Welcome to the STEM Clubs Newsletter for Secondary Schools in Wales

September 2013

Find out more about what's happening, competitions, new educational resources, events, new rounds of grants and more…

If you're planning a STEM Club of any kind or an event at your school and need speakers, workshops, links with the real world, or an extra pair of hands, contact See Science and request a STEM Ambassador to come and help. The STEM Ambassadors Programme is FREE to schools – just email ambassadors@see-science.co.uk or go to http://networking.stemnet.org.uk and click on 'Request a Stem Ambassador'. Please don't forget to fill in our teacher feedback form if a STEM Ambassador has visited your school.

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What is a STEM Club?

A STEM Club is any out-of-timetable session that gives students the chance to explore aspects of science, technology, engineering, or maths outside their normal curriculum-based classroom activities.

STEM Clubs come in all shapes, sizes and themes. They can focus on specific disciplines or be cross-curricular.

Many STEM Clubs are completely individual and formulate all their own ideas for sessions and projects. Other Clubs are aligned to national programmes or competitions, such as the British Science Association's CREST Awards, Young Engineers or Salters' Chemistry Clubs.

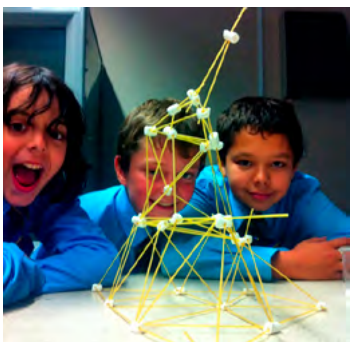
Clubs are a powerful enrichment and enhancement activity and can be all-inclusive or focus on specific groups of students. The format of your Club depends entirely on what suits the needs of you, your school and your students.

STEM Clubs shouldn't be confused with homework or revision clubs. Although they complement the curriculum, they are not designed to be about writing, tests, or exams. Activities can include practical experiments, investigation, group work, discussion and reflection. Most of all, they should be fun.

STEM Clubs can:

- enrich, enhance and extend the school curriculum
- improve attainment in, interactions with, and experiences of, the STEM subjects among pupils
- improve collaboration between schools and also between schools and industry
- encourage pupils to continue their education in STEM beyond GCSE and Diploma (or equivalent qualification) level.

The National STEM Clubs Programme



The aim of the National STEM Clubs Programme at www.stemclubs.net is to help secondary schools across the UK set up and maintain STEM Clubs.

We can offer advice and guidance on:

- setting up Clubs
- activity ideas
- where to look for funding, and
- how to get local businesses involved.

TeachMeets share Club ideas

Teachers, activity providers and STEM Ambassadors from across North Wales took part in two STEM Club-focused TeachMeets at Ysgol Uwchradd Eirias, Colwyn Bay and Ysgol Rhiwabon on 15 and 16 May.

Through short and snappy presentations, participants shared experiences of running STEM Clubs activities ranging from cooking, Eco Clubs, gardening, building greenhouses, astronomy and designing solar powered racing boats.

In addition to the teachers' presentations, a wide range of activity providers gave a brief overview of how they could support school STEM Clubs. STEM Ambassadors also gave an insight into their work and how they could support and enthuse students in STEM Clubs.

The TeachMeet format for inter-school meetings has also been proving popular across South Wales. Four sessions focusing on STEM Clubs were held before the summer break in Penarth, Baglan, Merthyr Tydfil and Bassaleg. Teachers shared their experiences of running STEM Clubs, ranging from cookery to astronomy and rocketry, and award-based activities such as CREST, and competitions like the F1 Challenge and EESW. The meetings were also attended by activity providers and STEM Ambassadors, who offered suggestions as to how they could support STEM Clubs. The TeachMeet format provided a lively and dynamic atmosphere for sharing ideas and making contacts. If you are interested in hosting a STEM Club TeachMeet or simply inviting other schools to see your STEM Club project contact enquiries@see-science.co.uk.

More to come in 2013-2014.

‘Curiosity’ leads students to Silver CREST awards

Following the success of the NASA’s Mars Rover ‘Curiosity’, a group of MAT (More Able and Talented) students at Ysgol Bryn Elian, Colwyn Bay, have been working together as an after school club since last October to research and investigate all aspects of ‘Life in Space’. Their ultimate goal is to produce a lively and informative magazine on the topic aimed at 12-16 year olds.

The sky really has been the limit, as their investigations have taken them to the Jodrell Bank space telescope, and have included a day’s rocket design, construction and launching with STEM Ambassador David Ingleston.

Having been awarded a grant from the Welsh Government for National Science and Engineering Week, the group purchased robot kits and worked with the school’s Technology Department to build and program a vehicle suitable for searching for life on planets in other solar systems.

Once the different articles, features and quizzes have been gathered together, the initial drafts of the magazine will be evaluated by fellow students in the target audience, and the final version will be produced as an e-magazine and also as a limited print run. In addition, the group are submitting their work as a Communication project for the Silver CREST Award, and are hoping the wide range of skills and knowledge they have built up during their time on the project will put them ‘right on target’ for the start of their GCSE courses in September.

The Big Bang @ EESW Success!

Earlier in the year for the first time the Engineering Education Scheme Wales extended its Annual Presentation Day to involve The Big Bang @ EESW in collaboration with Careers Wales.

The event was held at Venue Cymru on 4 March 2013 and more than 150 Year 12 students participated in The Big Bang competition.

The day featured an exciting rock guitar show by the talented Dr Mark Lewney and presentation by Wing Commander Andy Green, driver of the Bloodhound SSC project, as well as a large exhibition including universities such as Glyndŵr, Bangor and Swansea University’s STRIP Interactive which gave students insight into studying Engineering at a higher level.

Companies such as Airbus, Magnox, JCB and RWE npower also demonstrated some of the fantastic careers on offer in Wales.

Sir Thomas Picton students seek a greener future

Students at Sir Thomas Picton School are looking into the green credentials of hydrogen as a fuel for cars. The group of students from Year 9 attend a lunchtime club investigating aspects of chemistry and their application in society.

The students are working towards the British Science Association’s CREST Silver Award by comparing exhaust emissions of various fuels, and considering the advantages and disadvantages of hydrogen as a fuel.

How can you make enough hydrogen to fuel millions of cars? Would this process damage the environment and would it be cost effective?

The group has already had a visit from a STEM Ambassador, from the energy sector in Pembrokeshire, to help launch the topic, and has received funding through the Welsh Government towards the cost of the CREST Awards. The students meet with teacher Howell Himsworth weekly at lunchtime.

Howell also runs a science club for Year 7 pupils using projects from the ‘Engineering in a Box’ equipment provided by the Engineering Education Scheme Wales.

Switching you on to STEM

More than 40 teams of budding scientists and engineers came to The Big Bang Cymru from schools and colleges across Wales. The event was hosted by The University of South Wales on Wednesday 3 July 2013.

The Big Bang Cymru brought together an array of exciting and stimulating educational displays, workshops and shows to ensure that about 1,000 pupils were given an engaging and hands on experience – including experiments with liquid nitrogen, oxygen foam, dry ice, explosions and vegetable cannon.

The Big Bang Cymru is one of many Big Bang fairs held across the UK which culminate in the Big Bang UK Young Scientists & Engineers Fair at Birmingham NEC in March 2014. At The Big Bang Cymru, school and college students and STEM Clubs brought their excellent STEM projects to discuss the fruits of their hard work with experts from industry and academia.

Cooking Club – Eirias High School

Healthy eating and good nutrition are as important as ever for growing youngsters, but with easy access to fast food and with an increasingly hectic lifestyle, choosing and eating a balanced diet can be tricky.

Eirias High School's Cooking STEM Club aims to provide opportunities for students from all year groups to try out new recipes and have fun together, whilst providing them with a sound understanding of good nutrition and the skills to prepare healthy meals and snacks.

Ellie Owen, Food Technology teacher at the school who runs the club said, "We make it easy for anybody to follow even the most complex recipes, from amateur beginners to more confident chefs. Ingredients are easily obtainable from local retailers, without having to damage the piggy bank. Recipes are self-explanatory and vary from savoury to sweet."

So how does the Cooking Club work? Basically, it does what it says on the tin. Once a recipe has been chosen, students are invited to sign up in the Food Technology room a few days before, collect the recipe, bring in the ingredients on the day, and learn to cook the dish during the after school session.

Up to 15 students can take part in each session, and they are often full! Examples of recipes cooked recently include Chicken and Leek Stroganoff, Roasted Vegetable Couscous, and Banana muffins. Recipes are later posted on the school's website for future reference.

"Some students have now developed their skills to the extent where they are taking the lead in teaching others to cook a family favourite!" explained Ellie. "A real bonus has been when students from other countries such as Nepal and Romania have shown us all how to prepare traditional dishes from their own country."

However the activities don't just stop there. The reputation of their work has grown, and over the past year the club's members have catered for functions held for the school's governors and for teachers on a STEMNET TeachMeet held at the school. They have also demonstrated their catering skills at the Conwy Food Festival held in October each year.

"This is a great opportunity for students to meet and work together with others from different year groups", said Ellie. "As Eirias is a large school with over 1,500 students, the Cooking Club provides an opportunity to get to know those with similar interests from other years. We also have club members from the Eirias Pupil Inclusion Centre who may not generally have lessons with the mainstream classes. Having such a wide variety of members helps everybody to feel included, and each student has something different to offer the club."

By selling their products at school events, the club is able to raise funds to buy ingredients for students who might not otherwise be able to take part in the club's activities. The tempting wares prepared recently by the club for raising funds include bara brith, homemade apricot cookies and fruit punch tea!

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Looking towards next term, Club leader Ellie Owen is putting in a request for a STEM Ambassador with experience of the catering industry, allowing the students to gain further glimpses into this field of work.

It is hoped that Eirias High School's Cooking Club will continue to be a popular opportunity to learn and develop skills, to meet and get to know other members of the school community and, of course, to have fun doing it and enjoy eating the results!

Xplosive Club! Bassaleg

Bassaleg School on the outskirts of Newport has a thriving STEM Club, where pupils have enjoyed a variety of activities.

Xplosive Club is an extracurricular Science club run during lunch every Thursday. This year is our most popular year yet with over 30 attendees each week. Here we attempt to uncover the burning questions such as 'Can we make a hovercraft?', 'How many different coloured flames can we make?', 'Could science make a rubber glove explode?' and 'Can we build a tower out of spaghetti and marshmallows?' We don't always come to a firm conclusion, but we do have fun finding out!

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We can always try and help!

See Science have resources that you can borrow free of charge if you request an Ambassador through the STEM Ambassadors Programme.

At Bassaleg School 7BW asked our friends at See Science for ideas for fun experiments, and were delighted when they sent us the resources to build and race our own air pressure powered dragster racers!

We had a fun lesson learning about streamlining and forces before using our knowledge to build the fastest paper cars on the planet.

stem clubs
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The answer is – do it all at once!

It's good to hear that schools are finding ways to enrich the curriculum without taking on too much work. The science department at Ysgol Maes Garmon in Mold is a good example; teachers and students have worked together to develop a nice, simple way to get a few things done at once.

"… just one club, meeting for 25 minutes every Tuesday, has created a whole suite of STEM enrichment opportunities."

In the first place the department wanted to set up a lunchtime science club for Year 7 and 8 students. Initial hurdles to overcome were finding projects that could fit into the timeslot, sharing the workload and keeping momentum through the year.

Head of Science at the school, Lesley Howells asked her local STEMNET supporter to provide a few ideas including links to the STEM Clubs Network, where schools throughout the UK have shared (over 500!) of their own clubs' activities for other schools to pick up ideas and adapt to their own requirements. The British Association's CREST Award site has lots of pick-up-and-run projects and outline ideas and the Institute of Physics Marvin and Milo series is packed with short experiments, perfect for club time.

Last summer, eight Year 12 students were registered as STEM Ambassadors to help run the club, to take some of the load off the teachers, to create student mentors and to support the volunteering requirement in Welsh Bacc. As STEM Ambassadors in Year 13, the students have joined a scheme which places them in a relationship with people already in careers. It has also given them material for university application. Students interviewed during a club session said they had all been asked to talk about their STEM Ambassador activities in their university interviews and this really seemed to give them confidence.

The Year 13 students have picked the activities each week and, with the support of the department's technician, have set up some great experiments. After a few weeks they have now embarked on a more in-depth project; Practical Action's Floating Garden Challenge, which lasted over several sessions for which club attendees will receive CREST Bronze Awards.

So with just one club, meeting for 25 minutes every Tuesday, Ysgol Maes Garmon has created a whole suite of STEM enrichment opportunities, bringing together a good cross-section of the school in enjoying their delight in science.

"I like science and so I thought it would be good. I thought it would help me in the future", said a thoughtful Lowri. "It's better than singing", said Leighton. Fair enough and quite right; it's great to hear about a school providing so much to nurture the interests and aspirations of so many students.

See Science
Gweld Gwyddoniaeth

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Ysgol Pen y Dre Merthyr Tydfil

Under strong science leadership, Daniel Lockett has taken on the responsibility for enrichment and enhancement with real enthusiasm. With his engineering background and work on Formula 1 racing design, Daniel was well placed to set up his 'car build' lunch time and holiday club, targeting a small group of mixed ability boys at KS4. The group are eagerly taking on the challenge of designing and building a working Formula 1 type vehicle to compete with other schools regionally.

In another initiative, working with the local feeder primary schools, triple science girls are given the opportunity to work with Year 6 children on practical science activities – the girls call this 'science busking'.

"… the opportunity to apply skills gained in lessons to an unfamiliar task is very special."

These are just a couple of an impressive range of enrichment activities, including trips, residential courses, lectures, clubs and competitions, some of which target the high attainers in KS4 and KS5 Science, and to which students are responding to positively.

"These STEM enrichment activities have had a positive impact on both pupil attitude and achievement in science. Learning a skill or piece of theory is common place in the classroom, but the opportunity to apply skills gained in lessons to an unfamiliar task is very special. These experiences have encouraged many pupils to follow a science based route in further education that they would not have previously considered", comments Daniel Lockett.

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