National technicians conference.....Page 26
- Senior technicians: leadership, training and management.....Page 26
- STEM Clubs in space.....Page 26
- Technicians supporting practical work in the classroom.....Page 26
- Technicians supporting triple science.....Page 26

All fees and award values are valid for state funded schools and are correct at the time of print (November 2016).

See www.stem.org.uk for fee paying schools and the latest information.



ENTHUSE AWARD

Our ENTHUSE Award bursary funded residential courses are run at the National STEM Learning Centre in York. Teachers or technicians 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.



COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

PYTHON CAMP FOR SECONDARY COMPUTING TO GCSE LEVEL

Arm yourself with knowledge about Python - the most popular text based programming language used in secondary schools and it's accepted by all exam boards for assessed tasks.

- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 17 Jul 2017 (3 days)

■ www.stem.org.uk/cy212

BBC MICRO:BIT IN SECONDARY COMPUTING

• Dates and fees online

■ www.stem.org.uk/cy224

BIG DATA - AN INTRODUCTION WITH PYTHON

• Dates and fees online

■ www.stem.org.uk/cy223

COMPUTING CONFERENCE WITH CAS REGIONAL CENTRE FOR YORKSHIRE AND HUMBER

Sessions led by CAS Master Teachers and other leading practitioners will give you fresh ideas and tried-and-tested lesson activities to help raise the attainment of your students.

- Your school receives: £100 ENTHUSE Award
- Activity fee: £80 (ex VAT)
- 30 Jun 2017 (1 day)

■ www.stem.org.uk/cy007

EVIDENCING PROGRESS IN COMPUTING AT KS3

• Dates and fees online

■ www.stem.org.uk/cy216

GREENFOOT CAMP

Learn about object oriented programming using Greenfoot and Java as part of the core GCSE and A level computing specifications.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 30 Jun 2017 (2 days)

■ www.stem.org.uk/cy222

DESIGN AND TECHNOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

A BEGINNER'S GUIDE TO E-TEXTILES AND CREATING PROGRAMMABLE CIRCUITS IN DESIGN AND TECHNOLOGY

Taking you from being an absolute beginner in etextiles to having the confidence to do basic etextiles programming in order to create more adventurous projects.

- Your school receives: £700 ENTHUSE Award
- Activity fee: £650 (ex VAT)
- 16 Jun 2017 (2 days)

■ www.stem.org.uk/ty219

DEVELOPING MATHEMATICS SKILLS FOR THE NEW DESIGN AND TECHNOLOGY AS AND A LEVELS

Improve your own subject knowledge and develop teaching strategies for teaching the mathematics content in the new design and technology AS and A levels.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 11 May 2017 (2 days)

■ www.stem.org.uk/ty222

DEVELOPING MATHEMATICS SKILLS FOR THE NEW DESIGN AND TECHNOLOGY GCSE

Develop your subject knowledge and hone your teaching strategies for teaching the mathematics content in the new design and technology GCSE.

Your school receives: £600 ENTHUSE Award

- Activity fee: £500 (ex VAT)
- 19 Jun 2017 (2 days)

■ www.stem.org.uk/ty225

"The initial food science experiments were really useful, these gave me more confidence in carrying out experiments. The final sessions showing the implementation in KS3 and KS4 were also fantastically useful."

- GCSE food preparation and nutrition: teaching food science, 2016 participant.

GCSE FOOD PREPARATION AND NUTRITION: TEACHING FOOD SCIENCE

Develop your food science subject knowledge and learn how your school food curriculum can be adapted to include food science.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 16 Jun 2017 (2 days)

■ www.stem.org.uk/ty205

PREPARING TO TEACH THE NEW DESIGN AND TECHNOLOGY GCSEs

Giving you the essential information that you need to embed change, along with ideas and strategies that will help you do this in a manageable way.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 30 Jun 2017 (2 days)

■ www.stem.org.uk/ty223

PREPARING TO TEACH THE NEW DESIGN AND TECHNOLOGY AS AND A LEVELS

Changes to A level specifications will be introduced from 2017 and this course supports design and technology departments to make a smooth transition into the new qualifications.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 10 Feb 2017 (2 days)

■ www.stem.org.uk/ty500

PREPARING TO TEACH MATHEMATICS AND SCIENCE CONTENT IN THE NEW ENGINEERING GCSE

Improve your own mathematics and science subject knowledge and develop teaching strategies for teaching the new Engineering GCSE.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 22 May 2017 (2 days)

■ www.stem.org.uk/ty224

SUPPORTING ITERATIVE AND CREATIVE DESIGN IN THE CLASSROOM

Help support your students to create their own design briefs and encourage creative design solutions.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 4 Jul 2017 (2 days)

■ www.stem.org.uk/ty215

TECHNICIANS SUPPORTING THE NEW DESIGN AND TECHNOLOGY GCSE

Helping technicians to support their department in the preparation and delivery of the new Design and Technology GCSE.

- Your school receives: £500 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 4 May 2017 (2 days)

■ www.stem.org.uk/ny621

TECHNICAL TEXTILES: USING SMART AND MODERN MATERIALS IN YOUR SECONDARY CLASSROOM

Learn how smart materials and wearables are changing the way that we use textiles and discover practical ideas for incorporating these new technical textiles into the classroom.

- Your school receives: £700 ENTHUSE Award
- Activity fee: £650 (ex VAT)
- 9 Jun 2017 (2 days)

■ www.stem.org.uk/ty208

USING 3D PRINTERS CREATIVELY IN KS3 AND KS4 DESIGN AND TECHNOLOGY

Make better use of your 3D printer in the classroom and fix those troublesome printing issues!

- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 3 Jul 2017 (2 days)

■ www.stem.org.uk/ty214

"I was hoping to develop a better understanding and create a range of samples. This was more than achieved with a lot more information and samples than expected."

- A beginner's guide to e-textiles and creating programmable circuits in design and technology, 2016 participant.

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

NEW TO TEACHING A LEVEL MATHEMATICS SUMMER SCHOOL

Learn to teach mathematics for understanding and engagement rather than 'teaching to the test.' Participants will increase subject knowledge and deepen understanding of mathematics.

- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 21 Aug 2017 (4 days)

■ www.stem.org.uk/my500

RESOURCING THE NEW SECONDARY MATHEMATICS CURRICULUM

Explore resources designed to support improved teaching of the new curriculum with hand-on activities.

- Activity fee: £50 (ex VAT)
- 7 Jun 2017 (1 day)

■ www.stem.org.uk/my202

USING MANIPULATIVES TO ENHANCE UNDERSTANDING IN KS3 MATHEMATICS

Manipulatives including counters, interlocking cubes, Cuisenaire rods, tiles, multi-base blocks have long been used to aid understanding in secondary mathematics.

- Activity fee: £50 (ex VAT)
- 14 Jul 2017 (1 day)

■ www.stem.org.uk/my204

USING RESOURCES TO DEVELOP PROBLEM SOLVING SKILLS IN SECONDARY MATHEMATICS

Explore what is meant by problem solving and develop skills to implement this way of working in your scheme of work.

- Activity fee: £50 (ex VAT)
- 11 Jul 2017 (1 day)

■ www.stem.org.uk/my203

"Had an absolutely great few days, really feel the course has boosted my confidence for my first year teaching core maths. Will be recommending to colleagues."

- New to teaching A level mathematics summer school, 2016 participant

"I have received lots of useful resources, along with ideas for different ways of incorporating them into schemes of work."

- Using resources to develop problem solving skills in secondary mathematics, 2016 participant.

"I was introduced to new resources and had the chance to talk to people from other schools on how the new curriculum has/ will impact my teaching and how STEM can help. Lots of new ideas to help teach "old" topics."

- Resourcing the new secondary mathematics curriculum, 2016 participant.



Bringing cutting edge research into the classroom

Our innovative programme of cutting edge research CPD is designed to help you inspire your students.

Forensic analysis, nanotechnology, climate change, astrophysics and wearable technologies are just some of the topics that our CPD focuses on. Learn about advances in scientific research, update your knowledge, explore new contexts and discover practical activities to help you deliver the curriculum in an accessible, enjoyable and stimulating way for your students.

A bursary is available for state funded schools.

■ www.stem.org.uk/ms/rcuk

"I have the tools to be able to engage and enthuse my classes. Some stratagems to help with tough classes and settling as well as help with scaffolding. I have a few new tips on how to stretch pupils at higher level using solo and scamper."

- Differentiation: visible progression for all, 2016 participant.

SCIENCE

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

DIFFERENTIATION: VISIBLE PROGRESSION FOR ALL

Supporting you in providing differentiation for all students and ensuring that they can demonstrate progress in learning.

Your school receives: £897 ENTHUSE Award

• Activity fee: £897 (ex VAT)

• 22 May 2017 (3 days)

■ www.stem.org.uk/ny237

PRACTICAL PLANT SCIENCE AND ECOLOGY FOR SECONDARY SCHOOLS

Extend your knowledge in field study techniques, including a visit to RHS Garden Harlow Carr. Explore horticulture practicals and learn new ways to use plants in science lessons.

Your school receives: £1,050 ENTHUSE Award

• Activity fee: £900 (ex VAT)

• 20 Jun 2017 (3 days)

■ www.stem.org.uk/ny260

PRACTICAL WORK SUMMER SCHOOL

For newly qualified teachers or those moving into science, learn how to plan, deliver and evaluate effective science lessons

• Dates can be found online

■ www.stem.org.uk/ny217

SUMMER SCHOOL FOR NEWLY AND RECENTLY QUALIFIED TEACHERS

Develop your skills in delivering challenging and inspirational practical activities and hone your teaching skills further to inspire and engage your students.

• Your school receives: £1,500 ENTHUSE Award

• Activity fee: £1,500 (ex VAT)

• 10 Jul 2017 (5 days)

■ www.stem.org.uk/ny255

BEHAVIOUR MANAGEMENT IN SCIENCE

Supporting teachers new to the profession in considering ways of managing the behaviour of their students so that a positive, effective learning environment can be sustained.

• Various dates and venues online

■ www.stem.org.uk/rp222

CAREERS IN STEM

Develop your understanding and support students in signposting career options.

• Various dates and venues online

www.stem.org.uk/rp226

DELIVERING THE LATEST SCIENCE CURRICULUM

Identify the key issues arising from the new curriculum and consider how to audit and adapt existing schemes of learning to accommodate the changes.

• Various dates and venues online

■ www.stem.org.uk/rp223

EFFECTIVE PREPARATION FOR EXAMINATIONS

Helping teachers in developing effective strategies for supporting students as they prepare for exams.

• Various dates and venues online

■ www.stem.org.uk/rp211

ENGAGING AND ENSURING PROGRESS OF LOW ATTAINERS IN SCIENCE

Develop strategies to improve the progress made by low attaining students in science.

• Various dates and venues online

■ www.stem.org.uk/rp229

ENHANCING LITERACY SKILLS IN SCIENCE

Supporting participants in responding to the increased literacy demands in examinations and help to provide students with the skills to be effective, independent learners.

• Various dates and venues online

■ www.stem.org.uk/rp212

IMPROVING PROGRESS IN SCIENCE

In response to demand from teachers, this CPD activity is for those wishing to improve their students' progress and attainment in science.

• Various dates and venues online

■ www.stem.org.uk/rp213

IMPROVING SUBJECT AND CURRICULUM KNOWLEDGE IN...

It is important to keep up-to-date with current science matters, including pure subject knowledge, topic specific developments and general pedagogical methods.

• Various dates and venues online

■ www.stem.org.uk/rp224

INTRODUCING THE NEW SCIENCE GCSES

An update of the new GCSE and key stage 4 qualifications.

• Various dates and venues online

■ www.stem.org.uk/rp230

MAKING A DIFFERENCE THROUGH EFFECTIVE FEEDBACK

Trial a range of strategies for gathering and using data, explore the research behind assessment for learning, and develop and test your own techniques in the classroom.

• Various dates and venues online

■ www.stem.org.uk/rp203

MATHEMATICS IN SCIENCE TEACHING

Exploring the use and failure to use mathematics in science. Look at typical weaknesses in mathematical concepts that hinder hinder students' ability to understand and solve scientific problems.

• Various dates and venues online

■ www.stem.org.uk/rp210

RESPONDING TO PUPIL NEEDS IN SCIENCE

Develop strategies which personalise the science curriculum, in order to engage students of all abilities, widen engagement and participation, and increase progression to further science study.

• various dates and venues online

■ www.stem.org.uk/rp220

TEACHING ASSISTANTS SUPPORTING LEARNING

This CPD activity gives teaching assistants the chance to explore this, and plan how they can support most effectively.

• Various dates and venues online

■ www.stem.org.uk/rp228

TOWARDS OUTSTANDING

Secure knowledge of what outstanding practice looks like strengthens the ability to support colleagues, for the benefit of themselves and their students.

• various dates and venues online

■ www.stem.org.uk/rp215

"A very active hands-on course which was well led, with an atmosphere where everyone shared strategies. I came away with some useful ideas."

- Active approaches in A level chemistry, 2016 participant.

"The course gave me some good ideas about teaching maths in the context of science."

- Mathematics in science teaching, 2016 participant.

"I have clear ideas on how some of the ideas presented can be simply, quickly and effectively implemented in the department."

- Science subject leaders network, 2016 participant.

"Very useful as a new head of department."

- Essential skills for new and aspiring science leadership, 2016 participant.

LEADERSHIP

ESSENTIAL SKILLS FOR NEW AND ASPIRING SCIENCE LEADERSHIP

Working with an experienced science leader, you will develop your vision and leadership skills to enable you to lead an effective and vibrant science team.

• Various dates and venues online

■ www.stem.org.uk/rp206

LEADING ACTION RESEARCH IN SCIENCE EDUCATION

Gaining further classroom enquiry skills will provide an opportunity for you to review and reflect on personal and professional practice to the benefit of your students.

• Various dates and venues online

■ www.stem.org.uk/rp209

LEADING PROFESSIONAL DEVELOPMENT IN SCIENCE EDUCATION

Helping you to identify the principles, strategies and resources that can be used to develop a programme valued by colleagues and demonstrates impact in the science classroom.

• Various dates and venues online

■ www.stem.org.uk/rp204

SUBJECT LEADERS NETWORK

This is a chance for collaboration with your peers so you can share information and develop as a leader. Expert consultants will help you identify priority issues in teaching and learning and professional development for your teams.

• Various dates and venues online

■ www.stem.org.uk/rp219

99% OF TEACHERS REPORT POSITIVE IMPACTS ON THE QUALITY OF TEACHING IN THEIR SCHOOLS.

BIOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included

PREPARING TO TEACH BIOLOGY

Providing newly qualified teachers or those moving into science with strategies and ideas to teach biology effectively.

- Your school receives: £700 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 12 May 2017 (2 days)
- www.stem.org.uk/ny263

ACTIVE APPROACHES IN A LEVEL BIOLOGY

Providing opportunities to explore the acknowledged benefits of active, collaborative and 'minds-on' approaches to learning at advanced level.

- Various dates and venues online
- www.stem.org.uk/rp506

GETTING TO GRIPS WITH A LEVEL BIOLOGY

Supporting teachers in developing higher level thinking with their students through the use of practical work, demonstrations and modelling activities.

- Various dates and venues online
- www.stem.org.uk/rp501

GOING FURTHER IN A LEVEL BIOLOGY

Discussing the wider implications and applications of biology and exploring some tools for teaching and learning, will broaden and deepen your repertoire of practical activities and teaching approaches.

- Various dates and venues online
- www.stem.org.uk/rp509

PREPARING FOR PRACTICAL TEACHING AND ASSESSMENT IN A LEVEL BIOLOGY

Prepares teachers to make effective use of practical work in the new A level science curriculum.

- Various dates and venues online
- www.stem.org.uk/rp510

STRENGTHENING PRACTICAL WORK IN BIOLOGY

We will explore strategies for teaching topics across the biology curriculum and develop an understanding of how practical work can be made more relevant and effective.

- Various dates and venues online
- www.stem.org.uk/rp200

CHEMISTRY

ACTIVE APPROACHES IN A LEVEL CHEMISTRY

Providing opportunities to explore the acknowledged benefits of active, collaborative and 'minds-on' approaches to learning at advanced level.

- Various dates and venues online
- www.stem.org.uk/rp504

GETTING TO GRIPS WITH A LEVEL CHEMISTRY

Improve confidence in subject knowledge and skills appropriate to post-16 chemistry through the exploration of key ideas common to all specifications.

- Various dates and venues online
- www.stem.org.uk/rp502

GOING FURTHER IN A LEVEL CHEMISTRY

Confident teachers will deepen their repertoire of practical activities and teaching approaches with a key focus in the use of electronic technologies.

- Various dates and venues online
- www.stem.org.uk/rp508

MEETING THE DEMANDS OF CHEMISTRY IN THE NEW A LEVEL SPECIFICATIONS

This one day course will show how specific activities can be used to get across key concepts; use maths skills and develop practical skills in chemistry.

- Various dates and venues online
- www.stem.org.uk/rp514

MEETING THE DEMANDS OF CHEMISTRY IN THE NEW GCSE SPECIFICATIONS

Explore how specific activities can be used to get across key concepts: use maths skills and develop practical skills in chemistry.

- Various dates and venues online
- www.stem.org.uk/rp232

PREPARING FOR PRACTICAL TEACHING AND ASSESSMENT IN A LEVEL CHEMISTRY

Designed to prepare teachers to make effective use of practical work in A level chemistry and use them to improve outcomes for students.

- Various dates and venues online
- www.stem.org.uk/rp512

STRENGTHENING PRACTICAL WORK IN CHEMISTRY

Through hands-on activities you will undertake new and established strategies and practical techniques to make students' learning more effective.

- Various dates and venues online
- www.stem.org.uk/rp202

PHYSICS

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included

PREPARING TO TEACH PHYSICS

Extend your physics understanding and challenge the misconceptions students have about the subject.

- Your school receives: £700 ENTHUSE Award
- Activity fee: £800 (ex VAT)
- 9 Jun 2017 (2 days)
- www.stem.org.uk/ny265

ACTIVE APPROACHES IN A LEVEL PHYSICS

Working with others, you will refresh your teaching and learning strategies to improve you students' understanding of core concepts of A level physics.

- Various dates and venues online
- www.stem.org.uk/rp505

GETTING TO GRIPS WITH A LEVEL PHYSICS

Develop subject knowledge, confidence and skills primarily through the exploration of key demonstrations and practicals common to all specifications.

- Various dates and venues online
- www.stem.org.uk/rp503

GOING FURTHER IN A LEVEL PHYSICS

Ideal for teachers who are confident in their subject knowledge as there will be ample opportunity to try out these new approaches.

- Various dates and venues online
- www.stem.org.uk/rp507

PHYSICS FOR NON-SPECIALISTS

Develop your understanding of key physics principles and the skills and strategies needed to teach physics effectively.

- Various dates and venues online
- www.stem.org.uk/rp208

PREPARING FOR PRACTICAL TEACHING AND ASSESSMENT IN A LEVEL PHYSICS

Together we look at how activities can be run effectively, used to support the awarding of the practical endorsement and to improve exam grades.

- Various dates and venues online
- www.stem.org.uk/rp511

STRENGTHENING PRACTICAL WORK IN PHYSICS

Explore a range of ideas for teaching topics across the physics curriculum and develop an understanding of how practical work can be made more relevant and effective.

- Various dates and venues online
- www.stem.org.uk/rp201

TRIPLE SCIENCE

IDENTIFYING AND INSPIRING YOUR STUDENTS IN TRIPLE SCIENCE

Examine ways to motivate students, enrich their triple science learning and investigate STEM career resources.

- Various dates and venues online
- www.stem.org.uk/rp781

MANAGING EFFECTIVE PRACTICAL WORK IN TRIPLE SCIENCE

Teachers who are new to teaching triple science will explore ways to develop their use of practical work.

- Various dates and venues online
- www.stem.org.uk/rp782

RAISING ATTAINMENT IN TRIPLE SCIENCE

Looking to improve students' performance? This course will enable you to consider a range of key strategies to help you achieve this. It has been designed for science departments that have little or no experience in delivering triple science.

- Various dates and venues online
- www.stem.org.uk/rp777

"The long term impact of this course will help me construct a KS2 that has literacy, numeracy and practical understanding implicitly embedded throughout so students arriving at KS4 are already prepared with the foundational skills."

- Raising attainment in triple science, 2016 participant.

TRIPLE SCIENCE: BIOLOGY

Teachers who have experience of teaching biology at 14 to 16 will gain support in effective teaching and learning of the triple science extension modules. Explore a range of modules from across the awarding bodies.

- Various dates and venues online
- www.stem.org.uk/rp780

TRIPLE SCIENCE: CHEMISTRY

Teachers who have experience of teaching chemistry at 14 to 16 will gain support in effective teaching and learning of the triple science extension modules. Explore a range of modules from across the awarding bodies.

- Various dates and venues online
- www.stem.org.uk/rp779

TRIPLE SCIENCE: PHYSICS

Teachers who have experience of teaching physics at 14 to 16 will gain support in effective teaching and learning of the triple science extension modules. Explore a range of modules from across the awarding bodies.

- Various dates and venues online
- www.stem.org.uk/rp778

TRIPLE SCIENCE: PREPARING FOR LINEAR ASSESSMENT

Go beyond looking at short term interventions to explore issues such as progression, tracking progress and how best to structure learning so students gain a deep, long terms understanding of the science.

- Various dates and venues online
- www.stem.org.uk/rp788

"I have enhanced my leadership skills, shared good practice and addressed key issues for effective performance in my role. I have evaluated situation and identify all the necessary changes in my department."

- Senior technicians: leadership, training and management, 2016 participant.



Science Mark

Is your department silver, gold or platinum? Showcase the high standard of science in your school with Science Mark – designed to recognise and celebrate excellent secondary science across the UK.

- Find out more, and start your journey towards gaining the Science Mark www.stem.org.uk/ms/science-mark



Running throughout the year, this free recognition scheme is designed to celebrate the impact your professional development has on you, your students and your schools.

- Apply today at: www.stem.org.uk/ms/stem-educators

TECHNICIANS

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

DESIGN AND TECHNOLOGY TECHNICIANS: CO-LEADERS IN THE DEPARTMENT

Perfect for those responsible for running or aspiring to run their design and technology department's technical service.

- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 15 May 2017 (3 days)
- www.stem.org.uk/ny619

DESIGN AND TECHNOLOGY TECHNICIANS: LEADERSHIP AND MANAGEMENT

Perfect for those responsible for running or aspiring to run their design and technology department's technical service.

- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 15 May 2017 (3 days)
- www.stem.org.uk/ny619

STEM CLUBS IN SPACE

Developing ideas for innovative STEM Clubs, using the context of space and exploring biology in space and cutting edge science to engage students.

- Your school receives: £600 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 13 Jul 2017 (2 days)
- www.stem.org.uk/ny627

TECHNICIANS SUPPORTING A LEVEL PHYSICS

Examine a range of relevant practical's for you to support students with the practical endorsement and skills required at A level.

- Your school receives: £400 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 18 May 2017 (2 days)
- www.stem.org.uk/ny617

TECHNICIANS SUPPORTING BIOLOGY: 11-16

Examine and explore: microbiology, biotechnology, genetics, dissections, ecology, microscopy and working with animals and plants.

- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 22 May 2017 (3 days)
- www.stem.org.uk/ny604

NATIONAL TECHNICIANS CONFERENCE - DAY 1

Enhance and apply new skills and knowledge in practical work and explore updates to the technicians profession.

- Your school receives: £100 ENTHUSE Award
- Activity fee: £80 (ex VAT)
- 6 Jul 2017 (1 day)
- www.stem.org.uk/ny609

NATIONAL TECHNICIANS CONFERENCE - DAY 2

Share ideas and ways to improve practical work and the technical system in your school or college.

- Your school receives: £100 ENTHUSE Award
- Activity fee: £80 (ex VAT)
- 7 Jul 2017 (1 day)
- www.stem.org.uk/ny609

SENIOR TECHNICIANS: LEADERSHIP, TRAINING AND MANAGEMENT

Designed to enhance leadership and management skills, through examining the role of senior technicians, managing an effective technical service, creating and contacting local groups and training other technicians.

- Various dates and venues online
- www.stem.org.uk/rp602

TECHNICIANS SUPPORTING TRIPLE SCIENCE

Gain hands on experience of effective and engaging practical ideas in biology, chemistry and physics. You will also have the opportunity to discuss key learning points behind the practicals, where to find resource materials and how to prepare them.

- Various dates and venues online
- www.stem.org.uk/rp776

TECHNICIANS SUPPORTING A LEVEL BIOLOGY

Developed in collaboration with CLEAPSS, giving technicians an opportunity to learn skills and techniques specifically tailored to supporting advanced level biology.

- Various dates and venues online
- www.stem.org.uk/rp603

"I have come away with numerous ideas of how we can do things differently for the benefit of the students and more safely and reduced costs."

- National technicians conference, 2016 participant.

TECHNICIANS SUPPORTING A LEVEL CHEMISTRY

Learn about the key skills and techniques required for the effective support of post-16 chemistry, in conjunction with CLEAPSS.

- Various dates and venues online
- www.stem.org.uk/rp604

TECHNICIANS SUPPORTING A LEVEL PHYSICS

In collaboration with CLEAPSS we provide you with hands-on experience of a variety of apparatus and experiments, including new software and resources for supporting A level physics.

- Various dates and venues online
- www.stem.org.uk/rp605

TECHNICIANS SUPPORTING PRACTICAL WORK IN THE CLASSROOM

Understand what makes good practical work, working effectively with teachers and students, assisting with practical project work, and managing small group work and individuals with practical activities.

- Various dates and venues online
- www.stem.org.uk/rp600

WORKING AS A SCIENCE TECHNICIAN: AN INTRODUCTION TO THE ROLE

Understand the role of a technician, general health and safety, policies and procedures, technician skills and working in a science department.

- Various dates and venues online
- www.stem.org.uk/rp601

ONLINE

DIFFERENTIATING FOR LEARNING IN STEM TEACHING

Improve your understanding and use of differentiating for learning within the STEM subjects. It is designed as companion to our successful assessment for learning in course.

- www.stem.org.uk/online-cpd

MANAGING BEHAVIOUR FOR LEARNING

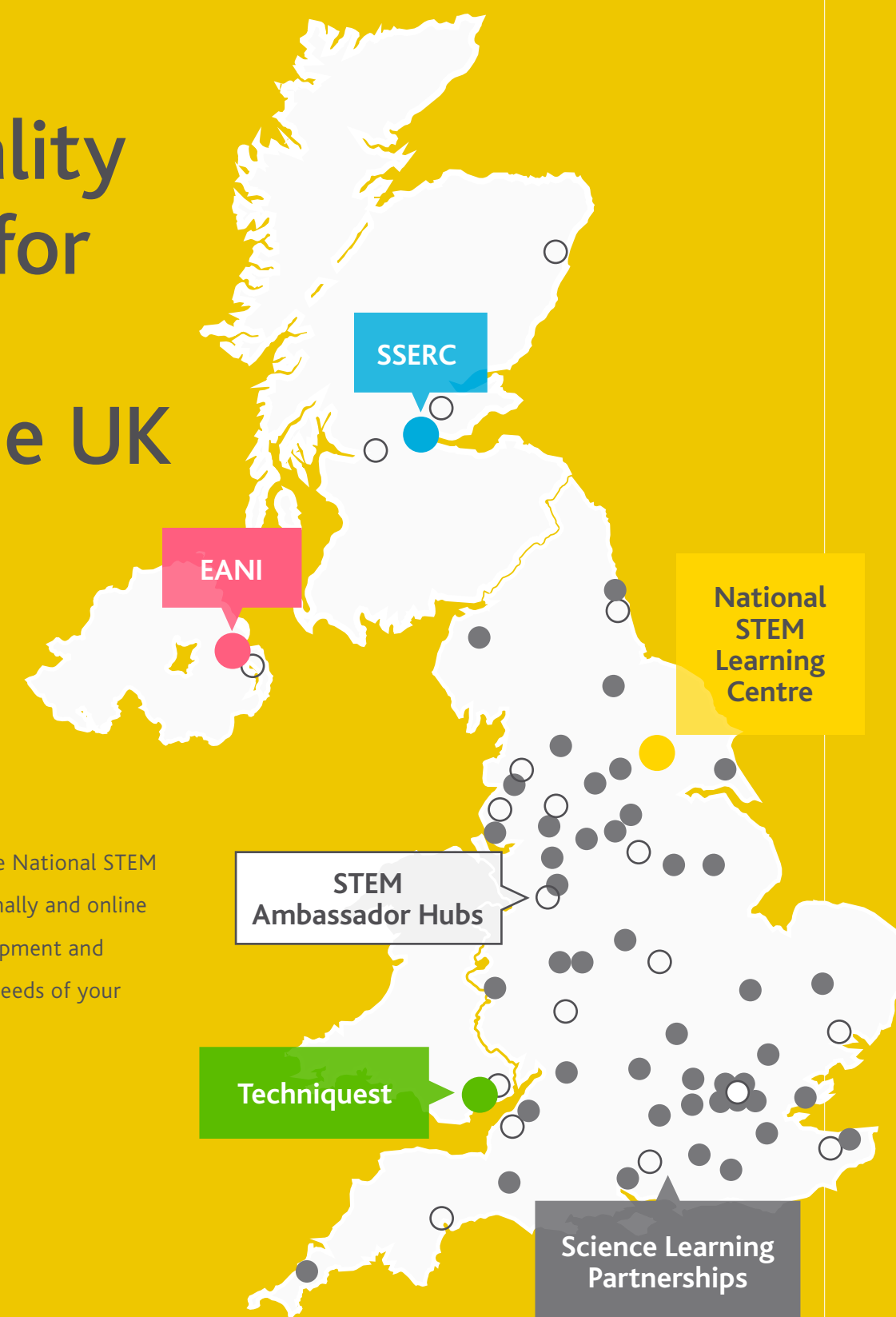
Transform your classroom by making small shifts in your own behaviour. Paul Dix, a leading voice in behaviour management in the UK and internationally, will help you learn how to positively influence the behaviour of your students through small shifts in your own behaviour.

- www.stem.org.uk/online-cpd

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



CELEBRATE YOUR ACHIEVEMENT



Teachers, support staff and schools are doing amazing things across the country every day. The impact that you have on your students and your community deserves celebration - and we've got some fantastic schemes to help you do just that.

AWARDS

ENTHUSE CELEBRATION AWARDS

Designed to recognise the impact that teachers, technicians and support staff have on their students, colleagues and schools.

Could you be one of the next winners of our ENTHUSE Celebration Awards?

OPEN FOR APPLICATIONS

STEM INSPIRATION AWARDS

Do you enhance and enrich the learning for young people in STEM subjects?

Why not apply for our STEM Inspiration Awards – with an awards ceremony at the House of Lords and a trip to CERN in Switzerland for the winners.

OPENS MAY 2017

RECOGNITION

STEM EDUCATORS

STEM Educators runs all year, and is designed to highlight the impact professional development has had on you and your school community.

Has your professional development had an impact on you, your students, your colleagues and your school?

OPEN YEAR-ROUND

SCIENCE MARK

Could your science department be silver, gold - or even platinum?

Science Mark is a quality standard designed to recognise and celebrate inspiring practice in secondary science departments across the UK.

JOIN THE NEXT COHORT

www.stem.org.uk/ms/awards

www.stem.org.uk/ms/recognition