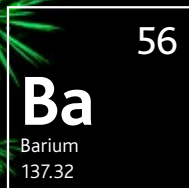
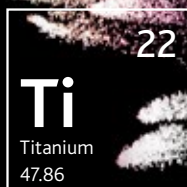
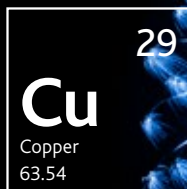


Secondary and FE (stem LEARNING



The science behind fireworks

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Welcome

As the new Editor in Chief of the STEM Learning magazine, I'd like to welcome you to this autumn 2017 issue.

We've been working on a new suite of free online CPD for 2018 which looks at the science of learning. We couldn't think of anyone better to help us with this than Paul Howard Jones, Professor of Neuroscience and Education at the University of Bristol, and expert on the TV series The Secret Life of Four Year olds.

It has been an incredibly powerful experience having teachers and researchers come together to explore effective learning while developing this CPD. We all know that it can sometimes feel like wading through treacle when trying to select the right activity, resource or pedagogical approach from the wealth of material available. It is very empowering being able to make informed choices about what you do in the classroom, knowing that they are backed up by research.

If you've ever wondered about the science behind why a particular strategy you've used has more impact on your students' learning than another, then I'd invite you to join us on this CPD when we launch it next year. We'll unlock the secrets of your students' brains and show you how to maximise the learning for everyone in your classroom.

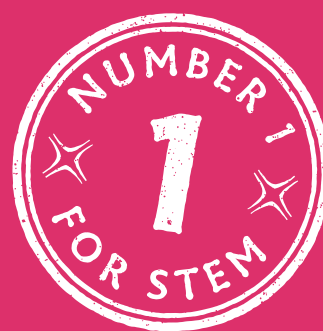
I find it fascinating what you can learn from working with young people, and how that feeds into the support we offer teachers, technicians and others working in schools and colleges. This issue of our magazine is packed with tried-and-tested ideas that will support your subject knowledge, leadership and practical skills at every stage of your career. So, start the new term feeling informed, refreshed and secure in the knowledge that what you choose to do will make a positive impact and a difference to your students.



I hope you enjoy this first magazine of the new academic year.

Fran.

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



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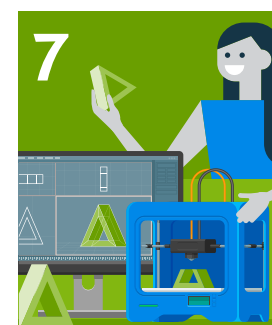
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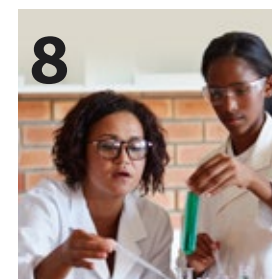
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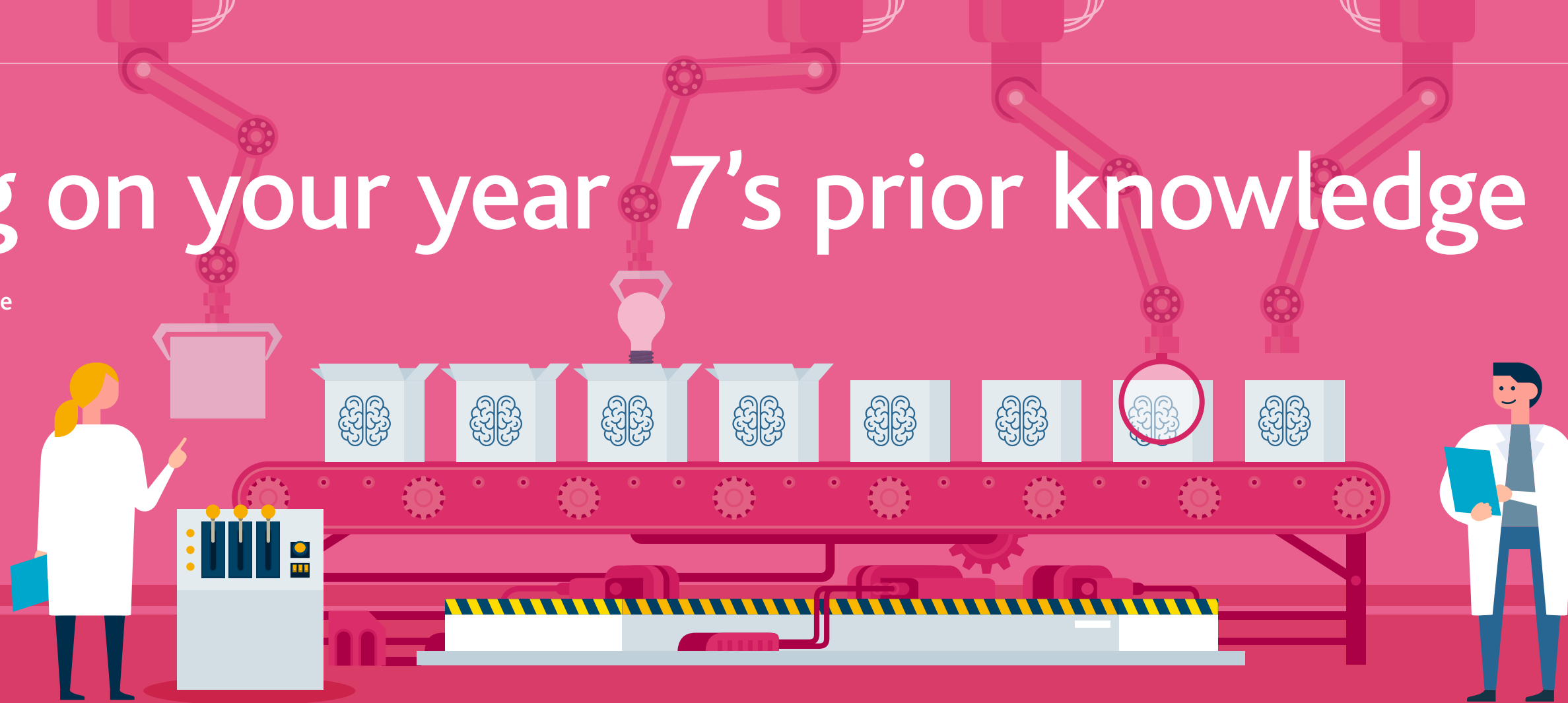
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Building on your year 7's prior knowledge

Have you noticed the difference in your year 7 computing and mathematics students? We've spoken to teachers about the changes to key stage 2, what year 7 teachers should expect, and what all this might mean for your practice.



MATHEMATICS

by **MICHAEL ANDERSON** Mathematics Subject Specialist, STEM Learning
@STEMLearning_MA

The primary landscape has changed a lot in recent years. In mathematics, probability is no longer part of the primary curriculum. Key stage 3 content such as area, volume and linear sequences have now moved into key stage 2. Focus has shifted to problem-solving approaches, whilst the term 'mastery' is found everywhere.

Alison Hogben, a year 6 teacher and specialist leader of mathematics, told us: "Schools that have embraced the mastery approach have focused on greater depth of understanding for pupils and this is particularly important in light of the raised expectations for key stage 2, particularly in topics such as fractions and algebra. All pupils spend time exploring concepts using manipulatives and different representations. They investigate models and images, such as the use of the bar model, before moving on to more formal methods of calculation.

"Learning involves strategies rather than answers, and children are taught through the use of deliberate mistakes and common misconceptions. There is an increase in reasoning


and problem-solving tasks for the application of knowledge and to challenge those with a greater level of understanding. In addition, work on growth mindset is developing more positive attitudes, resilience and a love of learning, which should prepare pupils for the next step in their mathematical journey."


So how can secondary school teachers build on the recent developments in primary mathematics education? We spoke to Rebecca Holmes, Learning Leader of Mathematics key stage 3 at Boston Spa School in Leeds, to see what changes she has made:

"Year 7 students are now joining us with a much deeper understanding of mathematical concepts. We have restructured our scheme of work in order to keep challenging and progressing, particularly the most able pupils. We have done this by ensuring more open-ended tasks and multi-step problems are being delivered to each and every class and students are assessed using sample questions intended for the new GCSE exams.

"The students themselves have much greater confidence in approaching these types of questions as they seem to be less self-conscious of their own abilities. We have seen pupils who struggle to retain their times table knowledge are still able to support themselves with problem-solving activities, using a variety of strategies which have clearly been embedded throughout their mathematical education. In Year 7 we have included topics that these students haven't yet seen in primary school, however, we are able to do this at a much quicker pace than previously due to their understanding and resilience being at a higher level."

SUCCESSFULLY MAKE THE TRANSITION

 Mastering mathematics at key stage 3
■ www.stem.org.uk/my218

 Secondary mathematics resources
■ www.stem.org.uk/ms/secondary-maths

COMPUTING

by **DAVE GIBBS** Computing Subject Specialist, STEM Learning
@adgibbs

The old ICT curriculum tended to develop well-practised skills with a select range of tools; presentations and desktop-published posters spring to mind. In primary, ICT no longer exists. It has been replaced by a computing curriculum that aims to ensure children can analyse problems, write computer programs, understand and apply abstraction, logic, algorithms and data representation as well as be responsible, competent, confident and creative users of information and communication technology. Three years into the new curriculum your newest students have experienced vastly different primary school computing. They bring an increasingly varied toolkit of skills and knowledge to secondary school, somewhat dependent on the confidence and skill of their primary teacher.

Scratch is the de facto graphical programming tool, and some level of ability can be expected of your new arrivals. Some may even have touched on Python programming but for most this will be a new, and potentially terrifying, step. Whatever the tool, assessment of programming ability is

likely to be shaky in primary schools – just as in many secondary schools.

Online safeguarding is usually given a high profile in primary schools, and parents are often given direct guidance too. Parental involvement doesn't have to fall away after the transition to secondary school. In fact there's every reason to maintain the momentum from primary school, and not shut down and restart learning.


In terms of algorithmic thinking, your youngest students are likely to have programmed floor-roving robots and have some 'unplugged' understanding of algorithms as sequences or rules. Projects such as CAS Barefoot have provided accessible learning resources to teachers, and form a basis for next steps. The vocabulary of computing is well embedded too, built on the firm literacy foundations found in primary schools.

The majority of secondary computing teachers, having transitioned themselves from non-specialist backgrounds, may sympathise with

those primary colleagues struggling to embed computer science. Only occasional evidence exists of algorithms being developed to write programs that solve problems. Primary teacher knowledge of cybersecurity, networks and the internet and other specialist topics will take time to develop, and data-intensive projects remain a challenge to many. Have you seen a difference in students coming up from primary school? How are you going to build on your year 7's prior knowledge?

As primary computing continues to improve it is vital that secondary curriculum planning takes this into account to avoid young people switching off. Collaboration, or at least communication, with primary school leads is the best way to ensure a joined up experience with real progression at all stages.

USE OUR COMPUTING RESOURCES FOR A SMOOTH TRANSITION

 Secondary computing resources
■ www.stem.org.uk/ms/sec-comp-resources

The science behind fireworks

by **MARK LANGLEY** Professional Development Leader, STEM Learning
@mark_sailor

There is a misconception that the theme of fireworks is too dangerous to bring into the classroom. However, there are lots of demonstrations you can perform in the classroom which link to fireworks and make learning fun for students. Here are some demonstrations you can safely use in your science lessons.



THE FLAMETHROWER

Show your students how to create different coloured fireworks by mixing simple solutions of metal salts in a spray bottle. Spray the solutions over a lit Bunsen burner to create brightly coloured flames. For example a mix of 50/50 water and ethanol with the metal salt will create a green flare, a mix with lithium nitrate will give a vibrant red, and potassium will produce a lovely purple.

SPARKLERS

Demonstrate the science behind sparklers by putting a small amount of iron filings onto a spatula and letting them gently roll into the flame of a Bunsen burner. The iron filings will create an impressive shower of sparks – just like a sparkler.




COMBUSTION ROCKETS

This is an exciting and explosive one, guaranteed to wake your students up! Get a half-litre carbonated drinks bottle and fill it with a stoichiometric mix of oxygen and methane and cover the opening with cling film to stop the gases from escaping. Place the bottle horizontally on a stand with safety screens on either side. Ignite the cling film, which will cause the gases to expand, creating thrust propelling the plastic bottle forward. The perfect demonstration of how a firework rocket works.

Before doing this demonstration, see CLEAPSS Supplementary Risk Assessment 12 to ensure maximum safety.

There are a whole host of demonstrations you can use to link the curriculum to fireworks; the key is having the confidence to go ahead and do them. Practise them first, make sure you've carried out a full risk assessment (check out CLEAPSS for all the information you need) and then go have some fun with it! Your students will definitely enjoy these demonstrations and we hope they'll remember the science that goes with them.

TAKE A LOOK AT SOME OF OUR SPARKLING SUPPORT

-  Fireworks in the classroom
■ www.stem.org.uk/rxy8x
-  Visit CLEAPSS for health and safety
■ www.cleapps.org.uk
-  Strengthening practical work in chemistry
■ www.stem.org.uk/rp202

Embedding careers into lessons

by **KAREN HORNBY** Science Subject Specialist, STEM Learning



Learning about careers and real-life applications of knowledge is crucial for raising student aspirations towards STEM careers.

No one expects teachers to be career experts, however, you are an expert in your subject area and can inspire your students. You can enthuse them about learning, help them find information about career opportunities and stimulate their aspirations by weaving careers throughout the curriculum, as well as increasing your own job satisfaction.

WHERE TO START?

Enriching the curriculum with careers information needn't be too tricky. It can be as simple as using a career related video as a starter to illustrate a real context for the main content of your lesson. Why not have a look through some of our curriculum linked careers videos and add them into your scheme of work?

3D PRINTING

Mat Beardsley is a precision design engineer at RAL Space. Using the perspective of manufacturing and engineering in the spacecraft industry, this film provides a great context for the use of 3D printing and computer aided design. There are even some handy teachers' notes to help you along the way.



3D PRINTING CAREERS VIDEO
■ www.stem.org.uk/rxazj

GET HELP DEVELOPING STEM CAREERS KNOWLEDGE

-  Careers in STEM CPD
■ www.stem.org.uk/rp226
-  STEM Ambassadors
■ www.stem.org.uk/ms/stem-ambassadors
-  STEM Insight placement
■ www.stem.org.uk/ms/stem-insight
-  STEM careers toolkit
■ www.stem.org.uk/ms/careers-toolkit



FIRE EXTINGUISHERS AND COMBUSTION

Yusuf is developing a revolutionary new household fire-safety device, incorporating the techniques of professional firefighters into everyday kitchen plumbing. His device extinguishes fires fast and aims to save lives. This video comes with a predict-observe-explain activity, which gets students to explore different ways of extinguishing a flame with some surprising results!



FIRE EXTINGUISHERS AND COMBUSTION CAREERS VIDEO
■ www.stem.org.uk/rx354r



FORCES AND MOTION – INSTITUTE OF PHYSICS

Why do we need to learn about this? Well, it comes in very handy if you want an exciting career in the video game industry, and I'm sure you know lots of students who would love a job in gaming! The film showcases how an understanding of forces and motion is required to develop certain video games. It looks at the work of a company, which develops computer models, that ensure objects and people in video games adhere to real world laws of motion.



FORCES AND MOTION CAREERS VIDEO
■ www.stem.org.uk/cx4t7

Getting hands-on: the power of practical science

by **HILARY LEEVERS** Head of Education and Learning, The Wellcome Trust
@Wteducation @hleivers



It's no surprise that the Prime Minister's Brexit negotiation objectives emphasised the importance of making the UK "the best place for science innovation". But we are experiencing workforce shortages in the science-related roles needed for us to be the best, and these shortages are predicted to grow. If the UK is to have the apprentices, technicians, teachers and graduates needed to be globally competitive, it needs an education system that gets, and keeps, young people interested in science.

Science and other STEM subjects are at the heart of how we live: improving our health, how we work and the ways we communicate. To confront the challenges of the future – climate change, overpopulation, epidemics – we rely upon the knowledge and application of science.

if they were taught in a way that gave them a deeper understanding of such work.

Good teaching and experimental work are equally effective in encouraging students to learn science. The two are intimately linked: more confident teachers are likely to include more and richer hands-on experiences. That's one of the reasons why we, the Wellcome Trust, and other partners including the government, have invested nearly £50 million since 2003 in helping science teachers and technicians to develop their skills through STEM Learning.



Finally, the Science Education Tracker demonstrates that students' science experiences continue to be heavily associated with their gender, ethnicity and family and socioeconomic background. We know that subject preferences are established early in life, suggesting that change needs to also start early.

Everyone should be able to appreciate and make well-informed decisions about science in their everyday lives, and, for some, it will form the basis of exciting, rewarding careers.

But some students are not being given the opportunities they deserve to engage with learning about science. The Science Education Tracker, published earlier this year, is a new survey designed to build understanding of the experiences, aspirations and intentions of 14 to 18 year olds in England with respect to science. It shows that providing more high quality practical science in schools and colleges could increase the size and the skills of the UK's scientific workforce.

The survey shows that students frequently identify doing experiments as a factor that encourages them to learn science. Most students said that they want to do more practical science and that the extent to which they enjoy science is the biggest driver in choosing a science-based career.

But the survey also shows that we are not tapping into the full power of practical science. It's absolutely unacceptable that 29% of students said they did practical work less than once a month, and there's a shocking correlation between the frequency of practical work and socioeconomic area. It's also worrying that a fifth of students said that, a lot of the time, they just follow the instructions without understanding the purpose of practical work.

On a more positive note, it is exciting to imagine how interest in science could improve if all students did hands-on practical work at least fortnightly – as half of them currently do – and

"Providing more high quality practical science in schools could increase the size and the skills of the UK's scientific workforce."



We also know that assessment drives teaching. Recent changes to science GCSEs and A levels have seen the removal of teacher assessed practical work from students' grades. We have yet to see how this impacts on teaching and learning, but we, like many organisations with an interest in science education, believe that science qualifications should reflect not just what students know but what they can do. That's why we are working with partners to fund new research to explore better ways of assessing practical science.

To address this need we've developed Explorify, a programme of activities to help primary teachers grow their pupils' curiosity and thinking skills. This complements BBC Learning's Terrific Scientific campaign which provides primary school children with amazing opportunities to take part in genuine national experiments. Hopefully these projects will not just increase the quantity of STEM skills, but also address inequalities and strengthen the workforce through greater diversity.

As the Prime Minister has said, the UK has "a proud history of leading and supporting cutting-edge research and innovation". But if this history is to continue, if science and other STEM disciplines are to remain at the heart of the UK socially and economically, then practical science needs to sit at the heart of science education.

The government should ensure that schools and colleges are encouraged and able to give students high-quality practical science experiences and governors, trustees and Ofsted should monitor this. Based on evidence from the Science Education Tracker, parents and students should feel empowered to ask for practical work, especially if they are getting less than average. And teachers should have the space and skills to teach inspiring and educational experimental work. When it comes to teaching science, we need to get hands-on.

THE WELLCOME TRUST STUDENT TRACKER

Student tracker
■ <http://bit.ly/SciEdTracker>

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

Technical education: which way now?

by **DAVE GIBBS** > STEM Computing and Technology Specialist, STEM Learning

@adjibbs

With the introduction of the new technical awards, we've pulled together what's going to be available across the STEM subject areas to make sure you're prepared.



For students aged between 14 and 16, a new fleet of level 1 and 2 technical awards are now available, designed to be taken alongside GCSE. They are largely practically assessed with an externally examined component which will boost mathematics, English and digital skills.

The technical awards that count towards performance tables are varied and some STEM subjects have more to offer than others. There is also a new standalone qualification for STEM, combining all the flavours.

CHECK OUT OUR SUPPORT FOR COMPUTING >



Teaching computing in FE community group
www.stem.org.uk/ms/fe-comp-group



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



COMPUTING

The digital route includes options in ICT, digital applications, control technology, IT systems and interactive media. There are qualifications too for IT users and for those interested in related fields such as music technology.



MATHEMATICS

Mathematics has no technical award. GCSE mathematics is essentially mandatory so there is little call. At 16 to 19 there is the core maths award, catering for those who have a good pass at GCSE, but haven't opted for A level.



POST-16

The Technical Baccalaureate (TechBacc) is a programme from City and Guilds for those aged 16 to 19 comprising work related study that complements hands-on technical qualifications in digital, engineering, health and care, and several other areas.

By 2022 the post-16 offer will be streamlined into 15 possible routes, from agriculture to transport. The first 'pathfinder' routes will be available for teaching from 2019. The actual number of qualifications to be made available is unknown, but is likely to be more than one per route as subject areas split into broad occupational areas.



SCIENCE

The list of technical awards only includes one purely science-related award (laboratory science) but there are several in related applied disciplines such as agriculture.



TECHNOLOGY

There are lots of engineering options from automotive to manufacturing, systems control and electronics. After the retirement of several GCSEs under the design and technology umbrella, it is anticipated that the level 2 technical awards will be a popular choice with teachers of resistant materials, textiles and graphics.

There is still much detail yet to be released about the technical awards, so keep an eye on our website for further updates relevant to your subject area.

Building bridges between extra-curricular days and lessons

by **DOM SHIBLI** > Founding Member of the Chartered College of Teaching and former Head of Science at The Nobel School

At their best, STEM subjects can be stratospheric, offering students opportunities that can excite and broaden their horizons. For example, last summer we took advantage of the Rio Olympics to run three days of activities across the whole school.

To promote STEM subjects, a colleague came up with the inspiring idea of using BBC micro:bits as pedometers. He designed plastic holders and Velcro straps for the devices and the technology technician produced a prototype. After extensive testing, it was improved and 20 additional holders were made. The teacher then worked with the PE department to come up with a 30-minute lesson, which enabled students to gather data, and then a computer science teacher programmed the micro:bits. Colleagues from four different departments worked together and produced the best drop down day I have experienced in 20 years of teaching.

These collaborations can be hugely creative for teachers. You can find out about the interests and skills of colleagues and give them a chance to shine. In the book, Drive, the surprising truth about what motivates us, Daniel Pink writes that autonomy and mastery are two important elements in increasing motivation. If you are lucky enough to find a colleague who comes up with an idea and then allow them to run with it, there will be lots of benefits.

Imagine a teacher who is intellectually challenged by what they are doing. If this is managed correctly then they are more likely to work hard and use the experience of the drop down day in their everyday teaching. That is something that is going to make you want to come into school or college and also have students looking forward to coming to your lessons.

Offering experiences that are out of the ordinary should be encouraged. Not only do they offer students the opportunity to experience STEM subjects in a way that is out of the ordinary it might also act as a stimulus that takes them into a STEM career. It can also provide teachers with an



opportunity to shine. Producing a one-off session where your creativity can be harnessed is extremely motivating and, if it works well, can give you the confidence to incorporate these ideas within your lessons. This is where the real benefit lies because it is in the classroom where it matters the most.

EXTRA-CURRICULAR SUPPORT AND CLASSROOM INSPIRATION >



STEM Clubs
www.stem.org.uk/ms/stem-clubs



Robotics in education
www.stem.org.uk/ty249



CERN study visit
www.stem.org.uk/nv200



Making a difference through effective feedback
www.stem.org.uk/rp203

CREST Awards - raising student engagement and enjoyment in lessons

by **NEIL TREVETHAN** Project Manager for Digital Crest, British Science Association



Students who achieve a CREST Silver Award gain better science GCSE results and are more likely to study science at A level. So what are CREST Awards and how can you use them in your classroom to improve engagement and enjoyment in science?

The CREST Awards scheme is the British Science Association's (BSA) flagship programme for young people. The scheme provides science enrichment activities that inspire and engage 5 to 19 year olds. It is the only nationally recognised accreditation scheme for project work in STEM subjects.

Students explore STEM subjects through hands-on investigations. They take on the roles of scientists, engineers and designers to complete a project – choosing what they do and how they do it.

How does completing a CREST Award raise engagement and enjoyment?

"The whole experience was amazing – I got a real feel for what working in a science setting is like."
- Rosy Halfyard, CREST Gold Award holder

We think these are some of the reasons why CREST Awards work.

Doing a CREST Award project allows students to become more familiar with the scientific method,

really getting to grips (sometimes literally) with the nuts and bolts of how their project will work. Students have the time and space to tackle problems at their own pace, with no pressure to finish by a specific time. This can result in a better understanding of both the method and the experiment design. Students may be better able to apply this understanding to practicals in lessons.

What's more, as they don't have to focus on the mechanics of the experiment ("what do I do first?", "what comes next?" etc) they are able to focus on the content of the practical.

Giving students the opportunity to delve into something they're genuinely interested in is a wonderful way to enthuse them and potentially change their perception of STEM subjects and careers. The breadth of content coverage for CREST Awards projects over the past 30 years is astounding. Ranging from why it's important to wash your hands with soap after going to the loo, to discovering more about our solar system. In short, there's a CREST Award for everyone,

with Gold Award students often contributing something new to an area of study.

Silver and Gold Award projects are assessed externally by people who have expertise relating to the project. This gives students positive, constructive feedback from someone other than their friends, parents or teachers, taking their first steps to joining a wider STEM community.

We think that the above results in students gaining a greater appreciation not only for their area of interest, but for STEM subjects as a whole.

TAKE ON THE CREST AWARDS

CREST Awards website
■ www.crestawards.org

CREST Awards resources
■ www.stem.org.uk/cx5dd

Inspiring the next generation with STEM Clubs

by **FARAH KHAN** Science teacher and STEAM Club leader, Ashcroft Technology Academy



Winning the Most Dedicated STEM Club 2016 award at the STEM Inspiration Awards at the House of Lords last November was a really special milestone for Ashcroft Technology Academy's STEAM Club.

I watched proudly as my students presented their work to the guests at the awards event – particularly when they so articulately discussed their work with VIP guests, such as Minister for Education Justine Greening MP, whom expressed how impressed they were by my students and by our STEAM Club work.

The moment came for the winners to be announced and we stood with baited breath. When the award winner was declared it actually took us a good few seconds to register that we had won!

Our prize was an exclusive trip to the CERN Laboratories in Switzerland for five students and two staff members. How would I choose which five students to take from a cohort of 85 deserving students? This was indeed a dilemma. Dr Andrew Taylor came to the rescue by offering a special winner's prize of an exclusive trip to Science and Technology Facilities Council Rutherford Appleton Laboratories for the entire STEAM Club cohort.

"I am so grateful for this opportunity and the moments on this trip were so unique and special that I will always remember them. I can't believe how much I have learnt in only two days!" – Year 8 student.

In Switzerland, we learned all about the history of CERN, participated in the gas cloud chamber workshop, visited the amphitheatre where the Higgs Boson was announced, experienced a health and safety drill in a mock up of the LHC tunnel, dined with particle physicists and experts from CERN, and ended our trip with the grand finale of visiting the enormous CMS – a "wow" moment for certain!

At the STFC Rutherford Appleton Laboratories our STEAM Club enjoyed a day of particle physics, thermal engineering, wind turbines, space exploration, and the Chris Frost interactive science show. This trip felt like a celebration event and it was such a privilege to be able to take our entire STEAM Club along as well.

The impact of winning the Most Dedicated STEM Club 2016 award has been felt right across our school. Students, their parents and staff all now view our STEAM Club as a key feature of our school. It is only a starting point and I hope for our STEAM Club to continue to pioneer the way forward for other STEM Clubs in schools and colleges across the UK.

GET RECOGNITION AND SUPPORT

Get recognition for your work - STEM Educators
■ www.stem.org.uk/ms/recognition

Inspire your students with a STEM Club
■ www.stem.org.uk/ms/stem-clubs

Find out how a STEM Ambassador can support your STEM Club
■ www.stem.org.uk/ms/stem-ambassadors

STEM clubs in space
■ www.stem.org.uk/ny627

STEM clubs in the wild
■ www.stem.org.uk/ny628

Technicians: promoting what you do

by **SIMON QUINNELL** National Technicians Lead, STEM Learning
@quinnell75

Research shows how effective practical work can lead to greater understanding in students (which, if you're not working in a practical subject, can be difficult to comprehend). With the practical requirements both at A level and GCSE, there are practical endorsements and design projects that all students have to do which would be impossible without the required technicians. All schools and colleges have to ensure this and write a statement to this effect.



WHAT STEPS CAN YOU TAKE TO PROMOTE YOUR ROLE IN YOUR SCHOOL OR COLLEGE?

- 1** ENCOURAGE PRACTICALS IN YOUR DEPARTMENT

If you see a new idea or piece of equipment, show it to your team and get them using it.
- 2** TECHNICIANS' TERMS OF SERVICE

Create a document that tells teachers exactly what your technicians' service does so they use your skills and knowledge effectively.
- 3** KEEP A RECORD OF THE TEACHERS YOU TRAIN

Make sure you record it all - any work with students and help with extracurricular activities. You never know when you'll need it!
- 4** BE SURE TO TAKE YOUR LAB COAT OFF

When you're outside the lab, look like any other staff member (a lab coat is also known as the coat of invisibility).
- 5** UTILISE DISPLAY BOARDS

Have a technicians' section all about you and what you do (also means the kids will know who you are).
- 6** MAKE SURE YOU DRESS PROFESSIONALLY

Lab coats with school or college names will make you feel part of the wider organisation.
- 7** GET INVOLVED IN OPEN EVENINGS

They are a great way to show your skills off and get noticed.
- 8** JOIN TECHNICIAN NETWORKS

Always good for troubleshooting and getting tips, we recommend our STEM Learning Technicians community group.
- 9** GET PROFESSIONAL RECOGNITION

By becoming professionally accredited, you're showing the value of your role.
- 10** WORK WITH STUDENTS DIRECTLY

Going into the classroom occasionally (if you want to) can be good fun and rewarding, also students get to know who you are.

In the current climate, with schools and colleges facing challenging circumstances around funding, staff costs can be an area that leaders look to for savings. As part of this it can be seen to be easier to reduce support staff, including technicians in science and design and technology. So how can you display the value of what you do to senior leaders?

There are several things you can put in place to make sure that what you contribute is recognised and valued. In a way this can be split into two parts. The first part is making sure that we ourselves know what value we add to students' education. The second is making sure you effectively advertise your role and the known value of what you do.

If you're a technician in design and technology or science, your value lies with the practical requirements of the course you run. Other areas of value are the direct student work you may do (demonstrations, troubleshooting design projects, extracurricular activities such as STEM Clubs).

One obvious area to focus on is your health and safety knowledge, especially when it comes to chemicals (2, 4-dinitrophenylhydrazine anyone!) and band saws etc. You ensure that students and staff are working in a safe environment.

The other point that senior leaders often miss is that technicians end up training PGCE and NQT teachers when it comes to practical work, supporting teachers with trialling practicals and health and safety. If it wasn't for this service our practical subjects would struggle.

SUPPORT FOR TECHNICIANS

- Senior technicians accredited co-leader in science
www.stem.org.uk/ny600
- Science technicians community group
www.stem.org.uk/ms/technicians-group

WIN £150

FOR A CHANCE TO WIN, ENTER OUR TECHNICIANS COMPETITION



Have you created, designed or constructed something that helps you in your role as a technician?

It could be something to help organise the technical service or a piece of equipment that helps preparing practical equipment for lessons. If you have, then we want to hear about it.

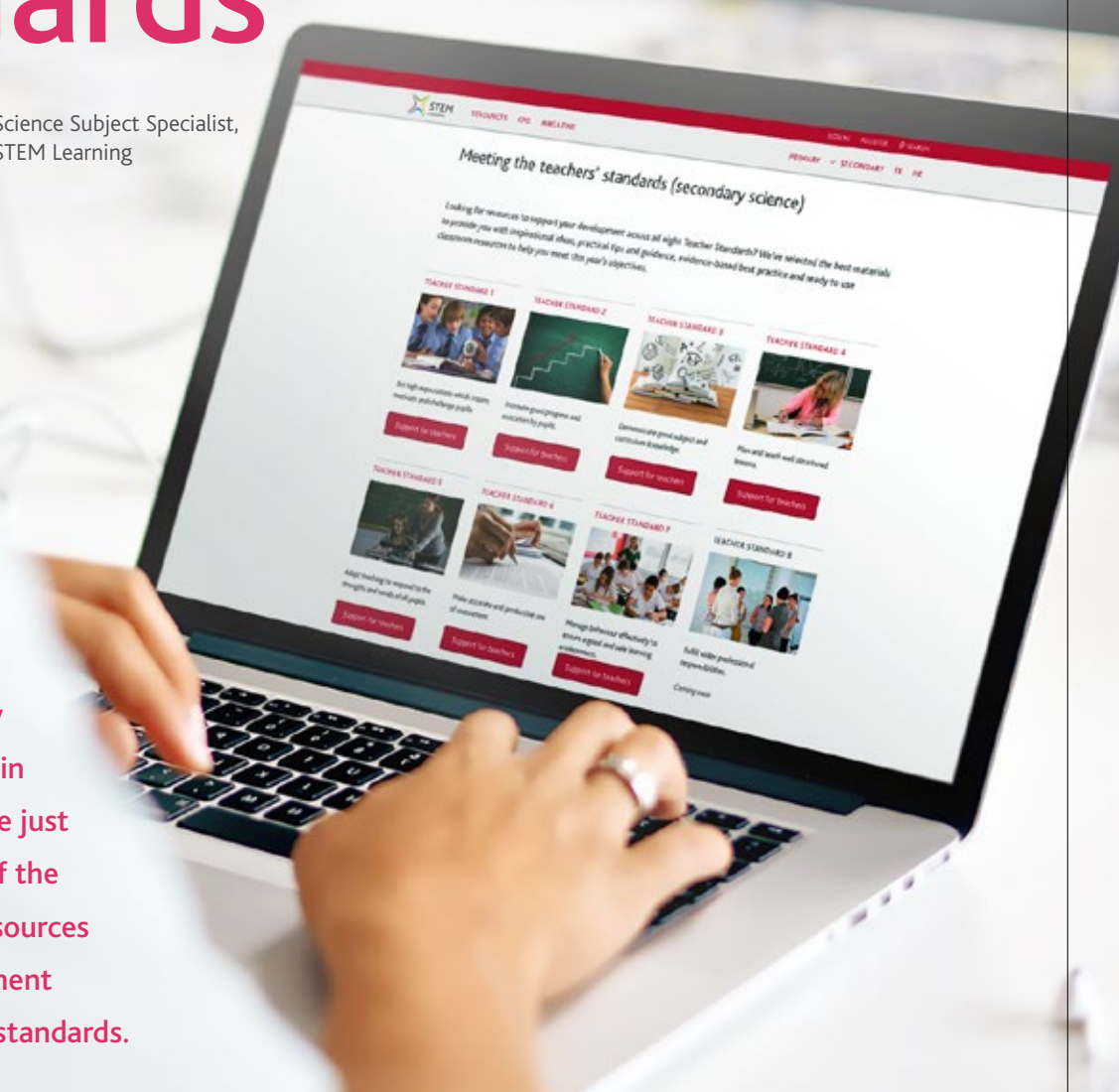
We're running a competition to find the most useful technician tools that technicians have created themselves.

All entries will feature in our STEM Learning resources for all technicians to use and share, and the winning entry will win £150 worth of vouchers.

DEADLINE FOR ENTRIES IS 15 DECEMBER 2017. SUBMIT YOUR ENTRY AT:
www.stem.org.uk/ms/technicians-comp

Meeting the teachers' standards

by **KAREN HORNBY** Science Subject Specialist, STEM Learning



If you are mentoring colleagues next year or you have responsibility for teaching and learning in your department, we have just launched a new section of the website with over 200 resources to support staff development across all eight teachers' standards.

We've selected the best materials to provide inspirational ideas, practical tips and guidance, evidence-based practice and ready to use classroom resources. For trainee teachers there's also a handy checklist to print out and put straight into their evidence folder.

You could have a look at the bank of 600 diagnostic questions, all linked to the misconceptions and research they are based

on. Or print out the ever popular questioning bookmark to help plan effective questions. We look at how to use examiners' reports to inform planning, and if you're setting meaningful targets for students there are 200 high quality, ready to use suggestions.

There are behaviour management videos on how to deal with arrogant lateness, students who say 'no' and managing the difficult class, with


tips on restorative practice, body language and developing a positive environment for learning.

Differentiation strategies, tools for reflecting on the effectiveness of practical lessons, tried and tested techniques for effective group work and metacognitive approaches... there's enough to keep you going all year!

www.stem.org.uk/ms/teachers-standards

Our top picks for your calendar...

EDITOR'S TOP PICK



NATIONAL CODING WEEK
18-24 SEPTEMBER

If your students haven't got the coding bug already, they definitely will after National Coding Week! From Python to Ruby, teach students all about the different programming languages available.


- If you need support, check out our secondary computing page www.stem.org.uk/ms/secondary-computing

WORLD SPACE WEEK
4-10 OCTOBER

Discover a whole world of possibilities with World Space Week. This year's theme is 'Exploring New Worlds in Space', and ESERO-UK has a host of exciting resources to help your Space Week rocket to success.

- www.stem.org.uk/ms/esero





STEM INSPIRATION AWARDS
4 OCTOBER 2017

Discover the incredible work taking place across the UK to enrich young people's experience of STEM subjects as we celebrate this year's winners.

- www.stem.org.uk/recognition

BONFIRE NIGHT
5 NOVEMBER

Why do fireworks make such a loud noise when they explode? Make this year's Bonfire Night one to remember by teaching students all about the science behind fireworks.

- www.stem.org.uk/lxmnt





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

The McVitties @TheMcVitties
Had an amazing two days at @STEMLearningUK, so inspiring! Can't wait to try out all the wonderful ideas.

scdiYESC @scdiYESC
Delighted to see evidence of positive impact @STEMclubs We support >30,000 #YoungEngineers in >1,400 schools across Scotland! #STEMScotland

Amanda Mutch @MrsAMutch
@STEMLearningUK look at what we made completely out of lego!!



Sarah Peake @SarahPeake12
@STEMAmbassadors - It's official!! Very excited I'm fully inducted as a STEM Ambassador #STEM #Skills #UpSkill



Explore our CPD

We are the UK's largest provider of subject-specific CPD for teachers, technicians and support staff. Our CPD has an impact on you, your students and your school or college:

- improved quality of subject teaching
- raised profile of STEM subjects
- greater motivation and engagement in lessons

You can access our CPD nationally, locally and online. See what the year could hold for you www.stem.org.uk/cpd

All fees and award values are valid for state funded schools and colleges are correct at the time of print (August 2017). See www.stem.org.uk for fee paying schools and the latest information.

100% DISCOUNT



We are offering a 100% discount on the activity fee for a range of our spring term National STEM Learning Centre CPD, to help more state-funded schools and colleges benefit:

- find the CPD with a yellow circle in the listing
- when booking online use the code SPRING18SEC
- pay the VAT (which as a state-funded school or college you may be able to claim back)

Some courses also still offer an ENTHUSE bursary. This offer is only available for state-funded schools and colleges and only for the courses marked in the CPD listing. For more details please see the website.

Our ENTHUSE bursary-funded residential courses are run at the National STEM Learning Centre in York.

Teachers or technicians working in state-funded schools or colleges in the UK are eligible for these bursaries which can be used to contribute to covering the cost of course fees, supply cover, travel, accommodation, or equipment.



COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included



A LEVEL COMPUTER SCIENCE PROJECT HACKATHON

Develop your programming skills to provide effective support for students during their non-exam assessment.

- Your school receives: £700 ENTHUSE bursary
- Activity fee: £500 (ex VAT)
- 18 January 2018 (2 days)

■ www.stem.org.uk/cy233



CREATIVE CODING WITH SONIC PI

Bring creativity to your computing classroom by introducing Sonic Pi, an exploratory software that teaches programming through music.

- Your school receives: £700 ENTHUSE bursary
- Activity fee: £500 (ex VAT)
- 7 February 2018 (2 days)

■ www.stem.org.uk/cy249



DATABASES UNLEASHED

Explore designing databases, table relationships and keys, SQL programming, Python and web interfaces. Discuss theory and practice and gain useful classroom approaches to take away.

- Your school receives: £500 ENTHUSE bursary
- Activity fee: £500 (ex VAT)
- 8 March 2018 (2 days)

■ www.stem.org.uk/cy235

GCSE COMPUTER SCIENCE THEORY - TEACHING THE TOUGH TOPICS

Learn strategies to teach theory and help your students achieve their potential in exams.

- Your school receives: £700 ENTHUSE bursary
- Activity fee: £500 (ex VAT)
- 23 January 2018 (2 days)

■ www.stem.org.uk/cy239

PROCESSORS AND COMPUTATION IN A LEVEL COMPUTER SCIENCE

Boost your subject knowledge on this inspiring CPD, which will take you from Turing's foundations of computing through to modern processors.

- Your school receives: £300 ENTHUSE bursary
- Activity fee: £300 (ex VAT)
- 28 February 2018 (1 day)

■ www.stem.org.uk/cy209

PYTHON – PRACTICAL PROGRAMMING TO A LEVEL

Extend your programming understanding and skill and provide teaching ideas and guidance suitable for higher GCSE and A level.

- Your school receives: £1,050 ENTHUSE bursary
- Activity fee: £900 (ex VAT)
- 10 January 2018 (3 days)

■ www.stem.org.uk/cy231

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

- Your school receives: £600 ENTHUSE bursary
- Activity fee: £500 (ex VAT)
- 7 February 2018 (2 days)

■ www.stem.org.uk/ty222

ROBOTICS IN EDUCATION: A CONFERENCE FOR PRIMARY AND SECONDARY SCHOOLS

The Robotics in education conference will provide a full day of hands-on robotic activities for any member of staff involved in primary or secondary education.

- Your school receives: £100 ENTHUSE bursary
- Activity fee: £80 (ex VAT)
- 9 February 2018 (1 day)

■ www.stem.org.uk/ty249

VEX IQ: INTEGRATING ROBOTICS INTO YOUR CURRICULUM

No previous programming experience required. Learn how to use VEX IQ in your STEM-related classes and receive your own free VEX IQ Super Kit.

- Your school receives: £700 ENTHUSE bursary
- Activity fee: £650 (ex VAT)
- 9 March 2018 (2 days)

■ www.stem.org.uk/ty706

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD Accommodation and meals included

ADVANCING YOUR SECONDARY MATHEMATICS TEACHING

Consider recent research in mathematics and explore innovative case studies to improve current and future practice.

- Your school receives: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- 15 January 2018 (4 days)

■ www.stem.org.uk/my211

BUILDING CONFIDENCE AS A NON-SPECIALIST MATHEMATICS TEACHER

Perfect for teachers of mathematics who aren't specialists. Increase your skills and knowledge of the subject and become more confident in your teaching of mathematics.

- Your school receives: £1,400 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- 26 February 2018 (4 days)

■ www.stem.org.uk/my213



HOW TO DELIVER: "EXTENDING THE MOST ABLE AT GCSE MATHEMATICS"

Effective support for those with no experience of teaching mathematics beyond GCSE. We will give you the opportunity to extend your knowledge in a range of topics.

- Your school receives: £600 ENTHUSE bursary
- Activity fee: £600 (ex VAT)
- 19 March 2018 (2 days)

■ www.stem.org.uk/my217

NEW AND ASPIRING LEADERS OF MATHEMATICS

Inspirational CPD for new and aspiring leaders of mathematics, provides the skills required for outstanding learning and leading of a mathematics department.

- Your school receives: £2,100 ENTHUSE bursary
- Activity fee: £1,800 (ex VAT)
- 29 January 2018 (6 days)

■ www.stem.org.uk/my200

TEACHING ASSISTANTS IN SECONDARY MATHEMATICS

Essential for any teaching assistants who support secondary mathematics. Develop your knowledge and improve your role in supporting students' learning.

- Your school receives: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- 22 January 2018 (4 days)

■ www.stem.org.uk/my212

"I gained a lot of ideas for practical steps I can take to incorporate my new knowledge into the classroom."

- Chris Myhill
Bradfield School

SCIENCE

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

CERN STUDY VISIT AND FOLLOW-UP CONFERENCE

A unique opportunity for UK science teachers to visit CERN and have its facilities, functions and operation explained by the scientists and engineers who work there.

- Your school receives: £1,200 ENTHUSE bursary
- Activity fee: £300 (ex VAT)
- 13 February 2018 (5 days)

■ www.stem.org.uk/nv200

IMPROVING STUDENT PROGRESS

Utilise active learning approaches and current research to support your practice and improve student progress.

- Your school receives: £1,500 ENTHUSE bursary
- Activity fee: £1,250 (ex VAT)
- 17 January 2018 (5 days)

■ www.stem.org.uk/ny714

CPD NEAR YOU

Browse dates and venues online

BEHAVIOUR MANAGEMENT IN SCIENCE

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

- Browse dates and venues online

■ www.stem.org.uk/rp222

CAREERS IN STEM

Develop your understanding and support students in signposting career options.

- Browse 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.

- Browse 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.

- Browse 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.

- Browse dates and venues online

■ www.stem.org.uk/rp229

"I found the whole day really useful as the trainer was really engaging and all the participants contributed throughout."

- Past participant 2016

ENHANCING LITERACY SKILLS IN SCIENCE

Respond to the increased literacy demands in examinations and provide students with the skills to be effective, independent learners.

- Browse dates and venues online

■ www.stem.org.uk/rp212

IMPROVING PROGRESS IN SCIENCE

Develop an increased understanding of how to use data and learn a variety of strategies to track and improve students' progress.

- Browse 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.

- Browse dates and venues online

■ www.stem.org.uk/rp224

INTRODUCING THE NEW SCIENCE GCSEs

An update of new GCSE and key stage 4 qualifications.

- Browse dates and venues online

■ www.stem.org.uk/rp230

KEY STAGE 3 SCIENCE FOR NON-SCIENCE SPECIALISTS

A series of four CPD sessions to help non-science specialists teach science confidently.

- Browse dates and venues online

■ www.stem.org.uk/rp297

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.

- Browse dates and venues online

■ www.stem.org.uk/rp203

MATHEMATICS IN SCIENCE TEACHING

Explore the use and failure to use mathematics in science. It looks at typical weaknesses in mathematics that hinder students' ability to understand and solve scientific problems.

- Browse 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.

- Browse dates and venues online

■ www.stem.org.uk/rp220

SCIENCE FOR LOWER ATTAINING STUDENTS: SUPPORTING THE 1-3 AGENDA

Explore ways to support your students who are likely to attain grades 1 to 3 at GCSE science.

- Browse dates and venues online

■ www.stem.org.uk/rp296

TEACHING ASSISTANTS SUPPORTING LEARNING

Understand how science is special and how you can support students in science lessons to maximise their success.

- Browse dates and venues online

■ www.stem.org.uk/rp209

TOWARDS OUTSTANDING

Consider how to embed outstanding practice in all lessons and improve outcomes.

- Browse dates and venues online

■ www.stem.org.uk/rp215

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 bursary
- Activity fee: £2,250 (ex VAT)
- 29 January 2018 (9 days)

■ www.stem.org.uk/ny200

CPD NEAR YOU

Browse dates and venues online

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.

- Browse dates and venues online

■ www.stem.org.uk/rp206

"Lots of really good ideas about how to assess science throughout all lessons and topics."

- Past participant 2016

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.

- Browse dates and venues online

■ www.stem.org.uk/rp209

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.

- Browse dates and venues online

■ www.stem.org.uk/rp219

BIOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

INSPIRING POST-16 BIOLOGY

Develop effective approaches to the introduction of key ideas in post-16 biology and explore advances in technology to enrich your lessons.

- Your school receives: £1,500 ENTHUSE bursary
- Activity fee: £1,250 (ex VAT)
- 19 February 2018 (5 days)

■ www.stem.org.uk/ny501

CPD NEAR YOU

Browse dates and venues online

ACTIVE APPROACHES IN A LEVEL BIOLOGY

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

- Browse 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.

- Browse 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.

- Browse 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.

- Browse dates and venues online

■ www.stem.org.uk/rp510

STRENGTHENING PRACTICAL WORK IN BIOLOGY

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

- Browse dates and venues online

■ www.stem.org.uk/rp200



100% DISCOUNT AVAILABLE

Bring cutting edge science into your classroom



Keep up to date with advancements in science and technology

Bring authentic contexts to your work

Effectively deliver your science content

Engage students with inspiring teaching approaches

Find out more
www.stem.org.uk/ms/rcuk

What will they learn this week?

Offer a richer experience of STEM subjects to your students with a STEM Club

- engage students of all abilities
- develop links with local businesses
- broaden your knowledge of STEM careers
- increase student engagement and attainment in STEM

Free support to set up or develop your STEM Club
www.stem.org.uk/ms/stem-clubs

CHEMISTRY

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

100% DISCOUNT AVAILABLE

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 bursary
- Activity fee: £1,500 (ex VAT)
- 28 February 2018 (4 days)
- www.stem.org.uk/ny500



NEW TO TEACHING A LEVEL CHEMISTRY

Learn how to develop, lead and support outstanding practical chemistry, linking it to effective pedagogy within the subject.

- Your school receives: £1,200 ENTHUSE bursary
- Activity fee: £1,200 (ex VAT)
- TBC TBC 2018 (4 days)
- www.stem.org.uk/ny251

"This course has given me lots of ideas to use in lessons and has increased my confidence in doing practical work at A level."

- Heather Kirby
Emmanuel College

CPD NEAR YOU

Browse dates and venues online

ACTIVE APPROACHES IN A LEVEL CHEMISTRY

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

- Browse 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 exploration of key ideas common to all specifications.

- Browse 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 on the use of electronic technologies.

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



MEETING THE DEMANDS OF CHEMISTRY IN THE NEW A LEVEL SPECIFICATIONS

Explore how to support students with key areas of challenge in A level chemistry and how to develop effective teaching strategies for engaging students with core chemistry concepts.

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

MEETING THE DEMANDS OF CHEMISTRY IN THE NEW GCSE SPECIFICATIONS

Discover resources for practical and theoretical chemistry and explore how to support students with key areas of challenge in GCSE chemistry.

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

PREPARING FOR PRACTICAL TEACHING AND ASSESSMENT IN A LEVEL CHEMISTRY

Preparing teachers to make effective use of practical work in A level chemistry to improve outcomes for students.

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

"I tried out some new experiments that will engage the students and I was given some very useful resources that I can use whilst planning my own practical lessons and modules."

- Hollie Clayton
Northumberland CofE Academy

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.

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

"This course involved a multitude of activities which support and promote inspiring teaching and stimulate student minds."

- Chris Beale
Magna Academy

100%
DISCOUNT
AVAILABLE

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 which will help you inform and alter your classroom practice.

- Your school receives: £1,500 ENTHUSE bursary
- Activity fee: £1,250 (ex VAT)
- 7 March 2018 (5 days)
- www.stem.org.uk/ny502

CPD NEAR YOU

Browse dates and venues online

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.

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

GETTING TO GRIPS WITH A LEVEL PHYSICS

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

- Browse 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.

- Browse 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.

- Browse 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.

- Browse 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.

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

TRIPLE SCIENCE

CPD NEAR YOU

Browse dates and venues online

IDENTIFYING AND INSPIRING YOUR STUDENTS IN TRIPLE SCIENCE

Use data to identify appropriate students for triple science and learn how to motivate and enrich their learning.

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



MANAGING EFFECTIVE PRACTICAL WORK IN TRIPLE SCIENCE

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

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

RAISING ATTAINMENT IN TRIPLE SCIENCE

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

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

TRIPLE SCIENCE: BIOLOGY

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

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



TRIPLE SCIENCE: CHEMISTRY

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

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

TRIPLE SCIENCE NETWORK OF EXCELLENCE

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

- Browse dates and venues online
- www.stem.org.uk/rp793

TRIPLE SCIENCE: PHYSICS

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

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

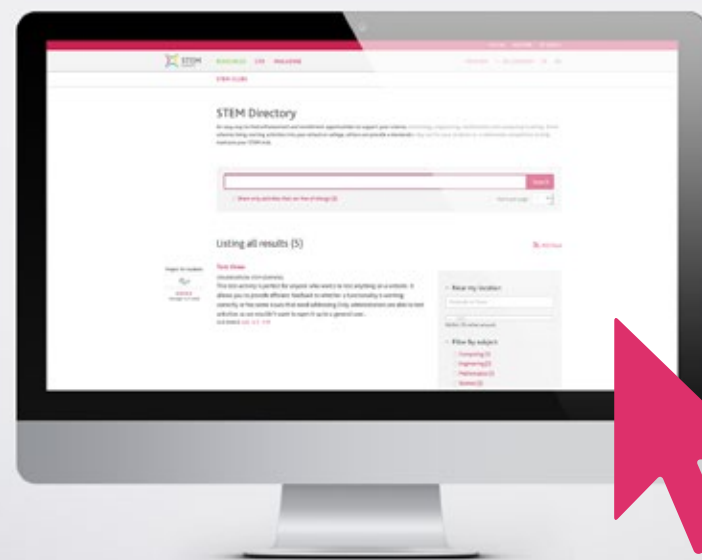


TRIPLE SCIENCE: PREPARING FOR LINEAR ASSESSMENT

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

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

Enhance the teaching of science, engineering and mathematics



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You'll find the usual catalogue of activities in a fantastic new format:

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- easy-to-use rating system

Use it today

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97%

of participants expect the CPD to further impact their future practice

TECHNICIANS

INTENSIVE SUBJECT-SPECIFIC CPD

Accommodation and meals included

PRACTICAL MICROBIOLOGY FOR TECHNICIANS

Explore the basic and more advanced aseptic techniques, investigate health and safety requirements, and trial a range of practicals that students can carry out to build their skills whilst being engaged in microbiology.

- Your school receives: £600 ENTHUSE bursary
- Activity fee: £500 (ex VAT)
- 14 March 2018 (2 days)
- www.stem.org.uk/ny630

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 bursary
- Activity fee: £3,300 (ex VAT)
- 16 January 2018 (10 days)
- www.stem.org.uk/ny600

SKILLS FOR NEW TECHNICIANS

Suitable for those new to the role within a school, this CPD activity provides a thorough grounding in the science technician profession.

- Your school receives: £2,100 ENTHUSE bursary
- Activity fee: £2,100 (ex VAT)
- 5 March 2018 (6 days)
- www.stem.org.uk/ny601

TECHNICIANS SUPPORTING A LEVEL BIOLOGY

Explore and examine a range of relevant practicals for technicians to support students with the practical endorsement and skills required at A level.

- Your school receives: £600
- Activity fee: £500 (ex VAT)
- 22 February 2018 (2 days)
- www.stem.org.uk/ny616

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.

- Activity fee: £900 (ex VAT)
- 19 March 2018 (3 days)
- www.stem.org.uk/ny605

TECHNICIANS SUPPORTING PHYSICS

Examine and explore electricity, electronics, sound, light, radioactivity, forces, heat transfer, space, astronomy and electromagnets.

- Your school receives: £900 ENTHUSE bursary
- Activity fee: £900 (ex VAT)
- 29 January 2018 (3 days)
- www.stem.org.uk/ny606

CPD NEAR YOU

Browse dates and venues online

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.

- Browse 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.

- Browse 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.

- Browse 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.

- Browse 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.

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

TECHNICIANS SUPPORTING TRIPLE SCIENCE

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

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

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.

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

ONLINE

ASSESSMENT FOR LEARNING IN STEM TEACHING

Designed for STEM teachers in primary and secondary schools, sixth form and further education colleges this course will help you understand and use Assessment for Learning more effectively.

- Activity fee: Free
- 29 January 2018 (6 weeks)
- www.stem.org.uk/ne701

TEACHING PRACTICAL SCIENCE

Discover how to use practical work across the three science subjects to support explanation of theory. Discuss the relationship between theoretical concepts and practical work to challenge yourself to think about what is happening in the classroom and what your students are learning through practical work. Develop and share creative ways of teaching practical science with approaches that are applicable to a range of curricula.

- Biology:**
- Activity fee: Free
- 5 March 2018 (3 weeks)
- www.stem.org.uk/ne707

- Chemistry:**
- Activity fee: Free
- 19 February 2018 (3 weeks)
- www.stem.org.uk/ne705

- Physics:**
- Activity fee: Free
- 12 March 2018 (3 weeks)
- www.stem.org.uk/ne706

High quality support for teachers across the UK



You can access support from the National STEM Learning Network locally, nationally and online to meet the professional development and enrichment and enhancement needs of your department, school, college or network.

www.stem.org.uk

New STEM Ambassadors digital platform



It will soon be easier than ever before to engage with a STEM Ambassador with our new digital platform which will be launched this September.

A more streamlined experience:

- connect faster
- access free resource packages
- share experiences
- be inspired by real-life experiences

“Our work with STEM Ambassadors has really inspired us as a school to take STEM forward in a bold way”

– Anna Travis
Manchester Creative Studio School

Explore, inspire, transform – a faster way to connect with STEM Ambassadors.
www.stem.org.uk/ms/stem-ambassadors