ISSUE 03 • SUMMER 2016

primary stem LEARNING

in this issue

Classroom Olympics

Bring the Olympics into your classroom this summer

STEM LEARNING

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

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Welcome

Welcome to the third edition of STEM Learning magazine.

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

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

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

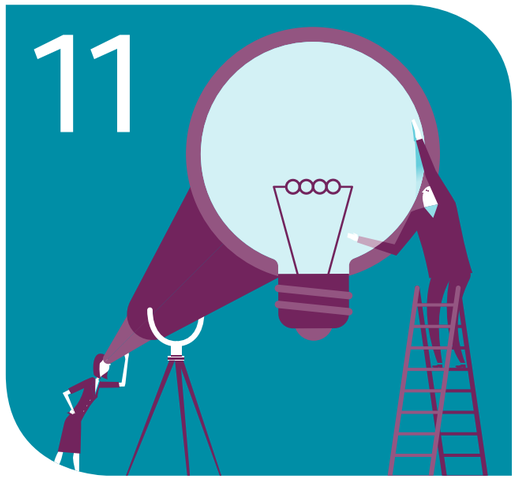
Yvonne Baker

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

Features

CPD LISTING

Articles



What does primary STEM look like?

by TANYA SHIELDS Professional Development Leader, National STEM Learning Centre and Network
@PriSciTan

The launch of the primary curriculum in 2013 saw an increased focus on providing children with an education that would enable them to contribute to the future prosperity of the country. If we are to truly offer a curriculum that enables children to successfully enter the skilled workforce we need to think carefully about how STEM education is fully integrated in our day-to-day teaching. STEM should not just be an acronym that is used to plan enrichment activities such as science weeks and challenge days.

STEM stands for science, technology, engineering and mathematics. Becoming a successful STEM educator does not mean changing everything you do. In most instances it's a case of stepping back and recognising the work you already do. In the spring edition of our primary magazine, Rachel Jackson discussed the intrinsic link between mathematics and science. By planning a coherent combination of mathematics and science lessons, children not only have the opportunity to consolidate mathematical skills in science but they also improve their ability to draw scientific conclusions based on their findings. A good STEM curriculum should enable children to experience how science, technology, engineering and mathematics work together to improve the world in which we live.

While engineering might not be a subject commonly found in primary schools, there is no shortage of engineering skills being developed. Possibly some of the most creative engineering can be found in the early years foundation stage (EYFS) where children are encouraged to freely build structures, whether they be tall towers or imaginary space ships. The more formal teaching of engineering is embedded within the design technology curriculum where children are expected to design, make and evaluate.

The development of the new computing curriculum provides children and teachers with a wealth of creative and exciting new skills to explore. The introduction of coding to the curriculum has seen a boom in the number of children writing their own computer programmes. Back in December 2015 we saw a perfect example of how STEM subjects are intertwined. Astronaut Tim Peake's launch to the international space station would not have been possible if it were not for STEM education. Not only is this a great news story but it's also an excellent opportunity for children to see how their in-school education can be used in the real world. Tim took with him two Raspberry Pi computers and school children have been sending their code to the space station. One example is a reaction time test which Tim used to measure his changing abilities throughout his mission. Back on Earth, children can use the Stupendous Stepper activities from 'In The Zone' to find out if they can improve their reaction time through practice; or maybe even write their own code to measure their sporting achievements.

In short, STEM education doesn't have to be complicated or time consuming. Simply make the time to ensure children knowingly use what they have learnt in one curriculum area and apply it to another curriculum area. Children will then begin to see how the STEM subjects are not single entities but subjects that rely on each other and when this knowledge is brought together amazing, life changing things can be achieved.

AVAILABLE RESOURCES

SHARE CHALLENGES AND IDEAS ONLINE WITH OUR PRIMARY STEM COMMUNITY GROUP:
■ www.stem.org.uk/mp/primary-group

GET YOUR SCHOOL INVOLVED WITH THE TIM PEAKE PRIMARY PROJECT:
■ www.stem.org.uk/esero/mp/tim-peake

GET INSPIRED WITH THE WELLCOME TRUST'S RESOURCE COLLECTION 'IN THE ZONE':
■ www.stem.org.uk/cx622

Taking the next step in coding

A great workshop can be inspiring. But what happens when you get back to your own classroom? Do the new ideas and knowledge get to see the light of day? Two teachers tell us what they've got up to after finishing computing CPD in York.

by RUTH in Suffolk
Primary Mathematics Leader

Following my Scratch training, I was able to teach the Year 5 and Year 6 children to write their own Scratch programs and games using a wide range of commands, including using sound and animation and so on.

Enjoyment and motivation definitely improved with many of the children downloading and using it at home and choosing Scratch as their chosen vehicle for producing their homework. One of my Year 5 boys wrote a program to show how to sort decimal numbers rather than making a leaflet or a poster as others did! It was great to see pupils applying their skills to other aspects of their schooling.

As mathematics leader, I was keen to develop some Scratch programs that I could use to demonstrate some of the solutions to maths problems and use Scratch as a means to practise skills and review learning in maths. I used the freely available Mathematical challenges for able pupils for Key Stages 1 and 2 book as a start. The children enjoyed seeing how these problems could be modelled through Scratch and the challenge to write the programs in the first place improved my Scratch skills hugely.

My aim after attending the course was to become more confident myself in order to be able to support the learning for my pupils and to be able to assist colleagues too. After a number of weeks, I led some INSET in school and was able to support colleagues with Scratch plans and lessons in Years 3 and 4. Staff could also see how mathematics lessons could use Scratch as a means to assist learning.

by ROB in Darlington
Key Stage 2 Teacher

Last February I attended training on the teaching of the new computing curriculum. It was a brilliant two days which inspired me to develop a coding ethos in the school.

I could see that the curriculum we were following focused too heavily on word processing and presentations. A picture which must sound familiar to a lot of colleagues! Two days of CPD showed me how out of touch we were as a school and how much of a leap we had to make to get the children accessing the new computing curriculum.

It was simple as well – that was the best part – using online Scratch software to meet the requirements of most of the new curriculum. By opening up the curriculum to computer coding you would be allowing the children to access a whole new world of possibilities. I learnt a new term – debugging. The best thing is this does not involve the removal of creepy crawlies from children's heads either!

So where are we now? Well, we have a brand new computing curriculum that centres around Scratch. This includes all year groups and not just Key Stages 2. The best bit is the children. They're buzzing about computing lessons and they've all become better programmers than I will ever be.

Are we there yet? 'No' in a word. The pressures on the primary curriculum from literacy and numeracy mean that teachers are only getting into the computer suite once a week at the moment, but it is a start and I do feel that we are giving the children the skills that could enable them to become the programmers of the future.

EXPLORE OUR COMPUTING CPD AND SEE WHERE IT COULD TAKE YOU

LEADING THE NEW PRIMARY COMPUTING CURRICULUM
■ **www.stem.org.uk/cy004**

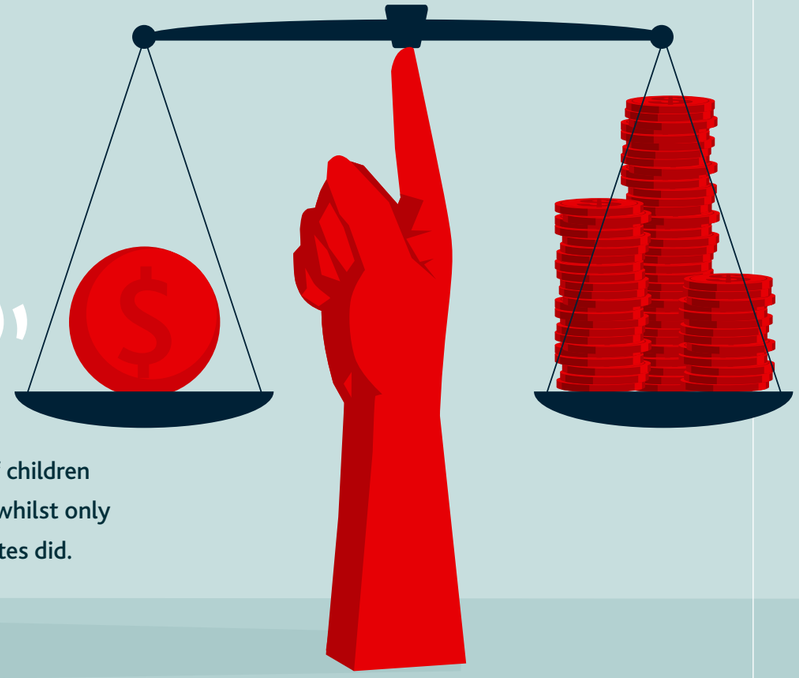
ASSESSMENT IN PRIMARY COMPUTING
■ **www.stem.org.uk/cy032**

CODING USING SCRATCH AND KODU
■ **www.stem.org.uk/lx3ek6**

Could the Singapore Bar Model hold the key?

by RACHEL JACKSON Primary Specialist , National STEM Learning Centre and Network
@JacksonR141

"Laura had $240. She spent 5/8 of it. How much money did she have left?"



When asked this question 78% of children in Singapore answered correctly, whilst only 25% of children in the United States did.

This question, highlighted on a course, intrigued me as solving worded problems proves to be a stumbling block for many children. So how does teaching differ in Singapore to produce this result?

As we went on to discover, this visual representation may hold the key…

In Singapore children are taught to use the Singapore Bar Method to represent a worded problem before performing the calculation. The example given would show two bars; the first representing 240 dollars then a second smaller bar representing 5/8 beneath it. This representation supports children in seeing that the answer must be less than 240 dollars and gives a visual representation of the calculation hidden within the words.

With this method being taught consistently in schools in Singapore and with a higher percentage of children able to answer worded problems successfully, I wonder if this could be part of the solution for teaching this tricky area. It is interesting to note that in a 2011 Ofsted report on good practice in primary mathematics an example of using the Singapore Bar Method is highlighted as an example of using a visual representation to aid conceptual understanding. Currently Maths Hubs across the country are working with primary schools using adapted versions of textbooks currently used in Singapore exploring the Concrete-Pictorial-Abstract way of teaching mathematics including the bar model.

When speaking with teachers and listening to experts in this field, it does appear to provide children with a visual representation of the calculation, so they can understand what needs to be done. Even though the calculation they perform may not always be carried out correctly, they are given the tools to unravel the often confusing worded problem and find the mathematics underneath.

The curriculum contains a much greater focus on problem solving and reasoning, at both primary and secondary level, so could the bar model could help provide a standard approach for worded problems and developing reasoning skills?

FIND OUT MORE ABOUT THE BAR MODEL

Inspirational ideas and more:
■ **www.stem.org.uk/lx4e4s**

We will be discussing the Bar Model at this year's Primary mathematics conference in June:
■ **www.stem.org.uk/my007**

Growing relationships

by JANE WINTER
@JaneWinter115
Professional Development Leader at CIEC (York University), National STEM Learning Centre and Network and Schools advisory teacher

The best Early Years activities not only engage children, but engage their families too. The trick is to find age appropriate science experiences that also grab the attention of adults and get them talking, not only to their children, but to each other. Often though it is not what we do but the way that we do it that has the biggest impact.

Planting and growing sunflowers for example is perfect. The seeds are easily manipulated by small hands, germination is generally reliable and the resulting plants are dramatic. There are plenty of opportunities for children to measure, record, observe over time and to find out what a plant needs to grow. However, if children take their young plants home, the momentum is frequently lost and most of the plants are destined to remain in their small pots until they die a premature and stunted death.

It doesn't need to be like this. One year, I let families know that the sunflowers were to be 'homework' for the rest of the term. Every few days the children would bring home measuring kits and the day after measuring their sunflowers, adults were asked to come in with their child to support them to fill in a full scale graph of their sunflower. Families inevitably began to compare notes as they noticed that some plants were considerably taller than others. People who were not usually interested in gardening suddenly became very interested. Larger pots were bought, grandparents were consulted, and fertilizer was applied.

Even with high levels of engagement, it is still possible that the impact can be wasted; there is a danger that families do not realise that they are engaged in science, as some see science as a remote and difficult subject. It's important to show that science is interesting and relevant if children are to realise that it could be a worthwhile subject to pursue when they are older.

I found that the class pages of the school website were a useful way to share information. To ensure that people regularly logged on I found that it was necessary to upload photographs and information regularly. Parents got used to reading, not only about what their child had been doing in school, but why they had been doing it, and how they could continue to support their learning at home.

For example, when children made playdough they took some home. On the website I showed pictures of children making the dough and highlighted how this experience had helped them to develop their understanding of materials. I also shared ideas about how they could play with the dough at home and included a recipe so that they could make more if they wanted. I found adult engagement was often hooked if a challenge was issued, for example by asking them to investigate different ways of making playdough or experimenting with different flours. Many times they were as excited as their children when they realised that they were 'doing science'.

> It's important to show that science is interesting and relevant if children are to realise that it could be a worthwhile subject to pursue when they are older.

Over time families came to realise that when I countered their requests for homework sheets with a suggestion that they might like to do some cooking, gardening or something else with their child, I was not fobbing them off. Moreover, they understood how they could get the most out of the experience because they had a better understanding of why they were doing it. They also began to change their views about science.

All of these suggestions would be effective throughout the primary age range. I think that it is easier to build these kinds of positive relationships in the early years classroom, when teachers generally have a lot more contact with families. Moreover, attitudes about education in general and science in particular formed at this early stage will have an impact on children not only for the rest of their time at school but arguably for the rest of their lives.

GROW YOUR KNOWLEDGE

ENGAGE PUPILS WITH SEEDS, PLANTS AND SUNFLOWERS
■ **www.stem.org.uk/lx4p46**

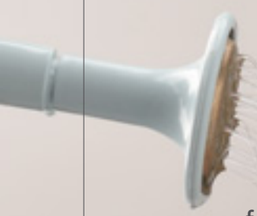
PUTTING SCIENCE AT THE HEART OF EARLY YEARS
■ **www.stem.org.uk/rp120**

USING YOUR OUTDOOR LEARNING ENVIROMENT
■ **www.stem.org.uk/rp111**

ENRICHING PRIMARY SCIENCE THROUGH INSPIRATIONAL IDEAS
■ **www.stem.org.uk/ny045**

Food for thought

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



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

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

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

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

> "Teachers, parents and students are being challenged to examine their relationships with food"

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

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

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

SERVE UP SOME NEW LESSONS

FOOD SECURITY AND SUSTAINABLE DEVELOPMENT AT PRIMARY LEVEL:
■ **www.stem.org.uk/lx4p3r**

SUPERMARKET SCIENCE
■ **www.stem.org.uk/rp125**

Look to the future: the future needs STEM

by YVONNE WRIGHT Space Ambassador, ESERO-UK

The Aspires report produced by Kings College, London looked at young people's science and career aspirations.

The five year study provided a series of messages for policy and practice, here are a selection:
- efforts to broaden students' aspirations, particularly in relation to STEM, need to begin at primary school. The current focus of most activities and interventions – at secondary school – is likely to be too little, too late.
- breaking the pervasive perception that 'studying science = becoming a scientist'.
- embed STEM careers awareness in science lessons

The 'Look to the future: the future needs STEM' is a careers resource written to highlight some of the STEM career opportunities available so that pupils, teachers and school communities in primary schools can discuss and explore from an earlier age the breadth of jobs opportunities available. I have used this resource in many schools in my role as a space ambassador for ESERO-UK and every time I use it I wish someone had talked to me at an earlier age about careers.

The activity that always fascinates me is the A-Z alphabet activity. You ask pupils to list all the jobs they know of and as you may have already guessed the jobs they include are often the ones that have experienced or seen in their community. For example doctor, nurse, fireman, teacher, plumber etc. I then ask the children to research an everyday object that is made possible by STEM. For example food, hair-gel, make-up, sports equipment, clothes, cars. I ask them to research how the object is developed, designed, tested and who would be involved? This starts to get the children to make connections with the real world.

The activity which teachers say they particularly enjoy delivering from the booklet is the activity where each pair of children is given a set of skills and qualities cards. These include words like hardworking, caring, reliable, determined, trustworthy etc. The children are asked to sort into skills and qualities and then identify which ones would describe the two people in the job profiles provided: these include astronaut Tim Peake and Katherine Jackson (Engineer).

The ASPIRES research showed that it is not a lack of interest in science that is causing a low uptake of STEM careers but instead a lack of awareness as to where science can lead. Using resources such as Look to the Future within lessons can help to broaden perspectives at this crucial age.

USE THESE ACTIVITIES IN YOUR CLASSROOM:

LOOK TO THE FUTURE, THE FUTURE NEEDS STEM
■ **www.stem.org.uk/rx34fw**

BRING MARS EXPLORATION INTO THE PRIMARY CLASSROOM
■ **www.stem.org.uk/cy010**

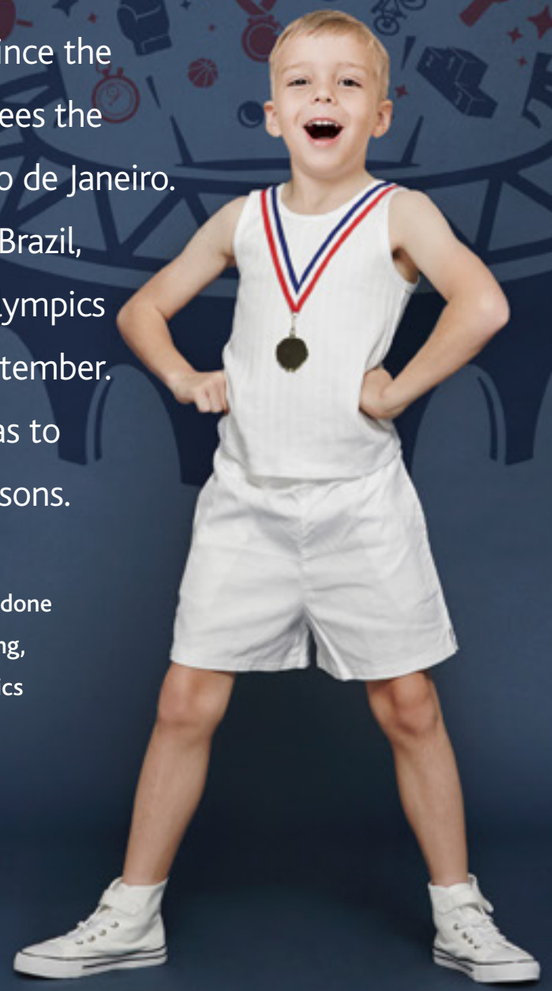
SPACE EDUCATION QUALITY MARK
■ **www.stem.org.uk/esero/mp/seqm**

MISSION X - TRAIN LIKE AN ASTRONAUT
■ **www.stem.org.uk/rxyqo**

Bring the Olympics into your classroom

by TANYA SHIELDS Professional Development Leader, National STEM Learning Centre and Network
@PriSciTan

How time flies! It's been four years since the London Olympics and this summer sees the opening of the Olympic Games in Rio de Janeiro. The Olympics will be taking place in Brazil, from 5 to 21 of August, and the Paralympics will be taking place from 7 to 18 September. We've come up with some great ideas to link up with the Olympics in your lessons.



Each one of the activities we've suggested could be done in isolation, but why not link your science, computing, design and technology, engineering, and mathematics lessons in the build up to Brazil, and challenge your students to become 'Olympic STEM champions'?

#STEMolympics16

SCIENCE

Turn your classroom into a sports science laboratory this summer. There are so many great experiments you can get your pupils to run – testing their classmates' reaction times, how exercise affects the heart and other organs, thinking about athletes' diets... The list is endless! One challenge for Team GB will be the Brazilian climate.

Why not get the class investigating the amount of UV reactive beads to investigate the amount of UV light that hits their playground or sports field at different times of day? What time of day would be best to hold a race to avoid high UV? Could they investigate which sun cream the athletes should wear to protect their skin?

DESIGN AND TECHNOLOGY

Try getting your students to investigate the design of footwear for different sports which athletes need grippy shoes and which need slippy shoes? Using a Newton meter and a variety of sports shoes children can find out which shoes create the most friction when pulled across the floor.

How could you make them lighter, grip better, or keep athletes feet cool in hot South America? Challenge them to design a special shoe that will enable athletes to jump higher or run faster.

COMPUTING

Get your class coding this summer term – if you have access to a Nintendo Wii, why not bring it in and use their sports game to introduce some of the classic Olympic sports? Once they've got inspired by the game, challenge them to design their own Olympic game using Scratch. Over several lessons they can begin creating the game, debug the code and finally present their game to the class.

ENGINEERING

There's so much you could do to link the Olympics and engineering – looking at exciting designs for the stadiums, examining the perfect running track or what materials would work best as different pieces of sporting equipment. But a great angle could be the Paralympics. Taking place in September, these Games will show case the application of science and engineering working together to build prosthetic limbs. Why not challenge your students to work in teams to design a prosthetic limb for a range of Olympic sports?

MATHEMATICS

The Olympics offers some great opportunities for data handling activities with an exciting context. From measuring lengths of arms and legs and seeing how these affect athletes' success at various sports, to timing their classmates' lap times and creating averages. If you've been doing Olympics challenges in all your lessons you could ask your class to analyse how well the class does across the whole range of activities, and work out who is the 'Olympics STEM champion'!

There is a wealth of resources and ideas out there to enrich your STEM curriculum and introduce children to the forthcoming games. You can also link this theme to literacy, art, drama, physical education - even the school lunches. We hope we've got you inspired – and if you decide to bring the Olympics into your classroom, don't forget to Tweet us some pictures!

GO FOR GOLD:

Activities in this article are inspired from our fantastic collection of online resources – you can browse over 10,000 free resources here:
■ www.stem.org.uk/mp/resources

STEM leaders: inspire the next generation

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

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

Currently around 39% of companies that currently recruit employees with STEM skills are reporting difficulties in recruiting staff with STEM qualifications. This figure is set to rise due to the expansion of STEM industries and as the existing ageing STEM skilled workforce retire in the next few years.

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

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

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

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

THE IMPORTANCE OF CAREERS EDUCATION AT PRIMARY LEVEL
■ **www.stem.org.uk/mp/careers-toolkit**

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

EDITOR'S TOP PICK CHOICE

TIM PEAKE RETURNS
JUNE

After spending six months on the International Space Station, completing a spacewalk and taking part in a number of scientific experiments and activities, Tim Peake will be returning to Earth in June!

There is still plenty of opportunity to use Tim Peake's mission to inspire pupils of all ages.

■ www.stem.org.uk/mp/esero/tim-peake

MAY 2016

ROLLS-ROYCE SCIENCE PRIZE
13 MAY

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

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

WORLD TURTLE DAY
23 MAY

Put it in your diaries, World Turtle Day takes place annually on 23 May. This resource from the ARKive collection is packed full of games and engaging materials to teach your pupils about the life cycle of turtles and the dangers they face on a daily basis.

■ www.stem.org.uk/rx325k

JUNE 2016

WORLD ENVIRONMENT DAY
5 JUNE

Celebrate the biggest day for positive environmental action. Inspire your pupils with environment-related activities and resources, all based around the Earth and our carbon footprint.

■ Find out more: www.unep.org/wed

FREE ONLINE CPD, DIFFERENTIATING FOR LEARNING
20 JUNE

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

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

JULY 2016

ENTHUSE CELEBRATION AWARDS
5 JULY

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

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

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

AUGUST 2016

OLYMPIC GAMES 2016
5-21 AUGUST

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

■ www.stem.org.uk/cx5nz

2016 summer conferences

Want to improve your skills over the summer? Come along to one of our subject specific conferences held at the National STEM Learning Centre in York. With everything from developing your coding knowledge to teaching the more difficult aspects of the mathematics curriculum, we have something for everyone. Plus get your creative juices flowing in our inspiring Centre and check out the physical resources we have available in our library.

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

We're giving you the opportunity to learn how to effectively use research to improve your lessons with evidence based teaching. Featuring keynote speakers like expert Professor Shirley Simon, interactive workshops, discussions and debates all based around academic papers and case studies provided by teacher participants. Don't miss out on your chance to maximise your impact on the teaching of STEM subjects.
- 20 May 2016: 2 days

■ www.stem.org.uk/ny259

COMPUTING CONFERENCE WITH CAS REGIONAL CENTRE FOR YORKSHIRE AND HUMBER

Featuring sessions from leaders in computing education and CAS Master Teachers, this conference is an ideal opportunity to learn about computing at all phases of education and to share ideas.
- 29 Jun 2016: 1 day

■ www.stem.org.uk/ty007

PRIMARY MATHEMATICS CONFERENCE

An inspiring day of workshops with opportunities to discuss mathematics education with a broad range of colleagues.
- 30 Jun 2016: 1 day

■ www.stem.org.uk/my007

PRIMARY SCIENCE CONFERENCE

Inspire children and colleagues to enjoy science and develop a range of creative and cross-curricular approaches to primary science.
- 1 Jul 2016: 1 day

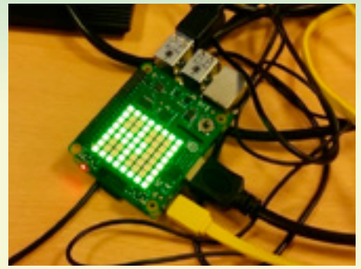
■ www.stem.org.uk/ny007

SOCIAL MEDIA

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

@STEMLearningUK
Followers: 17.7K

@astro_pi Creeper made by a new coder at the @STEMLearningUK #megaJam6



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

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

@AvonTSA A successful afternoon yesterday with our primary colleagues on @STEMLearningUK Key Areas of Primary Science course

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

High quality professional development that makes an impact

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

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

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

TEACHING AND LEARNING

PROGRESSION, MODERATION AND ASSESSMENT

SUBJECT KNOWLEDGE

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

COMPUTING

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

ACHIEVING THE E-SAFETY MARK IN YOUR PRIMARY SCHOOL

Gain an understanding of the new changes to inspection in schools. Understanding the responsibilities, procedures, risks and good practice to keep staff and children safe.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 5 Dec 2016 4 days over 2 periods

www.stem.org.uk/cy009

ASSESSMENT IN PRIMARY COMPUTING

Develop your ability to make confident assessment decisions in computing and secure positive assessment practices in the computing curriculum.
- Your school receives: £900 ENTHUSE Award
- Activity fee: £750 (ex VAT)
- 20 Oct 2016 3 days over 2 periods)

www.stem.org.uk/cy032

BRING MARS EXPLORATION INTO THE PRIMARY CLASSROOM

ESA's ExoMars mission will search for signs of life on the red planet - this course uses a range of exciting and engaging kit to get your children involved.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 24 Nov 2016 1 day

www.stem.org.uk/cy010

LEADING THE NEW PRIMARY COMPUTING CURRICULUM

Supporting subject leaders and teachers with a strong interest in leading computing, looking at key areas of the curriculum including debugging and digital content.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 15 Sep 2016 4 days over 2 periods

www.stem.org.uk/cy004

POWER UPS, EXTRA LIVES AND ZOMBIES – ENRICHING THE KS2 CURRICULUM THROUGH GAMES CREATION

Guiding you through the coding elements of the KS2 computing curriculum, with opportunities to experience a variety of programming skills.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 26 Sep 2016 2 days

www.stem.org.uk/cy005

DESIGN AND TECHNOLOGY

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

CRUMBLE ROBOTICS: USING LIGHTS, SENSORS AND MOTORS

Crumble is a programmable board that is being used in KS2 and KS3 to create programmable computing and design and technology projects.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 23 Nov 2016 1 day

www.stem.org.uk/ty236

PRIMARY DESIGN AND TECHNOLOGY: PROJECTS, IDEAS AND RESOURCES

This one day course is packed full of inspiring ideas for design and technology projects, open-ended challenges to help you explore and experiment with during the day.
- Your school receives: £300 ENTHUSE Award
- Activity fee: £300 (ex VAT)
- 7 Dec 2016 1 day

www.stem.org.uk/ty025

USING FILM TECHNOLOGY TO SUPPORT PRIMARY LITERACY

Explore a variety of film related skills and techniques for the classroom, from film analysis and shot direction to creating content using accessible technology and software.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 1 Dec 2016 2 days

www.stem.org.uk/ty021

USING IPADS, CHROMEBOOKS AND OTHER TABLET DEVICES IN THE PRIMARY CLASSROOM

This CPD activity is a beginner's guide to using your mobile device in the classroom. It is suitable for teachers and teaching assistants who are users of iPads, Android and Windows based devices.
- Your school receives: £600 ENTHUSE Award
- Activity fee: £600 (ex VAT)
- 12 Dec 2016 2 days

www.stem.org.uk/ty015

"93% of participants who attended courses at the National STEM Learning Centre reported a positive impact on their pupils."

MATHEMATICS

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

ASSESSMENT IN PRIMARY MATHEMATICS

This CPD activity combines conceptual understanding, procedural fluency, reasoning and problem solving to help teachers accurately assess performance in mathematics.
- Your school receives: £1,200 ENTHUSE Award
- Activity fee: £1,000 (ex VAT)
- 20 Oct 2016 3 days over 2 periods

www.stem.org.uk/my032

SCIENCE

ASSESSMENT AND PROGRESSION IN PRIMARY SCIENCE

Evidence shows that effective assessment for learning leads to raised attainment. Identify how you can integrate and embed assessment practices into your science teaching.
- Look for dates and venues online

www.stem.org.uk/rp102

CREATING A BUZZ AND RAISING THE PROFILE OF SCIENCE IN YOUR SCHOOL

You will leave full of practical ideas to enrich primary science in your school. You will be inspired to enthuse your pupils about the thrill of scientific ideas and science enquiry.
- Look for dates and venues online

www.stem.org.uk/rp117

DEVELOPING THE ROLE OF THE SCIENCE SUBJECT LEADER

Explore a range of strategies to audit and lead science in your school, understand your role more fully and be able to identify and promote effective primary science.
- Look for dates and venues online

www.stem.org.uk/rp101

EMBEDDING THE SCIENCE NATIONAL CURRICULUM

Our experienced primary practitioners will help review your provision in line with the primary curriculum guidance and offer strategies and advice for any gaps in your plans.
- Look for dates and venues online

www.stem.org.uk/rp104

ENGAGING SCIENCE IN KEY STAGE 1

Try out ideas for practical science that can be used with young children to develop a range of scientific skills and explore opportunities to

promote children's social skills.
- Look for dates and venues online

■ **www.stem.org.uk/rp109**

MAKING POWERFUL CONNECTIONS BETWEEN LITERACY AND SCIENCE

Explore the curriculum links between science and literacy and how to develop literacy skills to improve the quality of children's written explanations in science.
- Look for dates and venues online

■ **www.stem.org.uk/rp114**

MAKING POWERFUL CONNECTIONS BETWEEN MATHEMATICS AND SCIENCE

Maximise your pupils opportunities to develop their numeracy skills and improve attainment in science by planning lessons in which children effectively handle data.
- Look for dates and venues online

■ **www.stem.org.uk/rp113**

PLANNING CROSS-CURRICULAR SCIENCE WITHIN THE NATIONAL CURRICULUM

You will be given support to create plans for meaningful cross-curricular links within science.
- Look for dates and venues online

■ **www.stem.org.uk/rp106**

PRIMARY CONFERENCE

Our primary conferences always provide outstanding learning opportunities linked to topical developments in primary science teaching along side time to talk and share ideas with other primary practitioners.
- Look for dates and venues online

■ **www.stem.org.uk/rp124**

PRIMARY SCIENCE SUBJECT LEADERS' NETWORK

These meetings are a chance for subject leaders to learn about the latest local and national initiatives in science and keep abreast of developments within the subject.
- Look for dates and venues online

■ **www.stem.org.uk/rp121**

PROMOTING THINKING AND TALKING IN PRIMARY SCIENCE

Consider the key elements of thinking, talking and communicating in science and develop these skills to create an effective learning environment in your classroom.
- Look for dates and venues online

■ **www.stem.org.uk/rp116**

PUTTING SCIENCE AT THE HEART OF EARLY YEARS

Increase your confidence in using a range of approaches and assessment strategies to meet children's needs in Early Years.
- Look for dates and venues online

■ **www.stem.org.uk/rp120**

RAISING ATTAINMENT IN SCIENCE

Identify teaching and learning strategies that will move good lessons to outstanding lessons by focussing on the learning happening in the classroom.
- Look for dates and venues online

■ **www.stem.org.uk/rp103**

STRENGTHENING SUBJECT UNDERSTANDING IN...

Focus on the big ideas in primary science, helping you make a difference to children's learning by identifying and challenging misconception.
- Look for dates and venues online

■ **www.stem.org.uk/rp112**

SUPERMARKET SCIENCE

This practical CPD will provide you with a bank of easy to use ideas that you can take away with you to enable your pupils to conduct experiments and have fun.
- Look for dates and venues online

■ **www.stem.org.uk/rp125**

USING COMPUTING AND DATA LOGGING TO SUPPORT SCIENCE

Gain hands-on practical experience using digital technologies in science and be able to decide on the best use of the technology and integrate them into your science lessons.
- Look for dates and venues online

■ **www.stem.org.uk/rp115**

USING YOUR OUTDOOR LEARNING ENVIROMENT

Using the outside world we will create exciting and inspiring investigations that will motivate and engage your pupils to learn.
- Look for dates and venues online

■ **www.stem.org.uk/rp111**

WHY CHILDREN NEED TO WORK SCIENTIFICALLY AND HOW THEY CAN

Learn to implement strategies for enquiry in order to improve children's outcomes through effective teaching of scientific enquiry.
- Look for dates and venues online

■ **www.stem.org.uk/rp107**

WORKING SCIENTIFICALLY IN THE PRIMARY CURRICULUM - PUPIL LED INVESTIGATIONS

You will explore a range of techniques to draw out pupil ideas and develop strategies to inspire and incorporate these ideas into your science lessons.
- Look for dates and venues online

■ **www.stem.org.uk/rp108**

INTENSIVE SUBJECT-SPECIFIC CPD
Accommodation and meals included

ASSESSING, MODERATING AND TRACKING PRIMARY SCIENCE

Ideal for teachers who want to familiarise themselves with the current expectations around assessment and children's progress in science.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 20 Oct 2016 3 days over 2 periods

■ **www.stem.org.uk/ny032**

DEVELOPING AN OUTSTANDING PRIMARY SCIENCE CURRICULUM

This CPD activity will give you either a starting point or springboard to practical advice and a range of approaches for developing a primary science curriculum.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 13 Dec 2016 3 days over 2 periods

■ **www.stem.org.uk/ny044**

DEVELOPING SUBJECT KNOWLEDGE FOR PRIMARY TEACHERS

Improve subject knowledge and develop your ability to deliver high quality science lessons and address pupils' misconceptions.
- Your school receives: £2,100 ENTHUSE Award
- Activity fee: £1,800 (ex VAT)
- 28 Nov 2016 6 days over 3 periods

■ **www.stem.org.uk/ny029**

DIFFERENTIATION: SUPPORTING ABLE STUDENTS IN STEM

This course supports you in providing differentiation for high ability students and ensuring that they are sufficiently challenged to fulfil their potential.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 4 Oct 2016 3 days over 2 periods

■ **www.stem.org.uk/ny052**

EMBEDDING WORKING SCIENTIFICALLY IN THE PRIMARY CURRICULUM

Practical science is essential for inspiring children and teachers alike, you will develop practical strategies to enhance learning in primary science.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 2 Nov 2016 3 days

■ **www.stem.org.uk/ny030**

ENRICHING PRIMARY SCIENCE THROUGH INSPIRATIONAL IDEAS

A perfect opportunity to explore some of the activities which you could do during science weeks with something for every budget.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 14 Nov 2016 3 days

■ **www.stem.org.uk/ny045**

IMPROVING NUMERACY AND LITERACY THROUGH SCIENCE

Revealing how to use the curiosity and enthusiasm generated through science, to connect with, support and enhance children's learning in mathematics and English.
- Your school receives: £1,400 ENTHUSE Award
- Activity fee: £1,200 (ex VAT)
- 27 Sep 2016 4 days over 2 periods

■ **www.stem.org.uk/ny036**

NEW AND ASPIRING PRIMARY SCIENCE SPECIALIST

This CPD activity will help you develop the knowledge, skills and confidence to become a primary science specialist changing the way science is taught in your school.
- Your school receives: £3,150 ENTHUSE Award
- Activity fee: £2,925 (ex VAT)
- 28 Nov 2016 6 days over 3 periods

■ **www.stem.org.uk/ny010**

SUPPORTING SEN PUPILS IN THE PRIMARY STEM SUBJECTS

Focusing on how best we can support and motivate less able pupils, you will be given the opportunity to engage with current theory and best practice in the field.
- Your school receives: £1,050 ENTHUSE Award
- Activity fee: £900 (ex VAT)
- 7 Nov 2016 3 days over 2 periods

■ **www.stem.org.uk/ny043**

ONLINE

FREE ONLINE CPD, DIFFERENTIATING FOR LEARNING

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

■ **www.stem.org.uk/online-cpd**

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

Don’t miss out

on everything our website has to offer

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

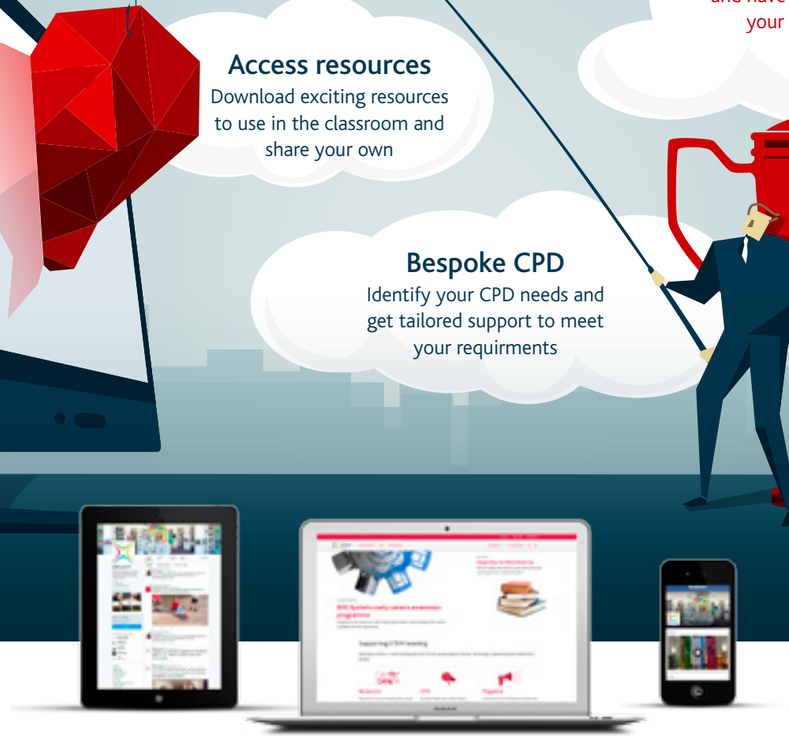
Personalise your experience
Use your dashboard to find and store information tailored to your interests

Recognition
Demonstrate the positive impact of your professional development

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

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

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



www.stem.org.uk

PROJECT
ENTHUSE

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

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

ENTHUSE AWARDS

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

INTENSIVE ENTHUSE AWARDS

£5,000 bursaries to support in-school, consultant led professional development for state schools in England that have not participated in Project ENTHUSE supported professional development in the last five years.
■ **www.stem.org.uk/mp/intensive-enthuse**

ENTHUSE PARTNERSHIPS

£12,000 for groups of between four and eight primary schools located in England, working together to address local issues of underachievement in science/STEM subjects.
■ **www.stem.org.uk/mp/enthuse-partnership**

TEACHER INDUSTRIAL PARTNERS’ SCHEME

To ensure that your students are informed for the next academic or industrial phase of their lives, it is crucial that teachers keep up-to-date with both modern career options and routes into academia.

Being part of the Teacher Industrial Partners’ Scheme or the Teacher Academic Placement Scheme provides the perfect opportunity for STEM teachers to step out of the classroom and experience the world of industry or a cutting edge biochemistry department.

The skills learned from the scheme will enable teachers to better advise students, create partnership links with industry or a university and support the contextualised teaching of the STEM curriculum.

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

■ **www.stem.org.uk/mp/tips**

■ **www.stem.org.uk/mp/taps**

National STEM Learning Centre and Network

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

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

Find out more at www.stem.org.uk

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