

STEMtech

Educator

Issue 1, November 2014





STEMtech[®]

Advancing STEM and technical education

The 2nd Annual Conference & Showcase

The Queen Elizabeth II Conference Centre

Westminster, London

29th April 2015

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Welcome

Welcome to the first issue of **STEMtech Educator**, a magazine for teachers of Science, Technology, Engineering and Maths (STEM) in the UK. Published once a term, the magazine is free to subscribers and includes articles which will inspire, motivate and inform anyone who is dedicated to and passionate about advancing STEM and technical education.

Tina Lucas, Founder & CEO, STEMtech

Are you passionate about STEM education?

If you would like to contribute to STEMtech Educator please get in touch.



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Scholarships to inspire your best STEM students

The Arkwright Scholarships Trust administers the most prestigious engineering scholarships scheme in the UK, offering a unique package of mentoring and assistance to talented engineering and technical design students.

Do you have high-performing 15/16 year old students who already aspire to a career in engineering? Or do you have students whose combination of academic prowess and creative practical ability means that an engineering career might be of interest to them? If so, Arkwright Engineering Scholarships can help you to reward these high-potential students whilst also enhancing their academic and career prospects.

Established in 1991, the Arkwright Scholarships Trust is a charity that identifies and nurtures future leaders in engineering and technical design. Arkwright achieves this aim by awarding Engineering Scholarships to high-calibre students to enrich

the students' experiences throughout their 'A' levels or Scottish Advanced Highers. The Engineering Scholarships are sponsored by Industrial companies, Universities, Charitable Trusts, the Armed Services, Professional Institutions, Trade Associations and Personal Donors. Scholars are actively encouraged to develop a partnership with their sponsor. Arkwright's track record means that it is the most prestigious Scholarship scheme of its type in the UK. Students apply during year 11 (England and Wales), S4 (Scotland), year 12 (Northern Ireland). Arkwright Engineering Scholarships are awarded after a competitive assessment process comprising: a detailed

application form with teacher reference (submitted between October and January); a two-hour aptitude exam (sat under exam conditions in the applicant's school in February); an interview (hosted at a top engineering university in March/April).

The Scholarships provide students with access to a wide range of exclusive enrichment activities, plus a £600 financial award to support the purchase of reference books, project materials and equipment, museum and university visits. Third-party activities such as Smallpeice residential courses, STEMNET mentoring, HeadStart summer schools and Nuffield Research Placements are also promoted to the Scholars.



New Arkwright Engineering Scholars receive their certificates from their Sponsor at the annual Awards Ceremony

“ Arkwright’s track record means that it is the most prestigious Scholarship scheme of its type in the UK.”



Arkwright Scholars at an exclusive chemical engineering ‘come-and-try’ event at the University of Nottingham

The school department receives £400 for each Scholarship awarded to one of its students, to be spent on equipment, materials, student trips, or teacher training to enhance the teaching of STEM subjects in your school. The scheme has proven benefits for the students’ personal development, for their future education and for their careers. The Trust’s tracking of its Scholars since 1991 has shown the outstanding exam results and excellent careers that Scholars have gone on to achieve.

“Arkwright Scholars are not only academically excellent, but also show a strong practical, problem-solving ability. Our Scholars are highly respected

by university admissions tutors and industry recruiters for this reason,” says Dr. Martin Thomas, Chief Executive of The Trust.

David Robb, Mechanical Engineering Admissions Tutor, Imperial College, London backs this up: *“I have always rated Arkwright Scholarships highly. Scholars who apply to study at our University demonstrate a strong interest in the real world of engineering.”*

Former scholarships recipient, John Hutcheson, is now an Engineering Undergraduate student at The University of Edinburgh. He says: *“I believe it played a big part in my getting an unconditional place at university.”* In order to submit student applications a school must

be affiliated to the Arkwright Scholarships Trust. Arkwright has worked with STEM Departments in over 1200 schools across the UK since 1991. New schools are encouraged to affiliate without delay to ensure they can submit their best students in the 2014/15 application round. Affiliation is quick, simple and free.

To affiliate your school for free, visit www.arkwright.org.uk/schools for more details, or ring **01926 333210**.

on its head

Science teacher, Jim Baker advocates a radical new way of structuring lessons and homework – “the flipped classroom” – in a mission to create truly independent learners.

Jim Baker is now semi-retired, but it is clear when speaking with him that his love for education is as strong as when he started his career as a chemistry teacher 43 years ago. Educating students to become independent learners is something that he is truly passionate about.

Jim, who describes himself as a maverick, doesn't like the word 'teach' so avoids it whenever possible, and even when asked his profession says he's an entertainer as, “that way students learn”.

It is this commitment to helping students learn more effectively that has led Jim to seek better ways of structuring his lessons. In the conventional classroom, students will read a chapter in class (something they could manage to do without the aid of a teacher - but the teacher is there nonetheless) and are set the 'end of chapter question' to do at home. This is when they need a teacher most but the



teacher is not there to help them. This is a nonsense according to Jim, who avoids the word, 'homework' wherever possible.

In the 'flipped classroom' students use their time away from the teacher to familiarise themselves with the next lesson. To make this possible the whole year's work, or even a whole key stage of work (2 or 3 years' worth) is mapped out online before their course starts. For this Jim uses secure social education network, 'Twiducate' which he says complements the flipped classroom. For each topic there is a variety of resources such as notes, games, videos and interactive modules to support different learning styles. He prefers to call this time 'Prep' rather than 'Homework' as the students are indeed preparing for the next lesson. Students can post questions on their twiducate page to be answered by their peers or the teacher/s, who are notified by email whenever a post is made.



ask, or where the discussions may lead? Jim says his students' independent learning skills are far more important and with his 'flipped' approach, more is achieved because students are far happier when they are in control of their learning.

Jim cites another advantage of his 'Flipped Classroom' approach to be that: *"If a student does not immediately understand some information, he/she can rewind the video (as many times as necessary) whereas one cannot rewind the teacher in a lesson!"*

Jim says: *"The resources from which to learn are already out there; our job is to help our students manage their way through these resources by using the valuable class time to work interactively with them and guide them."*

Students receive feedback when they need it, not days after. This all helps foster and maintain their 'love of learning'. The bright, gifted, or highly motivated student has plenty of resources at his/her fingertips and the lessons are spent as Jim insists they should

be: discussing the topics that the students themselves have read, with Jim answering their questions, ones they

want answering. This is using time with the teacher for active learning, giving the students ownership of their learning, and correcting their misconceptions. *"It is not spent them answering questions I am going to ask because I've researched the answers beforehand."*

Of course this begs the question: How can Jim 'Ofsted-plan' lessons when he doesn't know what questions his students will

He does accept that this approach depends on technology. *"A main failing at present is the lack of funding to create a sound infrastructure."* Jim warns that a fast, reliable internet connection in every school should be standard if we are not to be left behind by

countries such as South Korea, which plans to digitize all text books by next year. Jim's vision for 24/7/365 future learning

is one in which every student has access to his/her scheme of work for every subject together with resources on a tablet.

Jim remembers his professor of education telling him way back in 1969: 'You are entering education at a very interesting time'. How right he was - and how right he still is.

“ Students are far happier when they are in control of their learning.”



About Jim

'The Way Forward'
<http://alturl.com/cqsaf>

Website
www.jimbakersonlinelearning.co.uk

Blog
<http://alturl.com/hwf6q>

LinkedIn
<http://alturl.com/rqrfd>

Twitter
<http://alturl.com/jiqqp>

Facebook
<http://alturl.com/6pjax3>

You Tube
<http://alturl.com/dk536>

Useful links

The Next Generation Global Education (NGGE) represents the next frontier in learning.
www.ngge.org

Article: 'South Korea to digitize all textbooks by 2015, provide tablets for school kids'
<http://alturl.com/oysfc>

Jim's KS3 twiducate page:

Login:
www.twiducate.com/login.php

On the drop down menu choose 'student'

Class Code: **ssppks3j**

Password: **1000**

Don't forget to enter the text in the box.

Just chill!



Chilled Education is an initiative from the Chilled Food Association (CFA) which, along with teachers and industry-specialists, has brought out an award-winning package of resources. Their aim is to help make science and food science lessons even more inspiring, informative and relevant.

The rapid expansion of the industry behind the chilled foods we rely on every day brings with it an increasing demand for high calibre technical staff - at any one time there are around 200 science degree-requiring vacancies left unfilled. More young people are urgently needed to bring their love of food, and passion for science, to chilled food production. And their commitment and knowledge will be rewarded with fulfilling, varied careers, full of opportunities for promotion, travel, generous salaries and, most importantly, job satisfaction.

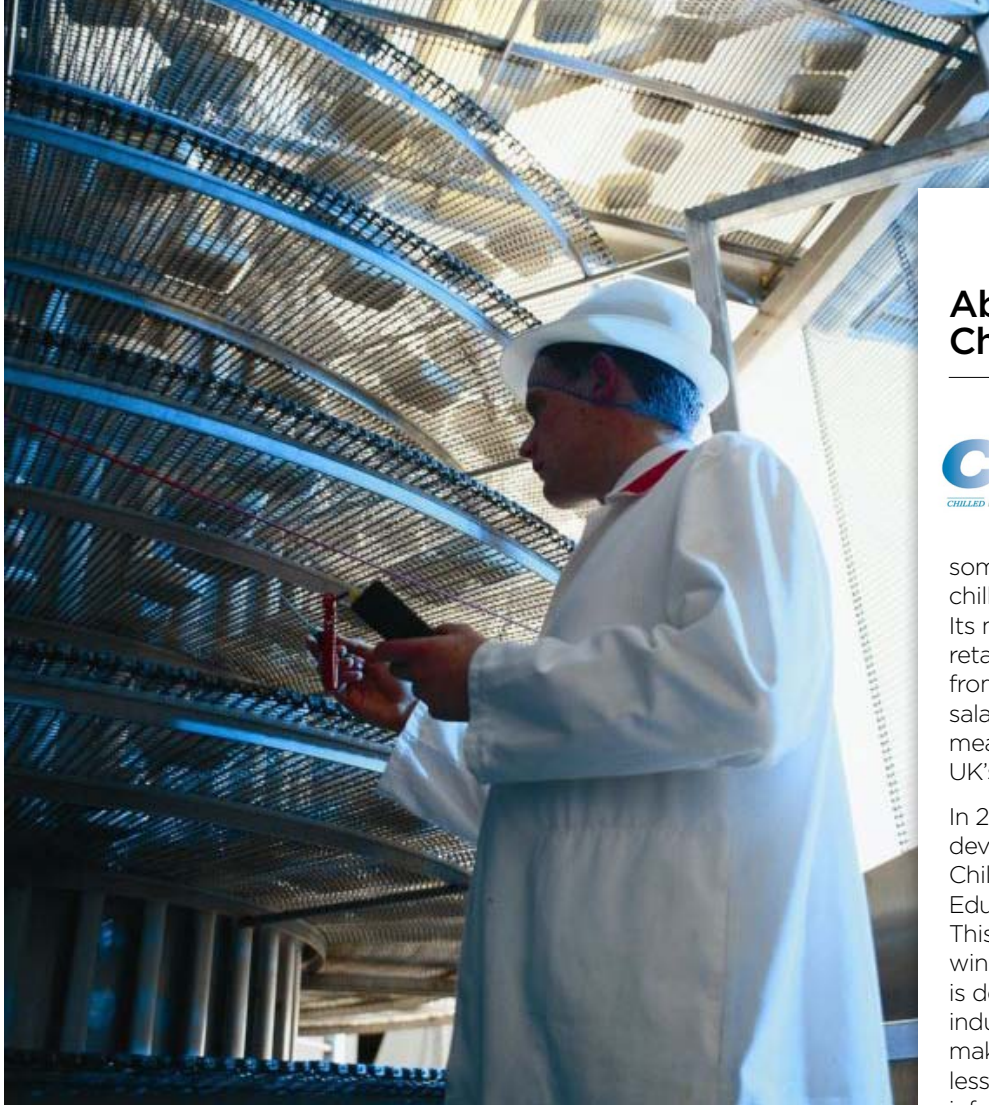
Young people studying STEM are ideally placed to consider a career in 'chill', and excellent resources are now available to help lesson planning and fire the enthusiasm of both students and

teachers. The Chilled Education (CEd) initiative was developed by sector representatives the Chilled Food Association (CFA) to help teachers inspire the next generation of food scientists. It has worked with food science professionals, teachers and industry experts, to design a range of lesson plans and hands-on resources.

CEd also takes the industry out into schools with its own STEM Ambassadors who take part in classroom activities and meet students and teachers at science and careers fairs. Greg Hunn is Technical Director at S&A Foods a Derby-based company who supply ethnic foods to retailers in the UK and across Europe. As one of the CFA's 18 STEM Ambassadors he's attended science career fairs, teaching hundreds of curious

students the importance of correct hand hygiene using one of CEd's most popular resources - the Glo-Germ hand wash training kit.

Greg enjoys seeing their imaginations spark as he explains why chilled food needs to be stored at a particular temperature to keep it safe from the potential threat from the different microbes that could be present. Using the humorously illustrated CEd's Nanobug temporary tattoos he tries to engage all age groups in a discussion on why we keep chilled foods safe. The tattoos always generate a response! He is happy to share his career experiences. He says: *"I had always been interested in chemistry and my aspirations to be a marine biologist led me to a degree in biological sciences. But the call of the food industry was*



About the CFA and Chilled Education



The Chilled Food Association (CFA)

represents

some of best-known UK chilled food manufacturers. Its members supply major retailers with foods ranging from sandwiches to prepared salads, sushi, chilled prepared meals and desserts in the UK's >£11bn retail market.

In 2011 CFA developed Chilled Education.



This award-winning package of resources is designed by teachers and industry specialists to help make science and food science lessons even more inspiring, informative and relevant.

To find out more about the resources available for teachers and students, and the wealth of ways to turn STEM into a fulfilling career in chill, visit www.chillededucation.org

Twitter: [@chilledfood](https://twitter.com/chilledfood)

You Tube: <http://alturl.com/dk536>

strong and the opportunities it offered too good to miss. I have enjoyed promotion, new challenges, meeting fascinating people and exceeded my career expectations. All this and a daily routine that is anything but routine! I enjoy talking to young people about how science has really worked for me."

CEd's classroom resources include free downloadable lesson plans for Key Stages 1-4. These cover subjects ranging from food hygiene to taste to new product development and are downloadable via D&TA's website www.data.org.uk/cfa and the National STEM centre website www.nationalstemcentre.org.uk. Proving popular they have been downloaded over 15,000 times.

As well as the Glo-Germ kits, there are fridge thermometers (showing the crucial role of temperature in keeping chilled

food safe and good to eat) and Nanobugs temporary tattoos. The unique MicroTrumps game puts a new twist on Top Trumps taking microbes as the theme, with cards depicting 14 microorganisms including Clostridium botulinum and Lactobacillus acidophilus to trump opponents in categories such as 'dangerousness' and preferred pH levels needed for growth. Each card has information alongside an electronmicrograph and fun cartoon of each organism.

Students can also find out more about careers in chill from the CEd website which contains a wealth of career information. The most popular pages include real-life career paths for colleagues in some of the sector's biggest companies - from directors to technical teams.

At any one time there are around 200 science degree-requiring vacancies left unfilled

Puff & wind

In the heart of the Norfolk Broads lies a unique and fascinating collection of historical wind powered machinery. It's a great opportunity for students to see engineering (and a host of other areas of the curriculum) in action.

The Wind Energy Museum is in the heart of the Norfolk Broads in the small village of Repps with Bastwick. On a secluded 2.5 acre site surrounded by farmland, its unique collection of historical wind powered machinery covers the journey of wind energy from the early 1800s to date. The museum is the only one of its type in the UK and offers a wealth of educational activities.

The Wind Energy Museum was created by Mr Ronald Morse, who had a fascination with windmills and wind pumps dating back more than 80 years. Originating from Sussex and from an engineering background, he, at the age of seven was given a writing pad picturing a windmill on the front cover. This was to lead to a lifetime of engineering in the preservation and restoration of many exhibits which without his efforts would have been lost.

In 1949 he purchased the derelict white tower mill at Thurne in Norfolk at a time when most were being knocked down for the rubble and scrap. He restored this to working order and then began saving and restoring wind pumps from around the world. The museum's collection now includes exhibits from the UK, America and Australia dating from the nineteenth to the early twentieth century. Standing between

25 feet and 50 feet high and of wooden or metal construction they demonstrate varying ways to harness and use the wind. Since 2003 the museum has acquired exhibits and models which create the journey of wind power and its uses into the 21st century. The museum is engaging with education and the energy sector and now offers opportunities for students studying in several subjects such as Engineering, Maths, Science, Art and Design, Computing, Design and Technology, Geography and Physical Education.

There are opportunities to see different gearing, cogs, shapes, and angles. Investigate the properties of wind turbines, changing the blades to establish the best result when generating energy. Learn and understand how to strengthen, stiffen and reinforce complex structures.

The museum welcomes school and group visits; it also opens to the public on set days throughout the year. For those unable to visit the museum staff can offer a talk at your venue or school. These talks contain moving illustrations on how the machinery works and their small turbine models accompany them too.

Main image

Scoop wheel: Originally used for drainage in Norwich, it has been positioned so that visitors can appreciate the height and volume of water movement.



For further information

or to arrange an educational visit contact
Debra Nicholson on **07796 407864**
email **debra@windenergymuseum**

Wind Energy Museum
Repps with Bastwick
Norfolk NR29 5JU

For opening times and volunteering opportunities
see: **www.windenergymuseum.co.uk**

Twitter: **@museumwind**



Foundations for the **Future**

Chair of the House of Commons Science & Technology Select Committee, Andrew Miller MP, talks to **STEMtech Educator** about the Committee's role, why a basic understanding of science is critical and the Committee's intention to challenge changes to engineering qualifications and practical science in schools.

Q What is the role of the Science and Technology Select Committee?

The remit of the science and technology select committee is to scrutinise the work of the Government Office of Science (GO-Science) which exists to ensure scientific knowledge and expertise is embedded within government policy. Over the past four years my Committee has looked into a range of policies across government that address issues such as innovation, health, cybercrime and space. Running through many of our inquiries has been the burning need for government to properly understand the evidence behind its policies and the need for them to communicate that to everyone else. Unsurprisingly, we have not found that policy is invariably backed up by solid evidence, nor any good evidence that the government is any good at communicating its policies whether they are well backed-up or not. The members of the Committee are not scientists by profession (though a few have good science or

technical backgrounds). It is impossible to consider the kind of issues that we encounter without picking up not only some knowledge of how science works, where it is useful, how it is misused and just how few people really have enough science understanding.

Q What issues has the Committee been involved in recently?

An early inquiry for the Committee considered the provision of practical science experiences in schools. We found that there were real misunderstandings on how little health and safety legislation actually limits what experiments or materials can be used in schools. We also found that schools were not incentivised to maximise the numbers of students taking science qualifications and fail to ensure that science teachers properly keep their science knowledge up to date. We considered it vital that, if practical science is going to be the hook that brings more children into science, teachers were enthused about science and that meant far more science-based CPD. This could be driven by ensuring Ofsted specifically noted performance in science and that Ofqual ensured that practical knowledge was fundamental to getting a good grade in science subjects. Unfortunately, since then we have seen schools receive a disincentive to provide the Engineering diploma by reducing its value to schools (it is now worth less than the 4 GCSEs that it once was) and practical science effectively removed from the grades given to A-level students. We have taken the Government to task about the Engineering diploma. We have also brought Ofqual in to explain their reasoning behind the changes to A-levels. These discussions are ongoing.

Q How important is STEM education for the economy?

This Government, and its predecessors, has staked the future economy of the UK being based on technological innovation. For that to happen we need our education system to produce not just the big brains for research laboratories but entrepreneurs that are confident in seeing the possibility of cutting edge being translated into saleable technologies and a science literate workforce to take advantage of the jobs created in producing those technologies. Science education is the foundation for the future.

“ *The burning need for government to properly understand the evidence behind its policies”*



About Andrew Miller, MP

Andrew Miller, MP is the Chair of the House of Commons Science and Technology Select Committee, and earlier this year the Science Council recognised him as “one of the UK’s 100 leading practising scientists” of 2014.

Andrew began his career as a technician in geology at the Portsmouth Polytechnic, where he developed an XRF and XRD laboratory. He then moved into industrial relations and was an official for the Association of Scientific Technical and Managerial Staffs (subsequently MSF) where he represented scientists and engineers from 1977 until he was elected to Parliament in 1992.

Andrew Miller is the Labour Member of Parliament for Ellesmere Port and Neston. As well as chairing the Science and Technology Select Committee he is Chair of the Parliamentary & Scientific Committee; Vice-Chair of the Parliamentary Internet, Communications and Technology Forum (PICTFOR) and a Member of the Liaison Committee. From 1992-2001 he was also a member of the House of Commons Information Committee.

More information on the Science and Technology Select Committee’s work: www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/

Get set, go **green**

The challenge, to design, build, race a sustainably powered race car provides a unique hands-on opportunity to engage in engineering. The excitement of motorsport inspires students from primary school through to university to excel in STEM studies.

Greenpower Education Trust has been helping to address the UK's engineering and manufacturing skills shortage since its launch in 1999. The project quickly grew to become a national challenge and the Trust is now a registered charity with five full time staff and over 600 volunteers.

The "real world" hands on aspect of the project is key to Greenpower's success, with 90% of key stage 4 pupils engaged with Greenpower choosing science and engineering studies at the next stage of education, 28% above comparable projects. The project is also responsible for high numbers of students continuing to degree level STEM studies, with one all-girls' school citing Greenpower as a major contributing factor for 18 of their pupils going on to such studies.

The senior school challenge sees teams creating vehicles that can race for 90 minutes on just a single charge of a pair of 12 volt batteries. The junior school challenge sees pupils building their car from a simple kit, giving them often their first opportunity to use hand tools to create something they can actually use. Teams then have to design bodywork for the car and are challenged to use recycled and sustainable materials wherever possible. These cars then compete in a series of driver challenges at Greenpower's regional events. Both age groups are encouraged to supply a portfolio which can win them a trophy and allows the Trust to see how much input the children have in the project.

This year has seen some major developments for Greenpower, with both Pearson and OCR recognising the strength of the project, mapping key stage 4 and key stage five engineering qualifications to it. The primary school project is also being brought into the curriculum with Stranmillis University College in

Northern Ireland building a whole range of resources with their student teachers. With this work addressing one of the major barriers for schools to participate in Greenpower it has seen a significant growth with 17% more taking part in the senior school challenge and over 80 primary schools from all over the UK taking part in the annual National event at Goodwood Motor Circuit last summer. The other major development this year has been the influx of international teams. The US and Polish teams are now working with Greenpower to develop the challenge in their own countries. Greenpower will also be running Schools' Series races at five of the ten new FIA Formula E (international all-electric) races in its first season.

Greenpower now has a steadily growing alumnus of ex-team members now working at the highest level in engineering, including aerospace, bio-medical engineering, and four people working in Formula 1 teams.

Greenpower is aiming to double participation by 2020, and is particularly keen to engage more teams from city centre schools.

www.greenpower.co.uk





Practical

Practical experiments are at the heart of new Biology, Chemistry and Physics A Levels

From September 2015, students studying Science at A level will be required to do a minimum of 12 practical experiments and encouraged to 'think more like a scientist', says exam board OCR's Head of Science Development Dr Steve Evans. If a student is taking all three Science subjects, this will add up to a minimum of 36 experiments over a two year course.

The new structure is a requirement set for all exam boards by Ofqual. OCR will be trialling the new approach during autumn 2014. In each subject, experiments will be grouped into 12 different skills, such as dissecting animal or plant material in Biology, measuring light and sound wavelengths in Physics and making aspirin in Chemistry. If a student takes all three subjects at A Level they will now have to complete a minimum of 36 experiments.

Dr Evans says: "The new emphasis is about 'thinking like a scientist.' It isn't just about following a recipe to bake a cake, what is much more exciting is to begin with some

ingredients and see what you can create. We are at the starting point in this new approach and OCR will continue to work with teachers and university academics to build a good library of practical activities that can be carried out in schools and colleges."

OCR's portfolio of practical experiments has been created in collaboration with leading Science teachers at schools and universities, many of whom were inspired by unforgettable experiments in their own school days. Ian Harvey, Head of Biology at Hills Road Sixth Form College, Cambridge and Member of the Education Committee of the Society of Biology argues that practical work is essential, saying: "It brings to life the theory, develops students' skills and helps them work in teams, as does fieldwork which I also consider to be crucially important." Ian recalls dissecting a shark that had been donated by the local fishmonger for his A Level Biology, an experience he will never forget. He also vividly remembers his two biology field courses which fuelled his life-long passion for ecology.

Under the current A Level coursework system, students are required to do only four practical experiments, and there are reports of students arriving to start Science degrees at university with no laboratory experience whatsoever. There is a consensus that the current coursework system is not achieving what it set out to do. With the new A Levels some students will be doing three times as many practical experiments as in the past.

OCR has been in contact with many teachers through its extensive networks, who have made clear that they welcome any increase in the amount of practical work undertaken by students. Under the new system, practical experiments will no longer contribute to the final exam grade. Instead, students will receive either a 'pass' or 'fail' once they have completed the



me



minimum 12 experiments per subject. Fifteen percent of marks will be allocated to students' understanding of practical experiments, which they will have to demonstrate in written exams. Lawrence Herklots, Head of Science at King Edward VI School, Southampton says: *"In future, written papers will ask questions which test students' practical skills, based on the knowledge that they have gained during practical experiments, so of course the practicals will have to happen in order for them to be*

able to answer the questions." David Read, Principal Teaching Fellow at the University of Southampton observes that: *"In recent years there has been a drift away from investigative practical work towards shorter experiments with already defined outcomes, because those are required by the current controlled assessment method of testing a student's ability."* He continues: *"Over the last six years at the University we've seen a noticeable decline in students' practical skills when they arrive to start their degree course. But if you're writing research papers at university the traditional approach (apparatus, method, results, discussion, conclusion) is still the standard format, and for that, you need to have experience of doing practical experiments at A Level."*

Concerns that the new approach could lead to marginalisation of practical work are dismissed by Harriet Jones, Senior Lecturer in the School of Biological Sciences at the University of East Anglia who says: *"If the experiment is not assessed then the student doesn't have to 'prove' anything and can explore and investigate, which is much more fulfilling. The idea that the results of experiments should always be pre-determined is crazy - it misrepresents the very essence of what science is about."*

OCR has now received accreditation for the new Biology and Physics AS and A levels, and is awaiting news on Chemistry. Subject to accreditation.

All three will be available for first teaching in schools from September 2015.

atters



For further information



www.ocr.org.uk/qualifications/by-subject/science/
Follow OCR's Science team on Twitter: twitter.com/ocr_science

STEM weeks

From Astronomy to Zoology there's probably a week dedicated to it. As well as a timely reminder of some of the great work and achievements made in each area, it's a great opportunity to get involved with something new and find out more about the subject.

Here are some future STEM weeks to add to your calendar:

Year of Code 2014

Launched by Michael Gove
- lasts all this year, so there's still time to get involved.

www.yearofcode.org

November

Energy Month

November is Energy Month, an initiative from EDF energy. It's the time to get the whole school exploring the energy topic. Teach students where it comes from, what the key issues are, why it's important to use it efficiently and how to save it.

<http://jointhepod.org/home>

RSC Chemistry week

Held every other year.
Next one is 2015

www.rsc.org/conferencesandevents/rscevents/chemistry-week

19

World Toilet Day

19th November 2014

In the UK having a day all about toilets may seem funny. But for millions of people around the world it's no laughing matter. A shocking 2.5 billion people - one in three of the world's population - do not have access to a safe, private toilet. World Toilet Day was officially recognised by the UN last year as a day to raise awareness of the importance of sanitation. This is a key event for the charity, Water Aid. www.wateraid.org/uk/get-involved/world-toilet-day-2014

22

European Week for Waste Reduction

22nd - 30th November 2014

The European Week for Waste Reduction (EWWR) is an initiative aiming to promote the implementation of awareness-raising actions about sustainable resource and waste management during a single week.

www.ewwr.eu

January

4

World Braille Day

4th January 2015

Celebrated every year on 4th January around the world to commemorate the birthday of Louis Braille.

www.rnib.org.uk/braille-and-other-tactile-codes-portal-braille-past-present-and-future/invention-braille

5

Big Schools Birdwatch

5th January -
13th February 2015

Big Schools' Birdwatch is a simple educational activity that gets you and your class closer to the birds visiting your school grounds. The Birdwatch takes just one hour, and can be carried out at any point between 5th January and 13th February 2015 - that's the entire first half of the spring term.

More information and age-specific resources: www.rspb.org.uk/discoverandenjoynature/discoverandlearn/schoolswatch

March

2

Climate week

2nd - 8th March 2015

Climate Week is Britain's biggest climate change campaign, inspiring a new wave of action to create a sustainable future.

www.climateweek.com

13

National Science and Engineering Week

13th - 22nd March 2015

Celebrating science, engineering and technology.

www.britishtscienceassociation.org/national-science-engineering-week

October

14

World Maths Day

14th Oct 2015

The annual event encourages thousands of students from around the world to take a break from standard maths lessons. Instead, they take part in competitive maths-themed games, with the chance to win certificates and prizes. The aim is to help raise standards of numeracy.

www.3plearning.com/worldeducationgames

June

20

National Insect Week

20th - 26th June 2016

www.nationalinsectweek.co.uk

Competitions

What better way to get your students fired up with enthusiasm for STEM subjects than by entering a competition? We've rounded up a selection of current school STEM competitions.

Raspberry Pi competition 2015

Closing date: 30th January 2015

www.paconsulting.com/events/pas-new-raspberry-pi-competition-for-2014-15

The 2015 competition challenge is to come up with an invention that revolutionises people's health and wellbeing. This could range from wearable technologies that ensure patients take their medication on time, to a health and fitness programme tailored to an individual's needs, or a system which could streamline a hospital's processes to make it more efficient. The competition is a broad challenge that asks entrants to work on something they are really passionate about. It is designed to support teaching and learning of Computing, Science, Design and Technology in the curriculum and inspire innovations from the entrepreneurs of the future. There are three categories:

- Primary School Award: academic years 4-6
- Secondary School Award: academic years 7-11
- Sixth Form & College Award: academic years 12-13

The winners of each category will receive £1,000.

Teams can use the Raspberry Pi and a limited amount of additional hardware with a budget of £100 (not including the cost of the Raspberry Pi itself).

The first 100 entrants will receive a Raspberry Pi starter kit worth £75.

F1 in schools

www.f1inschools.co.uk

Design a better, faster, cooler F1™ car of the future. There are so many tasks that must be mastered, in order to design, manufacture, prepare and finally enter a car for racing, teamwork will be vital to your success. A real F1 team succeeds because all the people learn to work together and support each other.

Vex Robotics

www.vexrobotics.com/vex/competition

In the VEX Robotics Competition, presented by the Robotics Education & Competition Foundation, teams of students are tasked with designing and building a robot to play against other teams from around the world in a game-based engineering challenge. Classroom STEM concepts are put to the test on the playing field as students learn lifelong skills in teamwork, leadership, communications and more. Tournaments are held year-round at the regional and national levels; local champions go on to compete against the best in the world at the VEX Robotics World Championship each April.

The North West Schools Science Competition

Closing date: 6th Nov 2014

www.nwblt.com/news-and-events/north-west-schools-science-competition-now-open/

Open to pupils in Year 7 and Year 8 in North West England (Cheshire, Cumbria, Greater Manchester, Lancashire and Merseyside). Pupils are invited to email NWBLT (info@nwblt.co.uk) on "Why I want to be a Scientist" and should write no more than 500 words. The winner will receive an iPad mini and cash for their school.

First Lego League (FLL)

FLL is a global science and technology competition with over 250,000 young people taking part each year. It's open to young people aged 9 to 16 years, working in teams of up to 10 with a supporting mentor. Each year FLL releases a new challenge. <http://faraday.theiet.org/stem-activity-days/firstlegoleague/index.cfm>

Rolls-Royce Science Prize

www.rolls-royce.com/careers/students_and_graduates/scienceprize/howtoenter/

The Rolls-Royce Science Prize is an annual awards programme that helps teachers implement science teaching ideas in their schools and colleges. The Prize recognises and rewards excellence in Science teaching across the full spectrum of teaching, from special education needs to high ability pupils. It also promotes innovative and sustainable strategies for teaching science which addresses a specific need in the schools or colleges and at the same time contributes to teachers' continuing professional development. There is a total of £120,000 in prizes to be won each year.

BP 'Ultimate STEM Challenge'

Submit by 16th Jan

www.bp.com/en/global/corporate/press/press-releases/bp-ultimate-stem-challenge-is-launched-for-11-to-14-year-olds.html

BP is running the Ultimate STEM Challenge - in partnership with STEMNET and the Science Museum. The competition is open to young people aged between 11 and 14 and will challenge them to put their Science, Technology, Engineering and Maths skills to the test by tackling some real-world problems.

Greenpower

www.greenpower.co.uk

Challenge to design, build and race an electric car. Students are guided by their teachers and an industry mentor. **See p14-15 for more details**

UK Biology competitions

The next competition will be announced in October 2014. www.ukbiologycompetitions.org/2015-competitions/



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