ISSUE 04 • AUTUMN 2016

secondary and post-16

stem LEARNING

in this issue

Performance management

Making it work for you

World-class CPD and resources from the National STEM Learning Centre and Network

STEM LEARNING

Welcome

Welcome to the fourth edition of STEM Learning magazine.

There is always something exciting about the beginning of the new academic year. As the leaves begin to turn and the nights start to draw in, autumn brings with it a fresh start, full of new challenges and opportunities. This September we're pleased to announce that we are making it even easier for you, as teachers and others who are crucial to inspiring the next generation in science, technology, engineering and mathematics (STEM), by bringing together even more STEM support in one place for the very first time.

As well as continuing to offer high-impact, career long, subject-specific support to teachers and others across the UK through the National STEM Learning Centre and Network, we are now supporting you and your students through access to STEM Ambassadors and STEM Clubs. The STEM Ambassador network is a true national treasure, which brings thousands of people working in STEM fields, (scientists, engineers, zoologists, architects, set designers, nuclear physicists and more), all of whom are passionate about supporting you and your students in STEM. STEM Clubs provide excellent opportunities to build students' skills, confidence and excitement around STEM through practical activities. Evidence shows both programmes can help build young people's employability skills as well as STEM understanding and enthusiasm, and open their eyes to a whole range of possibilities, including careers.

We are also excited to have relaunched the inspiring STEM Insight programme, which offers teachers, technicians, and others working in schools and colleges, a unique chance to spend time in a STEM-related industrial or university setting. Fancy a placement with IBM or the University of Cambridge? This could be your year to get out of the classroom, and come back from your placement filled with enthusiasm, new contacts and ideas.

Finally, you may have heard about Science Minister Jo Johnson naming the new, state-of-the-art polar research ship, named after world-renowned naturalist Sir David Attenborough. We are delighted to be working with BEIS and others in supporting educational activity around this exciting project through the Polar Explorer Programme. There will be lots of activities you and your students can get involved in during the run up to the RRS Sir David Attenborough's launch in 2019, so watch this space!

We're thrilled to be bringing you all these exciting new opportunities to inspire your students/pupils to study and perhaps go on to work in STEM-related fields. Who knows? Perhaps the next Tim Peake, Dr Helen Sharman, Sir David Attenborough or Dr Alice Roberts could be sitting in one of your classes this term...

Yvonne Baker

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

Get in touch...

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

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www.stem.org.uk

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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.

HOW TO

CPD LISTING

ARTICLES

Decoding the world of online CPD

by PAUL BROWNING 〉 Senior Project Consultant, National STEM Learning Centre and Network

Online CPD, like online learning, has many forms but we're going to focus on MOOCs – or Massive Open Online Courses. Think Martini – any time, any place. Think also anyone. Online CPD happens on your terms – when you want to do it and where you want to do it.

Moreover, the 'open' in MOOC means free at the point of access, so anyone can do it – it doesn't depend on a budget being available and lesson cover being arranged.

On a MOOC there may be thousands of teachers from many countries sharing ideas, successes and experience; you may be curled up on the sofa at home with a glass of wine but you are definitely not alone! The crowd-sourcing power of teachers on a MOOC is something with great potential.

Most MOOCs allow you access to all the resources for the duration of the CPD, so you might have a topic dropped on you in class, which you haven't covered in the MOOC yet, but you can access it and chop and change your learning as and when you need it. Welcome to 'just in time learning' and MOOCs as reference material.

There's a flip side to learning in a community of thousands – at times it can feel like drinking from a firehose. But there are strategies and tools to deal with the risk of overload. Though time commitment is significant for a course of several weeks, remember, once enrolled you can always come back later.

It may prove difficult to build longer term relationships because the sharing of contact details is prohibited on many platforms, but we know anecdotally of teachers from the same school or college participating in our MOOCs as a group.

Overall, for many teachers, the upsides of MOOCs outweigh the downsides. As Angela, a secondary school science teacher, said about our Managing behaviour for learning CPD:

"If you see the course advertised again, run don't walk, to your nearest internet connection and sign up."

DIVE INTO OUR CPD 〉

- **STEM Learning has partnered with FutureLearn to launch a suite of MOOCs that reinforce a vital set of skills for teachers:**
  - Managing behaviour for learning
  - Assessment for learning
  - Differentiating for learning
- **And if you're a computing teacher, don't miss this:**
  - Teaching computing
- **Find out more by visiting: www.stem.org.uk/ms/online-cpd**

STEM Clubs: where to start and where to go

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

STEM Clubs are a great way of engaging students with STEM subjects. They provide the opportunity to dive into investigations and hands-on practical work that usually gets cut out of lessons due to time constraints and curriculum demands. If you're thinking of starting a STEM Club, or already have one going, we pose some critical questions for you to consider and give you some ideas to make your club as engaging as possible.

What do you want to get out of running a club and what do you expect the students to gain from doing it?
Think of your outcomes and how they fit with the department and school development plan.

Who are you going to get involved in the STEM Club?
The first part is which students to invite; will it be open to all, or a particular year group? Whoever it is, make sure it's not just for gifted and talented students, as all students can benefit from a hands-on approach. Are you going to lead it or will there be a team? Have you got teachers and technicians behind the club to give advice? Make sure someone has responsibility for health and safety. Think about how you can involve senior leaders, governors and older students (who can often be mentors that you can train to help out in club sessions).

When and where is it going to be?
The club could be at lunchtime or after school. Will it need to be in a lab? What other activities take place in that room, around your club? Try and find a time and space that fits in and does not cause too much disruption to normal lessons.

What are you going to do in the club?
It may be worth planning out a short, medium and long-term curriculum of activities and finding projects, themes and topics which are linked. You could also consider the progression of activities and skills throughout the year so students build upon what they've learnt. Think about linking with the 'normal' curriculum but don't make your STEM Club too rigid. There are lots of great resources out there, from a host of different places to make your club as interesting as possible. Why not learn how to survive a zombie apocalypse or how to make your own batteries? The opportunities to engage students are endless.

Lastly what can you do to add long-term interest?
Well, beyond the activities and projects, there's lots you can do to add to your club. These could include trips out to museums, creating a wildlife garden, involving STEM groups (a local amateur astronomy group for instance), inviting STEM Ambassadors to talk about their work and STEM fairs, competitions and awards like RSPB wildlife action and CREST awards.

INSPIRE YOUR STUDENTS 〉

Find out more about careers with our useful STEM careers toolkit:
- **www.stem.org.uk/rx57e8**

Discover more about STEM Clubs with these useful guides:
- **www.stem.org.uk/rxvg5**

Attend our Technicians enriching STEM education CPD:
- **www.stem.org.uk/ny615**

Enhance science for all your students with responding to pupil needs in science:
- **www.stem.org.uk/rp220**

- **We've collated a great list of resources to help you along the way; remember you're not on your own!: www.stem.org.uk/ms/start-a-stem-club**

How will the A level changes affect you?

MATHEMATICS

by STEVE LYON Mathematics Specialist, National STEM Learning Centre and Network
@SteveJLyon

There have been a lot of changes to the mathematics curriculum and whilst these changes have been broadly welcomed, I have some concerns.

The first teaching of the new AS and A level mathematics curriculum will take place from September 2017; delayed so students can first complete the new mathematics GCSE. In addition to a change in content, the new mathematics A level requires students to use and apply standard techniques to reason, interpret and communicate mathematically. Building upon the principles of the new GCSE, students will also need to solve problems within mathematics and other contexts.

The structure of the new A level specifications is very different from what has gone before. All students will study a fixed syllabus of pure mathematics, statistics and mechanics all examined at the end of the course. Decision maths is no longer part of the new mathematics A level. Students are expected to be familiar with one or more large data sets as a context for learning statistics and are expected to use technology throughout their study.

The 'new kid on the block' in Level 3 Mathematics is the Core Maths qualification. It is aimed at students who have achieved a grade C in GCSE mathematics but who don't intend to study mathematics at A level. There has been a positive response, from both students and teachers, in schools and colleges that have embraced this new examination.

My main worry with all these changes is that the number of students studying A level mathematics, and particularly further maths, may fall. This could be because students who now choose options, which include statistics and/or decision maths, may be put off studying the new A level if they have to study mechanics.

Schools may also be reluctant to, or may not be in a position to, offer A level mathematics, Further Maths and Core Maths in addition to an increase in students re-sitting GCSE mathematics. Students who do not achieve grade C for GCSE mathematics are required to retake. With the new changes, it is unclear if a 'good pass' will be a grade 4 or 5. A threshold of a grade 5 will lead to an increase in the number of students required to retake mathematics. To meet this challenge we need more mathematics teachers to enable schools and colleges to offer a range of mathematics options post-16.

JOIN US ON OUR NEW AND ASPIRING LEADERS OF MATHEMATICS CPD
■ **www.stem.org.uk/my200**

VISIT OUR HANDY A LEVEL MATHEMATICS PAGE
■ **www.stem.org.uk/ms/a-level-mathematics**

JOIN THE CONVERSATION ONLINE IN OUR COMMUNITY GROUP
■ **www.stem.org.uk/ms/mathematics-group**

COMPUTING

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

It sometimes feels as if the only constant in computing education is change. ICT is under attack as an academic subject, and the drift away from ICT qualifications continues. Computer science is on the rise; in the year leading up to 2015, GCSE entries rose a whopping 111% and 17% at A level. ICT A level entries also rose during the same period, but this trend is likely to reverse sharply given the decision not to reform the ICT GCSE.

Meanwhile, a debate has developed during the DfE review of the new subject content for AS and A level computer science, bringing to light some crucial questions: is the mathematics content rigorous enough? Should students learn software development methodologies so vital in the modern technology workplace? Does the specification reflect the modern world of computing?

Staying relevant has always been a challenge for school and university curricula alike. It is anticipated the changes to A level will help higher education institutions to better appreciate that the content and demand of the subject in school. Maybe Russell Group universities – leading UK universities in research, teaching, learning and links with business – will begin to ask for the A level as an alternative to their previous expectations of a good mathematics pass for computing; something which has undermined efforts to raise the subject's profile in schools.

In response to the demands of professional bodies, universities and many teachers, there is more programming content at AS and A level. This includes procedural and object-oriented paradigms, and an introduction to functional programming. To toughen up the theoretical content there is more emphasis on algorithms and, at A level, an expectation of mathematical understanding of algorithmic complexity. Much of the mathematics content has transferred over from optional modules in further maths A level. The onus is placed on computer science teachers to teach this in context, although the mathematics specified is a complex mixture of pure and applied topics, some of which will be outside the abilities of even experienced computer science teachers.

Instead of outright software development, post-16 computer science students are expected to analyse problems in computational terms, then gain practical experience to design, write and test programmes that solve these problems. This is demonstrated through the 20% of the A level that comprises of non-examined assessment. It is a continuation of the main thrust of the secondary national curriculum, and offers a refreshingly joined-up approach to cohesive curriculum design. However, there is, so far, insufficient evidence of rigorous problem solving – actual problem solving – lower down the school; computational thinking remains, for many teachers, an idea rather than a way of working.

COME TO OUR NEW AND ASPIRING HEADS OF COMPUTING CPD
■ **www.stem.org.uk/cy200**

GET INVOLVED IN OUR ONLINE COMPUTING COMMUNITY GROUP
■ **www.stem.org.uk/ms/computing-group**

Risk assessment: not just for the 'elf and safety brigade'

by MARK LANGLEY 〉 Professional Development Leader, National STEM Learning Centre and Network
@mark_sailor

Good risk assessment is not about appeasing the 'elf and safety brigade' (imaginary do-gooders beloved by tabloid newspapers) but is a professional part of planning, teaching and learning.

Teachers have a responsibility to deliver effective, safe learning experiences and a sound thought process should consider health and safety. An over-emphasis on filling in paperwork, rather than the thought process, goes on far too often.

In schools, the wide variety of practical work, with a broad range of students and abilities, means that very tight methodology used in industry is not appropriate. Frequently, schools rely on large form-filling exercises, or use poor quality (or outdated) advice that is included in some published materials; or receive advice from people who do not understand effective health and safety in school science.

Good risk assessments support good practical science. Teachers should be considering what safety information they need to communicate to technicians, students and others (such as teaching assistants). They also need to record 'significant findings' – which is a long-standing requirement that is often ignored, giving no record of what was planned and done. Point of use documents, such as teacher planners, requisitions sheets, student worksheets and even PowerPoint presentations can have information that forms part of the risk assessment process.

Model risk assessments are often a good starting point, but it should be remembered that although the same nominal practical might be done across a whole year group, how it is done with a high ability class, compared to one with many SEN students, will require modifications to the risk assessment – and this must be recorded!

All schools in England, Wales and Northern Ireland should be members of CLEAPSS (the equivalent organisation for Scotland is SSERC). Without this membership, effective safe science would be exceptionally challenging work; sometimes when schools have converted to academies, their CLEAPSS membership, formally held through the local authority, has been lost.

CLEAPSS produced two very useful documents: PS90 and L196 – the latter, 'Managing Risk Assessment in Science', is an important read, not just for heads of department, but also teachers and technicians. It includes excellent exemplars of good practice and how the process of thinking effectively about science practical work can be embedded within the culture of a department.

- Find out more about CLEAPSS: **www.cleapss.org.uk**
- Get inspired about practical work: **www.stem.org.uk/ms/practical-work**

FEEL CONFIDENT IN THE CLASSROOM WITH OUR CPD 〉

Health and safety
- **www.stem.org.uk/ny253**

Strengthening practical work in biology
- **www.stem.org.uk/rp200**

Strengthening practical work in chemistry
- **www.stem.org.uk/rp202**

Strengthening practical work in physics
- **www.stem.org.uk/rp201**

- **We also have a great selection of CPD for technicians on page 26.**

Top tips for teaching out of your specialism

Teaching your own subject specialism can be a challenge sometimes. When you are asked to teach other subjects in science, it can be exceptionally difficult. Here are some ideas that might help you out:

by MARK LANGLEY 〉 Professional Development Leader, National STEM Learning Centre and Network
@mark_sailor

1. Ensure that you elicit what the students know already, as well as what they might be confused about. Don't assume they don't know about it!
2. Make sure you try out practical activities before the students do – never blindly order equipment and hope that everything works!
3. When planning practicals, make sure you have clear outcomes for the activity. Might it be better to concentrate on collecting data and graphing whilst having the equipment set up, for example?
4. Risk-assess practical science properly – use CLEAPSS resources to help, modify model risk assessments where appropriate and record the outcomes.
5. Looking at your scheme of work, does it plan for progression in practical science? If not, then you might need to teach the skills (such as setting up an electrical circuit, or using a microscope) in addition to the particular experiment (measuring resistance or watching plasmolysis).
6. Try and develop some background to the science you are teaching; anecdotes, real life examples and links to other subjects help make it more engaging for students. Developing this pedagogical content knowledge is a key step for those teaching out of specialism.
7. Get the mathematics right! Have ways of developing and practising the mathematical content with students and avoid using triangles for rearranging. Have a chat with your mathematics department, especially for physics topics.
8. If you use a word equation, try and also use a basic symbol equation, to help students embed the links between 'substance' and 'atom' and not just in chemistry.
9. Be very clear in your language, not misusing weight and mass, or concentration and strength, for example.
10. Increase your own subject knowledge and understanding. We run CPD to support those teaching out of specialism. Chemistry for non-specialists, and the physics equivalent, have helped hundreds of teachers to develop their own abilities – as well as tackling some of their own misconceptions.

GAIN CONFIDENCE OUT OF SPECIALISM 〉

Come to our specially designed CPD:

Biology for non specialists
- www.stem.org.uk/rp854

Chemistry for non-specialists
- www.stem.org.uk/ny243

Physics for non-specialists
- www.stem.org.uk/rp208

Use our selection of 10,000 free resources to plan your next lesson:
- www.stem.org.uk/ms/resources

Preparing for the new approach in GCSE Food Preparation and Nutrition

The investigation begins

by BARBARA MONKS BEd MEd
@cookeryteacher
Food education consultant and trainer, Senior Associate of the Food Teachers Centre

This term, design and technology food specialists will be teaching the new Food Preparation and Nutrition GCSE for the first time. As part of this new qualification, students will be assessed on their ability to understand the properties of ingredients – introducing task 1: the food investigation. This non-examined assessment will take 8–10 hours and will introduce students to an exciting approach to food, requiring them to think differently and show evidence of new skills. Here's some guidance to help you through these new changes.

1. GET PREPARED

Sample assessment materials will be provided by awarding organisations and these will indicate the demands of the final assessment. Ensure you are fully equipped by accessing as many sample assessment materials as possible to ensure there are no surprises when the final assessment takes place.

2. GIVE DIRECTION

Task 1 - this assessment carries 15% of the total examination marks and draws from scientific methodology which will be a new experience for many students (and possibly for you!). The pathway needs them to understand the task; carry out research; form a hypothesis; plan practical food investigations; and finally analyse and evaluate by writing a report. We want our students to feel confident – so be sure to give direction for the students to follow.

3. FOCUS YOUR STUDENTS' RESEARCH

There will be a specific focus that will direct the students' research. As the investigation is time-restricted you must guide students to research many specific elements, including information about an ingredient (or range of ingredients), their chemical make-up, types and varieties.

They will also need to understand the ingredients' functional properties in food preparation. Your students' research should inform and explain the role of the ingredient and give them the knowledge to build an experiment to test that function.

4. INCLUDE A HYPOTHESIS

A key skill for students will be the formulation of a prediction or hypothesis. You'll show them how to take key terms and facts they've researched to formulate a hypothesis or raise a prediction. So, for example, if potatoes, barley and arrowroot are found to contain starch, and starches thicken liquids, then these ingredients should thicken stock. The resulting food investigation must test the hypothesis.

5. KNOW HOW TO WRITE A REPORT

The investigation needs to be recorded in a report of no more than 2,000 words. Students will need your support on what to include and guidance on using photographs, notes, measurements and other collected data. The report should enable students to draw conclusions from their investigations and relate directly to their hypothesis for the given task.

LOOKING FOR THE NEXT STEP?

We've pulled together a list of the new design and technology GCSE specifications
- www.stem.org.uk/ms/dt-specs

GCSE food preparation and nutrition: teaching food science
- www.stem.org.uk/ty205

Preparing to teach the new design and technology GCSEs
- www.stem.org.uk/ty223

Technicians supporting the new Design and Technology GCSE
- www.stem.org.uk/ny621

Is your mathematics scheme of work fit for purpose?

In response to national curriculum changes and new examination specifications, secondary mathematics departments will be in the process of implementing new schemes of work. As Year 11 students begin their final year of GCSE study, now is a good time to take stock.

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

YOUR SCHEME OF WORK SHOULD BE A FLUID, LIVING DOCUMENT

Ofsted's 2012 'Made to Measure' report states "schemes of work were rarely adapted to the particular circumstances of the school and its pupils". Your scheme of work should match the changing requirements of your mathematics department from year to year, and the requirements of your individual cohorts. 'Off the shelf' schemes can provide a good starting point, but need to be reviewed and tailored to fit the needs of your school.

CREATE CONSISTENCY ACROSS THE DEPARTMENT WITH YOUR SCHEME OF WORK

New or inexperienced teachers benefit from a well-structured, detailed scheme of work, reducing inconsistency between classrooms. Ofsted highlight a key weakness in mathematics departments caused by a "lack of agreement among teachers in the same school or guidance in the schemes of work about the preferred ways of tackling particular topics, or the depth of treatment expected for different groups". Involving your department when building and reviewing a scheme of work provides a focal point for sharing and developing best practice, and promotes clarity when introducing and connecting mathematical concepts. One reason behind the success of the Shanghai mastery approach is that collaborative planning is at its heart; the more agreed, proven good practice a scheme of work contains, the stronger it will be.

DEVELOPMENT OF YOUR SCHEME OF WORK IS AN OPPORTUNITY FOR COLLABORATION

New design and technology, computing and science GCSE specifications include an increase in the examinable mathematics content. Mathematics advisor Dr Alison Borthwick recently argued: "we need to bring mathematics to life and give it purpose. Science is the perfect vehicle to do this". There has never been a better opportunity to work with other departments to create consistency and clarity across key subjects and to embed engaging, contextualised mathematics into your scheme of work.

With new GCSE examinations at the end of this academic year, ensure the contents of your mathematics scheme of work offer the best support to your mathematics team and include engaging, quality content that your students require in order to succeed.

CURRICULUM PLANNING

Use our handy lists on curriculum planning in mathematics
- www.stem.org.uk/lx63cp
- www.stem.org.uk/ms/secondary-mathematics-resource

DISCOVER MORE ON OUR GREAT MATHEMATICS CPD

Resourcing the new secondary mathematics curriculum
- www.stem.org.uk/my202

Using resources to develop problem solving skills in secondary mathematics
- www.stem.org.uk/my203

Playing the intervention game

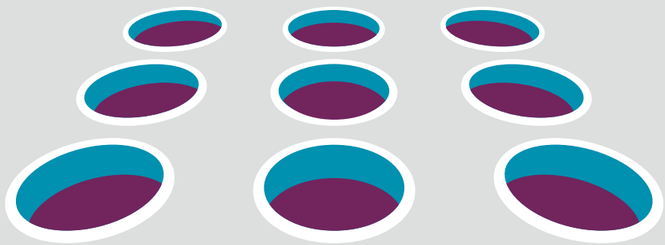
by KAREN HORNBY
Science Specialist, National STEM Learning Centre and Network

Sometimes intervention can feel like a game of 'whack-a-mole', where toy moles appear at random and players use a mallet to knock them back into their holes. The data is collected for a year group, you analyse it and intervention is put in place for students who are not on target. Then a month later, the process is repeated, and you put intervention in place for some different students.

As a subject leader thinking about your departmental plan and performance management, there are longer term strategies which can help move your team away from firefighting interventions and towards better progress for all students. Assessment for learning, differentiation, planning for progress, effective practical work… none of this is news to you I'm sure!

But when you are discussing performance management objectives with members of your team, the difficulty is often not in identifying where the areas of weakness are, but in supporting a member of staff in knowing where to start or where to look for ideas. A new suite of guides from the Triple Science Support Programme can help here. Each guide looks at one key area of practice, with an overview of current research and a range of evidence-based strategies to try out, together with a full package of supporting resources and relevant professional development.

Although the guides can be used individually, they are a far more powerful tool if they are used collaboratively as a basis for discussion, using paired observation and coaching:



1. Choose a particular section to focus on. Audit what current practice is like in this area; you might want to involve another colleague to observe your questioning practice for example.
2. Once you have analysed your current practice, try out one of the ideas in the guide and evaluate its impact on student learning, including asking the students what they think about the intervention.
3. Then either try another technique to further develop the same skill or area of practice, or look at a different section of the guide to both deepen and extend your repertoire.

The collection includes:

- Assessment for learning
- Planning for progression
- Differentiation
- Improving literacy and numeracy skills
- Progression in practical skills
- Working with teaching assistants
- Teaching for linear assessment

Explore this collection online:
■ www.stem.org.uk/triplescience/intervention

Take the next step with our Triple science page:
■ www.stem.org.uk/ms/triple-science

Going for silver, gold or platinum

by ADAM LITTLE
@SecretPhysicist
Professional Development Leader, National STEM Learning Centre and Network

Science departments up and down the UK are doing amazing work. We've set up the Science Mark award to recognise this – could your department be next?

There are three levels of award: Silver, Gold and Platinum. The first step on your Science Mark journey is a self-assessment using gateway statements we provide on our website. These statements will help you identify which award level your science department is most in line with and steer you to which award to submit for. Once you've chosen your award, our in-house specialists provide advice and guidance to give you all the information you need to work on your application.

Once you are confident with the process, it is time to work on your action plan. The action plan contains three areas for review: curriculum, leadership and management, and learning and teaching. These are subdivided into 16 categories, each of which needs to be assessed. You need to focus on what your department currently does, what the impact is and the evidence of that impact.

You are supported throughout the entire process by our dedicated, trained assessors. We ask you to submit three interim statements – one from each of the three areas of review – so our assessors can advise you on how to better your application. Typically we ask that you pick one topic you think you've nailed, another that is okay and a final topic that requires further work. The award isn't just about demonstrating excellence, you need to show that you can identify areas for development and how you will action them.

"I enjoyed the satisfaction of completing a piece of work that I was proud of and discovering that we have achieved more than I had been aware of before going through the process." – Mandy Quinton, physics teacher at St Clement Danes School, Platinum award school.

Our assessors review the interim statements and provide feedback and guidance to give you the opportunity to rewrite your application for the highest chance of success. You then submit your final application for assessment and await your result. Remember we want you to achieve your award, so if you need to make some small changes to meet the criteria, we do give you that chance.

Then it's time to celebrate your award (hopefully!). You receive a certificate and two glass trophies to display in your school – and you get invited to a celebration event that gives you the chance to network with other Science Mark awardees.

We're here to help you achieve recognition for excellence in your science department, so get involved and become a leading school in science education.

ARE YOU IN THE RUNNING?

Start your Science Mark journey today:
■ **www.stem.org.uk/ms/science-mark**

Give your science department a boost with our Towards outstanding CPD:
■ **www.stem.org.uk/rp215**

Performance management: making it work for you

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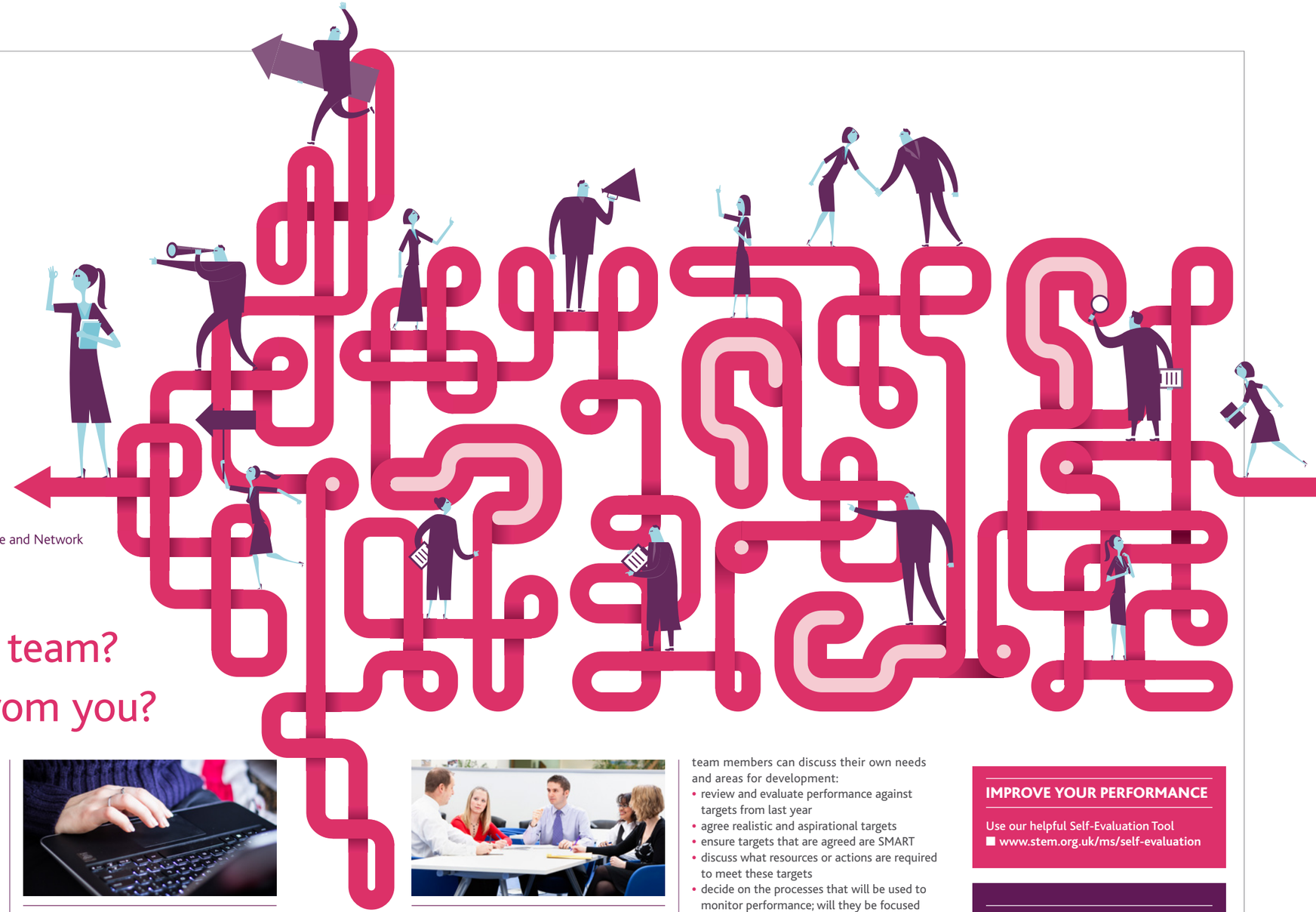
Professional Development Leader, National STEM Learning Centre and Network



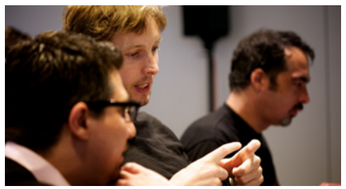
What do you want from your team? What does your team want from you?

As a head of department returning to school in the autumn term, your thoughts soon turn to reviewing and setting targets for yourself and your team, and the outcomes for students. But how can you use the performance management cycle to get the best from it?

Raising the profile of performance management has clear benefits:

- the team are clear about the departmental priorities
- individual performance is improved
- it can build confidence for inexperienced teachers
- student outcomes improve

Good performance management is a blend of support and accountability. Viewing the process as a conversation, not an interview, and keeping career progression in mind will benefit the team in terms of motivation as well as results. Equally, individual and departmental targets will need to be closely linked to the school development plan and the priorities within it. It sounds like a tall order to link all of this together, but here are some steps you can take to make the process a success.



1. USE EVIDENCE

You have a lot of evidence at hand to help you understand your department's current state of play; use this to identify strengths and areas for development:

- analyse examination results from GCSE and A level cohorts
- consider evidence from people who have observed you and your team's work
- look at evidence from teaching and learning observations, and feedback from students
- carry out needs analysis for the department and individual team members
- figure out how it links to the school development plan

2. USE OUR SELF-EVALUATION TOOL

In science, for example, our Self-Evaluation Tool can help you to translate these strengths and areas for development into an action plan.

If your analysis has identified a specific area for development, such as behaviour management or differentiation, ask yourself the question: "is it just one member of staff or several?"

You could identify members of your team who are particularly proficient and use them to coach others. You could select CPD activities for the department or individual members of staff, making sure they match their stage of career.

3. INCLUDE YOUR MANAGER

Hold a meeting with your line manager to discuss your plans for your team. It can be useful to get someone else's opinion on how to link departmental performance management to your school development plan.

4. MEET STAFF INDIVIDUALLY

Organise individual meetings making sure you emphasise their value so that they are not just viewed as a box-ticking exercise. When meeting with individuals, listen and question but ensure it is a conversation where your team members can discuss their own needs and areas for development:

- review and evaluate performance against targets from last year
- agree realistic and aspirational targets
- ensure targets that are agreed are SMART
- discuss what resources or actions are required to meet these targets
- decide on the processes that will be used to monitor performance; will they be focused observations, book looks or student outcomes?
- produce written documents to record the outcomes of the meetings

5. MAKE TIME WORK FOR YOU

Build dates into the calendar for progress reviews and give these meetings the importance they deserve.

Good performance management is critical for all successful departments to enable individuals to fulfil their potential and to ensure that their performance is the best it can be to optimise student outcomes.

IMPROVE YOUR PERFORMANCE

Use our helpful Self-Evaluation Tool
■ www.stem.org.uk/ms/self-evaluation

TAKE YOUR LEADERSHIP SKILLS TO THE NEXT LEVEL

New and aspiring heads of computing
■ www.stem.org.uk/cy200

New and aspiring leaders of mathematics
■ www.stem.org.uk/my200

New and aspiring heads of science
■ www.stem.org.uk/ny200

Leading an effective design and technology department
■ www.stem.org.uk/ty232

What can a STEM Ambassador do for you?

A STEM Ambassador can open your students' minds to the excitement of science, technology, engineering and mathematics and the life changing opportunities that a career in the STEM industries can bring. STEM Ambassadors are enthusiastic and knowledgeable role models, who can help support you and your students across STEM subjects. Even better, their support is completely free.

By broadening your students' learning in STEM , you can inspire them to consider new avenues and set new goals for themselves. Exposure to STEM Ambassadors has been proven to positively impact problem solving abilities, communication and social skills as well as teamwork, resilience and confidence.

STEM Ambassadors can help build the skills needed in the world of work, as well as demonstrating the range of opportunities that open up through studying science, technology, engineering and mathematics. STEM Ambassadors can work with you in many ways. Here's what teachers, pupils and employers who have worked with STEM Ambassadors have to say.

BRINGING FIRST-HAND EXPERIENCE OF CAREERS IN STEM:

"The pupils get to see the STEM Ambassador's flight path… hearing a real person's experiences, it's much more powerful."

CREATING INNOVATIVE STEM PROJECTS:

"The excitement they add to the project… it gives more credibility to what you are doing"

DELIVERING PRACTICAL DEMONSTRATIONS AND EXPERIMENTS:

"You can see STEM in action. You don't have to visualise it, you can actually make it and see how it's done."
"No matter what I've been looking for there has been someone to fit the bill."

STEM AMBASSADORS
ILLUMINATING FUTURES

From architects to zoologists; engineers to set designers; and farmers to nuclear physicists – STEM Ambassadors are a source of inspiration for your students.

Find a STEM Ambassador to inspire your students today:
www.stem.org.uk/stem-ambassadors

CALENDAR

Our top picks for you to put in the calendar…

NOVEMBER 2016

ROLLS-ROYCE SCIENCE PRIZE
NOVEMBER

The Rolls-Royce Science Prize helps teachers to implement science teaching ideas in their schools and colleges. Open to all schools and colleges in the UK, you can apply for the 2016/17 award.

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

EDITOR'S TOP PICK CHOICE

PRINCIPIA SCHOOLS' CONFERENCES
2 AND 5 NOVEMBER 2016

Students have the opportunity to present their work to leading space experts and, if his schedule allows, Tim Peake himself.

■ Find out more at: www.principia.org.uk/schools-conference

DECEMBER 2016

WORLD AIDS DAY
1 DECEMBER 2016

What is your school doing to raise awareness about AIDS? Use our resources for help.

■ Visit today: www.stem.org.uk/aids-aware

CHRISTMAS JUMPER DAY
16 DECEMBER 2016

The build up to this celebration can be a great opportunity to get your students excited and engaged with science.

■ Visit today: www.stem.org.uk/cx5ss

JANUARY 2016

ASE ANNUAL CONFERENCE 2017
4-7 JANUARY 2017

What better way to start 2017 than by discovering new teaching ideas and resources that you can use in your lessons? 2017 sees the University of Reading act as host.

■ Visit today: www.ase.org.uk/conferences/annual-conference/

BETT SHOW 2017
25-28 JANUARY 2017

Visit the EXCEL in London for your annual opportunity to experiment with the latest technology, hear from inspirational figures and network.

■ Visit today: www.bettshow.com

SOCIAL MEDIA

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

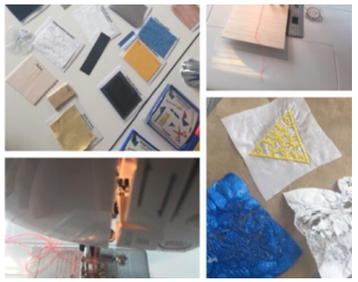
@STEMLearningUK
Followers: 20K

@ProfBeckyParker Thanks so much @mysci_ph @STEMLearningUK #STEMConf16 Really excellent conference and so much to develop as a result. Onwards and upwards!

@FergusonMr1 @miss_padfield @STEMLearningUK I am 2/3 of the way through their New and Aspiring HoD course and it is the best CPD I have ever done

@sciencejo A privilege to see the National STEM Learning Centre and to experience the Centre's commitment to sharing best practice with teachers.

@SecretPhysicist Here. At @RAL_Space_STFC with @STEMLearningUK and @space_tom doing activities!! #lovespace



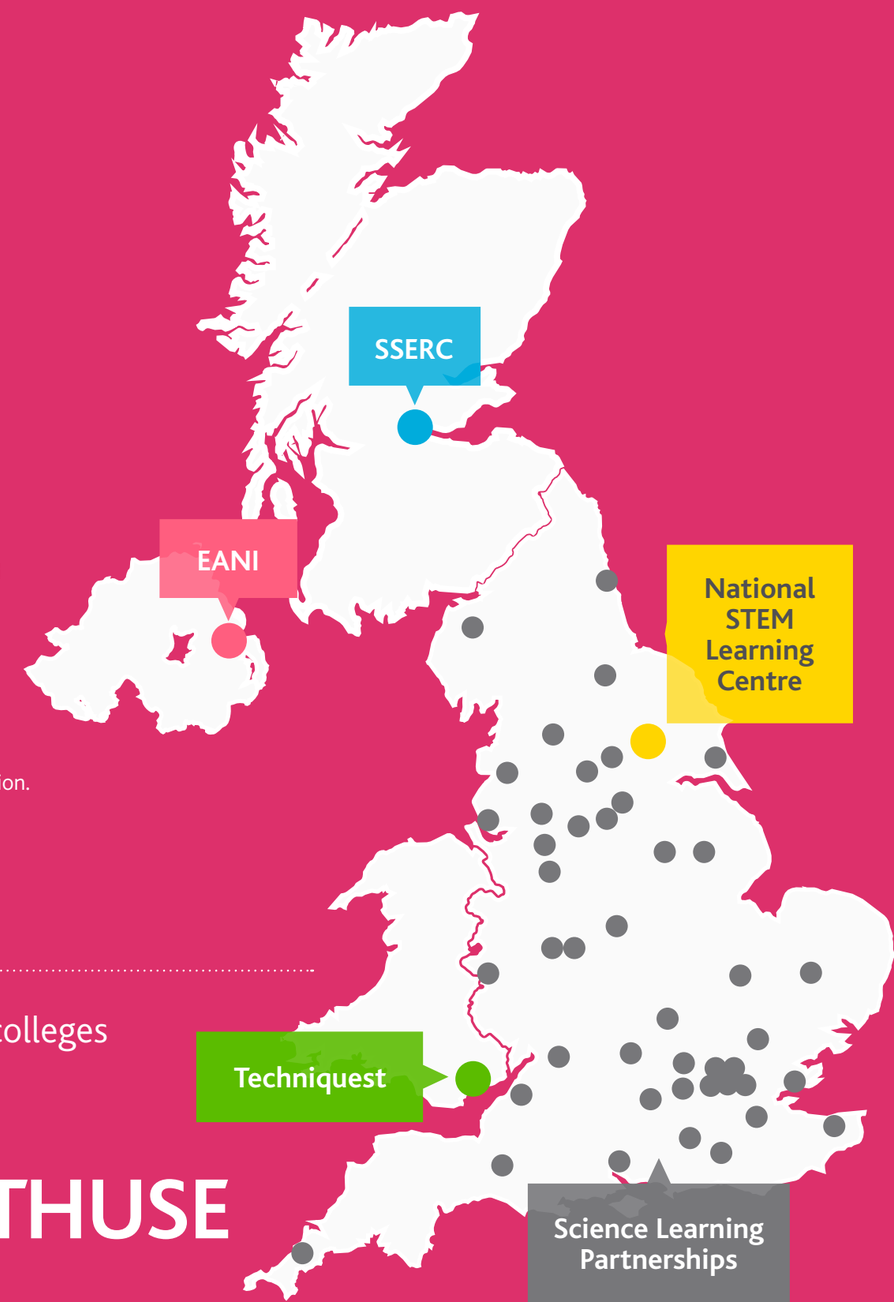
@MrsWaldram Feeling more positive towards new D&T GCSE's at @STEMLearningUK thanks to @julieboydonline & @QBoyd #productdesign

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

High quality professional development that has impact

You can access our CPD nationally, locally and online. Our ENTHUSE Award bursary funded residential courses are run at the National STEM Learning Centre in York and our network of school-based Science Learning Partnerships (SLPs) provide support locally across England. SLPs combine local expertise and knowledge with national standard provision to provide you with a range of courses and support to suit needs. Nationally and locally we can also tailor our CPD to meet the individual needs of your department, school or network through our bespoke provision.

To find your local SLP go to www.stem.org.uk/science-learning-partnerships



Bursary support for all state funded schools and colleges

ENTHUSE Awards

ENTHUSE Awards contribute towards the costs of attending world-class professional development provided by the National STEM Learning Centre.

ENTHUSE Awards are provided by Project ENTHUSE which is a unique partnership of government, charities and employers that have come together to bring about inspired STEM teaching through the professional development of teachers, technicians and support staff across the UK.

www.stem.org.uk/project-enthuse

ENTHUSE AWARD

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

SUPPORTING NEW ENTRANTS TO THE PROFESSION

SUPPORTING SECONDARY TEACHERS

SUPPORTING SUBJECT LEADERS

SUPPORTING POST-16 TEACHERS

SUPPORTING TECHNICIANS TO IMPACT THE QUALITY OF TEACHING

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

COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

NEW AND ASPIRING HEADS OF COMPUTING

Explore subject leadership and see the positive impact it can have on your computing teaching.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 18 Jan 2017 (4 days)

■ www.stem.org.uk/cy200

USING IPADS AND OTHER TABLET DEVICES IN THE CLASSROOM

Learn how teaching with iPads and other tablet devices in your classroom can improve student engagement and motivation. Activities include collecting and analysing data and pupil collaboration.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600
- 2 Feb 2017 (2 days)

■ www.stem.org.uk/ty700

TEACHING NETWORKS AND THE INTERNET FOR GCSE COMPUTER SCIENCE

Preparing you for your computing lessons, develop subject knowledge and learn practical 'unplugged' activities for engaging lessons.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 12 Jan 2017 (1 day)

■ www.stem.org.uk/cy207

TEACHING NETWORKS, THE INTERNET AND CYBER-SECURITY FOR A LEVEL COMPUTER SCIENCE

From protocols that make networks tick, to security measures that keep them safe, come away with lots of ideas to take back into your classroom.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 13 Jan 2017 (1 day)

■ www.stem.org.uk/cy208

TEACHING OBJECT ORIENTED PROGRAMMING (OOP) FOR A LEVEL COMPUTER SCIENCE

Cover the concepts and philosophy behind the development of object oriented software computer programs.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 16 Feb 2017 (1 day)

■ www.stem.org.uk/cy210

TEACHING PROCESSORS AND COMPUTATION FOR A LEVEL COMPUTER SCIENCE

Boost your subject knowledge and develop your confidence in areas such as Turing's foundations of computing through to modern computer processors.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 1 Feb 2017 (1 day)

■ www.stem.org.uk/cy209

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

- Design and technology CPD, 2016 participant

"The centre and facilities are fantastic and I will be recommending that all teachers visit."

- 2015 participant

"My work can be quite insular, it's great to be able to network with other design and technology teachers."

- Design and technology teacher, 2015 participant

DESIGN AND TECHNOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

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

Improve your subject knowledge and develop teaching strategies for teaching the mathematics content in the new design and technology AS and A levels.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 23 Jan 2017 (2 days)

■ www.stem.org.uk/ty222

DEVELOPING MATHEMATICS SKILLS FOR THE NEW DESIGN AND TECHNOLOGY GCSE

Develop your subject knowledge and develop teaching strategies for teaching the mathematics content in the new design and technology GCSE.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 30 Jan 2017 (2 days)

■ www.stem.org.uk/ty225

LEADING AN EFFECTIVE DESIGN AND TECHNOLOGY DEPARTMENT

Explore subject leadership and see the positive impact it can have on your computing teaching.
- Your school receives: £700 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 18 Jan 2017 (4 days)

■ www.stem.org.uk/ty232

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

Enhance your own mathematics and science subject knowledge and develop teaching strategies for teaching the new engineering GCSE.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 9 Jan 2017 (2 days)

■ www.stem.org.uk/ty224

USING IPADS AND OTHER TABLET DEVICES IN THE CLASSROOM

Learn how teaching with iPads and other tablet devices in your classroom can improve student engagement and motivation.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 2 Feb 2017 (2 days)

■ www.stem.org.uk/ty700

USING THE BBC MICRO:BIT IN DESIGN AND TECHNOLOGY

Discover practical activites to support your learning of the device functions and develop your awareness of the free teaching resources available.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 13 Mar 2017 (1 day)

■ www.stem.org.uk/ty231

"The course has definitely given me confidence to teach for understanding and engagement. It has also given me a deeper understanding of why it is so important to teach in this way, which motivates me to incorporate elements of the course into my practice. I'd go so far as to say I have a different and more positive perspective how I will teach in the future, as a result of this course."

- A level mathematics CPD, 2015 participant

"Usually you come away feeling short-changed from CPD but this is packed and you have loads of ideas to go away and do."

- New and aspiring leaders of mathematics, 2016 participant

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

NEW AND ASPIRING LEADERS OF MATHEMATICS

Inspirational support for new and aspiring leaders of mathematics, helping you to develop the skills required for outstanding learning and leading your department.
- Your school receives: £2,100 ENTHUSE Award
- Activity fee: £1,800 (ex VAT)
- 18 Jan 2017 (6 days)

■ www.stem.org.uk/my200

TEACHING ASSISTANTS IN SECONDARY MATHEMATICS: WAYS OF WORKING THAT MAKE A DIFFERENCE

Essential for any teaching assistant who supports secondary mathematics, develop your knowledge and improve your role in supporting the learning of students.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,000 (ex VAT)
- 26 Jan 2017 (4 days)

■ www.stem.org.uk/my212

TEACHING SECONDARY MATHEMATICS WITH CONFIDENCE AND SUCCESS AS A NON-SPECIALIST

Perfect for teachers of mathematics who aren't specialists, increase your skills and knowledge of the subject and become more confident in your subject field.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 16 Mar 2017 (4 days)

■ www.stem.org.uk/my213

USING IPADS AND OTHER TABLET DEVICES IN THE CLASSROOM

Learn how teaching with iPads and other tablet devices in your classroom can improve student engagement and motivation. Activities include collecting and analysing data and pupil collaboration.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600
- 2 Feb 2017 (2 days)

■ www.stem.org.uk/ty700

RESOURCING THE NEW SECONDARY MATHEMATICS CURRICULUM

Explore resources designed to support improved teaching of the new curriculum with hands-on activities.
- Activity fee: £50 (ex VAT)
- 10 Feb 2017 (1 day)

■ www.stem.org.uk/my202

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)
- 17 Feb 2017 (1 day)

■ www.stem.org.uk/my203

USING MANIPULATIVES TO ENHANCE UNDERSTANDING IN KS3 MATHEMATICS

Manipulatives including counters, interlocking cubes, Cuisenaire rods, tiles, multi-base blocks have long been used to aid understanding in secondary mathematics.
- Activity fee: £50 (ex VAT)
- 6 Mar 2017 (1 day)

■ www.stem.org.uk/my20

"I've got some good ideas as to how to use some of the manipulatives in different ways and I feel that I can share these ideas with the rest of my department."

- Using 'manipulatives' to enhance understanding in the KS3 mathematics, 2016 participant

SCIENCE

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

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)
- 5 Apr 2017 (2 days)

■ www.stem.org.uk/ny211

SUCCESS WITH GCSE SCIENCE PRACTICALS

Explore teaching and learning in science from a practical perspective.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,000 (ex VAT)
- 3 Apr 2017 (4 days)

■ www.stem.org.uk/ny256

USING IPADS AND OTHER TABLET DEVICES IN THE CLASSROOM

Learn how teaching with iPads and other tablet devices in your classroom can improve student engagement and motivation. Activities include collecting and analysing data and pupil collaboration.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600
- 2 Feb 2017 (2 days)

■ www.stem.org.uk/ty700

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

ENGAGING AND ENSURING PROGRESS OF LOW ATTAINERS IN SCIENCE

Develop strategies to improve the progress made by low attaining students in science. This course supports the development of numeracy and literacy skills in science and the identification of science misconceptions.
- Various dates and venues online

■ www.stem.org.uk/rp229

ENHANCING LITERACY SKILLS IN SCIENCE

Be able to respond 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

INTRO TO THE NEW SCIENCE GCSES

An update of new GCSE and KS4 qualifications and become familiar with the next generation of GCSE science courses.
- Various dates and venues online

■ www.stem.org.uk/rp230

MATHEMATICS IN SCIENCE TEACHING

Increase confidence in teaching the mathematical aspects of science and the skills and strategies to meet the requirements.
- 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

Science is special! This CPD activity gives teaching assistants the chance to explore this, and plan how they can provide support most effectively.
- Various dates and venues online

■ www.stem.org.uk/rp228

RESEARCH COUNCILS UK

Bringing Cutting Edge STEM into the Classroom

In partnership with Research Councils UK (RCUK); the Bringing Cutting Edge Science into the Classroom, is an innovative programme delivered with researchers.

Designed to deliver the latest cutting edge research, knowledge, new contexts and practical activities to support teachers in delivering the curriculum in an accessible, enjoyable and stimulating way for their students.

■ www.stem.org.uk/ms/rcuk

LEADERSHIP

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

NEW AND ASPIRING HEADS OF SCIENCE

New to the role of head of science or looking for your next challenge? This CPD activity will provide you with strategies and techniques to be successful in your role.
- Your school receives: £3,150 ENTHUSE Award
- Activity fee: £2,700 (ex VAT)
- 18 Jan 2017 (9 days)

■ www.stem.org.uk/ny200

EFFECTIVE PREPARATION FOR EXAMINATIONS

Develop effective strategies for supporting students as they prepare for exams.
- Various dates and venues online

■ www.stem.org.uk/rp211

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

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

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

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

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

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

BIOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

INSPIRING POST-16 BIOLOGY

New practical techniques, uses of ICT and active and context based learning strategies can help students find tricky subjects inspiring.
- Your school receives: £1,500 ENTHUSE Award
- Activity fee: £1,500 (ex VAT)
- 8 Mar 2017 (5 days)

■ www.stem.org.uk/ny501

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

Develop higher level thinking with your 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

Exploring 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

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.

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

"Engaging tutor, well planned activities that can be used in lessons. Taught me / refreshed my memory of a lot of chemical knowledge. It was all incredibly useful. I thought it would focus more of AS but we covered AS and A2. It was just excellent and I feel so much more confident with my chemistry and how to teach it now."

- Getting to grips with A level chemistry, 2016 participant

CHEMISTRY

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

INSPIRING POST-16 CHEMISTRY

Reconnect with the frontiers of chemistry and the teaching of it by engaging in a wide variety of stimulating sessions.
- Your school receives: £1,500 ENTHUSE Award
- Activity fee: £1,250 (ex VAT)
- 1 Feb 2017 (5 days)

■ www.stem.org.uk/ny500

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 your 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

"A very enjoyable day. Also very helpful to network with other A level Chemistry teachers and share ideas."

- A level Chemistry teacher, 2015 participant

MEETING THE DEMANDS OF CHEMISTRY IN THE NEW A LEVEL SPECIFICATIONS

Focus on independent guidance covering the requirements of all the major exam board specifications and explore how specific activities can be used to get across key concepts, use mathematics skills and develop practical skills in chemistry.
- Various dates and venues online

■ www.stem.org.uk/rp514

PREPARING FOR PRACTICAL TEACHING AND ASSESSMENT IN A LEVEL CHEMISTRY

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

93% OF PARTICIPANTS WHO ATTENDED OUR CPD REPORTED A POSITIVE IMPACT ON THEIR PUPILS.

PHYSICS

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

INSPIRING POST-16 PHYSICS

We have worked alongside research scientists, teachers and examiners to practise new activities, approaches and experiments to help in your classroom.
- Your school receives: £1,500 ENTHUSE Award
- Activity fee: £1,500 (ex VAT)
- 20 Mar 2017 (5 days)

■ www.stem.org.uk/ny502

PHYSICS FOR NON-SPECIALISTS

Designed to focus on the key principles needed to teach physics effectively through the use of stimulating practical activities and demonstrations.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 6 Mar 2017 (4 days)

■ www.stem.org.uk/ny201

ACTIVE APPROACHES IN A LEVEL PHYSICS

Working with others, you will refresh your teaching and learning strategies to improve your 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 your subject knowledge, confidence and skills 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, there will be ample opportunity to try out electronic technologies such as free modelling software, video analysis tools and apps to inspire and engage your students in physics.
- 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

"I have learnt that I can do Physics! And make it interesting! Our uptake of Physics post-16 is already improving, including the number of girls taking the subject. This course will also give me the Physics skills and confidence to start teaching A level Physics from September and writing the new SoW for the new A level and upcoming GCSE curriculum. I would like more CPD."

- Physics for non-specialists, 2016 participant

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.ukms/triplescience**

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**

TECHNICIANS

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)
- 16 Jan 2017 (10 days)

■ 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)
- 15 Mar 2017 (7 days)

■ www.stem.org.uk/ny601

TECHNICIANS ENRICHING STEM EDUCATION

Our programme is packed full of exciting cross curricular educational projects which will enhance STEM education in your school.
- Your school receives: £1,800 ENTHUSE Award
- Activity fee: £1,800 (ex VAT)
- 29 Mar 2017 (5 days)

■ www.stem.org.uk/ny615

TECHNICIANS SUPPORTING A LEVEL CHEMISTRY

Explore practicals for A level chemistry and learn about sourcing and setting up equipment, scientific backgrounds to practicals and health and safety.
- Your school receives: £400 ENTHUSE Award
- Activity fee: £500 (ex VAT)
- 27 Apr 2017 (2 days)

■ www.stem.org.uk/ny618

TECHNICIANS SUPPORTING CHEMISTRY: 11-16

Examine and 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)
- 11 Jan 2017 (3 days)

■ www.stem.org.uk/ny605

TECHNICIANS SUPPORTING PHYSICS: 11-16

Examine and explore electricity, electronics, sound, light, radioactivity, forces, heat transfer, space, astronomy and electromagnets.
- Your school receives: £900 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 13 Feb 2017 (3 days)

■ www.stem.org.uk/ny606

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, 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 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, 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

Get to grips with one or all three of these free online cpd activities. we are offering high quality, online professional development delivered by world-leading experts.

DIFFERENTIATING FOR LEARNING

- 16 Jan 2017

■ www.stem.org.uk/online-cpd

ASSESSMENT FOR LEARNING

- 27 Feb 2017

■ www.stem.org.uk/online-cpd

BEHAVIOUR FOR LEARNING

- 24 Apr 2017

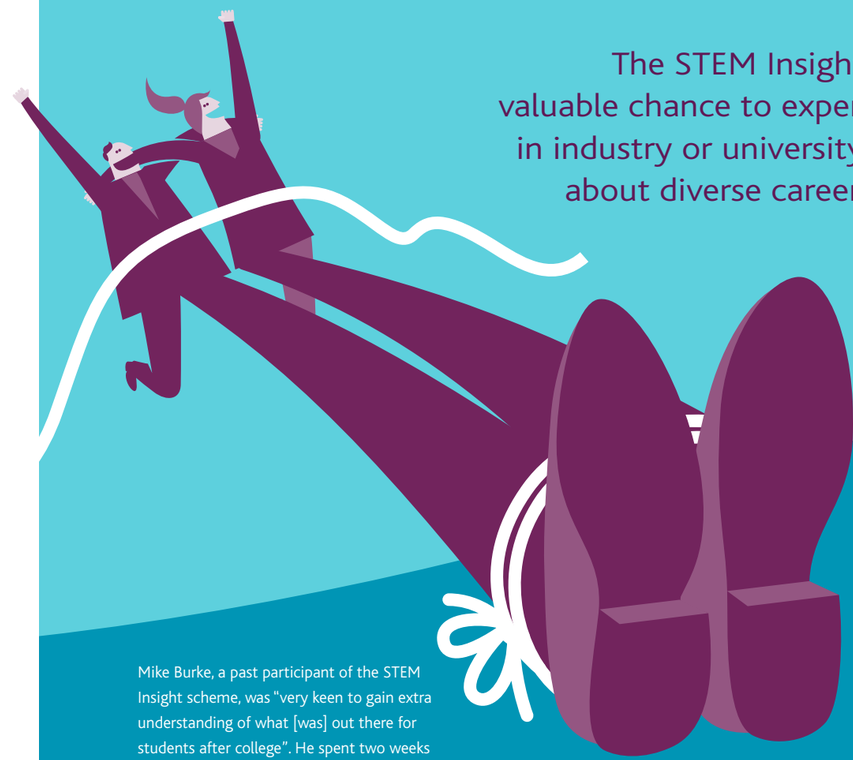
■ www.stem.org.uk/online-cpd

"The course, although entitled Technicians Supporting Practical Work in the Classroom had a particular focus on technicians supporting A level biology, chemistry and physics and provided an in depth insight into the new A level courses, which was excellent and was one reason why I wanted to attend this particular course at this venue."

- Technicians supporting practical work in the classroom, 2015 participant

Immerse yourself in the world of industry and university

The STEM Insight programme offers you a valuable chance to experience STEM-related work in industry or university settings, and learn more about diverse career paths and opportunities.



Mike Burke, a past participant of the STEM Insight scheme, was "very keen to gain extra understanding of what [was] out there for students after college". He spent two weeks with BP and found that "the range of careers available at BP is really quite extraordinary. I met people who worked in shipping, geology, ecology, refining, lubricant design, sub-sea hardware, site management, trading, professional training, IT – the list was endless". Not only did he learn about what was available, he discovered more about the job market: "working at a place like BP is highly competitive and attracts the best of the best. Not everyone can work for a company such as this, but the weeks did teach me more in general about jobs that apply science, as engineering does". But careers isn't the only benefit of this scheme; Mike had "many case studies, anecdotes and some photos (industrial secrecy) to relay to students" to make his lessons more engaging with links to the real world.

INSIGHT INTO INDUSTRY

During a placement, develop your knowledge of STEM careers and routes for your students to progress into STEM-related employment. Work with world-leading employers across a range of STEM industries including engineering, medical, manufacturing, computing and many more.

INSIGHT INTO UNIVERSITY

Spend time in a leading UK university and learn about the latest cutting edge research in your field. Support your students as they apply and make the transition from school to university.

Supported by a tailored package of face-to-face and online CPD that is bursary supported, you can:

- enrich your teaching of the STEM curriculum by linking to careers
- help your students make better informed choices about their futures
- make long-term links with employers and universities
- receive the opportunity to build a network of industry and university experts who can share knowledge across schools and colleges
- respond to the nationwide drive to improve careers education.

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

This is made possible by the generous support of our partners in Project ENTHUSE: 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, Institution of Structural Engineers, IBM and the Royal Society of Chemistry.

What are you looking for?

PROFESSIONAL DEVELOPMENT

We offer high-impact professional development across the UK, and online, based on the latest developments in both pedagogy and STEM subjects. We can also tailor professional development to your school's specific needs with our bespoke CPD.

CAREERS EDUCATION

As well as a host of excellent resources on our website including the Careers Toolkit, we also run the STEM Insight programme to give you a unique experience in industry or university through inspiring placements.

INSPIRATION

We've got a host of ways to help you inspire your students: why not bring a STEM Ambassador into your school to talk about STEM subjects and careers, or start a STEM Club to build confidence and teamwork skills?

STEM LEARNING

National STEM Learning Centre and Network

COMMUNITY

Share your ideas and challenges with teachers and technicians through our online groups and at our networking events. And join us on Twitter - we have over 20,000 like-minded educators following us.

RECOGNITION

Our recognition schemes and awards allow you, your department and school to showcase the impact you have on your students and colleagues.

RESOURCES

We have over 38,000 quality, STEM teaching resources, available online or at our centre. You can also browse teacher-made resources and submit your own.

STEM Learning operates the National STEM Learning Centre and Network, alongside other projects supporting STEM education

www.stem.org.uk

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