Fire up your students

Making the most of STEM Ambassadors
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, CHIEF EXECUTIVE, NATIONAL STEM LEARNING NETWORK

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

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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 relevant STEM projects.
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.

It 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.

Teaching assistants and technicians are some of the roles where support staff can directly work with students 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 in making sure they 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 can help them with their 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 rather than questioning them in the right way to develop a response. 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 arm’s length 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.

**Mission X resources to help you get involved**
- [Mission X website](https://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](https://www.stem.org.uk/even/tpd)

**GET THE X-FACTOR**

**Value your support staff**

by SIMON QUINNELL

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.

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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! Nine 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 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.

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.

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

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

Regional Development Lead, National STEM Learning Network

SECONDARY AND POST-16 STEM LEARNING MAGAZINE

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Recruiting and retaining teachers - mission impossible?

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.

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

RETENTION

However, for many schools, retaining teachers is a far larger problem than recruiting newcomers 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 didn’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
- Provide training which reinforces the teacher’s sense of worth
- Ensure your team feel valued but do not praise indiscriminately
- Lower stress from overwork by not leaning on good staff too frequently. Encourage your staff to create a work/life balance
- Give your teachers leadership opportunities to provide growth outside of their classroom environment
- Give your teachers leadership opportunities to provide growth outside of their classroom environment

AVAILABLE RESOURCE

Impact of STEM Learning CPD on teachers’ retention and careers:

- www.stem.org.uk/rx3du

Summer school for newly and recently qualified teachers

- www.stem.org.uk/ry255

IMPRESS YOUR KNOWLEDGE

@knowles_becca

by GILL COLLINSON

Head of Centre, National STEM Learning Centre

BECCA KNOWLES

Head of Network, National STEM Learning Network

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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.
What’s next for the BBC micro:bit?

by DAVE GIBBS  Computing and Technology Specialist, National STEM Learning Centre and Network
@adgibbs

The BBC micro:bit is here to stay, proving a massive hit with STEMod 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.

Idea 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 simple 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 IoT 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/tx Larson
- www.stem.org.uk/tx3bra
- www.stem.org.uk/rbb49

Get in-depth knowledge about how to use the micro:bit with our CPD:
- www.stem.org.uk/lv231
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 interpreting 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.

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.

Opinion

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
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 3,000 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.

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 experiences; 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 living, 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 be able to succeed in science. She interviewed the girl and found that she wanted to be a lawyer, focusing on need science to become a lawyer, focusing on management and an increasing number of students feeling that ‘science is for me’. 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.

STUDENTS’ SCIENCE CAPITAL

ENHANCE YOUR STUDENTS’ SCIENCE CAPITAL

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.
Teaching for understanding

by MICHAEL ANDERSON
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 play around, 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 lessons 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/16jsh

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

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

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/fihuww

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

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

FEBRUARY 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.britishscienceweek.org

APRIL 2017

ENTHUSE CELEBRATION AWARD

MARCH 2017

Editor’s Top Pick Choice
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

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.

1. BOOK
Book your CPD

2. PAY
Your school or college pays the course fee

3. PLAN
Complete intended learning outcomes and your action plan

4. ATTEND
Attend your CPD and complete your evaluation

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

6. REIMBURSED
Your school is reimbursed with the ENTHUSE Award bursary

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.
“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.
"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.
- Forensic analysis, nanotechnology, climate change, cryptography and wearable technologies are just some of the topics that our CPD focuses on, and that can help you achieve high levels of performance and engagement in the classroom.
- 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 PROFESSIONAL DEVELOPMENT 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/rp218
- 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 team.
  - 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: £250 (ex VAT)
- 14 May 2017
  - www.stem.org.uk/rp504

GETTING TO GRIPS WITH A LEVEL BIOLOGY

Improving 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 BIOLOGY

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/rp509

METTING 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

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 Jan 2017
  - www.stem.org.uk/rp265

ACTIVE APPROACHES IN A LEVEL PHYSICS

Working with others, you will refresh your teaching and learning strategies to improve 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 through the exploitation 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 used to support the practical endorsemnt 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

TRIPLE SCIENCE: PREPARING FOR LINEAR ASSESSMENT

Go beyond looking at short term interventions to explore issues such as programming 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

“Go beyond looking at short term interventions to explore issues such as programming progress and how best to structure learning so students gain a deep, long-term understanding of the science.”
- www.stem.org.uk/rp777

“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.

“Through hands-on activities you will undertake new and established strategies and practical techniques to make students’ learning more effective.”
- Raising attainment in triple science, 2016 participant.

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

“Through hands-on activities you will undertake new and established strategies and practical techniques to make students’ learning more effective.”
- Raising attainment in triple science, 2016 participant.
### 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 July 2017** (1 day)
  - www.stem.org.uk/rp601

### 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 July 2017** (1 day)
  - www.stem.org.uk/rp601

### 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 comparison 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

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### 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/rp776

### 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 BIOLOGY: 11-16
Examine and explore: microbiology, biotechnology, genetics, dissections, ecology, microscopy and working with animals and plants.
- **Your school receives:** £500 ENTHUSE Award
- **Activity fee:** £500 (ex VAT)
- **18 May 2017** (2 days)
  - www.stem.org.uk/rp600

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### NATIONAL WEEKEND CPD WARM UP - 11-16
- **30 April 2017** (2 days)
  - www.stem.org.uk/rp602

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### DEVELOP LEADING EDGE DESIGN AND TECHNOLOGY: LEADERSHIP, TRAINING AND MANAGEMENT
- 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: CO-LEADERS DESIGN AND TECHNOLOGY IN THE DEPARTMENT
- 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 July 2017** (1 day)
  - www.stem.org.uk/rp601

### TECHNICIANS: LEADERSHIP 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

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### 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:** £500 ENTHUSE Award
- **Activity fee:** £500 (ex VAT)
- **13 Jul 2017** (2 days)
  - www.stem.org.uk/rp602

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### TECHNICIANS SUPPORTING A LEVEL PHYSICS
- Examine a range of relevant practicals for you to support students with the practical endorsement and skills required at A level.
- **Your school receives:** £500 ENTHUSE Award
- **Activity fee:** £500 (ex VAT)
- **15 May 2017** (3 days)
  - www.stem.org.uk/rp601

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### SENIOR TECHNICIANS: LEADERSHIP, TRAINING AND MANAGEMENT
- Various dates and venues online
  - www.stem.org.uk/rp602

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### 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

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### 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

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### 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

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### 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

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### 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

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### 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

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### ONLINE
- **DIFFERENTIATING FOR LEARNING IN STEM TEACHING**
  - Improve your understanding and use of differentiating for learning within the STEM subjects. It is designed as comparison to our successful assessment for learning in course.
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- **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
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
www.stem.org.uk/ms/awards

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
www.stem.org.uk/ms/awards

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
www.stem.org.uk/ms/recognition

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/recognition