ISSUE 03 • SUMMER 2016

secondary stem LEARNING

in this issue

What goes up, must come down

Tim Peake and his return to Earth

Photo by ESA via Getty Images

STEM LEARNING

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STEM Learning Ltd operates the National STEM Learning Centre and Network; providing support locally, through Science Learning Partnerships across England,and partners in Scotland, Wales and Northern Ireland; alongside a range of other projects supporting STEM education.

This is made possible by the generous support of the Wellcome Trust, Gatsby Charitable Foundation, Department for Education, our partners in Project ENTHUSE and other funders of related STEM projects.

Welcome

Welcome to the third edition of STEM Learning magazine.

It's been an exciting year for STEM – Tim Peake, a British ESA astronaut has flown to the International Space Station, gravitational waves in the fabric of space have been discovered, giving evidence for the collisions of black holes...and the summer is set to be filled with even more highlights.

One event I'm looking forward to is the Rio de Janeiro Olympics in Brazil. Think of the million and one jobs that go into preparing for the Olympics and how many of them are STEM related: the sport scientists understanding how to achieve peak performance; the engineers designing the innovative new stadiums, packed with swimming pools, running tracks and velodromes; the designers reducing every last millimetre of drag from the design of bikes, dinghies and helmets. Then there are the software designers creating websites, apps and booking systems for visitors attending the games; the technicians ensuring that all the sporting and broadcast equipment is working so we can see the action. Even the pilots and aeronautical engineers creating and flying the planes that will bring athletes and visitors from across the world to the Games. With new technology and new discoveries being developed all the time, who knows what the Olympics of the future will look like, and which of your students will be involved?

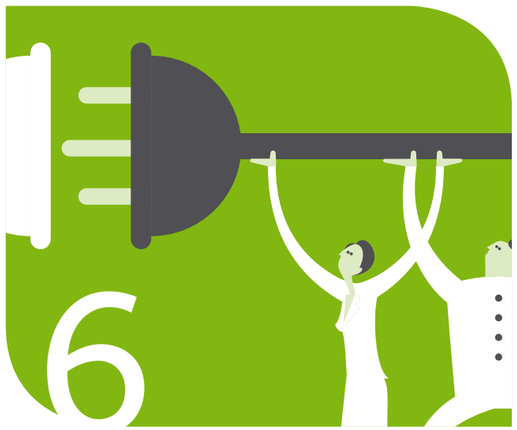
As the world changes, one thing remains the same – the constant need for every country to inspire its young people in STEM so they have the skills to deal with an increasingly technological world and, for many of them, to become those advancing science, technology, engineering and mathematics for everyone's benefit. As Gill Collinson mentions in her article on page 4, it's predicted that over 14 million jobs will need to be filled between 2012 and 2022 in the STEM industries, so there is plenty of opportunity for all. So let's embrace these exciting events, and use them to help more young people understand the possibilities that pursuing STEM subjects can open up for them.

Yvonne Baker

YVONNE BAKER, CHIEF EXECUTIVE, NATIONAL STEM LEARNING CENTRE AND NETWORK

FEATURES

ARTICLES



CPD LISTING

STEM leaders: inspire the next generation

by GILL COLLINSON 〉 Head of Centre, National STEM Learning Centre and Network

The number of job opportunities across the UK over the next decade is huge. The United Kingdom Commission for Employment and Skills (UKCES), predicts that over 14 million jobs will need to be filled between 2012 and 2022. Most of the 'hard to fill' vacancies are for people with strong STEM knowledge and skills.

In their annual skills survey in 2014, the CBI report that 39% of companies that currently recruit employees with STEM skills are reporting difficulties in recruiting staff with STEM qualifications. This figure is set to rise as the expansion of STEM industries accelerates and large numbers in the existing ageing STEM-skilled workforce retire in the next few years. This expansion will require a new generation of employees with a robust knowledge of STEM, with the skills and competencies to apply their knowledge in a wide range of employment settings.

There's no question about it, studying STEM subjects helps students to develop a wide range of skills. Some skills are specifically STEM based, such as mathematical reasoning and data collection, whilst others, such as communication, team working and curiosity, are more generic but still crucial for everyday life.

We all know that providing effective careers information, advice and guidance to all young people has a positive impact on their social identity and sense of self, their choices, opportunities, economic and social understanding and skills. Here's where you come in... one in five young people name teachers as the most important source of careers information, with the other two being parents (including carers) and friends. It is vital that secondary teachers recognise and feel confident in their role in relation to careers support. Teachers need to be aware of the advances in industrial sectors and cutting edge research, and can apply this knowledge in their teaching practice.

Having read this far it is clear you think this is important. You recognise that you can play a leading role in helping to improve young people's aspirations and you want to engage young people in fulfilling their STEM potential. Providing STEM careers information, which is embedded in the curriculum, makes STEM learning contextual and will support your students to see how their learning can lead to STEM careers.

At the end of the day, no one expects you as a teacher of a STEM subject, to be a careers expert. However, you are an expert in your subject and can enthuse your students about learning science, mathematics, computing, design and technology, and engineering. You can help them find information about learning routes and career opportunities and stimulate their aspirations by weaving careers throughout the curriculum. Careers awareness is a powerful concept – positioned at the heart of education we can together inspire the next generation, to help us all realise the scientific breakthroughs of the future.

Scientific breakthroughs continue to be part of our daily lives, from discoveries in space like the new planet Kepler-452b, to new anti-malarial vaccines and drugs to halt the progress of Alzheimer's disease. These breakthroughs capture the public imagination, our job as educators is to capitalise on these inspiring events and use them to propel our students into studying STEM subjects and going on to become future leaders.

GET A HELPING HAND 〉

We've created a package of information to assist you in embedding STEM careers-related information and examples into your everyday teaching.

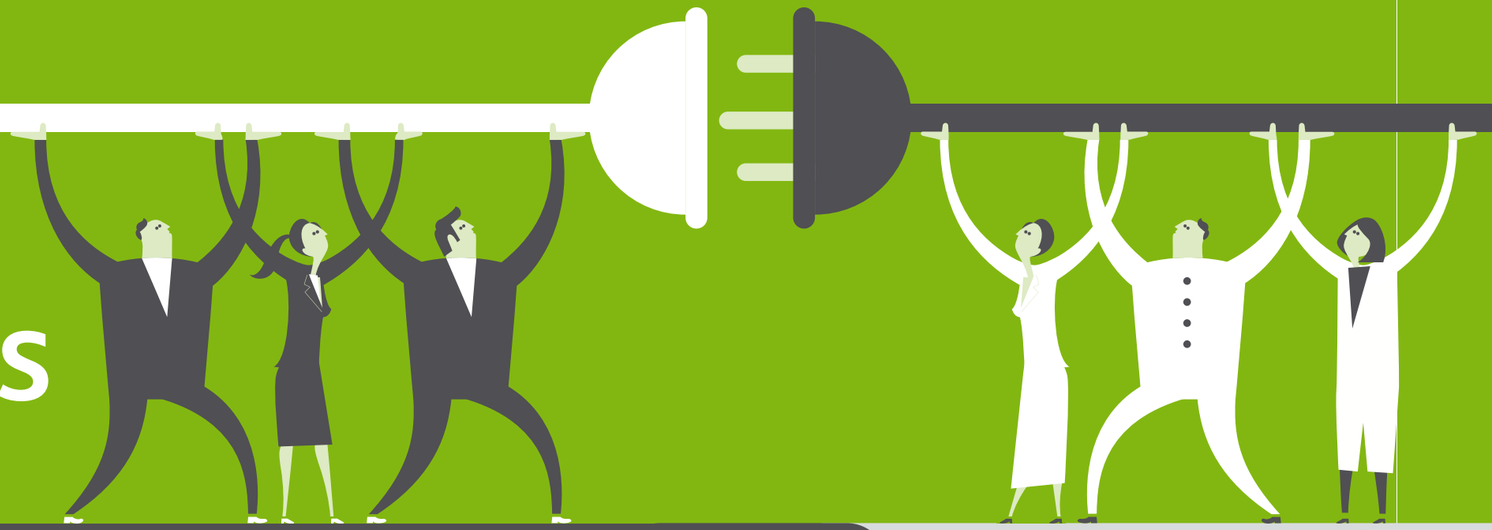
- www.stem.org.uk/ms/careers-toolkit

GET FIRST-HAND EXPERIENCE 〉

Get first-hand experience of pioneering STEM industries through our placement scheme. We offer placements throughout the year with universities and employers across the country.

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

Pioneering technical services



by SIMON QUINNELL 〉 National Technician Lead, National STEM Learning Centre and Network
@Quinnell75

After engaging with thousands of technicians on hundreds of CPD activities over the last ten years, we wanted to share some of the things we have learnt which could make your technical service more effective.

The first step to improving the technical service is to look at why you're there: what service do you provide to the teachers, students and school? This gives you a reason to promote the technical service. For me, the biggest reason is that effective practical work is engaging, and could lead to increased attainment and retention in science.

The next step after knowing why you're there, is identifying what you want to maintain and where you want the service to go. This could be a simple vision statement that helps you sell the service to others and remind them why your role is important. This statement should be used to move your service forward with everything you do; it can also go up in the prep room or on emails so people outside the department know what you do.

To move the service forward you have to think about how you can change the technical service and, in some cases, how you work. We ask all our participants to reflect on what they do and think about other ways of doing things. It's good to bounce ideas off others, such as co-workers, participants on a course, through a local technician network or online group (such as the School Science Technicians group on Facebook). By talking about and seeing what others do, it can really get you thinking about how to develop your own practice; sometimes just the realisation that what you're already doing is right can make a difference.

> "Effective practical work is engaging, and could lead to increased attainment and retention in science"

These changes could be relating to communication, requisitions, organisation techniques, teamwork, practical work, technical skills… the list is endless, but the biggest thing is to be reflective about what you do already. What could you improve? External viewpoints can really help you clarify changes you could make.

For me and the team at the National STEM Learning Centre and Network, the big focus for technicians is practical work. From organising supplies, to preparation and disassembling equipment, to research that leads to effective and engaging practical work, this is what the job should really be about. We are the practical experts and that's how we should be seen: educational scientists (maybe that should be the new job title).

So what can you do to make sure this is the case? Well, I think making teachers aware of your expertise in practical work is important; making sure they know that you can offer advice, support and guidance when needed, especially to PGCE, NQT and non-specialist teachers. In the last ten years, more technicians are now going into the lab and helping (time permitting and if you want to, of course!) and in some cases it's helped them strengthen their practical role and increased their enjoyment.

The biggest change in the last ten years is that the school science technician profession has become a network. From online discussion groups, such as SciTech, to groups on Facebook, all these have been created by technicians who realised the need to communicate and network to share good practice. Alongside the vast range of CPD that has developed for technicians and brought people together nationally, our profession is now stronger and more supported.

Being part of the wider community and taking part in CPD can make you feel confident about what you do, so if you're not already taking part, make sure you do. It builds your skills and knowledge, reinforces the good practice already occurring and makes you feel like you belong to a profession.

BE A PIONEER 〉

- Check out this inspiring resource on setting up your own technicians network: **www.stem.org.uk/rx34jt**
- Get further inspiration on senior technicians accredited co-leaders in science: **www.stem.org.uk/ny600**
- Find out more about technicians supporting practical work in the classroom: **www.stem.org.uk/rp600**

The hidden code:
mathematics in computing and science

Mathematics is woven throughout the STEM subjects – and understanding what skills to beg, borrow and steal from across the curriculum can help students and empower teachers.

by DAVE GIBBS

STEM Computing and Technology Specialist, National STEM Learning Centre and Network

@adgibbs

by ED WALSH

Regional Development Lead, National STEM Learning Centre and Network

@cornwallscied

COMPUTING

Mathematics and computing go together like cheese and biscuits; you can consume them separately but they're so much better together. Mathematics can give context to computing tasks – many of which are reliant on arithmetic, Boolean logic, an understanding of number bases (including binary and hexadecimal) and expressing algorithms algebraically. Computing is a powerful calculation tool in mathematics too; a subject that has been explored by Miles Berry, Conrad Wolfram and others.

Building rigorous mathematics into computing tasks makes for better programming and a richer understanding of how computers work – mathematics is the 'native language' of the computer. With Scratch, working knowledge of distance, angles, bearings and co-ordinates is essential. A rich set of mathematics tools such as square roots, remainders, trigonometry functions, rounding and comparison operators (less than, greater than, equal to, etc) are included in Scratch and Python, and can be applied to solving real problems efficiently.

The synergies between mathematics and computing deepen at age 14, with 'computing-related mathematics' to be included by all exam boards. Beyond this it is hard to separate mathematics from computing; much that was taught in optional mathematics and further mathematics A level modules, now sits within GCSE Computer Science.

SCIENCE

The new science specifications makes specific reference to the need for students to be competent in a range of mathematical skills in order to fully access the science curriculum. More so than ever before the ability to use the correct mathematical tool in the correct place is a skill that students need to acquire, and we as teachers need to be able to support students in achieving this goal. The solution is sometimes buried deeper in scientific contexts and helping students explore the mathematical processes involved in solving a problem is crucial.

Greater cohesion between the work of the science and mathematics departments is key in this process. In one school where I work Year 7 students do a practical investigation in a science lesson, plot the data in their mathematics lesson and draw conclusions in their next science lesson. Teachers in both teams noted good progress and increased in understanding with one student commenting: "So that's what you wanted us to do with the numbers!"

I believe that science teachers need to develop the ability to scaffold difficult mathematical concepts encountered in a science context. Good mathematics teachers are great at iteratively cranking up the challenge, whereas science teachers can sometimes be guilty of heading straight for the crunch point.

There are some 'easy wins' when mathematics and science teams in a school collaborate. By agreeing common terminology, using the same strategies where appropriate and even using common resources, the two departments can deepen the impact on students' knowledge.

COMPUTING RESOURCES

- Develop knowledge in mathematics for A level computer science: www.stem.org.uk/cy211
- Computing and mathematics curriculum related resources:
  - Computers and mathematics in space: www.stem.org.uk/rx35tk
  - The magic of computer science III: www.stem.org.uk/rx35eq
  - The scratch patch - physics of a cannon ball www.stem.org.uk/rx35kh

SCIENCE RESOURCES

- Some excellent case studies, highlighting collaborative work between science and mathematics departments can be found in this collection of STEM case studies: www.stem.org.uk/cx64n
- Explore mathematics in the science classroom: www.stem.org.uk/rp210
- Establish shared understanding and teaching approaches in mathematics and science: www.stem.org.uk/my214

What goes up, must come down

by MICHAEL ANDERSON Mathematics Specialist, National STEM Learning Centre and Network
@STEMLearning_MA

Tim Peake is scheduled to return to Earth later this summer, following his stay on the International Space Station (ISS). The Principia mission was named after Isaac Newton's revolutionary text, Naturalis Principia Mathematica, which described the principal laws of motion and gravity.

In addition to becoming the first 'official' British astronaut to complete a spacewalk, Tim has worked in the weightless research laboratory on the ISS, running a series of scientific experiments for researchers back on Earth.

However, as a mathematics teacher, his mission has raised more questions than it has answered. What are the speeds, distances and times involved in space exploration? Do astronauts cut their hair in space? If not, by how much will it have grown by the time they arrive home? How much food and water will he and his fellow astronauts require? Tim posed some of the most common questions to students on Facebook:

"Just time for a couple more commonly asked questions:
1. How many times will we go around Earth during our flight?
2. How far will we travel in that time?"

His return journey will be an event to capture the imagination. Just like Newton's apple, Tim Peake will fall back to Earth due to the pull of gravity. After detaching from the ISS, a series of small burns will see him re-enter the Earth's atmosphere roughly three hours later; before landing, the Soyuz will separate into three modules.

The crew remain in the central deorbit module, from which a sequence of parachutes deploys. Nearly three and a half hours after undocking, the capsule will return to the ground in Baikonur, Kazakhstan. When travelling at around 16 miles per hour, and one second before impact, thrusters will be fired downwards to reduce the velocity to a more comfortable 3.4 miles per hour for landing.

A core element of Principia is to inspire and educate young people, from exploring mathematical concepts and coding with Astro-Pi, to being active in the Space to Earth Challenge. From growing seeds for the Rocket Science project to monitoring the environment in EO Detective, there is every reason for your students to continue to play a part in Tim Peake's Principia mission.

PREPARE FOR LANDING

- Find out more about how to get involved with Tim's mission: www.stem.org.uk/ms/esero/tim-peake
- Learn more about:
  - Astro-Pi: www.stem.org.uk/cx65e
  - Space to Earth challenge: www.stem.org.uk/cx6ad
  - Rocket science: www.stem.org.uk/cx6a3
  - EO detective: www.stem.org.uk/cx6a6

Photo by ESA via Getty Images

HOW TO

Our world is getting smarter

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

Look around and you'll find hundreds of devices becoming 'smart' - bins, lightbulbs, vacuum cleaners, checkouts... the list goes on, and gets longer every day. Powering this revolution is the widespread availability of ubiquitous computing – small, programmable devices linked to a range of inputs and outputs.

A myriad of cheap, simple-to-use devices are available to teachers and students, expanding the potential for exciting projects across STEM. It is in the design and technology workshop where these projects become products, combining form and function, and preparing students for the smart world of automation that awaits them.

To automate a process, an 'intelligent device' must sense its environment, process this data, and effect an output. This input-process-output model can be explored with plug-in or wireless I/O modules and simple block-based programming languages. Off-the-shelf solutions include LittleBits, SAM Labs or Pimoroni's Flotilla, offering quick physical prototyping and a platform for creative programming.

Grab some jumpers (the wire, not the woolly, kind) and the possibilities are endless. Raspberry Pi Zero, Arduino Uno, Crumble and BBC micro:bit all easily connected with external devices. Add input devices such as variable or light-dependent resistors, switches or other sensors and you have the rudiments of a smart device that can automatically water your plants, greet the sunrise with a fanfare or detect a sibling entering a bedroom fortress.

- Bucket-loads of ideas can be found at the BBC micro:bit and Raspberry Pi websites, Arduino Playground and in our own resource collection. My top picks are in this list: www.stem.org.uk/lxrjq

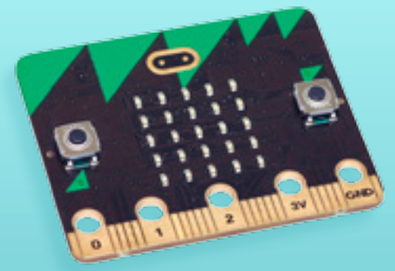
Spotlight on the BBC micro:bit

Geoff Hampson, director of Kitronik, gives us a quick how-to on getting started with the BBC micro:bit.

The micro:bit is one of the most exciting pieces of technology to arrive in schools in a generation. The small, programmable device is Bluetooth-enabled and along with its five-by-five board of LEDs and push-button switches, you will also find a compass and an accelerometer. On the bottom of the BBC micro:bit is a row of connections, which can be used to output to devices or detect inputs from sensors.

Read my online guide for some quick ideas to get you started, including:
- connecting an LED
- attaching a buzzer
- creating an alarm

Once you're confident enough, you will be designing your own projects for your students to explore. Happy coding!



- Read the full guide online at: www.stem.org.uk/ms/spotlight-microbit

FEATURE

Discover the future of food

by STEPHANIE SINCLAIR Senior Project Manager for The Crunch, Wellcome Trust
TIM BENTON Champion, UK Global Food Security Programme. Prof. University of Leeds
@wellcometrust

The future of food is one of the greatest challenges on our plate. Did you know, for example, that about 11 tonnes of water are required to produce a kilogramme of steak? And even more surprisingly, 70% of the water used to grow our food is used overseas.

A green bean, perhaps grown in Morocco or Kenya, may require a bucket of water to produce. If we buy a packet of beans from overseas, leave them in the fridge until they've gone slimy and throw them away, it's the equivalent of importing a bathtub of water from a drought-prone country and tipping it down the drain. What we eat and drink affects our health and our planet in astonishing ways.

The Wellcome Trust's new project The Crunch, has been set up to explore these very issues. With free events happening all over the UK; teachers, parents and students are being challenged to examine their relationships with food, explore cutting-edge research and think about how we can eat in ways that keep our planet and ourselves healthy. Students will work scientifically to investigate questions like:

- how does our diet give our bodies superpowers?
- where in the world does our food come from?
- how can we help crops to grow in difficult places?
- what will happen to the food we eat, and the food chains we are part of, if the climate changes?

There are some fantastic activities to get your class involved with. They could: learn about digestion, including why certain foods are so good for us to eat; design menus for an astronaut, gladiator and superhero; how chickens are related to human health; grow plants hydroponically; debate the merits of genetically modified food; and discuss what our food will look like in the future.

This year all UK schools and colleges will receive free schools kits, packed with all these activities and more, to help teachers and learners examine: our relationship with food; our planet; and keeping ourselves healthy.

- Find out how you can engage with the Wellcome Trust's new project at: thecrunch.wellcome.ac.uk

Getting the most from your CPD

by GILL GUNNILL › Professional Development Leader, National STEM Learning Centre and Network

How do you convince your senior leadership team of the need for and benefits of engaging in CPD? As a head of department I had to be prepared to put forward a case in support of myself or a member of my team.

When you speak to your line manager you need to have your arguments ready. We all know the benefits of networking with like-minded people, sharing ideas and good practice, and the upskilling in subject and pedagogical knowledge can have upon our confidence, enthusiasm and practice. However, the most compelling argument for members of senior leadership is the impact that CPD has on the outcomes for students' attainment and progress. You need to be able to demonstrate the impact that CPD will have upon your practice and the benefits for yourself, your students and your colleagues.

So, we've come up with some great strategies to get the most from your CPD.

The greatest selling point to any school leader is the impact that the CPD will have on student outcomes. As head of department with recruitment issues, I found it was easy to develop a convincing strategy to engage with CPD to develop subject skills for non-specialist teachers to build capacity across the team, improving the progress and attainment of pupils. Next time you want to take up the opportunity of subject specific CPD, go armed with your arguments and a strategy for how you will make use of it to impact on the school.

Enthusiasm is infectious and if you and your students are more engaged, your colleagues will want to know what changes you have implemented. By cascading your increased subject and pedagogical knowledge, you will impact on the quality of teaching and learning throughout your school.

10 WAYS TO GET THE MOST OUT OF YOUR CPD:

1. Ensure the activity you have chosen addresses the priorities within the school or your departmental action plan
2. Think about the impact CPD will have on you, your students and your colleagues, and what outcomes you want to achieve from the training
3. Collect baseline data such as student voice and students' progress data to allow for comparison after the event to measure the impact it has had
4. Plan how you will measure the impact using your success criteria as a guide
5. Action plan how you will implement the changes in practice, and include milestone points when you will identify the changes which have taken place
6. Ensure there is enough time to embed your planning, implement and practise the changes
7. Enlist leadership support and encouragement to allow you to champion the changes
8. Cascade knowledge and skills to colleagues – ask if they can help monitor the changes in your practice and in your students' progress
9. Create a plan for how you will evaluate – identify what data you need, when you need it, how you will collect it and evidence of how your practice has changed
10. Collect data on short term impacts – this will give you the encouragement to continue

AVAILABLE RESOURCES

Find out more about how you can maximise the impact of CPD in your school:
■ www.stem.org.uk/rx3e22

For a full list of our CPD activities available throughout the autumn:
■ Look at our listing on page 18

Identify the strengths and areas for development of science provision in your school using our Self-Evaluation Tool:
■ www.stem.org.uk/ms/tools-and-toolkits

Demonstrate the positive impact of your CPD with our recognition schemes:
■ www.stem.org.uk/ms/recognition

What you need to know about changes to the curriculum

With significant modifications across the curriculum, we bring you the key information you need to know about the changes to science, mathematics, computing and design and technology at GCSE and A level.

SCIENCE

The new GCSE sciences are due to start in September 2016, with first examinations in 2018. The content has been known for a while, but the specifications from the awarding bodies are still to be accredited at the time of going to press.

Mathematics will play a larger part in the science GCSE, with mathematical skills making up 20% of the assessment in combined science, and in varying amounts in the separate sciences – 10% in biology, 20% in chemistry and 30% in physics.

Practical skills have also been brought to the fore, making up 15% of the assessment. There will be a minimum of 8 practicals for each of the separate sciences and 16 for combined science.

The reforms to A level science are already in place in secondary schools and FE colleges, with the linear assessment for A level being one of the greatest changes. Many schools have opted to enter their students for the de-coupled AS examination to give them practice in the new assessment-style questions.

Assessment of practical skills is a compulsory requirement of A level science, and the result will appear as a separate reported grade (pass or fail) on the certificate. Students will be expected to undertake a minimum of 12 practical activities which are identified within each specification.

– Gill Gunnill
Professional Development Leader,
National STEM Learning Centre and Network

MATHEMATICS

The curriculum reforms in mathematics impact all key stages, making the curriculum more challenging. At key stage 3 the major change is the emphasis on fluency, mathematical thinking and problem solving. These themes continue at GCSE where only 40% of the marks at higher level will be awarded for using and applying standard techniques, 30% for reasoning, interpreting and communicating mathematically, and 30% for problem solving. The first teaching of the new mathematics GCSE specifications began in September 2015 with students being awarded the new 9 to 1 grades in mathematics and English in summer 2017.

At post-16 the picture is less straightforward. Students not gaining a grade C at GCSE already have to re-take the exam, and students achieving at least a grade C, but not taking AS or A level mathematics, are encouraged to study 'Core Maths'.

The new AS and A level specifications for mathematics come into effect in September 2017. As with all other A level subjects the examinations will be linear. All specifications have to contain pure mathematics, statistics and mechanics, removing the choice offered in the modular system. There has been a marked increase in the numbers studying mathematics over the last decade; it is hoped that the changes will not discourage students from studying mathematics at AS or A level.

– Stephen Lyon
Mathematics Specialists,
National STEM Learning Centre and Network

DESIGN AND TECHNOLOGY

The reforms to design and technology have been a hot topic of debate for subject specialists across the country. For GCSE, the existing qualifications that currently fit under a design and technology banner are to be discontinued and replaced with a new suite of qualifications:

Food preparation and nutrition is launching for teaching in September 2016, ready for exams in June 2018. This is the only qualification that will be available for those students looking to specialise in food at GCSE level.

Design and technology, engineering and electronics are the three GCSE's that are planned for a September 2017 launch, ready for exams in June 2019. Design and technology will bring together the various material areas of design and technology into one single GCSE. The engineering and electronics GCSE's will remain specific to their subject areas, but with reformed content and assessment. All GCSE's will have an increased focus on mathematics and science within the subject content and assessment. Draft specifications for these qualifications are due to be released in late May 2016.

For AS and A level, existing qualifications that sit within design and technology have again been either reformed, or removed completely. As of September 2017, the three remaining AS and A level routes will be:
- design and technology (product design)
- design and technology (fashion and textiles)
- design and technology (design engineering)

For those students looking to follow a more vocational route, technical qualifications at level 2 and level 3 will be available with new titles in development over the next year.

– Gemma Taylor
Technology CPD Lead,
National STEM Learning Centre and Network

COMPUTING

The aim in the realm of computing may perhaps be summed up in the phrase 'upping the ante'. GCSEs, AS and A levels must now be based on core content requirements. This is to minimise any confusion arising from the different topics covered by the various examination boards.

Another reform is to reduce the number of similar and overlapping qualifications. Following this, the DfE announced its proposal to discontinue the ICT qualification, as its subject matter would be covered elsewhere in the curriculum – a descision which was moved the focus onto computing.

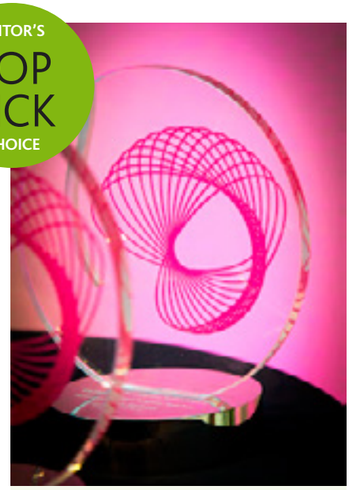
The new computer science GCSE will be available from September 2016 for examination in summer 2018. The subject is now regarded as a science (hence the name change) and is therefore eligible – at GCSE – for inclusion in the EBacc. As such, there is a greater emphasis on mathematical understanding, and an ability to apply mathematical concepts to computing.

At A level, the permissible amount of coursework in computer science is reduced from 40% to 20%, although some boards have opted for 100% terminal examinations. However, AS is assessed purely by examination.

– Terry Freedman
Independent Consultant,
ICT & Computing in Education

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

EDITOR'S TOP PICK CHOICE



ENTHUSE CELEBRATION AWARDS
5 JULY

The ENTHUSE Celebration Awards are presented each year to recognise the impact that teachers, technicians and support staff have on their pupils, colleagues, schools, colleges and peers, as a result of ENTHUSE supported professional development.

Applications are now open to apply for the awards. The dinner and ceremony will be held on 5 July at the Wellcome Trust Building in London.

■ Sign up now at: www.stem.org.uk/ms/enthuse-celebration-awards

MAY 2016

ROLLS-ROYCE SCIENCE PRIZE
13 MAY

The application deadline for the Rolls-Royce Science Prize is 13 May 2016. This awards programme helps you to implement new science and mathematics teaching ideas in your school or college. Simply attend CPD through the National STEM Learning Centre and Network or fill out an application form to enter the competition.

■ Find out how to apply at: www.stem.org.uk/ms/rolls-royce-science-prize

JUNE 2016

FREE ONLINE CPD, DIFFERENTIATING FOR LEARNING
20 JUNE

Transform your classroom by differentiating lessons to benefit students' learning. Led by Dylan William and Christine Harrison, this CPD provides the opportunity to learn from two leading STEM education experts.

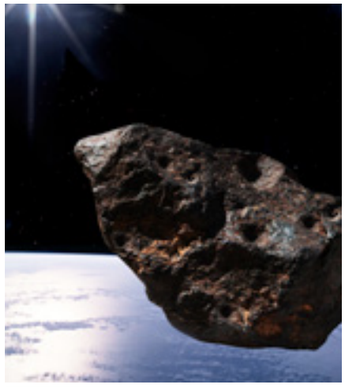
■ Register your interest: www.stem.org.uk/ms/online-cpd

NATIONAL WOMEN IN ENGINEERING DAY
23 JUNE

NATIONAL WOMEN In ENGINEERING DAY

Brought to you by the Women's Engineering Society, National Women in Engineering Day aims to raise the profile of women in engineering. This international awareness campaign takes place annually on 23 June.

■ Get involved: www.nwed.org.uk



ASTEROID DAY
30 JUNE

How can the Earth be protected from asteroid impacts? Asteroid Day is a global awareness movement for people to come together to discuss the best ways to protect our planet and future generations.

■ www.stem.org.uk/rxuwx

AUGUST 2016

OLYMPIC GAMES 2016
5-21 AUGUST

As the Olympic Games approach, why not use these Olympic Games related activities to help engage and inspire students? Covering science, technology, engineering and mathematics, these resources can be used in individual lessons or as part of a cross-curricular Olympic theme.

■ www.stem.org.uk/cx5nz

2016 summer conferences

Want to improve your skills over the summer? Come along to one of our many subject specific conferences held at the National STEM Learning Centre in York. With everything from mathematics to a dedicated day for technicians, we have something for everyone. Get your creative juices flowing in our inspiring Centre and check out the physical resources we have available in our library.

USING STEM RESEARCH CONFERENCE: USING RESEARCH TO IMPROVE TEACHING AND LEARNING OF STEM SUBJECTS

We're giving you the opportunity to learn how to effectively use research to improve your lessons with evidence based teaching. Featuring keynote speakers like expert Professor Shirley Simon, interactive workshops, discussions and debates all based around academic papers and case studies provided by teacher participants. Don't miss out on your chance to maximise your impact on the teaching of STEM subjects.

• 20 May 2016: 2 day
■ www.stem.org.uk/ny259

COMPUTING CONFERENCE

Featuring sessions from leaders in computing education, CAS Master Teachers and higher education, this conference is an ideal opportunity to learn about computing at all phases of education and to share ideas.

• 29 Jun 2016: 1 day
■ www.stem.org.uk/ty007

ASE NATIONAL TECHNICIANS CONFERENCE

Enjoy a full day of practical ideas and activities at our technicians conference; including keynote and workshop sessions throughout the day for biology, chemistry and physics.

• 7 Jul 2016: 2 days
■ www.stem.org.uk/ny609

SUMMER SCHOOL FOR NEWLY AND RECENTLY QUALIFIED TEACHERS

Discover ways to enhance and apply new skills and knowledge in practical sessions, learn how to develop your technical service and explore the latest updates to the profession.

• 18 Jul 2016: 5 days
■ www.stem.org.uk/ny255

NEW TO TEACHING A LEVEL MATHEMATICS SUMMER SCHOOL

Improve your subject pedagogical knowledge and improve your teaching skills, to give you the confidence to teach for understanding and engagement. Inspire yourself and your students.

• 22 Aug 2016: 4 days
■ www.stem.org.uk/my500

SOCIAL MEDIA

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

@STEMLearningUK
Followers: 17.7K

@_MrsMaci @STEMLearningUK @astro_timpeake Great Space CPD today!

@Mr_Garner1 A brill day @STEMLearningUK in York! Some amazing workshops & plenty of resources/ideas to incorporate in lessons!

@SciKathryn Ooh, I'm a bit late for Q1, but just HAD to mention residential courses at @STEMLearningUK #asechat. Value for money no head can argue with!

@sciencejo Very much looking forward to participating in the Teacher Academic Placemement Scheme with the University of Birmingham @STEMLearningUK

@damianscough My destination tomorrow to lead science-focussed #cpd for @STEMLearningUK. And the sun's going to shine

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

High quality professional development that makes an impact

You can access our CPD online, face-to-face locally through Science Learning Partnerships (SLPs) and on ENTHUSE Award bursary funded residential activities at the National STEM Learning Centre. We can also tailor our CPD to meet the individual needs of your department, school or network through our bespoke support.

The support we provide is grounded in up-to-date research evidence which reflects current issues in STEM education and can be mapped to national standards. Participants' feedback consistently rates our support as of the highest quality and most impactful experiences they have had during their teaching career.

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

MAXIMISING PROGRESS AND OUTCOMES 11-16

- Effective feedback and assessing progress in mathematics without levels - Page 20
- Leading assessment for learning - Page 22
- From good to outstanding: making learning visible - Page 21
- Improving progress in science - Page 20
- Engaging and ensuring progress of low attainers in science - Page 20

HIGH QUALITY TEACHING

- Supporting the teaching of GCSE computer science - Page 19
- Success with GCSE science - Page 21
- Making a difference through effective feedback - Page 21
- Mathematics in science teaching - Page 21
- Towards outstanding - Page 21

SUPPORTING NEW ENTRANTS TO THE PROFESSION

- Building confidence as a newly qualified mathematics teacher - Page 20
- Teaching data and data structures (A level computer science) - Page 19
- Pre-NQT kick start - Page 21
- Physics for non-specialists - Page 23
- Working as a science technician: an introduction to the role - Page 24

DEVELOPING QUALITY SUBJECT LEADERSHIP

- Leading assessment for learning - Page 22
- Established heads of science: strategic leadership of your team - Page 22
- Leading professional development in science education - Page 22
- Essential skills for new and aspiring science leadership - Page 22
- Senior technicians: leadership, training and management - Page 24

MAXIMISING PROGRESS AND OUTCOMES POST-16

- Supporting the teaching of A level computer science - Page 19
- New to A level chemistry - Page 22
- Teaching data and data structures (A level computer science) - Page 19
- Getting to grips with A level physics - Page 23
- Preparing to teach the new A level mathematics curriculum - Page 20

All fees and award values are valid for state funded schools and are correct at the time of print (March 2016). See www.stem.org.uk for fees for non-state funded schools and the latest information.

COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

BRINGING MARS EXPLORATION TO THE CLASSROOM

Using Lego robotics, data logging and simple engineering challenges you will learn how to link this exciting context across the curriculum.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 23 Nov 2016 1 day

■ www.stem.org.uk/cy218

MATHS FOR A LEVEL COMPUTER SCIENCE

Examine tried and tested teaching methods that will develop your confidence and aid in tackling the trickiest topics.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 8 Dec 2016 2 days

■ www.stem.org.uk/cy211

SUPPORTING THE TEACHING OF A LEVEL COMPUTER SCIENCE

Gain experience in practical and investigative activities including a range of programming challenges; and deepen understanding of the underlying concepts of A level computer science.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 18 Oct 2016 2 days

■ www.stem.org.uk/cy202

SUPPORTING THE TEACHING OF GCSE COMPUTER SCIENCE

We focus on the themes that are common to all exam boards and that run through from earlier school stages, such as algorithms, programming, computer systems, networking and data.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 10 Oct 2016 2 days

■ www.stem.org.uk/cy201

TEACHING ALGORITHMS FOR A LEVEL COMPUTER SCIENCE

This day will develop your understanding of the abstraction of problems, examines procedural, functional and data abstraction.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 15 Nov 2106 1 day

■ www.stem.org.uk/cy206

TEACHING ALGORITHMS FOR GCSE COMPUTER SCIENCE

You will examine how algorithms are modelled and constructed using decomposition and abstraction, and how they are represented
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 14 Nov 2016 1 day

■ www.stem.org.uk/cy205

TEACHING DATA AND DATA STRUCTURES (A LEVEL COMPUTER SCIENCE)

Learn to develop student competency using a range of data structures and types; explain how they are stored, processed and manipulated; and apply mathematical methods.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 3 Nov 2016 1 day

■ www.stem.org.uk/cy204

TEACHING DATA AND DATA STRUCTURES (GCSE COMPUTER SCIENCE)

Discover GCSE database models, management systems and queries; alongside a range of classroom activities and teaching techniques.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 2 Nov 2016 1 day

■ www.stem.org.uk/cy203

DESIGN TECHNOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

A BEGINNER'S GUIDE TO E-TEXTILES & 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)
- 4 Nov 2016 2 days

■ www.stem.org.uk/ty219

PREPARING TO TEACH THE NEW DESIGN AND TECHNOLOGY GCSES

Gain the essential information that you need to embed change of the new GCSEs, 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)
- 9 Dec 2016 2 days

■ www.stem.org.uk/ty223

TECHNICAL TEXTILES: USING SMART AND MODERN MATERIALS IN DESIGN AND TECHNOLOGY

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)
- 25 Nov 2016 2 days

■ www.stem.org.uk/ty208

TECHNICIANS SUPPORTING THE NEW DESIGN AND TECHNOLOGY GCSE

Discover how to support your department in the preparation and delivery of the new design and technology GCSE, ready for first teaching in September 2017.
- Your school receives: £500 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 28 Nov 2016 2 days

■ www.stem.org.uk/ny621

USING 3D PRINTERS CREATIVELY AND EFFECTIVELY IN DESIGN AND TECHNOLOGY

Find out how 3D printers can effectively be used to encourage creativity and risk taking in the classroom.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 10 Nov 2016 2 days

■ www.stem.org.uk/ty214

"Fantastic ideas to use in the classroom, with hands on experience."

- Textiles participant, 2015

USING THE BBC MICRO:BIT IN DESIGN AND TECHNOLOGY

One day of hands-on tuition and learning about the programming and functions of the device, and develop your awareness of the free teaching and project resources available.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 14 Nov 2016 1 day

■ www.stem.org.uk/ty231

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

BUILDING CONFIDENCE AS A NEWLY QUALIFIED MATHEMATICS TEACHER

Explore what makes good mathematics teaching by considering questioning, promoting positive behaviour, planning for learning and giving feedback.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 1 Nov 2016 4 days over 2 periods

www.stem.org.uk/my205

DEVELOPING MATHEMATICAL UNDERSTANDING THROUGH REASONING AND PROBLEM SOLVING

Examine the importance of reasoning and problem solving for the new mathematics curriculum at key stages 3 and 4.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £,1200 (ex VAT)
- 21 Nov 2016 4 days over 2 periods

www.stem.org.uk/my206

EFFECTIVE FEEDBACK AND ASSESSING PROGRESS IN MATHEMATICS WITHOUT LEVELS

Consider the purpose of assessment, when and how assessment should take place, peer and self assessment, and what constitutes active assessment
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 26 Sep 2016 2 days

www.stem.org.uk/my208

MOVING ON WITH MATHEMATICS TEACHING: BECOMING MORE ADVENTUROUS IN THE CLASSROOM

You will examine recent research in mathematics education and explaore case studies of innovative practice.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £750 (ex VAT)
- 19 Sep 2016 3 days over 2 periods

www.stem.org.uk/my211

PREPARING TO TEACH THE NEW A LEVEL MATHEMATICS CURRIRULUM

Develop approaches to teaching that strengthen the overarching themes and aspects of the new content for the A level specifications.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,000 (ex VAT)
- 5 Dec 2016 4 days over 2 periods

www.stem.org.uk/my216

SCIENCE IN MATHS OR MATHS IN SCIENCE? ESTABLISHING SHARED UNDERSTANDINGS AND TEACHING APPROACHES

Identify common content, and explore ways of teaching that develop sufficient mathematical understanding whilst providing fluency in the skills required for science.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £750 (ex VAT)
- 7 Nov 2016 3 days over 2 periods

www.stem.org.uk/my214

TEACHING NEW MATHEMATICS GCSE CONTENT WITH UNDERSTANDING

Explore the new mathematics GCSE and gain an understanding of the importance of mathematical reasoning and problem solving.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 16 Nov 2016 4 days over 2 periods

www.stem.org.uk/my207

RESOURCING THE MATHEMATICS CURRICULUM

Explore resources designed to support improved teaching of the new curriculum with hand-on activities.
- Activity fee: £50 (ex VAT)
- 12 Oct 2016 1 day

www.stem.org.uk/my202

USING MANIPULATIVES TO ENHANCE UNDERSTANDING IN THE 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)
- 17 Oct 2016 1 day

www.stem.org.uk/my204

USING RESOURCES TO DEVELOP PROBLEM SOLVING SKILLS IN SECONDARY MATHEMATICS

Develop students' problem solving skills in your lessons with hands-on activities and resources.
- Activity fee: £50 (ex VAT)
- 11 Nov 2016 1 day

www.stem.org.uk/my203

SCIENCE

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 new GCSE and KS4 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. It looks at typical weaknesses in mathematical that 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 how learners make progress in science and in preparing them for success in examinations.
- 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

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

FROM GOOD TO OUTSTANDING: MAKING LEARNING VISIBLE

Investigate that shift in role to facilitate truly student-centered classrooms by evaluating effective approaches.
- Your school receives: £,1500 ENTHUSE Award
- Activity fee: £1,500 (ex VAT)
- 16 Nov 2016 5 days over 2 periods

www.stem.org.uk/ny714

HEALTH AND SAFETY

Learn how to implement essential and effective health and safety planning with a pragmatic, risk based approach.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 5 Oct 2016 2 days

www.stem.org.uk/ny253

LAB DESIGN: PLANNING SCIENCE ACCOMMODATION

Well-planned, imaginative and practical science spaces in schools and colleges can create outstanding learning environments for both students and teachers.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 10 Oct 2016 2 days

www.stem.org.uk/ny211

PRE-NQT KICK START

Are you ready for your first science teaching post? Let us support your personal planning and help you develop your repertoire of effective practical science activities.
- Your school receives: £2,100 ENTHUSE Award
- Activity fee: £1,800 (ex VAT)
- 14 Nov 2016 6 days over 3 periods

www.stem.org.uk/ny245

SUCCESS WITH GCSE SCIENCE

This CPD activity explores teaching and learning in science from a practical perspective.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,000 (ex VAT)
- 10 Nov 2016 4 days over 2 periods

www.stem.org.uk/ny256

TRIPLE SCIENCE SUPPORT PROGRAMME

Triple Science Support Programme

The Triple Science Support Programme (TSSP) is funded by the Department for Education to support schools across England successfully offer separate science GCSE courses to students.

We have a dedicated area for the TSSP including resources, iBooks and online communities.

www.stem.org.uk/ms/triple-science

TRIPLE SCIENCE NETWORK OF EXCELLENCE

This network will consider what effective teaching and learning of the triple science extension modules could look like.

See website for details and information: www.stem.org.uk/rp793

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

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

ESTABLISHED HEADS OF SCIENCE: STRATEGIC LEADERSHIP OF YOUR TEAM

If you want to develop your skills to meet the challenges of addressing the changes in expectations then this is the perfect CPD activity.
- Your school receives: £1,500 ENTHUSE Award
- Activity fee: £1,500 (ex VAT)
- 7 Dec 2016 5 days over 2 periods
- www.stem.org.uk/ny257

LEADING ASSESSMENT FOR LEARNING

Exploring strategies which will enable you to lead your colleagues in embedding Assessment for Learning (AfL) practices in science.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 3 Nov 2016 4 days over 2 periods
- www.stem.org.uk/ny703

BIOLOGY

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

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

NEW TO A LEVEL BIOLOGY

Through the development of new practical techniques, use of ICT activities and context based learning strategies, this CPD will provide a foundation for those with little experience of teaching A level biology.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 3 Oct 2016 4 days over 2 periods
- www.stem.org.uk/ny250

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

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

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

NEW TO A LEVEL CHEMISTRY

With much of chemistry centred around good experimental skills, this CPD activity allows you to develop, lead and support outstanding practical chemistry, linking it to effective pedagogy within the subject.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 1 Nov 2016 4 days over 2 periods
- www.stem.org.uk/ny251

The Royal Society of Chemistry has created a series of CPD activities that help support both specialist and non-specialist chemistry teachers improve their subject knowledge, pedagogical knowledge and confidence. The courses cover a wide range of topics at both pre- and post-16 levels and are suitable for teachers at all career stages.

There are three series of courses available in the UK through the National STEM Learning Centre and Network:

1. DEVELOPING EXPERTISE IN TEACHING CHEMISTRY

Developing expertise in teaching chemistry courses are designed to give you an in-depth understanding of key concepts in chemistry at pre and post-16 levels.

2. CHEMISTRY FOR NON-SPECIALISTS

If you teach secondary chemistry, but have a background in another subject, this course is for you. Chemistry for non-specialists is designed to provide teachers with the confidence, flair and enthusiasm to teach chemistry at pre-16 level.

3. INSPIRING CREATIVE CHEMISTRY TEACHING

The first few years in the classroom can be challenging. This series of three courses aimed at trainee teachers and those who are relatively new to the classroom helps to address this.

- Find out more at **www.stem.org.uk/ms/royal-society-chemistry**

PHYSICS

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

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

NEW TO A LEVEL PHYSICS

With recent changes to the A level specification now is an ideal time to develop your schemes of learning and integrate inspiring and engaging practical activities.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 6 Oct 2016 4 days over 2 periods
- www.stem.org.uk/ny252

Bespoke CPD tailored to your needs

Our comprehensive range of support can be requested as a bespoke offer for your department, school or network. We can make the CPD more effective and tailored to the specific challenges and needs your school faces.

We have a proven track record of highly evaluated, impactful professional development and a wealth of experience in supporting teachers, technicians and support staff in all aspects of STEM education.

www.stem.org.uk/ms/bespoke-cpd

TECHNICIANS

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 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

TECHNICIANS SUPPORTING A LEVEL CHEMISTRY

Learn about the key skills and techniques requierd for the effective support of post-16 chemistry, in conjuction 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

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

SENIOR TECHNICIANS ACCREDITED CO-LEADERS IN SCIENCE (STACS)

Deliver an effective service, support engaging practical work, work with large numbers of colleagues and keep abreast of changes within the profession.
- Your school receives: £3,850 ENTHUSE Award
- Activity fee: £3,300 (ex VAT)
- 19 Oct 2016 10 days over 3 periods

www.stem.org.uk/ny600

SKILLS FOR NEW TECHNICIANS

Suitable for those new to the role within a school or college, this CPD activity provides a thorough grounding in the science technician profession.
- Your school receives: £1,800 ENTHUSE Award
- Activity fee: £1,500 (ex VAT)
- 21 Nov 2016 7 days over 2 periods

www.stem.org.uk/ny601

TECHNICIANS A LEVEL BIOLOGY

Investigate a range of relevant practicals for technicians to support students with the practical endorsement and skills required at A level.
- Your school receives: £400 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 16 Nov 2016 2 days

www.stem.org.uk/ny616

TECHNICIANS IN THE CLASSROOM

Find out what makes good practical work, working effectively with teachers and students, presentations and demonstrations, assisting with practical project work and managing small group work and individuals with practical activities.
- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 12 Dec 2016 3 days

www.stem.org.uk/ny602

TECHNICIANS SUPPORTING BIOLOGY: 11-16

Examine microbiology, biotechnology, genetics, dissections, ecology, microscopy and working with animals and plants.
- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 26 Sep 2016 3 days

www.stem.org.uk/ny604

"I gained a better understanding of my job role and was able to manage my time better. My confidence improved enabling me to demonstrate practicals to teachers and technicians. It encouraged me to promote myself and the department and I expanded my role by running whole school CPD sessions"

- Previous STACS participant, 2015

TECHNICIANS SUPPORTING CHEMISTRY: 11-16

Explore a range of practical activities which include micro-practicals, analytical techniques including chromatography, spectrometry and colorimetry, polymers, diffusion, electrolysis, distillations, titrations and demonstrations.
- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 12 Oct 2016 3 days
- 11 Jan 2017 3 days

www.stem.org.uk/ny605

TECHNICIANS SUPPORTING PHYSICS: 11-16

Discover electricity, electronics, sound, light, radioactivity, forces, heat transfer, space, astronomy and electromagnets.
- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 7 Nov 2016 3 days

www.stem.org.uk/ny606

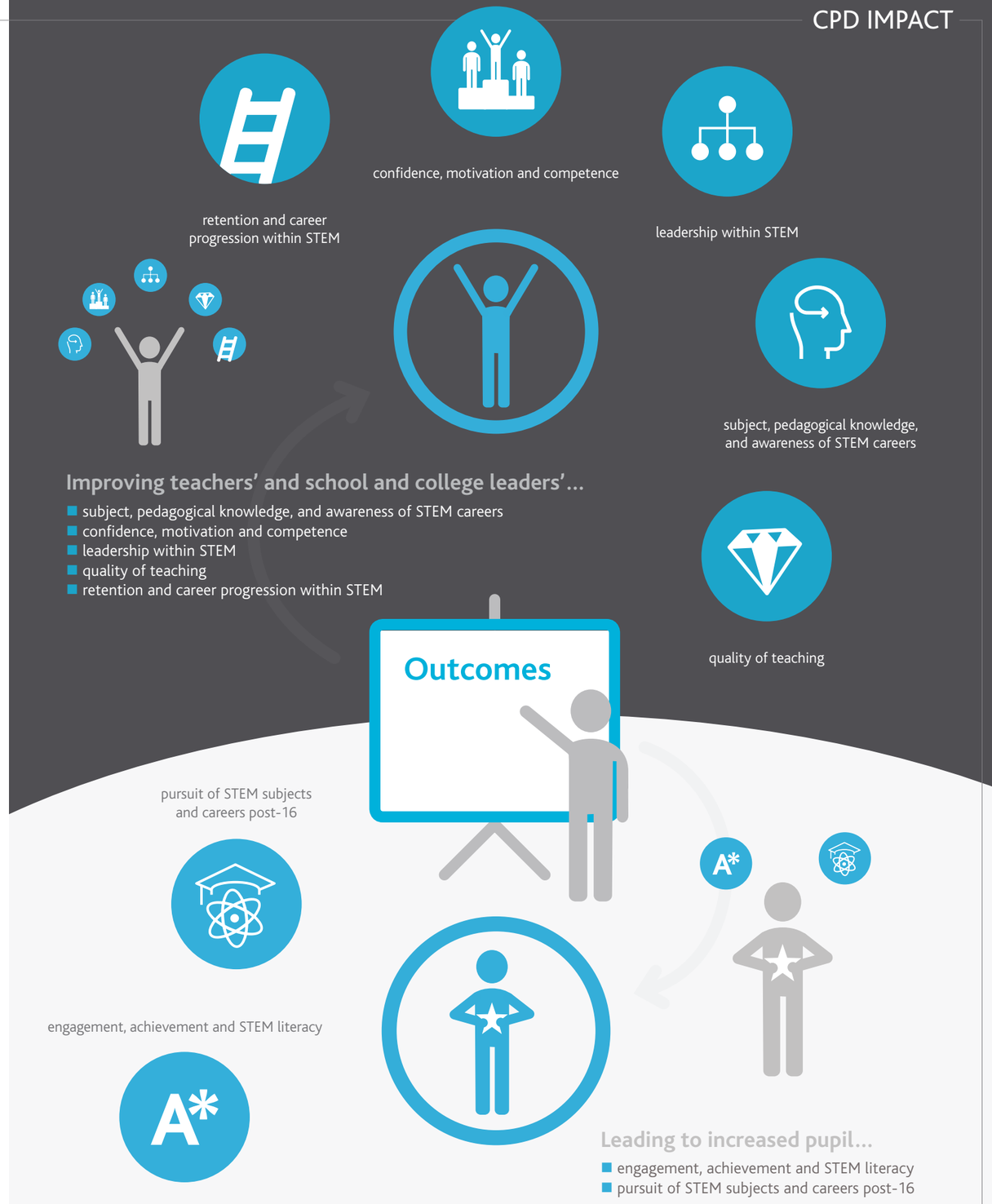
ONLINE

FREE ONLINE CPD, DIFFERENTIATING FOR LEARNING

Transform your classroom by differentiating lessons to benefit students' learning. Led by Dylan William and Christine Harrison, this CPD provides the opportunity to learn from two leading STEM education experts.
- 20 Jun 2016

www.stem.org.uk/online-cpd

CPD IMPACT



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on everything our website has to offer

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Share ideas, problems and best practice in our vibrant community groups

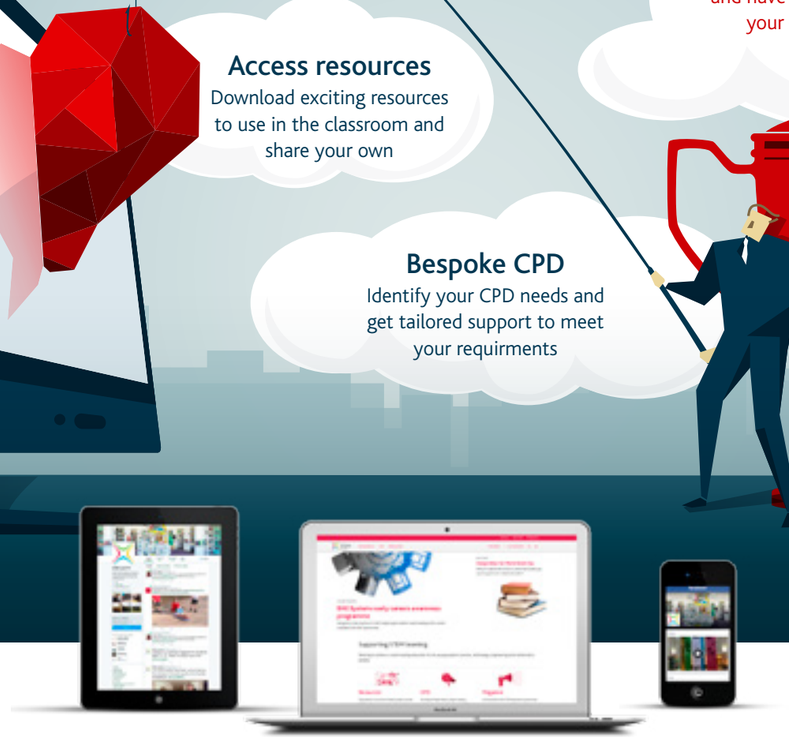
Personalise your experience
Use your dashboard to find and store information tailored to your interests

Recognition
Demonstrate the positive impact of your professional development

Book CPD activities
Enhance your learning with CPD activities and have a positive impact on yourself, your students and your school

Access resources
Download exciting resources to use in the classroom and share your own

Bespoke CPD
Identify your CPD needs and get tailored support to meet your requirments



www.stem.org.uk

PROJECT ENTHUSE

Supporting state funded schools across the UK with access to high impact professional development.

Project ENTHUSE is a unique partnership of government, charities and employers that have come together to bring about inspired STEM teaching, through the continuing professional development of teachers, technicians and support staff across the UK. The partners in Project ENTHUSE are: the Wellcome Trust, Department for Education, BAE Systems, Biochemical Society, BP, Institution of Engineering and Technology, Institution of Mechanical Engineers, Rolls-Royce, Royal Commission for the 1851 Exhibition and the Royal Society of Chemistry.

ENTHUSE AWARDS

Bursaries available to all state funded schools and colleges in the UK to support participation in professional development through the National STEM Learning Centre and partners in Scotland, Northern Ireland and Wales.
See our full CPD listing on page 18.

■ **www.stem.org.uk/ms/enthuse**

INTENSIVE ENTHUSE AWARDS

£5,000 bursaries to support in-school, consultant led professional development for state schools in England that have not participated in Project ENTHUSE supported professional development in the last five years.

■ **www.stem.org.uk/ms/intensive-enthuse**

TEACHER INDUSTRIAL PARTNERS’ SCHEME

To ensure that your students are informed for the next academic or industrial phase of their lives, it is crucial that teachers keep up-to-date with both modern career options and routes into academia. Being part of the Teacher Industrial Partners’ Scheme or the Teacher Academic Placement Scheme provides the perfect opportunity for STEM teachers to step out of the classroom and experience the world of industry or a cutting edge biochemistry department. The skills learned from the scheme will enable teachers to better advise students, create partnership links with industry or a university and support the contextualised teaching of the STEM curriculum.

Placements happen throughout the year with universities and employers across the country. To support with the cost of your teacher leaving the classroom, a generous bursary is available to state funded schools and colleges.

■ **www.stem.org.uk/placements**

National STEM Learning Centre and Network

Working to achieve a world leading education for all young people in science, technology, engineering and mathematics.

1. Altrincham Grammar School for Girls
2. Ashton Community Science College
3. Holmes Chapel Comprehensive School
4. Keele Science Learning Centre
5. Liverpool John Moores University
6. Ulverston Victoria High School
7. Carmel College
8. Chapel-en-le-Frith High School
9. Hallam TSA
10. John Leggott College
11. Kirklees Learning Service
12. Northern Lights TSA
13. North Tyneside Learning Trust
14. Sheffield Institute of Education
15. Bishop Challoner Catholic College
16. Bury St Edmunds County Upper School
17. Denbigh School
18. Forest Way School
19. Swavesey Village College
20. The Earls High School
21. The Priory Academy
22. Tuxford Academy
23. University of Hertfordshire
24. Wigmore School
25. Clapton Girls' Academy
26. Cranford Community College
27. George Abbot School
28. Institute of Education
29. Millais School
30. Newstead Wood School
31. Simon Langton Girls' Grammar School
32. St Clement Danes School
33. St Marylebone School
34. The Hertfordshire & Essex High School and Science College
35. Westcliff High School for Girls
36. Adfecto
37. Cheney School
38. Truro and Penwith College
39. Furze Platt Senior School
40. Kendrick School
41. Somerset Partnership Teaching School
42. St. Mary Redcliffe and Temple School
43. University of Southampton

Find out more at www.stem.org.uk

Please see www.stem.org.uk/science-learning-partnerships for the latest information.
All venues are correct at time of print, March 2016.