

# In the spotlight... Paula Cil, STEM Ambassador.

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Future careers in magic



Implementing Core Maths





# Welcome

When was the last time that anyone said 'well done, you're doing a great job and making a real impact on everyone you are working with' or ' the fact that you go the extra mile makes a real difference - keep it up'?



In such a fast paced environment, acknowledging and recognising the impact that you and your colleagues have can often be lost amongst getting everything else done. Just a simple well done in private can be enough to lift spirits or a public announcement in the staff room for a particular achievement makes a real difference.

We all know what a massive impact genuine praise and recognition has on the young people we teach. What we say can be a great motivator and an important factor in raising self-esteem and helping young people achieve their potential. So why is it any different for the adults who support young people?

To be formally recognised for how hard you've worked at improving the way you support young people is a great feeling. Not only is it fantastic to add to your portfolio and raise your own profile, it's a real confidence boost and motivates you to keep working at being better. As teachers we all aim to encourage the young people we teach to be active learners, be aspirational and to celebrate success. By engaging in CPD and marking your progress with reward and recognition you are being a role model for young people.

In light of this, we want each of you to take the opportunity to say well done to a colleague or to formally nominate them for a recognition award. They could become one of our growing number of prestigious STEM Educators - teachers, technicians, teaching assistants and anyone making a positive impact in education. It could be someone who really invests in developing themselves and sharing what they learn with others. Or an inspirational leader in STEM who ensures colleagues get the opportunity to develop themselves and be the best they can be.

Whether it's appreciating your own value as an educator or those you work with, let's start really recognising the impact our work has - after all, that's why we do it!



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

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Secondary and FE STEM Learning magazine



# Preparing BTEC students for university

by ADRIAN GREENALL @slp\_liverpool Advanced Lecturer and Lead for Science Learning Partnership Greater Merseyside and Warrington, City of Liverpool College

BTEC Level 3 Applied Science and A level, whilst being equivalent, are not the same. Angus Holford's study has shown that students who progress to university with BTEC qualifications perform worse overall than those students who progress with equivalent A level grades. Why though, should this be the case?

The City of Liverpool College has worked closely with The University of Liverpool to try and understand the challenges faced by students from a BTEC background, and how those issues can be overcome.

#### WHAT ARE THE CHALLENGES?

Many students from BTEC backgrounds are the first in their family to receive a university place. This comes with a series of challenges and so it pays to be mindful of this when giving advice to students about university applications.

BTEC Applied Science now includes a theory and a practical exam. However, the exam only covers

one of the BTEC units, so students still lack a lot of the skills that examined courses require. Christian, Coulby and Speed say this is especially true of the ability to think synoptically and see links between topics within science.

The university style of teaching, such as formal lectures with limited interaction, also poses a

#### SO, WHAT CAN WE DO TO PREPARE BTEC STUDENTS FOR UNIVERSITY?

#### 1. FOCUS ON WHAT BTEC STUDENTS DO HAVE

Students who have followed a BTEC science course have much more experience at working independently; better ICT and presentation skills, and practical experience than A level students.

#### 2. WORK WITH YOUR LOCAL UNIVERSITIES

We have found our nearby universities to be very helpful. They may be able to organise a taster day to allow BTEC students to get a flavour of what university life will be like. They may also be able to offer support with their first-year content that will allow you to select appropriate optional units so students do not suffer from a 'knowledge gap'.

#### **3. TEACH IT LIKE A LEVEL**

Even though A levels and BTEC courses are very different in the way they are structured and assessed, using A level resources where applicable can help to ensure that students are able to compete conceptually with A level students at university.

#### **4. REINFORCE THEIR KNOWLEDGE**

Even for the units that are not formally examined, frequent assessments will embed the skills needed for recall and understanding. Including a synoptic element to these assessments will allow students to develop their skills of thinking holistically and linking concepts together. barrier to BTEC students who are often used to a more 'hands-on' approach.

#### FURTHER READING )

Students with BTECs do worse at university – here's how we close the gap by Angus Holford www.guardian.com

## SUPPORT FROM YOUR SCIENCE LEARNING PARTNERSHIP )



www.stem.org.uk/sciencelearning-partnerships







# Future careers in magic

**by DAVE GIBBS** STEM Computing and Technology Specialist, STEM Learning @adgibbs





Arthur C. Clark famously said: "Any sufficiently advanced technology is indistinguishable from magic" and the technology under research in cuttingedge labs across the UK is certainly 'spooky'. By the time today's STEM students enter the workplace, however, quantum technology will have become mainstream, bringing opportunities to ride the wave of innovation to a fulfilling career.

Einstein didn't win a Nobel prize for his most famous work on relativity. It was in recognition of his groundbreaking work on the photoelectric effect which helped to kick-start the quantum revolution. This ultimately led to the invention of semiconductors, atomic clocks, satellite navigation, lasers, MRI scanners and much more. Einstein struggled with the full implications of quantum mechanics. He protested that "God doesn't play dice", whilst refusing to accept the "spooky action at a distance" resulting from quantum effects.

The inherent 'spooky' properties of quantum particles make them potentially very useful. The UK Quantum Technology Hubs are researching applications in four distinct areas: • information technology

- enhanced imaging
- secure communications
- sensing

While some practical applications remain on the horizon, many are at prototype stage or are on the verge of going to market. The best known (quantum computers) are tantalisingly close to entering the mainstream. When they do, many of the problems that stump today's supercomputers will become trivial, bringing advances in medicine, engineering and much more. The internet encryption methods used in banking and eCommerce will also become obsolete, so the race is on to create the unbreakable quantum communications systems that will replace them.

Quantum technology offers huge improvements in our ability to measure gravity, magnetic fields, light, rotation and time, with higher-definition medical scanners, groundwater detectors and space observations. It will lead to cameras that can see through smoke (or even skin!) and perhaps around corners too. These are the known consequences of quantum technology; it will doubtlessly spawn other inventions that, today, would seem like magic.

This is an exciting time to be a student of STEM subjects. For the innovators, and the consumers, of quantum technologies, the changes will be profound. You can prepare your students to ride this wave, helping them visualise and create the future. If the impact of the second quantum revolution matches the first, and the spooky properties of quantum objects are put to work, their world will change in unimaginable ways.

#### GET INVOLVED IN OUR QUANTUM TECHNOLOGY PROJECT )

www.stem.org.uk/ms

quantum-technology

#### OPINION

# What does a good science scheme of learning look like?

**by MARK LANGLEY** Science CPD Lead, STEM Learning

One-size-fits-all, off-the-shelf schemes of work are not ideal. Why? Well many of the examples and contexts given can mean very little to young people. Curricula should have an element of localisation, as if students cannot easily relate to the curriculum, then there is the risk of students disengaging.

Within secondary schools, taking a holistic five- (or seven-) year plan can support students to make progress, work towards mastery and build on their experiences from primary school and everyday life.

A five-year plan needs to focus not just on the hard science knowledge and understanding, but also the skills and techniques demanded. By the time students reach GCSE or A level, they should be able to apply and refine techniques, rather than 'doing them once' just so a box can be ticked. A high-quality curriculum allows for time to develop the skills required to be effective within the subject.

Key assessment points should be embedded within a plan – and not relying on summative tests just to give senior leadership teams 'hard data' – but using good assessment for learning, with formative tasks which should include application. Many assessment activities could be based around applying knowledge, understanding and techniques, rather than regurgitating facts. Effective, varied teacher and peer assessment is key to enabling students and teachers to monitor progress.

An effective science curriculum should include a robust approach to health and safety – not just proper risk assessment, but also supporting students so that, in the future as they enter the world of work, they are better positioned to look after themselves and others around them. An outstanding curriculum should support all young people, regardless of ability, to perform to the best of their ability.

With the view that the majority of young people will not be directly entering science careers, the curriculum should enable a high level of scientific literacy, and allow students the opportunity to increase their science capital, recognising how science affects their everyday lives.

#### **KEY POINTS FOR SUCCESS:**

- plan for long-term progression across subject and ages
- localise the curriculum where possible
- build in effective assessment for learning don't just rely on tests
- allow scope for teacher professionalism
- develop life skills, including health and safety

#### CPD FOR YOU )



Subject leaders network
www.stem.org.uk/rp219



# **Exploring our universe**

@space\_tom

**by TOM LYONS** ESERO Teacher Fellow, STEM Learning

When the Hubble Space Telescope (HST) pointed towards a tiny, dark patch of sky in 2003, very few astronomers would have predicted the spectacular resulting image of around 10,000 galaxies.

The image was built up over four months of observation, and is known as the Hubble Ultra Deep Field. The image shows us some of the earliest galaxies to form, a few hundred million years after The Big Bang.

We know that as the universe expands, these galaxies are accelerating away from us. This means that the light from distant galaxies becomes red-shifted, so that if we want to look even further back in time, we need to look in the infrared. The HST cannot see far enough into the infrared and is nearing the end of its life – so where do we go from here? Enter the James Webb Space Telescope (JWST).

The JWST is due for launch in 2019. It is a collaboration between the European Space Agency, Canadian Space Agency and NASA. It will be the largest telescope ever launched into space,

with a primary mirror of 6.5m in diameter. It will enable astronomers to see the highly red-shifted galaxies, forming in the very early universe.

The UK has had a key role in building and testing the Mid-Infrared Instrument, on board the JWST, which will analyse the spectra of light from the stars. The instrument will also allow us to analyse the light coming from the atmospheres of planets

outside our solar system. By analysing the spectra, astronomers can identify the gases present in the atmosphere, and whether these new worlds have the right conditions for life to form.

The JWST is a great way of getting your students engaged in STEM subjects, particularly to celebrate The Year of Engineering 2018. It demonstrates just how exciting and fundamental STEM subjects are when it comes to problem solving. The technical challenge of fitting a telescope the size of a tennis court into a rocket nose cone, and then unfolding the structure in space, is only rivalled by the precision engineering on the optics and detectors for this incredible piece of machinery.

#### **EXCITE YOUR STUDENTS** WITH THE JAMES WEBB SPACE TELESCOPE



STEM Clubs JWST resource www.stem.org.uk/ jwst-resource

#### INTERVIEW

# Moving into leadership

by KAREN CURZON Senior Technician and Associate Assistant Principal, Nottingham Academy

I am a Senior Technician in one of only a handful of schools in the country with its own nursery, primary, secondary and sixth form provision - we are based over three sites with more than 3,000 students. My role involves organising and managing the team of technicians who provide support across all practical disciplines. This support is predominately for our 2,000 secondary students, but we also have significant <u>input into primary science and design and technology lessons</u>.

To ensure I could take on this role, in 2012-13 I attended the Senior technicians accredited coleaders in science (STACS) CPD at the National STEM Learning Centre in York. The course sessions were varied, challenging and often thought provoking. The assignments set could seem daunting but the time between residential sessions gave me time to actually try out new things and refine my existing good practice. By implementing the skills I gained during the course the work for the assignments was done; it just needed putting down on paper.

But more than this, what STACS enabled me to do was look deeply into my own practice and reflect on my own habits and experience. Alongside the excellent facilities, high quality training provision, excellent tutors and technicians I met, the STACS experience extended my vision for the future. It's hard to list what I learned most from STACS, but by developing leadership skills and learning to adapt communication styles, it has impacted positively on my role and that of my fellow technicians. What success looks like for the science department is one happy, proactive, independent and effective team of multi-skilled technicians. We are allowed greater autonomy, given more respect, and are listened to when we express opinions.

Apart from the benefits to the school and fellow technicians, success for me has come from a new opportunity. By completing the STACS course I gained the recognition that allowed me to become part of the school's middle leadership team. Following this I have successfully applied for a secondment to my school's leadership team as Associate Assistant Principal where I currently represent all support staff. I have a voice in policy planning and decision making. I am able to represent staff, make my voice heard in a positive way, take on more responsibility and I still get to wear my white coat.

Good leaders are everywhere and if you lead well (wherever that may be) you should be recognised; the team in which you lead is irrelevant.

#### DEVELOP YOUR LEADERSHIP SKILLS )

Senior technicians accredited co-leaders in science www.stem.org.uk/ny600

OPINION

# /hy is it a challenge?

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by STEPHEN LYON @Steve]Lyon

Mathematics Lead, STEM Learning

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As a head of mathematics I didn't understand why students couldn't perform seemingly simple mathematical tasks during their science lessons. Recently, I've been looking closely at the new GCSE and A level biology specifications to understand why students

O ᠿ are struggling.

#### **CHALLENGE ONE**

Most of the mathematics required in A level biology is covered in GCSE mathematics, with a few notable exceptions. Logarithms, for example, don't appear until A level mathematics and Spearman's rank

#### **CHALLENGE TWO**

Though students experience similar questions in mathematics and biology, the context of these questions is usually simpler in maths than in biology exams.

However, the teaching and learning of GCSE mathematics is changing. It is no longer sufficient for students to learn a series of algorithms and 'tricks' without any understanding of how, or why, these algorithms work. The new mathematics

specifications have a much greater emphasis on students understanding mathematical structure and being able to explain why methods work. Often this understanding can be achieved without applying it to a real-life context in a meaningful way.

correlation, Chi-squared and Student's t-test are

specification! These therefore need to be taught

not included at all in the mathematics A level

from scratch by biology teachers who aren't

specialists in teaching mathematics.

So, students might have the knowledge they need to solve maths problems but they don't understand the theories well enough to be able to take them into a new context in biology lessons.

#### **CHALLENGE THREE**

I've found a number of significant differences in the way that maths is being taught in maths and biology lessons. Differences in notation and approaches to problem solving mean that students can't link what they have

learned in maths lessons to what they are working on in biology lessons. In addition, biology questions very often ask students to perform a number of different mathematical skills in one question.

#### **THE WAY FORWARD?**

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Mathematics and biology teachers (in fact all science teachers!) need to be given the time to liaise with each other in order to develop an awareness of the mathematical needs in each other's subjects.

This will help them develop common approaches to teaching mathematics, share best practice, acknowledge where differences occur and share contexts which can be used in maths lessons.

#### **DISCOVER HOW MATHS AND BIOLOGY CAN WORK TOGETHER**



#### HOW TO - CUT OUT AND KEEP

# Plasmolysis in plant cells

The osmosis practical is a cornerstone of biology practical work in schools and is often a core or required practical. Often using potatoes it explores semi-permeable membranes and the movement of molecules from lower to higher concentrated solutions. Often, though, students never see what's happening at the cellular level... well that's where the plasmolysis practical comes in.

The plasmolysis in plant cells practical explores what happens to individual cells when placed in a hypertonic solution (such as a concentred salt solution). The results under a microscope can be seen in real time as the cell membrane peels away from the cell wall, so students can see, on a cellular level, what happens during osmosis.

#### WHAT YOU NEED

- red onion or rhubarb
- slides and coverslips
- salt solution 5%
  distilled water
- pipettes

#### HOW TO DO IT

1. Set your microscope up.

 Take either a thin peel of rhubarb epidermis or a single layer of the red onion from the red layers using the forceps and/or scalpel. These need to be really thin sections to be able to see the cells clearly.

- Mount the section on a slide and add a few drops of water. Put a coverslip on top, making sure the water is all the way across the underside of the coverslip.
- Place under a microscope at the lowest magnification to start with and look for a clear group of red cells.

forceps

- filter paper
- scalpel (make sure these
- are counted in and out)

microscope

When ready, pipette some salt solution at one end of the coverslip.



 Draw the salt solution through the sample by placing a piece of filter paper at the other end of the coverslip.

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 Observe the cells changing as salt solution is drawn through the sample; you should see the red parts of the cell come away from the cell wall, plasmolysis in action.

Why not take pho of your plasmolysi practical and share them in our community group?

#### ENHANCE YOUR TEACHING OF PLANT SCIENCE )

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 Practical plant science and ecology for secondary schools
 www.stem.org.uk/ny260
 Teaching practical science: biology
 www.stem.org.uk/ne707
 Strengthening practical work in biology
 www.stem.org.uk/rp200
 Community group
 www.stem.org.uk/ms/ technicians-group
 Simon Quinnell, National Technician Lead @quinnell75

#### OPINION

# It's more than worth it!

by HELEN ROSE

Technician Professional Development Leader, STEM Learning

As STEM Club leaders, we see the joy and enthusiasm of our students when they engage with STEM activities. Watching students enjoy an activity in a relaxed environment, experiencing something whacky and out of the norm, that's what STEM Clubs are all about!

STEM Clubs are an amazing way to enthuse your students about science, technology (in its many forms), engineering and mathematics – and students don't even realise they are doing it! There are so many activities you can do in your STEM Club. One of my favourite examples is 'Chemistry in your bathroom', where students learn how to make toiletries and the role of chemistry in the cosmetic industry.

You could get your students to do all sorts of things in engineering, such as the designing and building of a streamlined car, developing ideas around renewable energy products and creating smart materials through textile engineering. You could even link up with a Code Club and explore creative programming through music – the range of projects is enormous! The great thing about these kinds of assignments is that they challenge students to think and solve problems that actually affect their daily lives.

## ALL THE SUPPORT YOUR STEM CLUB NEEDS )



#### SO, IF YOU HAVEN'T ALREADY, HOW CAN YOU GET A STEM CLUB STARTED?

Think about your goals and what you want your STEM Club to achieve. You can get guidance and more detailed information on how to achieve your goals via the STEM Learning website.

Team up with your technicians. They have a wealth of information and equipment (they're like magpies!) and they are always eager to help.

Develop new and exciting projects or schemes of work that sit outside of the curriculum. The STEM Learning website has a dedicated STEM Clubs web page with masses of free resources!

Be enthusiastic. If you are passionate about your STEM Club and offer exciting projects, your students will be queuing outside the door.

Remember that there is loads of support out there for you and your STEM Club, and the look of enjoyment on your students' faces will be more than worth the extra effort!

#### INTERVIEW

# Implementing Core Maths: a word from the wise

Core Maths is the new level 3 mathematics qualification for students who achieved at least a grade 4 at GCSE mathematics. We spoke with **Colin Prestwich**, **Maths Lead for the Yorkshire Ridings Maths Hub**, **Executive Faculty Leader at Harrogate Grammar School** – one of the early adopters of Core Maths – to see how their mathematics department has approached delivering the Core Maths qualification.

## How many of your students currently study Core Maths?

Studying maths beyond 16 is a big priority for our school. Students start to think about it at the start of Year 11. If a student is weaker in maths, Core Maths can help them with entry requirements into other subjects like sociology A level. About 50% of our sixth form this year do some sort of level 3 mathematics; it's going to be more like 60% next year.

#### How do you run Core Maths?

In my opinion, it runs better as a two-year course, especially if you focus on students who perceive themselves as not being good at mathematics. It is too hard to change that perception in six months, which is effectively what you'd need to do on a one-year course.

#### Is there a typical Core Maths student?

Typically they're not confident mathematicians, but they understand the importance of it. They realise that the subjects they are doing - sociology, psychology, geography, etc require an understanding of mathematics. They appreciate that learning things such as problem solving, personal finance and the ability to handle information will help them at and beyond school

## Where do you get your teaching resources from?

I'm never short of material. It's about a broader understanding of how to use mathematics to solve problems, to help get your head around what's happening in front of you. It is a much more practical approach. I've never been asked in any of my Core Maths lessons, "why are we doing this?" It's about working with real data and it's not the stuff that's provided in textbooks. You can see instantly how that will impact the performance of say your politics, or your history or even your geography students because they're able to actually get data and analyse it in a meaningful way. Because the content isn't large, I can spend time developing real understanding. There are some amazing resources hosted by STEM Learning.

## Have you got any recommendations for schools considering offering Core Maths?

Use Core Maths to develop teaching in other lessons. It's about trying something new, so it's a really refreshing opportunity to step out from what you might previously have been doing. Take risks with your teaching in a way that you might not be prepared to take in key stage 4 – and just see what happens!

## EVERYTHING YOU NEED TO TEACH CORE MATHS )

Core Maths resource page www.stem.org.uk/ core-maths



# the NAME: Paula Cil

**ROLE:** Aircraft Engineer PLACE OF WORK: RAF Benson

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## When and why did you decide to follow

I have always enjoyed building and making things so the job type was easy. After initially signing up for the army at 16 I felt that, for my choice of career, I needed more life experience. This led me to college and motor vehicle engineering but my desire to be in the armed forces had not swayed, both of my parents had worked on aircraft components when younger which made me change to want to join the Royal Air Force.

#### What is the main focus of your work?

Providing technical solutions for mechanical maintenance queries and fault rectification of the Puma2 helicopter

How does your work affect our lives/society? My work helps support the UK's capability to deploy at short notice anywhere in the world providing whatever support is required, such as the humanitarian aid for hurricane Irma in the Caribbean.

Do you have any career highlights? There are many highlights in my career but my international experience is one that will always stay with me. The opportunity to mentor international trainees from Saudi Arabia, Oman and Kuwait throughout their engineering training, whilst breaking down barriers between cultures, is one of the best. I have utilised what I have learnt from them in my time on operations in Oman and currently whilst deployed in Afghanistan.

If working with your hands inspires you then engineering is for you. It doesn't matter where you start, if it makes you happy then give it a go.

2018 is the Year of Engineering – as someone working in engineering, what would you say to young people considering a career in this field? Go for it! If working with your hands inspires you then engineering is for you. It doesn't matter where you start, if it makes you happy then give it a go.

You won the STEM Inspiration Award in 2017 – tell us about your work as a STEM Ambassador It was last year when I really took hold of the opportunity to work alongside passionate teachers within my son's primary school. I have engaged in numerous activities with the help of the RAF Youth and Diversity team, who have supplied me with copious amounts of equipment and additional training. I have personally grown the pool of Ambassadors at RAF Benson, including making connections with Science Oxford, Winchester Science and Cool Aeronautics running at RAF Halton. So, the RAF can hold and run residential weeks in the south of England which starts with the first Girlguiding residential being held in May 2018.

#### INSPIRE YOUR STUDENTS

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Find the perfect STEM Ambassador match for your activity www.stem.org.uk/ms/

stem-ambassadors

#### **OPINION**

# Can we use science to inform how we all teach?

by LIA COMMISSAR Programme Manager – Education and Neuroscience, The Wellcome Trust

@WTeducation @MissCommissar

Educational neuroscience is a new but growing field of study which aims to better understand how we learn. It brings together research from a range of fields related to education – including psychology, neuroscience, technology and genetics.

However, much of the research that is currently being carried out takes place in strictly controlled lab conditions, with small sample sizes and often with adult participants. This means it is impossible to suggest that similar results would be achieved on students in real classroom situations.

The good news is that as researchers from all these fields start to work more closely with the education sector, more research is taking place to help answer questions relevant in the classroom, with some trials starting to take place in schools.

#### SO, CAN WE USE SCIENCE TO INFORM HOW WE TEACH?

Although not many research studies exist that definitively recommend specific teaching practices or techniques, engaging with the research may still impact teaching in the following ways:

 understanding more about the research into how we learn could help you make your teaching more effective

- if you were armed with greater knowledge you could more easily determine which approaches were truly informed by evidence, and avoid those based on myth
- by engaging with researchers, you could influence the sorts of questions that researchers might investigate – hopefully leading to more practical answers

Wellcome believes that this research can have a big impact on science teaching and student outcomes. In order to help you access and engage with this research we have funded a number of projects which you can get involved in.

Learning is about so much more than the information a teacher gives to a student. If we knew how to improve memory, the effect of emotion on learning and the impact of sleep, would it change how you teach?

#### **1. THE SCIENCE OF LEARNING ZONE**

An online platform where you can ask questions and engage in discussions with researchers fortnightly, on topics relating to learning in the classroom. www.learning.imascientist.org.uk

#### 2. THE LEARNING SCIENTISTS

Podcasts and monthly Facebook Live events on science of learning topics.

www.learningscientists.org

#### **3. THE SCIENCE OF LEARNING ONLINE CPD**

The National STEM Learning Centre has a free online course exploring how you can use the science of learning to improve student outcomes.

www.stem.org.uk/ne709

Researchers will continue to understand more about how we learn, however, you will be key in helping to realise how the findings can be applied and evaluating the impact in your own classrooms.

#### DISCOVER MORE FROM WELLCOME

Find out more www.wellcome.ac.uk/ edneuroscience

Sign up to the newsletter www.wellcome.ac.uk/ education-and-learningnewsletter

Secondary and FE STEM Learning magazine

# DISCOVER THE INGREDIENTS OF GOOD PRACTICAL SCIENCE

Explore our free online resources to help you use the ten Gatsby Foundation Good Practical Science benchmarks to develop your approach to delivering practical science.

> www.stem.org.uk/ms/ good-practical-science

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# Our top picks for your calendar...



#### WORLD ENVIRONMENT DAY 5 JUNE

Teaching students about the importance of looking after the environment is crucial to the future sustainability of the planet. Whether you look at everyday issues, such as recycling, or decide to focus on wider issues like climate change, we have a range of free resources to support you.

www.stem.org.uk/cxeznv

#### ASTEROID DAY 30 JUNE

There are millions of asteroids in our solar system – but what is the likelihood of one hitting the Earth? This is what World Asteroid Day aims to investigate. Check out this video which looks at the asteroids most likely to hit Earth.

www.stem.org.uk/rx33tz



#### STEM INSPIRATION AWARDS OPEN APRIL 2018

Enter our free award scheme designed to celebrate individuals and organisations working to inspire young people in STEM subjects. Categories include Outstanding STEM Technician and Inspirational STEM engagement project. Winners are invited to attend an exclusive visit to CERN.

www.stem.org.uk/ms/ stem-inspiration-awards

#### WORLD CHOCOLATE DAY 7 JULY

World Chocolate Day is coming. Not only is this a great excuse to indulge, it can also be a fantastic way to engage students with the world of STEM. Whether you look into the structure of chocolate or the engineering careers available in the industry, why not celebrate World Chocolate Day?







people have been Tweeting:



really looking forward to my gap task and the next part in June. Residential courses are a revelation - absolutely worth it if you can teachers

Newham Teacher
 @NewhamTeacher

Follow

Returning back to London with a lorry load of ideas from @STEMLearningUK it's been a fantastic two days & I can't wait to get this going with my class! Can't recommend the STEM centre enough!



Joana dos Reis @joreis13

Follow

Coming home to this made me cry. **#STEM** education shapes my life to this day always making look at the world with curious & enquiring mind. Honoured to inspire others @UCLEngEdu @STEMAmbassadors @STEMLearningUK



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

# **Discover CPD that has an impact**

We support over 170,000 teachers, reaching more than 2 million young people, every year. Why not join us this year and plan your perfect CPD to help you develop in your role and support your students more effectively.

Participating in our CPD will have an impact on you and your students:

- over 80% of those who work with us improve the quality of their STEM teaching
- more young people pursue STEM careers as a result of our support
- · disadvantaged students are even more likely to benefit from our support

Find out more about the impact of our CPD at: www.stem.org.uk/ms/impact



We are offering a 100% discount on the activity fee for a range of CPD held at our **National STEM Learning Centre in York** to help more state-funded schools and colleges benefit:

- · look out for the CPD with a grey circle in the listing
- when booking online use the code AUTUMN2018SEC
- 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.

All fees and bursary values are valid for state-funded schools and colleges and are correct at the time of print (March 2018). See www.stem.org.uk/cpd for other fees and the latest information.

# Our ENTHUSE bursary-supported 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.



and see increased impact reimbursed with the **ENTHUSE** bursary

#### COMPUTING

#### **INTENSIVE SUBJECT-SPECIFIC CPD** Accommodation and meals included

#### A LEVEL COMPUTER SCIENCE **THEORY: TEACHING THE TOUGH TOPICS**

Be more effective in the classroom and learn how to support your students to maximise their exam success.

- Money back: £1,200 ENTHUSE bursary £1,200 (excl VAT)
- Activity fee:
- 5 December 2018 4 days
- www.stem.org.uk/cy230

#### MATHEMATICS FOR A LEVEL COMPUTER SCIENCE

Teaching a subject outside of your specialism is tricky. Learn everything you need to confidently teach maths topics within A level computer science.

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 21 November 2018 2 days
- www.stem.org.uk/cy211

#### **NEW AND ASPIRING** HEADS OF SECONDARY COMPUTING

Learn how good subject leadership can have a positive impact on computing teaching.

- Money back: £1,200 ENTHUSE bursary
- Activity fee:
  - £1,200 (excl VAT) 4 days
- 15 October 2018 www.stem.org.uk/cy200

## **NEW TO TEACHING**

**A LEVEL COMPUTER** SCIENCE

Improve your subject knowledge, discover practical and investigative activities including a range of programming challenges and deepen your understanding of underlying concepts.

- Money back: £600 ENTHUSE bursary • Activity fee: £600 (excl VAT)
- 1 October 2018 2 days
- www.stem.org.uk/cy202

#### **NEW TO TEACHING GCSE** COMPUTER SCIENCE

Focus on the themes that are common to all exam boards and that run through from earlier school stages, such as algorithms, programming, computer systems, networking and data.

- Money back: £600 ENTHUSE bursary
- Activity fee:
- £600 (excl VAT) • 25 September 2018 2 days
- www.stem.org.uk/cy201

- PYTHON CAMP FOR SECONDARY **COMPUTING TO GCSE LEVEL**
- An intensive activity to provide you with the knowledge and confidence to teach Python. £900 ENTHUSE bursary • Money back: £900 (excl VAT) • Activity fee: • 13 November 2018 3 days
- www.stem.org.uk/cy212

#### **TEACHING DATA AND DATA STRUCTURES FOR A LEVEL COMPUTER SCIENCE**

Learn to develop student competency using a range of data structures and types, explain how they are stored, processed and manipulated and apply mathematical methods. £700 ENTHUSE bursary Money back: • Activity fee: £600 (excl VAT) • 10 October 2018 2 days www.stem.org.uk/cy204

**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. Money back: £600 ENTHUSE bursary £500 (excl VAT) Activity fee:

• 22 October 2018 2 days 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. Money back: £600 ENTHUSE bursary £500 (excl VAT) • Activity fee: 24 October 2018 2 days www.stem.org.uk/cy208

"I enjoyed the whole course. but especially the dealing with data types, naming variables and tackling real life problems. I also found it very useful to talk to other teachers "

- Mr Dave Clarke Head of Computing & ICT Christ the King Catholic High School



#### CPD LISTING • FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD

#### **DESIGN & TECHNOLOGY**

#### **INTENSIVE SUBJECT-SPECIFIC CPD** Accommodation and meals included

#### **3D PRINTING FOR TECHNICIANS**

Find out how to safely operate and maintain your 3D printer and fix those troublesome printing issues!

- Money back: £600 ENTHUSE bursary • Activity fee: £600 (excl VAT)
- 10 December 2018 2 days
- www.stem.org.uk/ny629

#### **CONTROLLING MOTORS AND PROTOTYPING ELECTRONIC CIRCUITS** WITH MICRO:BIT

Discover how the micro:bit can be used to create programmable electronics projects in design and technology.

- Money back: £600 ENTHUSE bursary
- Activity fee:
  - £600 (excl VAT)
- 3 December 2018 2 days
- www.stem.org.uk/ty238

#### **DEVELOPING A STEM** CURRICULUM IN KEY STAGE 3 **DESIGN AND TECHNOLOGY**

Found out how to bring more STEM-related content into your key stage 3 design and technology lessons, with help from our STEM specialists. £600 ENTHUSE bursary

- Money back:
- Activity fee:
- £600 (excl VAT) 29 November 2018 2 days
- www.stem.org.uk/ty245

#### **DEVELOPING AN ENGINEERING CURRICULUM IN KEY STAGE 3 DESIGN AND TECHNOLOGY**

Gain ideas on how to implement an engineering curriculum in your key stage 3 design and technology lessons.

- £600 ENTHUSE bursary Money back:
- Activity fee:
  - £600 (excl VAT)
- 6 December 2018 2 days
- www.stem.org.uk/ty244

#### **DEVELOPING KNOWLEDGE AND** PRACTICAL SKILLS FOR DESIGN AND TECHNOLOGY GCSE

Develop your knowledge and practical skills to confidently teach design and technology GCSE. £600 ENTHUSE bursary

- Money back:
- £600 (excl VAT) • Activity fee:
- 23 November 2018 2 days
- www.stem.org.uk/ty242

#### **DEVELOPING MATHEMATICS SKILLS IN THE NEW DESIGN** DISCOUN AVAILABI F AND TECHNOLOGY GCSE

Improve your subject knowledge and develop strategies for teaching the mathematics content in the new design and technology GCSE. Money back: £600 ENTHUSE bursary £500 (excl VAT) Activity fee: • 28 November 2018 2 days

www.stem.org.uk/ty225

"It has developed my self confidence in being able to plan a whole new curriculum and subject with strong links outside of my own subject specialism."

- Helen Dunn Teacher, Parkside School

#### **GCSE FOOD PREPARATION AND NUTRITION: TEACHING FOOD SCIENCE**

Develop your food science subject knowledge and learn how your school food curriculum can be adapted to include food science. £600 ENTHUSE bursary

- Money back:
- Activity fee: £600 (excl VAT)
- 16 November 2018 2 days
- www.stem.org.uk/ty205

#### 100% DISCOUNT AVAILABLE **DEVELOPING SKILLS FOR THE F1** IN SCHOOLS STEM CHALLENGE

Get the skills needed to run this challenge with your students and develop your knowledge of computer aided design (CAD) and CNC manufacture. £600 ENTHUSE bursary

- Money back:
- Activity fee: £600 (excl VAT)
- www.stem.org.uk/ty200

#### **GETTING IT RIGHT IN KEY STAGE 3**, LAYING GOOD FOUNDATIONS FOR **DESIGN AND TECHNOLOGY GCSE**

Find out how to develop your key stage 3 curriculum, supporting progression into design and technology GCSE.

- £600 ENTHUSE bursary • Money back:
- £600 (excl VAT) • Activity fee:
- 9 November 2018 2 days
- www.stem.org.uk/ty241

#### **TECHNICIANS SUPPORTING** THE NEW DESIGN AND **TECHNOLOGY GCSE**

Explore how to support your department in the delivery of the new design and technology GCSE. Consider the key changes to the specifications and the role technicians have in implementing and supporting these changes. • Money back: £600 ENTHUSE bursary

- Activity fee: £600 (excl VAT) • 8 November 2018 2 days
- www.stem.org.uk/ny621

#### **TEXTILE TECHNICIANS: BASIC** SERVICING AND MAINTENANCE **OF SEWING MACHINES**

Discover how to carry out basic servicing and maintenance of sewing machines. Learn about common health and safety issues and gain a better understanding of how the correct use of tension, threads and needles can improve performance. Money back: £300 ENTHUSE bursary

- Activity fee:
- £300 (excl VAT) • 20 November 2018 1 days
- www.stem.org.uk/ny623

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

Find out how to make better use of your 3D printer in the classroom and fix those troublesome printing issues!

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 23 November 2018 2 weeks
- www.stem.org.uk/ty214

#### **VEX IQ: INTEGRATING ROBOTICS** INTO YOUR CURRICULUM

Discover how to use VEX IQ in your STEM-related classes and receive your own free VEX IQ Super Kit.

- £700 ENTHUSE bursary • Money back:
- Activity fee: £650 (excl VAT)
- 16 November 2018 2 days
- www.stem.org.uk/ty706

#### FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD • CPD LISTING

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#### MATHEMATICS

**INTENSIVE SUBJECT-SPECIFIC CPD** Accommodation and meals included

#### **AN INTRODUCTION TO CORE MATHS**

Gain a clear understanding of the role of Core Maths in schools and colleges and develop strategies to implement Core Maths in your educational setting.

- £1,050 ENTHUSE bursary Money back:
- £750 (excl VAT) • Activity fee:
- 19 November 2018 3 days
- www.stem.org.uk/my507



#### **BUILDING CONFIDENCE AS A NEWLY QUALIFIED MATHEMATICS TEACHER**

Explore what makes good mathematics teaching by considering questioning, promoting positive behaviour, planning for learning and giving feedback.

- Money back: £1,400 ENTHUSE bursary £1,200 (excl VAT)
- Activity fee:
- 7 November 2018 4 days
- www.stem.org.uk/my205

#### **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.

- Money back: £1,400 ENTHUSE bursary Activity fee: £1,200 (excl VAT)
- 15 November 2018 4 days
- www.stem.org.uk/my213

#### **DEVELOPING SHARED APPROACHES TO MATHS IN SCIENCE AND SCIENCE IN MATHS**

Identify common content between the science and maths curricula and explore ways of teaching that develop sufficient mathematical understanding whilst providing fluency in the skills required for science.

- £1,400 ENTHUSE bursary Money back:
- Activity fee: £1,200 (excl VAT)
- 12 December 2018 4 weeks
- www.stem.org.uk/my214

# FREE cross-curricular online CPD to help you:

- understand how your students learn
- unlock your students' learning potential
- take part in action research with leading neuroscience academics and other teachers

# The science of learning



# www.stem.org.uk/ne709

## **BRING YOUR SCIENCE TEACHER AND** YOU BOTH GET 50% DISCOUNT ON THE ACTIVITY FEE

This CPD is ideal for maths and science teachers from the same school or college to attend together. Use the code MY214FIFTY on both of your bookings to get the discount. See the website for more information.

#### **SCIENCE**

#### **INTENSIVE SUBJECT-SPECIFIC CPD** Accommodation and meals included

#### **DEVELOPING SHARED APPROACHES TO MATHS IN SCIENCE AND SCIENCE IN MATHS**

Identify common content between the science and maths curricula and explore ways of teaching that develop sufficient mathematical understanding whilst providing fluency in the skills required for science.

- Money back: £1,400 ENTHUSE bursary £1,200 (excl VAT)
- Activity fee:
- 12 December 2018 4 weeks www.stem.org.uk/my214

**BRING YOUR MATHS TEACHER AND YOU BOTH GET 50% DISCOUNT ON THE ACTIVITY FEE** 

This CPD is ideal for science and maths teachers from the same school or college to attend together. Use the code MY214FIFTY on both of your bookings to get the discount. See the website for more information.

#### **REACHING FOR GRADE 9 IN SCIENCE**

Support your students to reach grade 9 in GCSE science by exploring new strategies and activities. £1,200 ENTHUSE bursary Money back:

- Activity fee: £1,000 (excl VAT)
- 17 September 2018 4 days
- www.stem.org.uk/ny270

#### **CPD NEAR YOU** Browse dates and venues online

### **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.

- 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**

Develop effective strategies to support 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

#### **ENHANCING LITERACY SKILLS IN SCIENCE**

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

- Browse 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. 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**

Develop a repertoire of practical activities and learn to teach pre-GCSE level 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. Consider 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

#### FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD • CPD LISTING

#### 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

Discover strategies to improve your impact on students and improve your own skills and understanding of science.

- Browse dates and venues online
- www.stem.org.uk/rp228



#### **TOWARDS OUTSTANDING**

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

- Browse dates and venues online
- www.stem.org.uk/rp215

#### LEADERSHIP

**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

#### 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

## TAKING PART IN STEM LEARNING SCIENCE CPD **IMPROVES TEACHER RETENTION BY 160%**

#### 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

#### **MATHEMATICS FOR BIOLOGY TEACHERS**

Perfect for anyone who is teaching GCSE and A level biology. Improve your understanding and teaching of mathematics topics required for this subject.

- Money back: £600 ENTHUSE bursary
- Activity fee: £500 (excl VAT)
- 12 November 2018 2 days
- www.stem.org.uk/ny284

**NEW TO A LEVEL BIOLOGY** 

Develop new practical techniques, ICT activities and context based learning strategies.

- £1,200 ENTHUSE bursary Money back:
- Activity fee: £1,000 (excl VAT)
- 4 October 2018 4 days

#### www.stem.org.uk/ny250

#### **UNPICKING THE EXAMINER'S REPORT A LEVEL BIOLOGY**

Analyse examiners' subject reports to find out how to develop your teaching strategies in A level biology

- Money back: £700 ENTHUSE bursary
- £600 (excl VAT) Activity fee:
- 16 October 2018
- 2 days
- www.stem.org.uk/ny271

#### **UNPICKING THE EXAMINERS' REPORT: GCSE BIOLOGY**

An in-depth look at the examiners' reports from the new biology GCSE. Discover which areas your students need more support with.

- Money back: £600 ENTHUSE bursary
- Activity fee: £600 (excl VAT)
- 5 November 2018 2 days
- www.stem.org.uk/ny282

"The course will allow me to deepen my knowledge of botany and ecology, make it more interesting to organise biology lessons, as well as share knowledge with teachers."

> - Norbert Kleszko The Elmgreen School

#### - CPD LISTING • FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD

#### **BIOLOGY** (CONTINUED)

#### **CPD NEAR YOU** Browse dates and venues online

#### 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. • 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

#### CHEMISTRY

#### **CPD NEAR YOU** Browse dates and venues online

#### 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. • 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 the 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 in the use of electronic technologies.

- Browse dates and venues online
   www.stem.org.uk/rp508
- www.stell.org.uk/1p500

#### MEETING THE DEMANDS OF CHEMISTRY IN THE NEW A LEVEL SPECIFICATIONS

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

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

#### MEETING THE DEMANDS OF CHEMISTRY IN THE NEW GSCE SPECIFICATIONS

This one day course will show how specific activities can be used to get across key concepts: use maths skills and develop practical skills in chemistry. • Browse dates and venues online

www.stem.org.uk/rp232

#### PREPARING FOR PRACTICAL TEACHING AND ASSESSMENT IN A LEVEL CHEMISTRY

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

- Browse dates and venues on
- 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.

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

# Bespoke science CPD at your school or college

Your local Science Learning Partnership is the ideal partner for in-house professional development activity. We will help you by:

identifying your CPD needs

- tailoring the content of science CPD activities to your needs
  reducing costs by providing one session for all members of a
- department, school, college or multi academy trust

Connect with your local Science Learning Partnership www.stem.org.uk/science-learning-partnerships

#### FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD • CPD LISTING

#### PHYSICS

**INTENSIVE SUBJECT-SPECIFIC CPD** Accommodation and meals included

#### **NEW TO A LEVEL PHYSICS**

Develop your teaching schemes and discover how to incorporate exciting practicals into your A level physics lessons.

- £1,200 ENTHUSE bursary Money back:
- Activity fee: £1,000 (excl VAT) • 18 October 2018 4 davs
- www.stem.org.uk/ny252

#### **PHYSICS FOR NON-SPECIALISTS**

Discover how to teach secondary physics effectively through stimulating practicals and linking the curriculum to cutting edge research.

- Money back: £1,500 ENTHUSE bursary
- Activity fee: £1,250 (excl VAT)
- 8 October 2018 5 days
- www.stem.org.uk/ny201



#### **UNPICK THE EXAMINERS' REPORT:** A LEVEL PHYSICS

Analyse examiners' subject reports to support the development of your teaching strategies for the new physics A level.

£600 (excl VAT)

£700 ENTHUSE bursary

- Money back: £700 ENTHUSE bursary
- Activity fee:
- 15 October 2018
- 2 days
- www.stem.org.uk/ny272

#### **UNPICK THE EXAMINERS' REPORT: GCSE PHYSICS**

Analyse the examiners' reports and discover what your students need more support with in the new physics GCSE.

- Money back:
- Activity fee:
- £600 (excl VAT) • 7 November 2018 2 days
- www.stem.org.uk/ny283

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 your 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 the 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 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**

Effectively identify appropriate students for triple science. Examine ways to motivate students and enrich their triple science 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? This course will enable you to consider a range of key strategies to help you achieve this. It has been designed for science departments that have little or no experience in delivering triple science. 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

#### CPD LISTING • FOR MORE DATES AND VENUES VISIT WWW.STEM.ORG.UK/CPD

#### TRIPLE SCIENCE (CONTINUED)

#### **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 terms understanding of the science.

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



#### **TECHNICIANS**

#### **INTENSIVE SUBJECT-SPECIFIC CPD** Accommodation and meals included

#### **PRACTICAL SKILLS FOR TEACHING ASSISTANTS**

Science practical skills to support teaching assistants. Gain an overall understanding of the subject and enhance your confidence with students.

- Money back: £600 ENTHUSE bursary
- £600 (excl VAT) Activity fee:
- 15 November 2018 2 days
- www.stem.org.uk/ny626

#### 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.

- Money back:
- £3,850 ENTHUSE bursary £3,300 (excl VAT)
- Activity fee: • 22 October 2018 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.

- Money back: • Activity fee:
- www.stem.org.uk/ny601

#### **TECHNICIANS IN THE** CLASSROOM

Examine and explore what makes good practical work, demonstrations and managing small group work and individuals with practical activities.

- Money back: £900 ENTHUSE bursary
- Activity fee: £900 (excl VAT) • 26 November 2018 3 days
- www.stem.org.uk/ny602

#### **TECHNICIANS SUPPORTING BIOLOGY: 11-19**

Explore microbiology, biotechnology, genetics, dissections, ecology, microscopy and working with animals and plants.

- Money back: £900 ENTHUSE bursary Activity fee: £900 (excl VAT)
- 24 September 2018 3 days
- www.stem.org.uk/ny604

#### **TECHNICIANS SUPPORTING BTEC SCIENCE**

Learn practicals to help you support your BTEC level 3 in applied science students.

- Money back: £900 ENTHUSE bursary
- Activity fee: £750 (excl VAT)
- 10 December 2018 3 days
- www.stem.org.uk/ny635

#### **TECHNICIANS SUPPORTING** CHEMISTRY: 11-19

Discover a range of practical activities including micropracticals, analytical techniques, polymers, diffusion, electrolysis, distillations, titrations and demonstrations.

- £900 ENTHUSE bursary • Money back:
- £900 (excl VAT) • Activity fee:
- 3 December 2018 3 weeks
- www.stem.org.uk/ny605

#### **TECHNICIANS SUPPORTING PHYSICS (11-19)**

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

- Money back: £900 ENTHUSE bursary
- Activity fee: £900 (excl VAT)
- 21 November 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

- £2,100 ENTHUSE bursary £2,100 (excl VAT) • 5 November 2018 6 days

#### **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

"I am able to look at examples of homemade equipment and make something similar, or look at a diagram and use every day items such as pipes in order to make equipment. This will be a cheaper way of getting more resources for the science department. Recently, I made a class set of pinhole cameras from boxes we acquired from a delivery of ray boxes; I noticed the pupils used this equipment with great enthusiasm."

- Shahina Wahid Winchmore School

#### **TECHNICIANS SUPPORTING TRIPLE SCIENCE**

This course is designed for technicians who support practical work in triple science. You will gain hands on experience of effective and engaging practical ideas in biology, chemistry and physics. You will also have the opportunity to discuss key learning points behind the practicals, where to find resource materials and how to prepare them.

- 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**

Develop your understanding of assessment for learning and uncover how your students are progressing. Led by Dylan Wiliam, Chris Harrison and Andrea Mapplebeck. Activity fee: free • 8 October 2018 6 weeks

www.stem.org.uk/ne701

#### MANAGING BEHAVIOUR FOR LEARNING

Transform your classroom by making small shifts in your own behaviour. Develop the habits of effective behaviour managers and explore how to manage difficult confrontations. Led by Paul Dix.

- Activity fee: free
- 17 September 2018 5 weeks
- www.stem.org.uk/ne700

#### PLANNING FOR LEARNING **IN STEM TEACHING**

Improve your planning and tailor activities to create assessment and feedback opportunities for your students. Activity fee: free

- 12 November 2018 5 weeks
- www.stem.org.uk/ne710

#### **TEACHING PRACTICAL SCIENCE**

Discover how to use practical work across the three science subjects to support explanation of theory. **Biology**: free

free

- Activity fee:
- 26 November 2018 3 weeks
- www.stem.org.uk/ne707

Chemistry:

- Activity fee:
- 12 November 2018 3 weeks
- www.stem.org.uk/ne705
- Physics:
- Activity fee: free
- 29 October 2018 3 weeks
- www.stem.org.uk/ne706

#### **TECHNICIANS AS DEMONSTRATORS**

Explore the use of demonstrations in science to inspire students.

- Activity fee: £27 (excl VAT)
- 5 November 2018 6 weeks
- www.stem.org.uk/ne203

#### THE SCIENCE OF LEARNING

What is learning? Improve the way you support your students to achieve their potential by exploring the science of learning. Activity fee: free

- 17 September 2018 5 weeks
- www.stem.org.uk/ne709

#### STEM INSIGHT PLACEMENTS

A unique opportunity to experience careers in a modern industry or leading university. Placements are complemented by a one-day CPD at the National STEM Learning Centre in York.

#### **BABRAHAM INSTITUTE** (BIOCHEMISTRY)

Explore careers in this world-class research institution, which carries out research on the molecular mechanisms that underlie normal cellular processes and functions. Money back: £1,000

- Activity fee: £250 (excl VAT) Cambridge
- October 2018 www.stem.org.uk/ty802

#### **HIGHWAYS ENGLAND** (D&T, ENGINERING, MATHS)

Discover the STEM careers behind England's motorways and how they keep us moving.

£1.000

- Money back:
- Activity fee: £250 (excl VAT)
- Dates throughout year, Bristol
- www.stem.org.uk/ty855

#### **IBM** (COMPUTING)

Join IBM for a placement where you can immerse yourself in the world of STEM outside of the classroom.

- Money back: £1.000
- Activity fee: £250 (excl VAT)
- 15 to 19 October 2018, London
- www.stem.org.uk/ty813

#### **NETWORK RAIL** (ENGINEERING, MATHS, COMPUTING)

Discover a range of STEM-related careers that run and improve our railway track, bridges, viaducts and more.

- Money back: £1,000
- Activity fee: £250 (excl VAT)
- Dates throughout year, various locations
- www.stem.org.uk/ty837

#### **NORTHERN GAS NETWORKS** (D&T, ENGINEERING)

Explore the many and varied roles in this exciting organisation and the skills needed for each.

- Money back: £1,000
- Activity fee: £250 (excl VAT)
- Dates throughout year, Leeds
- www.stem.org.uk/ty850

#### **UNIVERSITY OF LIVERPOOL** (BIOCHEMISTRY)

Work with students and staff in the Department of Biochemistry who cover a full spectrum of biochemistry research areas.

- Money back: £1,000
- £250 (excl VAT) Activity fee:
- Dates available October to April, Liverpool
- www.stem.org.uk/ty819



## OUR RECOGNITION PROGRAMMES HELP YOU ACHIEVE A NEW LEVEL IN YOUR DEPARTMENT, SCHOOL OR COLLEGE.

#### **STEM EDUCATORS**

Open year-round, this free programme provides a hallmark of quality for educators teaching STEM subjects.

#### **SCIENCE MARK**

Could your department be silver, gold or even platinum? Showcase and develop the work of your science department through Science Mark.

#### SPACE EDUCATION QUALITY MARK

Is your school or college using space to enrich the curriculum, and bring STEM to life? This programme develops and recognises schools and colleges using space as a context for STEM subjects.

# www.stem.org.uk/ms/awards-and-recognition