

THE STEM DIRECTORY MATHEMATICS 2008/9

A directory of mathematics enrichment and
enhancement activities for schools and colleges

“YOUNG PEOPLE
CAN FIGURE OUT
AMAZING THINGS”



shape the future

CONTENTS

- 01 WHAT IS THE MATHEMATICS DIRECTORY?
How to use this directory
- 02 FAQs ABOUT STEM AND THE STEM DIRECTORIES
- 06 SUMMARY OF ALL UK-WIDE ACTIVITIES AND SCHEMES
- 09 WHAT CAN E&E ACTIVITIES DO FOR MY SCHOOL?
The Magic Mathworks Travelling Circus
- 11 UK-WIDE SCHEMES AND ACTIVITIES
- 29 WHAT CAN E&E ACTIVITIES DO FOR MY SCHOOL?
Liverpool Mathematical Society FunMaths Roadshow
- 31 REGIONAL SCHEMES AND ACTIVITIES
- 44 RESOURCES
- 44 CPD FOR TEACHERS AND LECTURERS
- 50 TAILORED ADVICE ON ACTIVITIES
- 52 DID YOU KNOW ABOUT ...?
National Science and Engineering Week
Enterprise Week
Design and Technology Week
After School Science and Engineering Clubs
Uk Young Scientists and Engineers Fair 2009
- 54 FURTHER HELP
WEB LISTINGS
- 58 INDEX
- 64 ABOUT THE DIRECTORIES
The National STEM Programme
Who has created the STEM directories?
Why have they been created?
How have teachers been involved?
How have schemes and activities been selected?
The next steps for this project
Comments, queries or suggestions

What is the 2008/9 Mathematics Directory?

The 2008/9 Mathematics Directory has been created in direct response to teachers needs. It comprises a collection of schemes and activities provided by organisations from across the UK that aim to enhance and enrich the curriculum. These schemes are usually based around events or experiences that cannot be delivered with standard school contacts and resources. Each activity is linked to the curriculum so that the impact of the experiences and outcomes can be sustained.

How to use this directory

The directory is divided into separate entries for UK-wide schemes, listed alphabetically by scheme name (see page 11) and then by Regional schemes, also listed alphabetically by scheme name (see page 31). UK-wide means that scheme providers can deliver throughout the four countries of the United Kingdom. Regional schemes are offered in one or more of the nine regions of England or on a devolved nation basis (Scotland, Wales and/or Northern Ireland).

The diagram illustrates the layout of a directory entry. At the top right, it says "SCIENCE: INTRODUCTION" and "SUBJECT KEY". A vertical bar on the right is labeled "Section tab". Below this is a "Key section" containing a "Subject Key" with a list of subjects: Ap (Applied Science), DT (Design/Technology), Eng (Engineering/Manufacturing), IT (ICT/Digital), Ma (Mathematics), Sc (Science), Bi (Science - Biology), Ch (Science - Chemistry), and Ph (Science - Physics). To the right of the key is a vertical stack of colored bars representing "Subjects covered". Below the key is the "More Maths Grads" section, which includes the text: "TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD", "AGE RANGE: 11-19", and a paragraph describing the project. To the right of this section are callouts for "Curriculum areas covered" (listing Ma, National Curriculum, Every Child Matters, Diploma, Enrichment and Extension) and "Regions covered" (listing Yorkshire & the Humber, West Midlands, London). At the bottom right is the "Scheme logo" for "more maths grads". A small box at the bottom center contains "Prep time: 0.5 hours", "Running Time: 1 hour", and "Cost: Free".

Prep time: estimation of time required by teacher/lecturer to prepare for the activity.

Running time: length of time activity runs.

Cost: given as an indication of prices charged for activity. Please consult provider for further information.

FAQs about STEM and the STEM directories

Q. What is STEM?

A. We are all increasingly aware that modern technological society now demands a workforce that is well educated in all aspects of science, technology, engineering and mathematics (STEM). Industry and research need experts who can work across STEM subjects in innovative ways. And we now all need to be confident with and have a good understanding of STEM and their relationships to each other, if we are to participate fully and make informed decisions about how we live our lives.

Q. Why is STEM important in the curriculum?

A. STEM broadens horizons and raises aspirations leading to increased achievement and participation in science, design and technology, ICT, engineering and mathematics. Importantly, the combined perspective enables a broader and more realistic perspective than the component subjects can offer individually, and can contribute to the development of a wide range of skills.

Q. What is an enrichment and enhancement activity?

A. An enrichment and enhancement STEM activity, or E&E activity for short, is an activity which provides schools with opportunities to deliver more relevant content in an exciting and challenging way. This might be by enabling students to engage in real-world STEM activities, such as designing cars or computer modelling natural disasters. Alternatively, it might involve bringing a real scientist, engineer or mathematician into the classroom to provide a direct link of personal experience between STEM in the classroom and the world outside.

Q. What is an E&E activity aiming to achieve?

A. It aims to offer a fun and stimulating opportunity for students to see the relevance of their studies to the world of life and work, and in the case of STEM, often involves industry in its widest sense. E&E activities include external visits, competitions, visiting speakers, teaching resources in any media, debates and simulations. Their distinguishing feature is the way they extend the regular curriculum into the world outside.

Q. Why should you engage with any of the activities in this directory?

A. All the activities in this directory have shown that they can make a difference to learning and, importantly for teachers and lecturers, that they do fit into school curriculum design and delivery methods.

Many of the activities provide access to resources and experience that a school would not otherwise be able to offer.

Q. What are the benefits to you, as a teacher?

- A.**
- Engagement with E&E may improve motivation, attitudes and enthusiasm in students, which can positively impact on teaching and learning in lessons.
 - E&E activities can be run by a variety of adults – teaching assistants, parents or STEM professionals from industry, academia and business – providing valuable support for teachers.
 - Improved understanding of the STEM aspects of business, industry, enterprise, careers, the environment, lifestyle and the importance of STEM to students as future citizens.
 - Personal involvement in bringing a creative STEM intervention into your school or college demonstrates leadership ability and a commitment both to your students and your school. Those who have engaged regularly with E&E have cited this as a significant career development opportunity.

Q. ... To the students?

- A.**
- It makes a difference to learning. Students are engaged in a stimulating and exciting addition to their normal lessons that can enhance their enthusiasm and interest in STEM curriculum subjects and may increase aspiration and confidence in general.
 - By raising the profile of STEM subjects, students are given broader life choices. Their understanding of the impact of STEM in the community and of STEM careers and opportunities in industry and business is greatly increased.

Q. ... And to the school?

- A.**
- E&E activities often provide better access to resources from industry that will make a difference in the classroom.
 - They challenge perceptions of STEM education and of STEM teachers.
 - They provide valuable links to local industry and business.
 - And they add value to the school curriculum whether by improving attitude, motivation, creativity, enterprise or relevance.

Q. How can these activities help you work with curriculum developments?

- A.**
- E&E activities help to embed understanding and apply knowledge through experiencing exciting new contexts that can also foster cross curricular links.

They provide opportunities to support important areas in the wider schools' agenda, such as Every Child Matters, Learning Outside the Classroom, Enterprise, Work Related Learning and community involvement.

With current developments taking a more open approach to the curriculum, these activities can provide a supportive framework for students to learn in way that can spark enthusiasm within the subject.

Q. Are these activities relevant across all age groups and all ability levels?

A. Yes. Each activity defines the age range for which it is suitable. Within that age group, the activity is suitable for all ability levels with some activities offering specific additional resource either to challenge or to support students further.

Q. Can they help me deal with students who have challenging behaviour?

A. There is much evidence to show that taking part in a fun and relevant E&E activity can help to engage students with challenging behaviour. Contact the STEM activity providers directly for more information on how their schemes may assist here.

Q. Why should you talk to your colleagues across Science, Mathematics and Design & Technology?

A. The practicality of STEM teaching *inside* the classroom is STEM with science and mathematics dominating curriculum time and resources. In reality, *outside* the classroom, it is STEM with science and mathematics enabling applications of technology and engineering.

Whilst the individual components of STEM should and do have importance as subjects in their own right, their interdependence in the outside world should not be ignored. Benefit to all STEM teachers and to students can be significant if colleagues across science, mathematics and D&T share and work together towards a common purpose.

Here are some views from teachers who have already benefited from using E&E activities in their schools:

"The main thing is the wow factor. They see that science is interesting, exciting and that it can lead on to things. It raises a level of awareness of what's going on in the world."

"Brought up-to-date ideas & technology with young presenters – which matters to young people."

"It is good for motivating the students to do physics at A level."

"It covered all levels, starting with simple leading to very scientific."

"There is no other extra curricular club in school that attracts the same level of interest or enthusiasm from the kids. The clubs are so popular we are over subscribed every week."

"One of the reasons the children love it is that it's very hands-on and much less formal than lessons, but the science is still there and is remembered!"

"The group has learnt from the experience but, much more than just the building of the car, has been the raising of self esteem and confidence through the recognition gained through the school and local press. They have certainly contributed to our school ethos of 'Learning for Life, Achievement for All'."

Q. OK, I'm convinced, so where do I start?

- A.**
- Scan the directory to see what's on offer, take a look at some of the websites for the different activities and contact the scheme or activity providers directly.
 - Talk to other teachers in your area who may already be involved with a STEM E&E activity and may be able to recommend relevant schemes for your school.

Tailored Advice from STEMNET

- Contact your local STEMPOINT organisation and book an appointment. Page 51 within this directory provides further details.

A brief meeting will give you answers to a wide variety of questions, such as:

- What kind of activity is best for your school and students' needs right now and into the future.
- How you can make an effective case, both to your colleagues and to the Head, to spend valuable time and money on such an activity.
- How you can build valuable relationships for the school longer term with local businesses and other education providers.

Important to Note. Risk Assessment:

You should consult your school risk assessment policy before carrying out any of the schemes or activities in this directory. Activities are covered by model (general) risk assessments widely adopted for use in UK schools such as those provided by CLEAPSS, SSERC, ASE and DCSF. Bear in mind, however, that these may need some modification to suit local conditions. More detailed guidance about risk assessment is provided at www.stemdirectories.org.uk/risk

The STEM Directories have been compiled by a consortium consisting of the Royal Institution of Great Britain, the British Association for the Advancement of Science, and the University of the West of England, Bristol. Text for each entry was developed using data directly provided and approved by the individual STEM activity/scheme provider. Teachers should consult the providers independently about any schemes published in this directory.

The strategic management group and the project management consortium for the STEM Directories project bear no liability for incorrect information printed in this directory.



Key

STUDENT/TEACHER RESOURCES

EVENTS

COMPETITIONS/ AWARDS

CLUBS

WORK RELATED

This diagram is based on the map of STEM activities developed by the Learning Grid and is used with permission.



	ENTERPRISING SCIENCE P.14			
	BUBBLZ THE MATHS AND SCIENCE CLOWN P.12			
	WOMEN IN SCIENCE, ENGINEERING AND TECHNOLOGY P.27			
	WHYNOTCHEMENG P.26			
	UNIVERSITY OF SOUTHAMPTON NATIONAL CIPHER CHALLENGE P.26			
	UK MATHEMATICS TRUST P.26			
	SODARACE P.24			
	SCIENCE MUSEUM LEARNING P.23			
	ROYAL STATISTICAL SOCIETY EDUCATION WORKSHOPS, SCHOOLS LECTURE AND STUDENT SCIENCE CONFERENCE P.23			
	ROYAL INSTITUTION CHRISTMAS LECTURES P.22			
	RAF EDUCATION PROGRAMME P.21			PLUS P.20
	NRICH P.19			
	MOTIVATE P.19			
	MATHS IN A SUITCASE P.18			
	INTERACTIVE STEM WORKSHOPS P.17			
	INSPIRATIONAL SCIENCE THEATRE COMPANY: SCIENCE AND MATHS SHOWS AND WORKSHOPS P.17			
	INDEPENDENT BOSCH TECHNOLOGY HORIZONS AWARD P.16			
	HANDS-ON MATHS ROADSHOW AND ENIGMA PROJECT P.16			
	HANDS ON SCIENCE P.15			
	DR MARK'S INSPIREEDUCATION P.14			
	BP EDUCATIONAL SERVICE P.12			
	AT HOME IN SPACE P.12			
	ARCHITECTURE WORKSHOPS P.11			
AGE 5-7	AGE 7-11	AGE 11-14	AGE 14-16	AGE 16-19

INCREASING TIME COMMITMENT ←



What can E&E activities do for my school?

The Magic Mathworks Travelling Circus

Since 1989 around 300,000 children and 20,000 teachers across 9 countries have experienced The Magic Mathworks Travelling Circus, a travelling hands-on maths exhibition for schools, museums and discovery centres which demonstrates and explores a multisensory approach to the learning of mathematics.

“A multisensory approach to the learning of maths is not commonly taken in the UK – in fact, a multisensory mathematics curriculum is only currently taught in the early years (Foundation Stage),” comments Paul Stephenson, founder, operations director and company secretary of the touring maths lab.

He continues: “But through the multisensory environment of the maths lab, I hope we’re beginning to show teachers and others the benefits to children of learning in this way. We hope that the teachers watching their pupils, often completely immersed in the tasks they undertake in the Circus, find ideas to incorporate more permanently in their own curricula.”

An example of such a task in the travelling circus is the concept of a ‘common multiple’, investigated through the use of chime bars, gear wheels, mathematical balances and OHP overlays. A typical visit from the Travelling Circus is likely to take place in a school hall, either for the use of one school across all years for anything from one day to one week or indeed for multiple schools coaching in pupils from the surrounding area.

“It was a tremendous success, both with our pupils and those of visiting schools,” says the Head of one such school. “Thank you for your circus which has engendered renewed enthusiasm for maths in the children.”

The Circus is further backed up by a website with a set of interactivities (available both on-line and via CD-ROM) – the Virtual Circus to complement the real one:
www.magicmathworks.org/circus.html



“ It’s been a good kicking-off point. We will now build on the ideas and the techniques ... and use them in our classroom teaching. ”

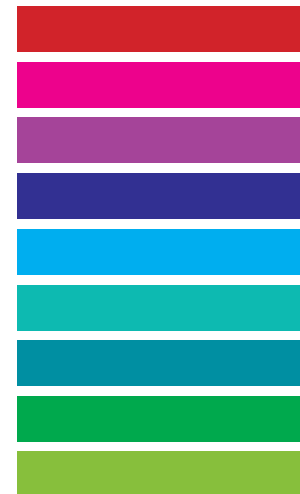
A teacher comments.

UK WIDE SCHEMES & ACTIVITIES



Subject Key

- Ap** Applied Science
- DT** Design/Technology
- Eng** Engineering/Manufacturing
- IT** ICT/Digital
- Ma** Mathematics
- Sc** Science
- Bi** Science – Biology
- Ch** Science – Chemistry
- Ph** Science – Physics



4x4 in Schools Technology Challenge

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 11-19

4x4 in Schools is an activity which can raise awareness, interest and enthusiasm in engineering through the practical application of design and technology, mathematics and science. The challenge is to design and build a radio-controlled four-wheel drive vehicle to the specification provided which will then successfully navigate a set track. This annual challenge provides an opportunity for students to work in design teams and gain an awareness and understanding of project management and key skills. The challenge can be undertaken by groups of four to six students either in lessons or as an extra curricular activity. The process encompasses research, design, testing, evaluating and competing. Cross-curricular themes can also be exploited enabling working with other departments.

Contact: Dave Howes
 Project Manager
 Tel: 020 7344 8449
 Email: contactus@4x4inschools.co.uk
 Web: www.4x4inschools.co.uk

Prep Time: 3 hours for research and registration
 Running Time: Minimum 60 hour student time,
 12 hour teacher time and 1 day of events
 Cost: £250 registration (valid for 2 years)



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 DIPLOMA
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Architecture Workshop

TYPE: OUT-OF & IN-SCHOOL EVENTS AGE RANGE: 5-19

Architecture Workshops are cross-curricular workshops in which pupils engage in problem-solving activities, as individuals and then in groups, to build large-scale structures. The themes of each workshop are often dictated by the individuals taking part and the location of the workshop, making each event unique. The workshops stimulate students' creative thinking, interpretation, visual problem-solving and team-working skills. Pupils benefit further by achieving greater spatial awareness and understanding of the built environment, as well as enriching their knowledge of science, technology, engineering and mathematics (STEM). For example, building a 12m Viking Long Boat captures the imagination as pupils get to grips with rowing past icebergs as they sail to America.

Contact: Elaine Frost
 Architecture Workshops Association
 Tel: 01223 365 378
 Email: architectureworkshops@ntlworld.com
 Web: www.architectureworkshops.org

Prep Time: 10-15 minutes
 Running Time: Foundation & Reception 0.5-1 hours
 5-11 year olds 0.5-2 hours
 11-16 year olds 1-2 hours
 Cost: Primary £330 per day
 Secondary £350 per day



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 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM

At Home in Space

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES

AGE RANGE: 5-19

At Home in Space is a show-and-tell presentation with participative workshops, detailing living and working in space. It brings space technology and exploration into the classroom in a fun way that supports cross-curricular activities for all age groups. The activity supports teachers in delivering and understanding difficult subjects, eg flying in space, seasons, phases of the moon. The activity benefits from contacts and real experiences within the space programme.

Contact: David John Shayler
Astro Info Service Limited
Tel: 0121 422 8801
Email: aisoffice@tiscali.co.uk
Web: www.astroinfoservice.co.uk

Prep Time: 1 hour
Running Time: 0.5-1 days
Cost: £250 plus daily expenses

DT Ma Bi Ch

Ph

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ENRICHMENT AND EXTENSION

BP Educational Service

TYPE: STUDENT & TEACHER RESOURCES AGE RANGE: 5-19

The BP Educational Service (BPES) responds to educational enquiries about BP and produces and distributes educational resources that focus on energy, environment, leadership and business skills. The resources are developed with practising teachers and other educational experts and focus on the key curriculum areas of science, environmental studies, engineering, citizenship, PSHE/PSE/PSD, design and technology, literacy, business studies and geography. BPES offers teachers and students the opportunity to take advantage of cutting-edge industry expertise and use real-life contexts to bring the curriculum to life. All materials are curriculum linked. In an independent audit of BPES materials, teachers stated that there was a significant increase in their students engagement with science, technology, engineering and mathematics (STEM) subjects after they had used BPES resources.

Contact: BP Educational Service enquiry team
Tel: 0871 472 3020
Email: bpes@bp.com
Web: www.bp.com/bpes

Prep Time: 0.5 hours
Running Time: 10 minutes to multi-lesson project
Cost: Free-£30 per resource

Ap DT Eng IT

Ma Sc Bi Ch

Ph

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ENTERPRISE
CITIZENSHIP
ENRICHMENT AND EXTENSION



Bubblz the Maths and Science Clown

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES

AGE RANGE: 5-19

Bubblz the Maths and Science Clown inspires teachers and students with maths performances, using exciting soap bubbles and giant balloons to explore shape and measurement in one-day school visits. All science, technology, engineering and mathematics (STEM) subjects can be explored hands-on by using the giant balloons (each balloon measuring 7.5cm x 150cm) to build models of any kind of structure from simple molecules, to the human body or even architectural or technological feats during one-day workshops. Bubblz gives vivid visual images to inspire teachers and students, and memorable cues that the teaching team can refer back to after the event. Teaching teams can use the resources (giant bubbles and balloons) to bring areas of STEM alive. These resources are left with the school after workshops and are available online.

Contact: Bubblz
Maths and Science Clown
Tel: 07963827376
Email: bubblz@bubblzthecrown.co.uk
Web: www.bubblzthecrown.co.uk

Prep Time: 1 hour
Running Time: 1 day
Cost: £385 per day plus expenses

Ap DT Eng Ma

Sc Bi Ch Ph

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EVERY CHILD MATTERS
ENRICHMENT AND EXTENSION
SELF-EVALUATION FORM



Club Maths

TYPE: **TEACHER RESOURCES** AGE RANGE: **11-19**

ClubMaths mathematical activities are designed for secondary mathematics teachers who need quality extension or enrichment materials, or who are looking for rich mathematical tasks. Available as digital downloads, they provide materials for use in the secondary mathematics classroom or with a maths club. Many of the tasks are investigative in nature and graded in difficulty, which helps to ensure that there is something accessible to all.

Contact: Andrew Jobbings, Arbelos
Tel: 01274 530430
Email: andrew@arbelos.co.uk
Web: www.arbelos.co.uk

Prep Time: 10–15 minutes for printing/copy
Running Time: 1–2 hours per activity
Cost: Teacher's licence for each activity £8

Ma

ENRICHMENT AND EXTENSION



CREST Awards

TYPE: **STUDENT RESOURCES** AGE RANGE: **11-19**

Through CREST, young people explore the nature of science, technology, engineering and mathematics (STEM) by doing creative problem solving through mini-projects. Awards are made at three levels (bronze, silver and gold). At the higher levels, practicing scientists and engineers mentor the projects and the students. Students submit their projects for Regional CREST celebration events. The best projects at each award level will then be selected for a place at the National Final. CREST develops practical and thinking skills, encourages teamwork and development of communication skills and prepares students for the world of work. For the teachers, CREST offers the opportunity to work more closely and in a different way with the participating students.

Contact: Samantha Murphy
CREST Awards
Tel: 020 7019 4943
Email: crest@the-ba.net
Web: www.the-ba.net/crest

Prep Time: Dependent on the project type and design
Running Time: Bronze approx. 10 hours,
Silver approx. 40 hours, Gold approx. 100 hours
Cost: Bronze award £4, Silver Award £8,
Gold Award £15



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ENTERPRISE
DIPLOMA
CITIZENSHIP
ENRICHMENT AND EXTENSION



CREST ★ Investigators

TYPE: **OUT-OF-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES**
AGE RANGE: **5-12**

The CREST ★ Investigators scheme provides schools and other organisations with packs full of motivating activities. The activities focus on thinking and talking about science, encouraging children to solve scientific problems through practical investigation. They are designed to be run by organisers of after-school clubs and science clubs, or even by Brownies and Cubs, using everyday materials, though some are suitable for use in the classroom. CREST ★ Investigators has three Awards: Star (usually for 5–7 year olds), SuperStar (usually for 7–11 year olds) and MegaStar (usually for 8–12 year olds). Star and SuperStar engage children with a range of activities set in different contexts. At MegaStar, the children undertake a series of projects, each containing several activities. This scheme has a strong emphasis on progression, with each award building on skills developed in the previous award. The activities in the resource pack have been designed to encourage the children to focus on thinking about, talking about and doing science.

Contact: Samantha Murphy
The British Association for the
Advancement of Science
Tel: 020 7019 4943
Email: creststar@the-ba.net
Web: www.the-ba.net/creststar

Running Time: 0.75–1.5 hours
Prep Time: 0.5–1 hour
Cost: Star resource pack: £30
SuperStar resource pack: £35
MegaStar resource pack: £40
Awards: £3 each



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Dr Mark's INSPIREducation: Advanced Thinking & Learning

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **5-16**

Dr Mark's INSPIREducation offers a range of lively and engaging (and fun!) science and maths shows and hand-on workshops for 5-14 year old pupils, with some shows also suitable for 14 and older, including adult/parent shows, all designed to inspire and engage the pupils about science and maths, and also to stimulate their innate problem solving and enquiry process skills. Teachers' CPD/INSET in-school & 'centre-based' is also available to show teachers how to use a wide range of novel science and/or maths classroom activities and investigations. Science & maths teachers' resource books, CD-ROMs and eBook downloads are also available. All CD-ROM contents have been approved by Curriculum Online.

Contact: Mark Biddiss (aka 'Dr Mark')
 Tel: 0845 0680 222 or 07966 182141
 Email: mark.biddiss1@btinternet.com
 Web: www.DrMark.co.uk

Prep Time: 0.25-1 hour
 Running Time: Shows/Workshops 0.75-1.25 hours,
 CPD 1-5 hours
 Cost: Shows/Workshops £295-£395 for 2/3 sessions.
 Teachers CPD £395-£645, depending on location
 and length of session



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 ENRICHMENT & EXTENSION

Enterprising Science

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **11-16**

Enterprising Science offers both teachers and students inspirational, curriculum-linked support. The Talk Science teacher masterclass, delivered by the Science Museum, is a unique opportunity for science teachers to develop their skills in facilitating classroom discussion around contemporary science issues. The one-day course aims to equip teachers with skills to develop scientific literacy, facilitate student understanding of how science works and increase enthusiasm for science. The Carbon Challenge in-school roadshow, delivered by BP presenters is a high impact science, maths and enterprise roadshow that uses voting technology, film and a series of hands-on activities to teach students about school carbon emissions and how they could be reduced. The roadshow activities develop group discussion and presentation skills.

Contact: Enterprising Science enquiry team
 BP Educational Service
 Tel: 0870 333 0428
 Email: info@enterprisingscience.com
 Web: www.enterprisingscience.com

Prep Time: 4 hours
 Running Time: Carbon Challenge 4.5 hours x 3 teachers,
 Talk Science 1 day out of school for attending teacher
 Cost: Free



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 WORK RELATED LEARNING/
 ENTERPRISE
 CITIZENSHIP
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F1 in Schools: The Formula One Technology Challenge

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **11-19**

F1 in Schools is a multi-disciplinary challenge in which teams use Computer Aided Design software to design, test and manufacture miniature compressed air powered balsa wood Formula One cars. The cars are raced side-by-side, competing regionally, nationally and internationally for the Bernie Ecclestone trophy. Teams of four to six students must raise sponsorship and manage budgets to fund research, travel and accommodation. Students benefit by experiencing the Design-Analyse-Make-Test-Race process deployed by the teams in the real world of Formula One. The challenge inspires students to use IT to learn about engineering, physics, aerodynamics, design, manufacture, branding, graphics, sponsorship, marketing, leadership/teamwork, media skills and financial strategy, and apply them in a practical, imaginative, competitive and exciting way.

Contact: Dave Howes, F1 in Schools
 Tel: 020 7344 8449
 Email: contactus@f1inschools.co.uk
 Web: www.f1inschools.co.uk

Prep Time: 3 hours
 Running Time: 40-80 hours plus 1 day event
 Cost: Free



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 CITIZENSHIP
 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM



FIRST LEGO League

TYPE: OUT-OF-SCHOOL EVENTS, STUDENT RESOURCES AGE RANGE: 9–16

FIRST LEGO League is a UK-wide programme that combines hands-on, interactive robotics activities with a sports-like atmosphere, using a LEGO MINDSTORMS robot set. Teams consist of up to 10 children, with the focus on team building, problem solving, creativity and analytical thinking. Teams face an annual challenge emulating a real world event or situation, and must also undertake a research project as well as design, build, programme and test a fully autonomous robot capable of accomplishing the challenge. This must all be completed within eight weeks. Students benefit from development in self-confidence as well as experiencing that they can achieve more by working within a team, in addition to specific science, technology, engineering and mathematics (STEM) skill enhancement.

Contact: Chris Proctor
 First Hand Technology
 Tel: 08707 669 685
 Email: info@firsthandtechnology.org.uk
 Web: www.firsthandtechnology.org.uk

Prep Time: 1–2 hours
 Running Time: 0–1 hours per week for 8 weeks
 Cost: £115 per team
 (often paid by sponsoring partner)



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 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 CITIZENSHIP
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 SELF-EVALUATION FORM



FunMaths Roadshow

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT AND TEACHER RESOURCES, CPD AGE RANGE: 7–19

The FunMaths Roadshow provides a day of activities tailored to a school's needs and engages pupils of any age or ability. The roadshow currently consists of 13 sets of 25 activities. Each set is targeted principally at a given age range. Within each set are some easy activities and some that are quite challenging. The intent is that all participants succeed. The resources are available in a range of languages, including French, Spanish, Welsh, Scots Gaelic, Portuguese and Mandarin Chinese. Events can lead to further discussion in lessons, and will generally help to improve pupils' and students' perception of mathematics and their problem-solving and communication skills. Teachers will discover innovative ways of presenting material and can use the resources themselves in any way they choose.

Contact: Chris Marchant
 University of Liverpool
 Tel: 0151 7944054
 Email: marchant@liv.ac.uk
 Web: www.liv.ac.uk/math

Prep Time: 2 hours
 Running Time: Full school day
 Cost: £150–£300 depending on location in UK



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 WORK RELATED LEARNING/
 ENTERPRISE
 CITIZENSHIP
 ENRICHMENT AND EXTENSION

Hands on Science

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT RESOURCES AGE RANGE: 5–14

Hands on Science develops and delivers educational science-based workshops. Topics include crime scene investigation, energy, rockets and robots, but new workshops are constantly created to help schools achieve their specific learning objectives. Hands on Science workshops are either delivered in-school directly to children or sometimes to parents and children together. Hands on Science takes the subject areas the teacher is looking to work on and presents them in a way students will have not seen before.

Contact: Mark Walton
 Hands on Science Ltd
 Tel: 0771 0087259
 Email: enquiries@hands-on-science.co.uk
 Web: www.hands-on-science.co.uk

Prep Time: Contact scheme/activity provider
 Running Time: Contact scheme/activity provider
 Cost: £400 per day



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 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM



Hands-On Maths Roadshow and Enigma Project

TYPE: IN-SCHOOL EVENTS AGE RANGE: 5-19

The Millennium Mathematics Project's Hands-On Maths Roadshow is a collection of hands-on mathematical puzzles, games and activities that are brought to schools for a special maths event. Roadshow activities are designed to promote creative approaches to mathematics and strategic thinking and to stimulate mathematical curiosity. The Enigma Project aims to inspire students in maths, science and history through codes and code breaking. Enigma Project visits include an interactive presentation in which all students see a genuine WW2 Enigma machine in action, followed by a circus of hands-on, code-breaking activities. Both the Roadshow and Enigma Project aim to enrich and enhance mathematics education in schools by providing a special maths event as a focus for inspiration and motivation. The Hands-On Maths Roadshow presents creative methods of exploring mathematics through concrete problem solving and strategic reasoning. The Enigma Project uses cryptography and cryptanalysis as a means of exciting students about maths, and exploring cross-curricular links between mathematics, science and history.

Contact: Nadia Baker
Millenium Mathematics Project
Tel: 01223 764 604
Email: roadshow@maths.cam.ac.uk
Web: enigma.maths.org
www.maths.org/roadshow

Prep Time: Contact scheme/activity provider
Running Time: Contact scheme/activity provider
Cost: Contact scheme/activity provider

Headstart

TYPE: STUDENT & TEACHER RESOURCES, CPD AGE RANGE: 16-19

Headstart is a well established education programme held every summer at 31 universities, providing students interested in mathematics or science with informed choices regarding technology-based degree courses and careers. Headstart provides a taste of university life at the time students are making their university decisions. Headstart students participate in a series of practical problem-solving activities, lectures and presentations, visits to local technology companies, meetings with recent graduates and academics. The programme provides an opportunity for students to identify sources of funding and support.

Contact: David Logan
EDT
Tel: 01707 871 505
Email: info@headstartcourses.org.uk
Web: www.headstartcourses.org.uk

Prep Time: 0.5 hours
Running Time: Up to 1 week
Cost: £210 per student
(Bursaries are available in cases of need)

Independent Bosch Technology Horizons Award

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT RESOURCES AGE RANGE: 14-19+

The Technology Horizons Award is an essay competition that challenges young people to express their views on how engineering and technology has impacted on society now and in the future. Schools and colleges set the essay challenge as coursework or homework in a variety of subjects including english, design & technology, engineering, science and PHSE. The winning essays in each category are reproduced in the *Independent*. The essay competition provides an opportunity for students to realise the importance of engineering. This has led to a change in how students perceive engineering as a result of the research they have carried out.

Contact: Dave Rowley
The Royal Academy of Engineering
Tel: 020 7766 0640
Email: dave.rowley@raeng.org.uk
Web: www.raeng.org.uk

Prep Time: 1 hour
Running Time: 1 hour
Cost: Free

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ENRICHMENT AND EXTENSION



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DIPLOMA
CITIZENSHIP
ENRICHMENT AND EXTENSION
SELF-EVALUATION FORM



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ENTERPRISE
DIPLOMA
ENRICHMENT AND EXTENSION



Inspirational Science Theatre Company

TYPE: **OUT-OF & IN-SCHOOL EVENTS, CPD AGE RANGE: 5-16**

The shows and workshops are embedded with physical theatre skills including the thrills and spills of circus science, mathematical tricks and stunts. They are designed to entertain and inspire whilst educating as there are strong links to the curriculum. Shows and workshops for schools are designed to entertain and inspire, improving the stereotypical image of scientists in society, demonstrating that science can be fun, encouraging pupils to take an interest and participate fully in science etc. A creative cross-curricular approach that compliments the work of classroom teachers to encourage pupils to look fondly upon science and maths.

Contact: Ken D Farquhar
 Inspirational Science Theatre Company
 Tel: 01508 473016
 Email: info@dodifferent.co.uk
 Web: www.dodifferent.co.uk

Prep Time: 0-2 hours
 Running Time: 0-1 hour
 Cost: £400-700 depending on travel/
 overnight expenses



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 CITIZENSHIP
 ENRICHMENT AND EXTENSION



Interactive STEM Workshops

TYPE: **IN-SCHOOL EVENTS AGE RANGE: 7-19**

The Interactive science, technology, engineering and mathematics (STEM) workshops are all delivered in the school environment, and cover topics such as forces, friction, speed, aerobic and anaerobic activity. The workshops have a longer-term impact being remembered by students, as they have specialist high technology equipment allowing them to deliver specific messages in a format that enables the students to remember difficult areas of the curriculum. The cross-curricular linkages are beneficial to teachers and students as they are provided with a fantastic experience that can be used in a variety of ways following the delivery of the session. Typical examples of this include the students using their own data in ICT lessons.

Contact: Robert Boyd
 By Design
 Tel: 01827 316297
 Email: info@bydesign-group.co.uk
 Web: www.bydesign-group.co.uk

Prep Time: 1 hour
 Running Time: 1 hour
 Cost: £750-£14,000 + VAT per day



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Jaguar Cars Maths in Motion Challenge for Schools

TYPE: **OUT-OF & IN-SCHOOL EVENTS, TEACHER RESOURCES AGE RANGE: 7-19**

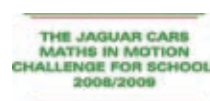
The Jaguar Cars Maths in Motion Challenge for Schools provides software which requires students to set up a virtual racing car, to enter a race against cars set up by other students. It is competitive, factual and generates a lot of excitement. Teams progress through knockout rounds in March and May each year, with the National Final taking place in June. Many schools, once involved, have set up maths clubs, specifically to take part, for the very first time. Many schools have used this as the catalyst for a transition year's project and have linked with other schools to run their own 'private' challenges. The Challenge uses basic understanding of mathematics to simulate something very complex in a way that creates a great learning environment.

Contact: Brian Richardson
 Jaguar Cars Maths in Motion Challenge for Schools
 Tel: 01487 741223
 Email: info@mathschallenge.org.uk
 Web: www.mathschallenge.org.uk

Prep Time: 3 hours
 Running Time: As long as schools wish to continue.
 Cost: Initial £275 for Secondary £140 for Primary.
 Annual renewal of £75 for Secondary and
 £55 for Primary to cover software updates



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 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION



Magic Mathworks Travelling Circus

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 5-14

The Magic Mathworks is a touring mathematics laboratory. The aim is to show teachers the possibilities that can be realised by experiencing mathematics in a multisensory environment. The Magic Mathworks provides three-dimensional activities that complement the ever-growing list of two-dimensional resources available via the computer. A set of interactivities is available both on-line and via CD-ROM. The Magic Mathworks gives teachers at all stages in their careers the opportunity to observe children handling a large range of manipulatives and interactives in the course of solving mathematical problems. Some of the materials they may choose to buy from the appropriate supplier, some they may choose to make themselves or, better still, help their children to make.

Contact: Paul Stephenson
 The Magic Mathworks Travelling Circus
 Tel: 01352 713014
 Email: stephenson@mathcircus.demon.co.uk
 Web: www.magicmathworks.org

Prep Time: 2-10 hours depending on activity
 Running Time: 8 hours for a 1 day event
 Cost: For a 1 day event: £500 plus travel and accommodation expenses for one



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Mathematics in Education and Industry

TYPE: TEACHER RESOURCES, CPD AGE RANGE: 14-19

Mathematics in Education and Industry provide CPD including ideas for enrichment. Examples are maths item of the month and handouts from the annual conference which are available on the website. Examples of teacher CPD include Teaching Advanced Mathematics. CPD includes ideas for enrichment that are related to the curriculum but go beyond it.

Contact: Bernard Murphy
 Mathematics in Education and Industry
 Tel: 0161 4321920
 Email: bernard.murphy@mei.org.uk
 Web: www.mei.org.uk

Prep Time: 5 minutes-2 hours
 Running Time: 5 minutes (web activity) – part-time course spread over 17 months
 Cost: Free activities from website
 CPD courses £100-£500 per teacher



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Maths in a Suitcase

TYPE: OUT-OF & IN-SCHOOL EVENTS AGE RANGE: 5-14

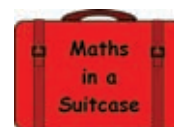
Maths in a Suitcase is a hands-on maths exhibition designed to be accessible to children of all ages, abilities, experience and backgrounds. The activities uniquely combine investigations, problem solving exercises and challenges, whilst at the same time encouraging children to be curious and to think mathematically. Each session includes an introduction and demonstration tailored to each particular audience. All the activities used in Maths in a Suitcase are rooted in serious mathematics, and can be appreciated at some level by everyone. The style and presentation of the activities lend themselves to be copied, and can be incorporated by teachers into their lessons at a later date. Maths masterclasses can also be arranged.

Contact: Selwyn van Zeller
 Maths in a Suitcase
 Tel: 0121 4299327
 Email: svanzeller@aol.com
 Web: www.mathsinasuitcase.co.uk

Prep Time: 0.5 hours
 Running Time: 1-2 hours
 Cost: £250 per day plus travel expenses



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Motivate

TYPE: IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES AGE RANGE: 5-19

Motivate is a live interactive videoconferencing project for schools, providing maths, science and cross-curricular videoconferences with associated project work for students of all ages both in the UK and internationally. Depending on their age, students interact with university mathematicians/scientists and other professionals who use mathematics and science in their work or with experienced teachers. Motivate video conferences are scheduled regularly throughout the school year; schools and colleges apply online to take part. Motivate offers students an opportunity to engage in collaborative investigation and research-type projects, exploring areas which extend the basic curriculum. Students are given opportunities to find out how maths underlies everyday life and how it is used in a wide variety of different applications

Contact: Jenny Gage
Millenium Mathematics Project
Tel: 01 223 764278 or 766839
Email: jag55@cam.ac.uk
Web: motivate.maths.org

Prep Time: 0.5 hours
Running Time: 1 hour-1 day, depending on activity
Cost: £60-£180 per video conference
£395 per maths day



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ENRICHMENT AND EXTENSION



NRICH

TYPE: STUDENT & TEACHER RESOURCES, CPD AGE RANGE: 5-19

The NRICH website supports teachers and learners of mathematics with thousands of free resources which are designed to develop subject knowledge and problem-solving skills. NRICH includes discussion boards to create an online community. NRICH staff also provide face-to-face CPD sessions. The accompanying notes to our resources give guidance about how they can be used in the classroom and the mapping documents indicate which problems could be used to focus on aspects of mathematical curriculum content as well as particular processes. NRICH encourages students to be more independent. They will be equipped with skills and processes to help them have the confidence to explore unfamiliar mathematical situations. Teachers will be able to engage their learners in mathematics by using real-life contexts, making connections, communicating and sharing.

Contact: Jennifer Piggott
NRICH
Tel: 01 223 764246
Email: nrich@damtp.cam.ac.uk
Web: nrich.maths.org

Prep Time: 5 minutes-1 hour
Running Time: Contact scheme/activity provider
Cost: Free website materials. CPD £415 (half day) -
£595 (full day) plus expenses



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SELF-EVALUATION FORM



Planet SciCast

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD AGE RANGE: 5-19

Planet SciCast is a film-making project based around practical science. Films contribute to the website, with the best films rewarded in a yearly ceremony. The project combines science learning with the group-working skills gained through film-making, and provides a lasting resource for teachers and other educators. Benefits to participants include experience of collaborative working, creative thinking and problem-solving, all within a science context. Organisers and leaders will find that students are already making short films; SciCast directs that energy and enthusiasm to help build an exciting, long-lasting resource. All team members are rewarded with a certificate, with the best films submitted through the year celebrated by nomination to the SciCast Awards, and an invitation to the glamorous Awards Ceremony.

Contact: Katie Walsh, NESTA
Tel: 020 7438 2670
Email: scicast@nesta.org.uk
Web: www.planet-scicast.com

Prep Time: 1-5 hours
Running Time: 1 day
Cost: Free



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Plus

TYPE: STUDENT & TEACHER RESOURCES AGE RANGE: 16-19

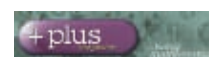
Plus is a quarterly online magazine for post 16 maths and physics students, featuring stories that uncover hidden mathematics in headline news stories, the mathematics of everyday life and news from the world of research. The site also features podcasts and a digital careers library. Plus also runs an annual mathematics- and science-writing competition for students. For teachers, we have recently introduced teacher packages, collating all the Plus material on a given topic. Plus helps teachers to extend and update their subject knowledge, and provides resources to support their classroom mathematics teaching. It helps students to gain a deeper insight into areas of mathematics and mathematical physics, and provides motivational careers case studies encouraging the further study of the subject.

Contact: Marianne Freiberger
Millennium Maths Project
Tel: 01223 766839
Email: plus@damtp.cam.ac.uk
Web: plus.maths.org

Prep Time: Contact scheme/activity provider
Running Time: Contact scheme/activity provider
Cost: Free



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Primary Engineer

**TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 5-11**

Primary Engineer is a complete primary liaison project to support primary design and technology. Teachers can run whole-class activities, but also available are INSET courses, challenge activities and resources. It is delivered nationally through secondary schools working with primary schools. Secondary teachers attend a practical two-day course which they then cascade to primary teachers. Primary teachers benefit from the CPD which effects the delivery of design and technology to support the practical application of science, maths and ICT. Cross-curricular links and resources enable children to break down curriculum barriers and become effective problem solvers. The scheme also facilitates the primary to secondary transition. Events enable schools to work with other local schools, the wider community and invariably large numbers of parents.

Contact: Susan Scurlock
Primary Engineer
Tel: 01254 720650
Email: susan.scurlock@primaryengineer.com
Web: www.primaryengineer.com

Prep Time: 2 day INSET course
Running Time: 8 hours
Cost: £200 per primary school



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CPD



Primary Engineer®

Primary Mathematics Challenge

TYPE: STUDENT RESOURCES AGE RANGE: 7-11

The Primary Mathematics Challenge (PMC) is a national mathematics challenge for upper primary children. Packs of challenge papers are purchased by schools. The aim is to interest and motivate young mathematicians. Certificates are provided for all who enter. The challenge takes place every November, with the 'Finals' the following February. The PMC provides opportunities for primary pupils to solve maths problems related to their experiences. It develops thinking skills and a creative approach to solving maths problems. Teachers arrange for pupils to take the challenge (multiple-choice paper) any time in November. Marks, schemes, follow-up ideas and certificates are provided.

Contact: Marcia Murray
The Mathematical Association
Tel: 0116 2210013
Email: pmc@m-a.org.uk
Web: www.m-a.org.uk

Prep Time: 0.25 hours
Running Time: 0.75 hours
Cost: £8 per pack of 10 PMC challenge papers



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RAF Education Programme

TYPE: IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES

AGE RANGE: 11-16

The RAF Education Programme offers maths and science educational resources and workshops to help students see practical applications of their studies. Online interactive resources are available and teachers' notes, curriculum maps and certificates are provided in the teachers' area. Teachers can also order interactive CD-ROMs, science posters and workshop visits from the RAF team. The programme has been developed in consultation with teachers and gives them the opportunity to show students the relevance of what they have learnt in the classroom. The resources are all curriculum-linked and use real-life contexts and profiles to bring the curriculum to life and innovative approaches and formats to excite students of all abilities and learning styles.

Contact: Amy Weaver
EdComs
Tel: 0871 4723016
Email: raf@edcoms.co.uk
Web: www.raftarget.com

Prep Time: 10 minutes – 2 hours
Running Time: 1 lesson to multi-lesson project
Cost: Free



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WORK RELATED LEARNING/
ENTERPRISE
DIPLOMA
ENRICHMENT AND EXTENSION



Researchers in Residence

TYPE: IN-SCHOOL EVENTS AGE RANGE: 11-19

Researchers in Residence facilitates partnerships between young researchers, teachers and pupils by matching university researchers with host schools. The scheme helps to dispel negative stereotypes of scientists and highlights the idea of science as a career, as well as giving pupils an insight into the work of an active researcher. The focus of the scheme is on tailoring each placement to the host school, and could take the form of practical work, talks, discussion groups and/or project work. For school students the emphasis is to connect with researchers and the process of conducting research and to appreciate the wider relevance of what is being learnt in the classroom. A placement is an opportunity for teachers to refresh and expand their knowledge of a subject.

Contact: Jan Barfoot
University of Edinburgh
Tel: 0131 6505470
Email: researchersinresidence@ed.ac.uk
Web: www.researchersinresidence.ac.uk

Prep Time: Depends on host teacher
Running Time: 14-24 classroom hours
Cost: Free



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RoboFesta-UK

TYPE: OUT-OF & IN-SCHOOL EVENTS AGE RANGE: 5-19

RoboFesta-UK is an educational robotics network open to individuals and organisations involved with hands-on robotics activities. These events may take place anywhere. The network was established to help co-ordinate robotics-related events and competitions, and provide resources and support to everyone involved with hands-on robotics activities. Robotics activities and competitions are effective means of interesting youngsters in science, technology, engineering and mathematics (STEM) subjects. They are cross-curricular and involve the development of a wide range of skills, including mechanical and electronic design, programming and team work. The benefits of RoboCupJunior include free involvement in regional and national events, and the chance to represent the UK at an international RoboCup event.

Contact: Ashley Allan Green
RoboFesta-UK
Tel: 01743 358013
Email: a.a.green@open.ac.uk
Web: www.robofesta-uk.org

Prep Time: 10 hours
Running Time: 50 hours
Cost: Free



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DIPLOMA
ENRICHMENT AND EXTENSION

Royal Institution Christmas Lectures

TYPE: **OUT-OF-SCHOOL EVENTS, TEACHER RESOURCES** AGE RANGE: **11-16**

The Royal Institution Christmas lectures have been inspiring children and adults alike since 1825. The theme of the lectures changes every year so can support a wide range of topics. Recent years have included maths, the human body, food and Antarctica, but the topic is examined from many different angles and is highly interdisciplinary. The RI Christmas Lectures are currently broadcast as a five-part series on channel 5 in the UK and are available the following March as a DVD. For topics in recent years there are also interactive resources to accompany the Christmas Lectures, or video archives of many previous years. Check the RI website for more details information about this year's lectures, and to find out about bringing your school group to see them being filmed.

Contact: Olympia Brown
Royal Institution of Great Britain
Tel: 020 7670 2969
Email: schools@ri.ac.uk
Web: www.rigb.org

Prep Time: 0.5 hours
Running Time: 4-6 hours
Cost: school groups are £8 children,
£11 adults. DVDs are available in March for £6



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Royal Institution Mathematics Masterclasses

TYPE: **OUT-OF & IN-SCHOOL EVENTS** AGE RANGE: **7-19**

Masterclasses aim to engage and enthuse keen young mathematicians. Masterclasses are given by inspiring presenters who help foster enthusiasm for and knowledge of mathematics. Topics can range from art to cryptography, dinosaurs to mazes. Masterclasses are highly interactive and include a mix of lecture, demonstration, individual and group work. There are also trans-disciplinary masterclasses, involving design, engineering and science. Masterclasses bring the outside world into the classroom, enabling students and their teachers to experience and engage in mathematics from new and imaginative viewpoints. Every masterclass offers materials, ideas and approaches that can be used in the classroom for all learners. The hands-on and investigative nature of masterclass activities make them ideal for students with a range of learning styles and abilities.

Contact: Amy Hooker
Royal Institution of Great Britain
Tel: 020 7670 2926
Email: maths@ri.ac.uk
Web: www.rigb.org

Prep Time: 1-2 hours per series
Running Time: 1-2.5 hours per masterclass
A series consists of a minimum of four masterclasses
Cost: Free-£5 per student



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ENRICHMENT AND EXTENSION



Royal Society Partnership Grants

TYPE: **OUT-OF & IN-SCHOOL EVENTS** AGE RANGE: **7-19**

The Royal Society Partnership Grants scheme awards grants to support creative partnerships between schools and practising scientists and engineers that promote scientific enquiry. The Partnership Grant provides funding for the elements of an investigative project, including scientific equipment, travel for students to access research laboratories, expenses for the scientist or engineer partner and teacher supply cover to allow the lead teacher to plan the project and take children outside of the school curriculum. Benefits to teachers are access to new equipment, new knowledge and a chance to be creative. Students benefit from a creative experience of science, working with scientists and engineers on real-life problems, and getting to see how they work in the real world.

Contact: Charlotte Thorley
Royal Society
Tel: 020 7451 2561
Email: education@royalsociety.org
Web: www.royalsociety.org

Prep Time: 2 hours
Running Time: 1 week-1 year
Cost: Free



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ENTERPRISE
DIPLOMA
CITIZENSHIP
SELF-EVALUATION FORM



Royal Statistical Society Education Workshops, Schools Lecture and Student Science Conferences

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 7-19

The Royal Statistical Society (RSS) Schools lecture is aimed at 14–19 students and draws out the importance and widespread applicability of statistics in a serious but accessible and entertaining way, highlighting how real statistics and data are used in the real world. RSS Educational Workshops are creative and outcome-focused teaching and learning experiences. A 'Bringing significance to the classroom' workshop is available which draws on article in *Significance* (the RSS quarterly). Additionally, workshops can be tailored to the needs and interests of individual schools. The RSS programme of science issues-focused conferences (for 14–19 students) have professionals in various fields make presentations and then work with students to analyse datasets and attempt to answer a question using the data as evidence to inform their response. These programmes are intended to expand the horizons of the students involved and give them some feeling of the ways in which the study of statistics is relevant. They also aim to help to build teachers confidence, and equip them better to deliver statistics content in the context of working with their own students.

Contact: Debra Hurcomb
 The Royal Statistical Society
 Tel: 020 7614 3934
 Email: d.hurcomb@rss.org.uk
 Web: www.rss.org.uk

Prep Time: 0.5–2 hours
 Running Time: 1 hour–1 day depending on activity
 Cost: Free–£500 depending on activity and student numbers



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 ENTERPRISE
 CITIZENSHIP
 ENRICHMENT AND EXTENSION



Science Museum Learning

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 5-19

From scientific inventions to contemporary science, the Science Museum brings science to life, and life to science. The Science Museum offers an extensive range of learning programmes for every age and audience. Events at the Science Museum boost student learning and engagement through memorable live science demonstrations, and IMAX/museum theme days. The Science Museum Outreach team can bring a wide range of interactive curriculum-linked shows and workshops into your school or science club. The Science Museum also offers courses and events for teachers at all stages of their career. Web resources are available and can be used in the classroom for homework and with science clubs. Science Night is an all-night extravaganza with a scientific twist; an evening of science fun rounded off by camping in the Science Museum overnight. Science Museum programmes are linked closely to the curriculum for all science levels and are presented in a fun and exciting way. All of the Science Museum's learning programmes are developed with our target audiences and advisors who ensure that we offer up-to-date events and support.

Contact: Education Booking Office
 The Science Museum, London
 Tel: 020 7942 4777
 Email: edbookings@sciencemuseum.org.uk
 Web: www.sciencemuseum.org.uk/educators

Prep Time: 15–30 minutes
 Running Time: 45 minutes–1 day depending on activity
 Cost: Various. Free–£750 depending on activity, numbers of students and location



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 ENTERPRISE
 CITIZENSHIP
 ENRICHMENT AND EXTENSION

sciencemuseum.org.uk/learning

Sodarace

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES
AGE RANGE: 7-19

Sodarace is a free online education resource for scientific learning, design and play where humans and machine-intelligences compete and collaborate to create racers and racetracks in an online Olympics. Sodarace is an easy to use multi-application resource to allow examination of issues in science, physics, engineering, design and also introducing concepts in artificial intelligence through models of evolutionary biology and other research areas. The fusion of art and science, along with the playful nature of the interaction, pulls students into a range of learning activities across the curriculum.

Contact: Peter McOwan
 Queen Mary, University of London
 Tel: 020 7882 5224
 Email: pmco@dcs.qmul.ac.uk
 Web: www.sodarace.net

Prep Time: 1 hour
 Running Time: 1 hour
 Cost: Free



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The Magic of Maths

TYPE: IN-SCHOOL EVENTS, CPD AGE RANGE: 5-14

The Magic of Maths shows and workshops seek to inspire and enthuse students about the wonder of mathematics. They are delivered in one hour shows (four per day) by a qualified teacher of 20 years experience who is also a professional magician. The show aims to give students the confidence to see that they have the potential to be good mathematicians by focusing on skills and attitudes. Students have often said that they feel more confident about maths once they understand more about the patterns inherent within so many of its topics.

Contact: Andrew Jeffrey
 Tel: 01273 279746
 Email: info@andrewjeffrey.co.uk
 Web: www.andrewjeffrey.co.uk

Prep Time: 1 hour
 Running Time: 1 day
 Cost: £500 plus expenses



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 ENRICHMENT AND EXTENSION

The Nuffield Science Bursaries

TYPE: OUT-OF-SCHOOL EVENTS AGE RANGE: 16-19

The Nuffield Science Bursaries (NSB) offer post-16 students (academic or vocational) the opportunity to go on a science, technology, engineering or mathematics (STEM) placement during their summer vacation. The overall aim of the NSB scheme is to encourage young people who are considering working in the STEM arena. The NSB scheme offers teachers the chance to develop contacts with working scientists, technologists, engineers and mathematicians in industry and research institutions and improve links with Higher Education. This scheme offers students a first-hand experience of STEM in a working environment, a greater awareness of possible career opportunities, experience of teamwork with students from varied backgrounds, interviews, presentations, the chance to apply for a Crest Award and become an ambassador for NSB.

Contact: Jo Oladejo
 Nuffield Foundation
 Tel: 020 7636 4612
 Email: joladejo@nuffieldfoundation.org
 Web: www.nuffieldfoundation.org/scb

Prep Time: 2 days (induction day + application)
 Running Time: 4-6 week project placement during summer vacation
 Cost: Free



WORK RELATED LEARNING/
 ENTERPRISE



The Smallpeice Trust

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 12-19

The Smallpeice Trust offers around 30 residential four-day courses for 14-17 year olds. These heavily subsidised courses take place around the school holidays at Universities across the UK. The timetable usually includes biomedical engineering, engineering experience, marine technology, materials technology, mining & minerals, nanotechnology, supercomputing and sustainable energy. The Smallpeice Trust also offers in school STEM days, designed for 12-14 year old students to enhance their understanding of, and aptitude for, problem solving, creativity, design, and engineering. Groups of up to 50 students work together in teams on design and make projects to improve their creative thinking and problem-solving skills. Projects include aeronautical design & make, wind turbine challenge, super capacitor vehicle and junkyard wars.

Contact: Hassana Begum
 The Smallpeice Trust
 Tel: 01926 333200
 Email: info@smallpeicetrust.org.uk
 Web: www.smallpeicetrust.org.uk

Prep Time: 0.5 hours
 Running Time: 1-4 days, depending on activity
 Cost: Free



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 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION



The Year in Industry

TYPE: OUT-OF-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 16-19

The Year in Industry (YINI) helps gap year students find paid, challenging, rewarding and fully-supported placements. Placements are predominantly for science, engineering and technology students and last for 9-12 months. Students receive mentoring and training courses, and are encouraged to join the relevant professional institutions. YINI gives students the opportunity to begin their university degree having had a practical experience of the kind of work they will do upon graduating. They can apply the theory they have learned in a real-world environment, helping them prepare for the world of work. The students are provided with leadership and management training, and develop communication, teamwork and problem-solving skills.

Contact: Clare Hall
 EDT
 Tel: 023 8059 7061
 Email: info@yini.org.uk
 Web: www.yini.org.uk

Prep Time: 1 hour-1 day (interview)
 Running Time: Gap year in Industry
 Cost: Free



WORK RELATED LEARNING/
 ENTERPRISE
 CITIZENSHIP
 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM



TrackNAVCHALLENGE

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 11-19

TrackNAVCHALLENGE is a challenge in which teams of four to six are tasked with designing and building a radio-controlled four-wheel drive vehicle that can emulate what a Land Rover can do. It's about traction and control, not speed! The challenge is designed to introduce young people to the world of engineering and enterprise in a relevant and appropriate manner that is fun, exciting and challenging. TrackNAVCHALLENGE supports both the engineering and design and technology curriculum. Support available from Land Rover includes visits, talks to the team and materials that support business acumen as well as the delivery of relevant engineering concepts. Teachers are supported with 4x4 technology material and access to engineers where necessary.

Contact: Ruth Martin
 Land Rover
 Tel: 01926 648299
 Email: tracknav@landrover.com
 Web: www.tracknavchallenge.co.uk

Prep Time: 2-3 hours
 Running Time: 60 hours
 Cost: Approximately £61 per student participating in a team of six



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 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION



United Kingdom Mathematics Trust

TYPE: OUT-OF-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 11-19

The United Kingdom Mathematics Trust's (UKMT) main activity is annual challenges for secondary school pupils consisting of multiple choice papers sat in schools on a specified date that aim to promote mathematical thinking. They also run team competitions for 12-14 and 16-18 year olds. The material from all these competitions is available to teachers to use for enrichment in the classroom. They also publish past papers and books on mathematical enrichment, run seminars for teachers and a mentoring scheme for gifted pupils. The questions in challenges include real-world examples and applications, but more importantly encourage students to think about how to apply their mathematics and what tools to use to answer what type of questions. Team events also encourage communication skills and teamwork combined with mathematics.

Contact: Mary Wimbury
 United Kingdom Mathematics Trust
 Tel: 0113 3432339
 Email: enquiry@ukmt.org.uk
 Web: www.ukmt.org.uk

Prep Time: 0.5-1 hours
 Running Time: 1 hour to 1 day
 dependent on activity
 Cost: £10 per 10 entries for challenge papers,
 £20 to enter team events,
 £30 teacher meetings, mentoring – free

Ma

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 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 ENRICHMENT AND EXTENSION



University of Southampton National Cipher Challenge

TYPE: OUT-OF-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES
AGE RANGE: 11-19

The National Cipher Challenge is an online code-breaking competition for UK schools, taken by a wide spread of abilities and ages. The competition is run annually throughout the autumn term with graded challenges published periodically over a period of three months. The messages to be broken are the chapters in an adventure story, enriched with ideas from science, history and engineering. Solutions are published throughout the competition so that those who are struggling can still follow. The scheme introduces participants to the thrill of discovery and genuine problem solving in mathematics and computer science. It presents mathematics as an exciting activity and involves them in a long-term project that is often seen as real and involving by the competitors.

Contact: Graham A. Niblo
 University of Southampton –
 National Cipher Challenge
 Tel: 023 8059 3674
 Email: cipher@soton.ac.uk
 Web: www.cipher.maths.soton.ac.uk

Prep Time: Contact scheme/activity provider
 Running Time: Challenges are published
 online periodically over three months
 Cost: Free

Ma IT

NATIONAL CURRICULUM
 ENRICHMENT AND EXTENSION

whynotchemeng

TYPE: IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES AGE RANGE: 7-19

whynotchemeng promotes chemical engineering as a career choice. It provides careers literature for school libraries, teaching resources for teachers of students aged 7-16, demonstrations for science lessons and events, posters for classrooms and comprehensive information about chemical engineering aimed at school students aged 14-18, teachers and parents. The website presents tools that teachers can use to provide information on chemical engineering as a career choice. Students can find information on what chemical engineering is all about, the variety of sectors chemical engineers work in and information about the universities who offer chemical engineering degree courses.

Contact: Claire Cooke
 Institution of Chemical Engineers
 Tel: 01788 534427
 Email: ccooke@icheme.org
 Web: www.whynotchemeng.com

Prep Time: 0-1 hour
 Running Time: 10 minutes-1 hour
 Cost: Free



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 WORK RELATED LEARNING/
 ENTERPRISE
 CITIZENSHIP
 ENRICHMENT AND EXTENSION



Women in Science, Engineering and Technology

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 11-19

Activities include work experience projects, courses and taster activities and teacher resources. Women in Science, Engineering and Technology (WiSET) works with partners locally and nationally to provide innovative ways to tackle occupational segregation. WiSET can signpost teachers and lecturers to other resources and partner organisations when needed. Girls and women are traditionally under-represented in a number of science, technology, engineering and mathematics (STEM) areas. There are a number of enrichment and enhancement activities that can exclude girls without meaning to. The range of resources and activities available also will support development of gender awareness in teachers. Benefits to students are to raise aspirations and widen horizons in career choice.

Contact: Pat Morton
 Sheffield Hallam University
 Tel: 0114 2254695
 Email: wiset@shu.ac.uk
 Web: www.shu.ac.uk/research/cse/

Prep Time: Contact scheme/activity provider
 Running Time: Contact scheme/activity provider
 Cost: Dependant on the activity



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 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION

Wondermaths: Gifted and Talented Maths

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD
AGE RANGE: 7-11

Wondermaths is a 10 week course for late primary pupils who have been identified as being gifted in maths. The course comes with the full session outlines, teacher guide and resources required to run the sessions, including graphical calculators, games, folders etc. The course aims to develop pupils mathematical thinking. Wondermaths has been designed to encourage pupils to take risks with their learning of maths, through carefully structured group and pair activities, encouraging them to think through and explain strategies in an environment where they feel safe to have a go. The teacher guide makes it clear that the course can be run by any teacher, not only those with a maths specialism, as there are teachers' notes throughout supporting understanding of the mathematics within the sessions.

Contact: Valerie Johnson
 Education Interactive
 Tel: 020 8318 6380
 Email: courses@education-interactive.co.uk
 Web: www.education-interactive.co.uk

Prep Time: 1 hour
 Running Time: 10 sessions x 90 minutes
 Cost: £400 for a 12 pupil box/£900 for 30 pupils



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 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM



What can E&E activities do for my school?

Liverpool Mathematical Society 'FunMaths Roadshow' "Frustratingly addictive" ... "our year 7 students loved the Roadshow and want to know when you're coming again".

With comments like these, it is unsurprising to hear that the Department of Mathematical Sciences at the University of Liverpool has been involved in outreach work in local schools for over 25 years. In the last few years, the outreach programme has broadened still further with events at schools as far afield as Kent and Aberdeenshire.

The Outreach team offers a range of events and activities, both on its own and in partnership with Maths Education on Merseyside (MEM), SETPOINT Greater Merseyside and Cheshire, and the Liverpool Mathematical Society (LivMS).

The FunMaths Roadshow consists of 12 sets of 25 activities, each targeted principally at a given age range. Typically, the Roadshow operates as a session for up to 100 pupils, with a targeted set of 50 activities on A3 baseboards spread around a school hall or similar venue. The Roadshow provides a valuable opportunity for older pupils to take on a mentoring role.

Within the given age range of each group of pupils, each set of activities aims to be all ability in the sense that there are some easy activities and some quite challenging. The aim is that all participants succeed.

"The students taking part self-select those activities which they wish to do," explains Chris Marchant, outreach officer at Liverpool University's Department of Mathematical Sciences, which runs the Roadshow. "This means that they can pick activities which reflect their interests and this encourages those who would otherwise probably disengage with mathematics to remain on-task and focussed".

He continues: "Sessions held at challenging schools have also been very successful, as have those held at special schools, and with groups such as asylum seekers and looked-after children."

The resources are available in a range of languages, including French, Spanish, Welsh, Scots Gaelic, Portuguese and Mandarin Chinese, which makes the Roadshow additionally appropriate for language enrichment as well as mathematics.

"In addition to the Roadshow, we have a range of workshops available for all age groups from Key Stage 1 to Key Stage 5," say Chris Marchant, "ranging from 'Maths in Art' to 'Proof', and from 'Code Breaking' to 'Pythagoras'. We even have a 'Maths Improvisation' workshop for able pupils".



“ The FunMaths Roadshow is a very enjoyable two days, particularly well received by Year 11. Staff and students had a great time and it was very well received by unexpected students (i.e. school refusers). ”

Comment by teacher from Wrenn School in Wellingborough.

Photo on opposite page: An example of pupils enjoying a STEM E&E activity.

REGIONAL SCHEMES & ACTIVITIES



Subject Key

- Ap** Applied Science
- DT** Design/Technology
- Eng** Engineering/Manufacturing
- IT** ICT/Digital
- Ma** Mathematics
- Sc** Science
- Bi** Science – Biology
- Ch** Science – Chemistry
- Ph** Science – Physics



BAE Systems Education Programme

TYPE: IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES AGE RANGE: 7-14

The BAE Systems Education Programme consists of an in-school roadshow comprising a dramatic performance and an interactive workshop. This is supported by a network of BAE Systems Ambassadors visiting schools, delivering a whole host of activities ranging from science, technology, engineering and mathematics (STEM) lessons to career talks, as well as a series of websites for the teachers and young people. The roadshow aims to inspire, engage and motivate young people to consider a future career in engineering, supported by the network of BAE Systems Ambassador's, allowing young people to hear from and benefit first-hand from people working in this field. The websites raise awareness of the types of jobs available to anyone considering a career in science, technology or engineering.

Contact: Lee Phillips
 BAE Systems
 Tel: 01484 686451
 Email: baesystems@cragrats.com
 Web: www.baesystems.com/education

Prep time: 1-6 hours
 Running time: 1-6 hours
 Cost: Free

- DT**
 - Eng**
 - IT**
 - Ma**
- Sc**

NATIONAL CURRICULUM
 DIPLOMA

NORTH-EAST ENGLAND
 NORTH-WEST ENGLAND
 YORKSHIRE & THE HUMBER
 EAST OF ENGLAND
 SOUTH-EAST ENGLAND
 SOUTH-WEST ENGLAND
 SCOTLAND
 WALES

BAE SYSTEMS

Bolton Science and Technology Centre

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES AGE RANGE: 5-19

Bolton Science and Technology Centre (BSTC), part of Bolton science, technology, engineering and mathematics (STEM) service, offers schools access to advanced design and manufacturing and science equipment not usually found in schools, by running drop-in science and engineering clubs and robotics activities, catch-up and revision classes and family learning days. BSTC also runs a broad CPD programme for teachers of STEM subjects that includes work in industrial contexts. This work takes place in schools and in their purpose-built high technology centre. Working alongside teachers and their pupils, BSTC introduces new activities and ways of working to immediate benefit for the pupils involved and impact on all pupils in each school as the practice becomes embedded in the school.

Contact: Torben Steeg
 Bolton Science & Technology Centre
 Tel: 01204 372204
 Email: steegt@dbtc.bolton.gov.uk
 Web: www.uktic.org

Prep Time: 0.25-1 hour
 Running Time: 1 day per activity
 Cost: Free – £400 per day, per class (max 30 students), dependent on activity

- Ap**
- Eng**
- IT**

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 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 ENRICHMENT AND EXTENSION

NORTH-WEST ENGLAND

**Bolton Science and
 Technology Centre**

Cambridge Science Festival

TYPE: **OUT-OF & IN-SCHOOL EVENTS** AGE RANGE: **5-19**

The Cambridge Science Festival is the UK's largest free science festival offering a range of activities for all ages over two weeks each March. These activities include: a schools roadshow, where science, technology, engineering and mathematics (STEM) academics give talks and demonstrations at schools across Cambridgeshire; lectures; schools masterclasses, where GCSE pupils have a taster day of life at a Higher Education Institution, involving interactive lectures, museum visits and tours of Cambridge colleges; and family fun days with hands-on activities and talks across the city and beyond. The benefits to students are that they will get to engage with university students and academics and see how STEM subjects can be applied and what career prospects are available to them if they continue their education in these areas.

Contact: Shelley Bolderson
Cambridge Science Festival
Tel: 01223 766762
Email: csf@admin.cam.ac.uk
Web: www.cambridgescience.org

Prep Time: 0.5-1 hour
Running Time: 1 hour lectures-2 weeks of festival activities
Cost: Free



NATIONAL CURRICULUM
ENRICHMENT AND EXTENSION

SOUTH-EAST ENGLAND



Catalyst Education Programme

TYPE: **OUT-OF-SCHOOL EVENT** AGE RANGE: **7-16**

Catalyst run science shows and workshops, have guest presenters and hosts special events such as Enterprise Week and National Science and Engineering Week. Catalyst are well-known for their chemistry activities and fill a unique niche within science centres. However Catalyst has widened their scope to include many other activities across the science and maths sphere. Catalyst offers a full day out with taught sessions and self-guided tours. The 3D theatre allows visitors to experience science in the workplace with virtual tours of industry. Catalyst offer primary and secondary teachers and pupils the opportunity to work in a real laboratory in a safe and exciting environment and enable school students to meet scientists.

Contact: Susan Halliday
Catalyst Education Programme
Tel: 0151 4201121
Email: sue@catalyst.org.uk
Web: www.catalyst.org.uk

Prep time: 0-4 hours
Running time: 0.75-1.5 hours
Cost: £3.25-£5.50 per student per activity,
£35-£50 per workshop (max 36 students)



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EVERY CHILD MATTERS,
WORK RELATED LEARNING/
ENTERPRISE
CITIZENSHIP

NORTH-WEST ENGLAND



Daresbury Laboratory: Talking Science and Site Visits

TYPE: **OUT-OF-SCHOOL EVENTS** AGE RANGE: **5-19**

The Talking Science programme at the Daresbury Laboratory offers schools a range of special events, presentations, topical lectures and debates from Science and Technology Facilities Council (STFC) scientists and eminent guest speakers. Different Talking Science events represent the broad range of STFC science. Daresbury Laboratory Site Visits welcome school visitors aged 11-19, providing a comprehensive and structured programme of talks, tours of departments and opportunities to engage with working scientists and engineers. There are also onsite hands-on activities and resources within the visitor centre. Both programmes allow students and teachers to gain first-hand experience of cutting-edge science and technology at a world-class laboratory. They have the opportunity to meet with inspirational scientists and engineers who can bring the experience to life. Not only do the experiences support the core topics within the curriculum but they also offer opportunities to illustrate examples of 'How science works'.

Contact: Paul Birchall
STFC Daresbury Laboratory
Tel: 01925 603408
Email: p.a.birchall@stfc.ac.uk
Web: www.scitech.ac.uk

Prep: 3 hours
Running Time: 3 hours
Cost: Free



NATIONAL CURRICULUM
CITIZENSHIP
ENRICHMENT AND EXTENSION

NORTH-WEST ENGLAND

Engineering Education Scheme

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **16–19**

The Engineering Education Scheme is a work-related, project-based, applied-learning scheme. Teams of four work with a teacher and industrial mentor on a company project over a period of six months. Each project is unique, designed by the company to feature real problems. Students experience project management, report writing, communication skills, teamwork and problem solving whilst developing skills focused on creativity and innovation. Students benefit by experiencing the world of work and clearer understanding of science, technology, engineering and mathematics (STEM) subjects and courses from different contexts. The students have the opportunity for the projects to be assessed by the CREST Awards and provide input into the skills section of the Duke of Edinburgh Awards. Accreditation is available through an awarding body and validation by a Higher Education Institution.

Contact: Marion Philips, EDT
 Tel: 01707 393 323 (England)
 Tel: 0141 548 4152 (Scotland)
 Email: info@thescheme.org.uk (England)
 Email: scotland@thescheme.org.uk (Scotland)
 Web: www.thescheme.org.uk

Prep Time: 0.5–5 hours
 Running Time: 6 month project (1–2 hours per week)
 plus 3-day workshop and two 1 day events
 Cost: £75.00 per student (teams of four students)

Engineering Inspirations

TYPE: **OUT-OF-SCHOOL EVENTS, CPD** AGE RANGE: **11–19**

Engineering Inspirations is an event held every July for students in York and North Yorkshire and further afield. Students from KS3–KS5 display their best engineering, science and maths project work, completed before attendance in July. The day also includes numerous drop-in activities, hands-on stands, the culmination of in-school challenges and a teacher challenge. The event allows young people to compete and compare results with their peers. It also fosters business–education links, and the opportunity to engage with employers.

Contact: Harriet Dow
 North Yorkshire Education
 and Business Partnership
 Tel: 01904 693632
 Email: harriet@nybep.org.uk
 Web: www.nybep.org.uk

Prep time: 3–12 hours
 Running time: 3–12 hours
 Cost: Free to schools in North Yorkshire, small charge
 for schools from other regions

Further Mathematics Network

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **14–19**

The Further Mathematics Network promotes AS/A level mathematics and further mathematics, and the study of science, technology, engineering and mathematics (STEM) subjects at university. It provides tuition in AS/A level further mathematics to students who cannot access it in their own schools/colleges and professional development for teachers. It gives free access to extensive teaching and learning resources and support for further mathematics for both students and teachers/lecturers in schools and colleges. The Network addresses the need for universal access to further mathematics qualifications, giving all students the opportunity to benefit from studying AS/A level further mathematics. The Network delivers flexible tuition across England, providing classes in schools, colleges, universities and online.

Contact: Charlie Stripp
 The Further Mathematics Network (MEI)
 Tel: 01225 774777
 Email: charlie.stripp@mei.org.uk
 Web: www.fmnetwork.org.uk

Prep Time: 20–30 minutes
 Running Time: 1 hour event–2 hour weekly tuition
 for 30 weeks
 Cost: Resources are free. Full tuition £243 per AS/A2
 unit per student. Other activities Free–£200



ENRICHMENT AND EXTENSION
 NATIONAL CURRICULUM
 EVERY CHILD MATTERS
 WORK RELATED LEARNING
 CITIZENSHIP
 SELF-EVALUATION FORM

NORTH-EAST ENGLAND
 NORTH-WEST ENGLAND
 YORKSHIRE & THE HUMBER
 EAST MIDLANDS
 WEST MIDLANDS
 EAST OF ENGLAND
 LONDON
 SOUTH-EAST ENGLAND
 SOUTH-WEST ENGLAND
 SCOTLAND



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 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM

YORKSHIRE & THE HUMBER
 NORTH-EAST ENGLAND



EVERY CHILD MATTERS
 ENRICHMENT AND EXTENSION

NORTH-EAST ENGLAND
 NORTH-WEST ENGLAND
 YORKSHIRE & THE HUMBER
 EAST MIDLANDS
 WEST MIDLANDS
 EAST OF ENGLAND
 LONDON
 SOUTH-EAST ENGLAND
 SOUTH-WEST ENGLAND



Go4SET

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **11-14**

Go4SET is a work-related, project-based, applied-learning activity. Teams of six pupils work with a teacher and industrial mentor on an environmentally-themed science, technology, engineering and mathematics (STEM) project over a period of 10 weeks. The project matter has equal relevance to the company and school. Projects are rigorously assessed and reported on by panels of assessors from industry, education and commerce. Go4SET has a competition format and all pupils are eligible for the CREST awards. By working closely with an industrial mentor, pupils benefit by getting a taste of real-life industry. They also benefit from experiencing project management, report writing, communication skills, teamwork and problem solving.

Contact: Marion Phillips
 EDT
 Tel: 01707 393323
 Email: info@go4set.org.uk
 Web: www.go4set.org.uk

Prep Time: 0.5-5 hours
 Running Time: 10 week project
 (1-3 hours per week) plus two 1 day events
 Cost: Free

In-company Educational Events

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES**
 AGE RANGE: **7-19**

The Industrial Trust organises and completes educational work-related events in workplaces and other out-of-school venues. The Trust works with teachers and companies to design tailor-made events to meet agreed learning needs. Events usually feature one or more aspects of science, technology, engineering and mathematics (STEM), ICT, business and/or enterprise. By using a work environment and involving industry and enterprise, the programmes help students to see STEM (and other subjects) in their inter-related and widest sense while learning about career opportunities that they might aspire to. These events dispel pre-conceived bias relating to gender, ethnic and professional stereotypes by enabling students see people they can relate to.

Contact: John Gibbs-Newton
 Industrial Trust
 Tel: 01949 850750
 Email: john.newton@industrialtrust.org.uk
 Web: www.industrialtrust.org.uk

Prep time: 2-3 hours
 Running time: 4-6 hours
 Cost: Free-£30 per students depending
 tailored event



Ph

NATIONAL CURRICULUM
 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM

NORTH-EAST ENGLAND
 NORTH-WEST ENGLAND
 YORKSHIRE & THE HUMBER
 EAST MIDLANDS
 WEST MIDLANDS
 EAST OF ENGLAND
 LONDON
 SOUTH-EAST ENGLAND
 SOUTH-WEST ENGLAND
 SCOTLAND



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 EVERY CHILD MATTERS
 WORK RELATED LEARNING/
 ENTERPRISE
 ENRICHMENT AND EXTENSION
 DIPLOMA
 CITIZENSHIP

NORTH-EAST ENGLAND
 NORTH-WEST ENGLAND
 YORKSHIRE & THE HUMBER
 EAST MIDLANDS
 WEST MIDLANDS
 EAST OF ENGLAND
 LONDON
 SOUTH-EAST ENGLAND
 SOUTH-WEST ENGLAND
 NORTH WALES



L M Interactive

TYPE: IN-SCHOOL EVENTS AGE RANGE: 7-19

L M Interactive offers a wide range of science shows covering topics in physical science, engineering and mathematics. Current topics covered include fire, air and the atmosphere, time and time measurement, navigation and electricity. All shows are written and presented by Richard Ellam, a highly experienced presenter, and most shows feature purpose-made, well-engineered props. L M Interactive science shows incorporate demonstrations which are not normally done in schools and bring together material normally taught in schools in separate disciplines, with the aim of providing a richer context for the science and technology covered. Teachers get to see novel demonstrations and advice on replicating these in the classroom is freely given. These shows provide valuable starting points for post-show discussions and classroom activities.

Contact: Richard Ellam, L M Interactive
Tel: 01761 412797
Email: richard@lminteractive.eclipse.co.uk
Web: www.limiteractive.co.uk

Prep Time: 0.5 hours
Running Time: 1 hour per show
Cost: £330 plus VAT per day plus expenses
Discounts for longer bookings



NATIONAL CURRICULUM
DIPLOMA
ENRICHMENT AND EXTENSION

NORTH-EAST ENGLAND
NORTH-WEST ENGLAND
YORKSHIRE & THE HUMBER
EAST MIDLANDS
WEST MIDLANDS
EAST OF ENGLAND
LONDON
SOUTH-EAST ENGLAND
SOUTH-WEST ENGLAND
WALES

Learning at Head of Steam

TYPE: OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES AGE RANGE: 5-19

Students have access to the museum and its collections illustrating the development of the railways in the North-East, and in particular the development of engineering. As well as museum objects, it is also possible to access the archival collections. Visiting the museum and accessing its collections fits into the national curriculum, and also into new vocational qualifications. The scheme aims to develop partnerships with schools and colleges to increase access to these materials. The museum context also illustrates the people behind the science, technology, engineering and mathematics (STEM) pioneers who drove the developments.

Contact: Sarah Gouldsbrough
Darlington Railway Museum
Tel: 01325 734128
Email: sarah.gouldsbrough@darlington.gov.uk
Web: www.head-of-steam.co.uk

Prep: 0.5-1 hour
Running Time: 1-2 hours
Cost: Free



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EVERY CHILD MATTERS
ENRICHMENT AND EXTENSION

NORTH-EAST ENGLAND
NORTH-WEST ENGLAND
YORKSHIRE & THE HUMBER



Maths in the Pipeline

TYPE: OUT-OF-SCHOOL EVENTS AGE RANGE: 14-16

Maths in the Pipeline is a full day of workshops and challenge for mathematically able 15 year olds based on the applications of realistic mathematics in the oil and gas industry. Pupils are allocated to teams for the day and work with the support of a teacher and industry professionals. The team winning the final business challenge is awarded a prize and all participants are presented with a certificate. The event gives maths in the classroom real relevance. Teachers and pupils benefit from working alongside highly motivated professionals doing the real job. Pupils realise the value of mathematical skills to industry and also some of the career paths available to them in the future.

Contact: Vivien Ellins
TechFest-SetPoint
Tel: 01224 274189
Email: vivien.ellins@abdn.ac.uk
Web: www.techfestsetpoint.org.uk

Prep Time: 1 hour
Running Time: 7 hours
Cost: Free



WORK RELATED LEARNING/
ENTERPRISE
ENRICHMENT AND EXTENSION
CURRICULUM FOR EXCELLENCE

SCOTLAND



Maths Inspiration

TYPE: **OUT-OF-SCHOOL EVENTS** AGE RANGE: **14-19**

Maths Inspiration run events that seek to inspire Year 12 and more able Year 11 students to pursue mathematical subjects to a higher level. Using some of the UK's leading maths, engineering and science speakers, the shows are held in venues around England, consisting of three speakers with diverse topics, each of them chosen to engage older teenagers. Maths Inspiration not only provides a high quality maths field trip, but feedback from teachers and students has also confirmed that the entertaining but educational way in which the events are run can have a long-term impact on the attitudes of students to maths.

Contact: Rob Eastaway, Maths Inspiration
Tel: 020 8299 4203
Email: mail@mathsinspiration.com
Web: www.mathsinspiration.com

Prep time: 0.5 hours
Running time: 3 hours
Cost: Tickets are typically £5

More Maths Grads

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
AGE RANGE: **11-19**

More Maths Grads is a three-year project funded by the Higher Education Funding Council for England to develop, trial and evaluate means of increasing the number of students studying mathematics and encouraging participation from groups of learners who have not traditionally been well represented in higher education. They aim to promote mathematics by working together with schools in their targeted regions. The overall goals are to encourage more students to continue with maths to A level or degree level, and to help students to understand how mathematics can be applied. They are particularly interested in encouraging participation from students who come from backgrounds under-represented in higher education. Teachers will gain an awareness of applications of mathematics and different ways of presenting or teaching curriculum subjects. Students will benefit from a different way of looking at school or college mathematics.

Contact: Farzana Aslam
Coventry University
Tel: 024 7688 8569
Email: farzana.aslam@coventry.ac.uk
Web: www.moremathsgrads.org.uk

Prep time: 0.5 hours
Running Time: 1 hour
Cost: Free

Museum of the History of Science Schools Education Programme

TYPE: **OUT-OF-SCHOOL EVENTS, TEACHER RESOURCES** AGE RANGE: **5-19**

The Museum offers a range of facilitated workshops that support QCA specifications covering KS1-KS5. Activities range from Tudor ships and shadows and sundials for primary schools, to sessions on astronomy, medicine, electricity and microscopy for secondary and Further Education. Visits can be combined with visits to the other Oxford University Museums including the Oxford University Museum of Natural History. The sessions are delivered by experienced teachers and are designed to engage students with reflection, problem solving and hands-on activities including access to original objects. The Museum provides a unique environment to stimulate learning about science using historical contexts.

Contact: Christopher Parkin
Oxford Museum of the History of Science
Tel: 01865 277280
Email: christopher.parkin@mhs.ox.ac.uk
Web: www.mhs.ox.ac.uk

Prep Time: 0.5 hours
Running Time: 0.5 hour tour – 1.5 hour workshop
Cost: Free



ENRICHMENT AND EXTENSION

NORTH-EAST ENGLAND
NORTH-WEST ENGLAND
YORKSHIRE & THE HUMBER
EAST MIDLANDS
WEST MIDLANDS
EAST OF ENGLAND
LONDON
SOUTH-EAST ENGLAND
SOUTH-WEST ENGLAND



NATIONAL CURRICULUM
EVERY CHILD MATTERS
DIPLOMA
ENRICHMENT AND EXTENSION

YORKSHIRE & THE HUMBER
WEST MIDLANDS
LONDON



NATIONAL CURRICULUM
EVERY CHILD MATTERS
ENRICHMENT AND EXTENSION

SOUTH-EAST ENGLAND



North-East Process Industry Cluster Education Engagement Programme

TYPE: **OUT-OF & IN-SCHOOL EVENTS, TEACHER RESOURCES, CPD**
 AGE RANGE: **5-19**

The North-East Process Industry Cluster (NEPIC) is an organisation working closely with the chemical, pharmaceutical, biotechnology and biofuels industries of North-East England, and their supply chain which includes many engineering companies. From board games with an environmental slant to real-life problem solving, primary science shows to a residential Chemistry Jamboree, NEPIC has a range of activities available and is able to develop new activities to suit. NEPIC puts science, technology, engineering and mathematics (STEM) study into context for students and take the learning beyond the classroom. Teachers benefit from an enhanced understanding of the process industries and gain experience of industry that can be used within the classroom in future years.

Contact: Emma Youdale
 North East Process Industry Cluster
 Tel: 0191 5164400
 Email: emma.youdale@nepic.co.uk
 Web: www.nepic.co.uk

Prep time: Contact scheme/activity provider
 Running time: Contact scheme/activity provider
 Cost: Dependent on activity



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 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 ENRICHMENT AND EXTENSION

**NORTH-EAST ENGLAND
 YORKSHIRE & THE HUMBER**



Personal Finance Education Group: 'Learning Money Matters', 'What Money Means' and 'Use Your Expertise'

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **5-19**

The personal financial education group (pfeg) is an independent educational charity that provides support to teachers and schools to deliver personal finance education through a number of initiatives. Learning Money Matters is a free consultancy support to secondary school teachers and schools to teach financial capability. What Money Means provides resources and support to primary school teachers and schools to teach financial capability. The website www.useyourexpertise.org matches schools with trained and CRB-checked financial services volunteers. www.pfeg.org contains a wealth of information, case studies and quality assured teaching resources. pfeg's support for schools and teachers, which usually involves face to face contact with a pfeg consultant, provides them with the knowledge, skills and confidence that enables them to deliver good quality personal finance education.

Contact: Personal Finance Education Group
 Tel: 020 7330 9470/0845 241 0925
 Email: info@pfeg.org
 Web: www.pfeg.org
 www.useyourexpertise.org

Prep Time: Initial time to set up consultancy 0.5 hours
 Running Time: 3 days consultancy (Learning Money Matters) and ongoing support from financial sector
 Cost: Free



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 WORK RELATED LEARNING/
 ENTERPRISE
 DIPLOMA
 CITIZENSHIP
 ENRICHMENT AND EXTENSION
 SELF-EVALUATION FORM

**NORTH-EAST ENGLAND
 NORTH-WEST ENGLAND
 YORKSHIRE & THE HUMBER
 EAST MIDLANDS
 WEST MIDLANDS
 EAST OF ENGLAND
 LONDON
 SOUTH-EAST ENGLAND
 SOUTH-WEST ENGLAND**



Primary Outreach Programme

TYPE: **OUT-OF & IN-SCHOOL EVENTS** AGE RANGE: **5-12**

TechFest-SetPoint offers a range of outreach shows and workshops suitable for primary schools in all areas of science, technology, engineering and mathematics (STEM). Each show and workshop is led by an experienced presenter with a teaching or science background. Themes covered by the shows and workshops include electricity, flight, bridge building and maths. The workshops can be delivered in schools or at local STEM festivals. The shows include a variety of learning and teaching methods to engage all participants. They enhance pupil understanding, experiences and knowledge of STEM in a fun and inspiring way. For teachers, support materials for each activity are being developed and include links to a Curriculum for Excellence, pre- and post-visit advice, and risk assessments.

Contact: Ann Larkham
TechFest-SetPoint
Tel: 01224 274192
Email: ann.larkham@abdn.ac.uk
Web: www.techfestsetpoint.org.uk

Prep Time: 0-1 hour
Running Time: 0.5-5 days
Cost: £55 per workshop plus subsidised travel expenses where applicable

Primary and Secondary Schools Education Programme

TYPE: **OUT-OF & IN-SCHOOL EVENTS** AGE RANGE: **5-18**

A wide selection of inspiring and hands-on activities designed to support Curriculum for Excellence. Programmes cover nursery to S6 and include activities such as DNA extraction, hands-on experiments, circuit soldering and robot programming. Debates for S4-6 provoke thought and discussion on ethical and controversial science issues. The activities seek to deliver inspiring science and technology experiences that cannot be achieved in school through our exhibitions, workshops and shows. All activities seek to deliver the values of Curriculum for Excellence, and promote active learning and confidence. Dundee Science Centre exists to complement in-school learning, and is inspected by MIE. Visits can be tailored to your needs. Outreach service also available.

Contact: Hannah Crookes
Dundee Science Centre (Sensation)
Tel: 01382 868610
Email: hannah.crookes@dundeesciencecentre.org.uk
Web: www.sensation.org.uk

Prep time: 2 hours
Running time: 2-5 hours visit duration
Cost: Standard admission
£3.50-£6.50 per pupil

Rutherford Appleton Laboratory: Talking Science and Site Visits

TYPE: **OUT-OF-SCHOOL EVENTS** AGE RANGE: **5-19**

The Talking Science programme at the Rutherford Appleton Laboratory offers schools a range of special events, presentations, topical lectures and debates from STFC (Science & Technology Facilities Council) scientists and eminent guest speakers. Different Talking Science events represent the broad range of STFC science. Rutherford Appleton Laboratory Site Visits welcome school visitors aged 11-19, providing a comprehensive and structured programme of talks, tours of departments and opportunities to engage with their working scientists and engineers. There are also on-site hands-on activities and resources within the visitor centre. Both programmes allows students and teachers to gain first-hand experience of cutting-edge science and technology at a world-class laboratory. They have the opportunity to meet with inspirational scientists and engineers who can bring the experience to life. Not only do the experiences support the core topics within the curriculum but they also offer opportunities to illustrate examples of 'How science works'.

Contact: Caroline Callard
STFC Rutherford Appleton Laboratory
Tel: 01235 445789
Email: c.callard@stfc.ac.uk
Web: www.scitech.ac.uk

Prep: 3 hours
Running Time: 5 hours
Cost: Free



CURRICULUM FOR EXCELLENCE

SCOTLAND



WORK RELATED LEARNING/
ENTERPRISE
CITIZENSHIP
ENRICHMENT AND EXTENSION
CURRICULUM FOR EXCELLENCE

SCOTLAND



NATIONAL CURRICULUM
CITIZENSHIP
ENRICHMENT AND EXTENSION

EAST MIDLANDS
LONDON
SOUTH-EAST ENGLAND
SOUTH-WEST ENGLAND

Science, Technology, Engineering and Maths Workshops

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES**
 AGE RANGE: **5-19**

The Assault Glider Trust (AGT) offers visits to its conservation hangar and runs workshops across science, technology, engineering and mathematics (STEM) subjects for KS2-KS4, Further and Higher Education Institutions. Workshops can be run in-house or as outreach activities. The Trust also accepts work placements throughout the year. The Trust allows students to see the practical applications of STEM subjects within a fully health and safety assessed engineering environment. Visits to, and activities in, the AGT's conservation hangar offer students the opportunity to engage with their aviation heritage as well as experiencing hands-on learning. There are few places in the country that offer such a unique experience.

Contact: Tim Jenkins
 RAF, Shawbury
 Tel: 01939 250009
 Email: t.n.jenkins@btconnect.com
 Web: www.assaultgildertrust.co.uk

Prep Time: 5 hours
 Running Time: 5 hours
 Cost: £150 per day

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 WORK-RELATED LEARNING/
 ENTERPRISE
 DIPLOMA

WEST MIDLANDS

Scottish Science & Technology Roadshow

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
 AGE RANGE: **11-14**

The Scottish Science & Technology Roadshow (SCI-FUN) targets Scottish second year pupils who are making their subject choices, offering a range of shows and interactive hands-on exhibits that aim to enrich the teaching of science that encourages the pupils to consider careers in science. The whole of the second year visits the roadshow. The sessions, for groups of up to 80 pupils at a time, last for 2 school periods and consist of 2 shows, a hands-on session and careers talk. In addition we offer activities for primary schools, evening sessions, workshops for senior pupils and CPD sessions. SCI-FUN gives students and teachers the opportunity to learn about the latest developments in science and learn from hands-on activities. Students and staff learn about the latest developments in science.

Contact: Brian Cameron
 The Scottish Science
 and Technology Roadshow
 Tel: 0131 6505292
 Email: brian.cameron@ed.ac.uk
 Web: www.scifun.ed.ac.uk

Prep time: 1 hour
 Running time: 1 to 2 days (depending on numbers)
 Cost: £800 per school visit

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CITIZENSHIP
 ENRICHMENT AND EXTENSION
 CURRICULUM FOR EXCELLENCE

SCOTLAND
 NORTH-WEST ENGLAND



Shape the Future STEPS at Work

TYPE: **TEACHER RESOURCES, CPD** AGE RANGE: **5–19**

The Royal Academy of Engineering is working with the National Education Business Partnerships Network to offer professional development opportunities for science, technology, engineering and mathematics (STEM) teachers, lecturers and careers specialists. Professional Development Placements (PDPs) with business and industry are an effective way for teachers to enhance their teaching and learning, gain vital work-related experience and case studies for the classroom, and also update their business and careers knowledge. PDPs provide teachers with the opportunity to identify how their subjects are used in the world outside of the classroom. This makes their teaching more relevant and exciting as they will be using examples and case studies from local employers. It brings the curriculum to life and adds excitement to STEM subjects.

Contact: Jenny Asher
National Education Business Partnership Network
Tel: 01635 279916
Email: jenny@nebpn.org
Web: www.nebpn.org

Prep Time: 1–3 hours
Running Time: 5+ hours
Cost: Free

Space Academy

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT & TEACHER RESOURCES, CPD**
AGE RANGE: **9–19**

Space Academy provides education programmes, built around schools' curricula in science, technology, engineering and mathematics (STEM) using space as the inspirational hook. It draws on the skills of universities in the region, and employers who need scientists and engineers and includes opportunities for educators in the field of STEM subjects. Space Academy is a project that couples the UK's areas of excellence at the cutting edge of space technology with the subject that often provokes inspiration and wonder in young people, in a programme that addresses the pressing needs of business and the country's future competitiveness in a global market. Space Academy boosts teacher subject knowledge and confidence, and enhances pedagogic skills set. It also enhances student engagement in curriculum studies.

Contact: Chris Darby
National Space Center
Tel: 0116 2610261
Email: chrisd@spacecentre.co.uk
Web: www.spacecentre.co.uk

Prep Time: 0.5 hours
Running Time: 1.5 hours–1 day
Cost: £250–£600 (for 20–34 students)
depending on programme

Study Days for A level and GCSE Students

TYPE: **OUT-OF-SCHOOLS EVENTS** AGE RANGE: **14–19**

Student Study Days are available in mathematics, physics, chemistry, biology, ICT and design and technology for A level students, and in science and mathematics for GCSE students. The programmes of each study day go beyond the A level and GCSE specifications to show students the excitement of science and where their studies in mathematics, science and technology can take them. The speakers at each study day are selected for their ability to transmit their enthusiasm and for their skill in communicating difficult concepts. The Study Days are delivered in first-class auditoria in central London.

Contact: Radka Newby
The Training Partnership
Tel: 01727 851001
Email: radka.newby@btinternet.com
Web: www.thetrainingpartnership.org.uk

Prep time: 1–2 hours
Running time: 1 day
Cost: £14 per student per day



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ENTERPRISE
DIPLOMA

NORTH-EAST ENGLAND
NORTH-WEST ENGLAND
YORKSHIRE & THE HUMBER
WEST MIDLANDS
EAST MIDLANDS
EAST OF ENGLAND
LONDON
SOUTH-EAST ENGLAND
SOUTH-WEST ENGLAND
WALES



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WORK RELATED LEARNING/
ENTERPRISE
DIPLOMA
CITIZENSHIP
ENRICHMENT
AND EXTENSION,
SELF-EVALUATION FORM

EAST MIDLANDS



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WORK RELATED LEARNING/
ENTERPRISE
ENRICHMENT AND EXTENSION

WEST MIDLANDS
EAST MIDLANDS
LONDON
SOUTH-EAST ENGLAND
SOUTH-WEST ENGLAND

Techniquest@NEWI

TYPE: **OUT-OF & IN-SCHOOL EVENTS, CPD AGE RANGE: 7-19**

Techniquest@NEWI is the largest Science Discovery Centre in North Wales, with an exhibition of 65 hands-on exhibits covering a variety of STEM topics, a theatre, workshop space, lunchroom and cafe. A rich programme of activities is delivered all year round at the centre and as outreach to North- and Mid-Wales, and North-West/Midlands England. Techniquest@NEWI aims to support school teachers in their delivery of the STEM curriculum by providing enrichment activities which would not normally be deliverable by teachers. Its emphasis is on providing a high energy, cross curricular programme which helps to create links between the curriculum and the real world, and to encourage pupils to realise their potential in further and higher education.

Contact: Rachel Mason
Techniquest@NEWI
Tel: 01978 293400
Email: info@techniquest-newi.org
Web: www.techniquest-newi.org

Prep time: 10 minutes-1 hour
Running time: 1-5 hours depending on activity
Cost: Contact scheme/activity provider



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EVERY CHILD MATTERS
WORK RELATED LEARNING/
ENTERPRISE
ENRICHMENT AND EXTENSION

NORTH-WEST ENGLAND
WEST MIDLANDS
WALES



Techniquest Outreach Programme

TYPE: **IN-SCHOOL EVENTS, STUDENT & TEACHING RESOURCES, CPD AGE RANGE: 5-19**

Techniquest's aim is to reach all KS2 pupils in Wales three times per year through eight hubs around Wales. The activities are shows, workshops and kits. Each complements science in the National Curriculum in Wales. Shows are interactive presentations that last for the length of a lesson. Workshops provide opportunities for pupils to consider evidence and develop observational skills. Kits are sets of 11 interactive exhibits. All activities are developed with associated teacher resource materials. In Wales, the new KS2, KS3 and A level curricula will be implemented from September 2008. The teaching of science, technology, engineering and mathematics (STEM) in Wales will require a great deal of support from other agencies, and the project has been designed to address these changes and needs.

Contact: Anita Shaw
Tel: 029 2047 5460
Email: anita@techniquest.org
Web: www.techniquest.org

Prep: 2-3 hours
Running Time: 1 hour-1 day
Cost: from £160 per day for shows and workshops,
£210 per day for starlab, £50 per day for kits



NATIONAL CURRICULUM
CITIZENSHIP
THE LEARNING COUNTRY
LEARNING COUNTRY
LEARNING PATHWAYS 14 - 19
SKILLS FRAMEWORK FOR
3 - 19 YEAR OLDS IN WALES

WALES



The Arkwright Scholarships Trust

TYPE: **STUDENT RESOURCES, CPD AGE RANGE: 16-19**

The Arkwright Scholarships Trust promotes the rewards of an engineering/technology career to young people through sponsored scholarships, providing direct contact with industry. Applications are welcome from students who are studying D&T at an Affiliated School, and plan to study relevant A level subjects to an engineering/technological course at university. Through this scheme, students will benefit from the experience of a formal application process including an interview. Scholars have access to the Arkwright Alumni website for early information of new sponsorship opportunities and receive £500 to support their studies. Advantages for teachers are having the opportunity to join the interviewing team, creating links to local industry, and heightening the profile of the D&T department within the school and community and £450 per scholar for departmental development.

Contact: Jayne Clark
Arkwright Scholarships Trust
Tel: 01926 333210
Email: jclark@arkwright.org.uk
Web: www.arkwright.org.uk

Prep Time: 2 hours
Running Time: 3 days in total
Cost: £30



NATIONAL CURRICULUM
WORK RELATED LEARNING/
ENTERPRISE

NORTH-EAST ENGLAND
NORTH-WEST ENGLAND
YORKSHIRE & THE HUMBER
EAST MIDLANDS
WEST MIDLANDS
LONDON
SOUTH-EAST ENGLAND
SOUTH-WEST ENGLAND
SCOTLAND
WALES

UH PAM Outreach Group

TYPE: **OUT-OF-SCHOOL EVENTS** AGE RANGE: **7-19**

The Group's activities (workshops, lectures, laboratory/observatory sessions etc) comprise a wide variety of topics. The Group works with children from Year 5, through Years 9 and 12 to working with adults. Most activities are aimed at challenging young people as the scheme gives them the opportunity to work on topics outside the National Curriculum. The activities can help to bring together like-minded young people. It is an important aim of the scheme to introduce students to interesting activities, often done in the context of working with students from other schools. Resources provided during the sessions may be used by teachers, who are encouraged to develop the ideas to suit their own circumstances.

Contact: Alan Davies
UH Physics Astro Maths
Tel: 01707 284385

Email: a.j.davies@herts.ac.uk

Web: www.herts.ac.uk/courses/schools-of-study/physics-astronomy-and-mathematics/

Prep Time: 0.5 hours

Running Time: 1 hour-1 day depending on activity

Cost: Free-£500 depending on activity
and number of student

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NATIONAL CURRICULUM,
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CITIZENSHIP
ENRICHMENT AND EXTENSION

LONDON
SOUTH-EAST ENGLAND

Widening Participation STEM Activities

TYPE: **OUT-OF & IN-SCHOOL EVENTS, STUDENT RESOURCES**

AGE RANGE: **11-19**

The University of Reading's Widening Participation Office has developed a programme of free events to support schools to inspire the scientists, engineers and technologists of tomorrow. These interactive activities, developed along with the Faculties of Science and Life Sciences at the University, aim to raise the profile of the sciences in order to increase participation in Higher Education by under-represented groups. Students benefit by interacting with experts in science, technology, engineering and mathematics (STEM) subjects. Scientists engage with the students, giving them role models with similar backgrounds. Each activity can be amended to meet the learning providers needs. Teachers benefit by being able to use facilities at the University to demonstrate aspects of science which they are unable to do so with their current resources.

Contact: Rachel South
University of Reading
Tel: 0118 3786127

Email: r.south@rdg.ac.uk

Web: www.rdg.ac.uk/wideningparticipation

Prep Time: 1 hour

Running Time: 1 hour-1 day

Cost: Free

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Ma Sc Bi Ch

Ph

NATIONAL CURRICULUM EVERY
CHILD MATTERS
WORK RELATED LEARNING/
ENTERPRISE
DIPLOMA
CITIZENSHIP
ENRICHMENT AND EXTENSION

EAST MIDLANDS
LONDON
SOUTH-EAST ENGLAND

Photo on opposite page: An example of pupils enjoying a STEM E&E activity.



Young Enterprise Management
S3 Child's

The problem I was presented with



Informational panels on the right side of the display board, including a photo of a person at a computer and several text-based panels.

Informational panels on the left side of the display board, including a pie chart and several text-based panels.

Resources:

CPD FOR TEACHERS AND LECTURERS

There are many providers of continuing professional development (CPD) for teachers and lecturers. These include Science Learning Centres, The National Strategy, Local Education Authorities, learned societies and subject associations. It is planned that Science Learning Centres and the NCETM will coordinate the various offers.

The National Centre for Excellence in the Teaching of Mathematics (NCETM)

NCETM Provides effective strategic leadership for mathematics-specific continuing professional development (CPD). The Centre aims to raise the professional status of all those engaged in the teaching of mathematics so that the mathematical potential of learners will be fully realised.

The NCETM works closely with partners in the other STEM areas, in particular with the Science Learning Centres and STEMNET, on a range of initiatives related to the professional development of teachers, and continues to work with the National STEM Director to lead Action Programme 2 of the STEM Framework: Improving teaching and learning through CPD for mathematics teachers, for which the National Centre has been designated as the lead organisation.

The NCETM is working with Government and partners nationally and regionally both to facilitate its work with teachers and school and college leaders, and to improve the quality and availability of mathematics CPD. In addition, the Centre is committed to identifying and sharing successful practice in mathematics CPD.

The Centre operates through a combination of face-to-face activity led by a team of Regional Coordinators around the country, and through its online portal communities and interactive professional learning framework.

Visit www.ncetm.org.uk and explore the online community and the professional development opportunities it offers. Find out about local activity through the regional pages, or contact one of the team (details at www.ncetm.org.uk/about).

Tel: 0114 219 1007

Email: info@ncetm.org.uk

The National Strategy

The National Strategy is a professional development programme for early years, primary and secondary teachers and managers. Its mission is to raise standards of achievement and rates of progression for children and young people in all phases and settings through personalised learning with a particular focus on core subjects.

Programmes are structured at three levels:

- A universal element, e.g. the Primary Framework and the renewed Secondary Frameworks for English, mathematics, science and ICT.
- A targeted element, where activity is differentiated for specific groups, e.g. intervention work.
- An intensive element to address significant underachievement.



Approaches include:

- Integrating Assessment for Learning into daily practice.
- A planning tool and exemplifications to help develop/renew schemes of work.
- Sharing good practice, including through the WhatWorksWell web tool.
- Strengthening subject knowledge and pedagogy of mathematics teachers by encouraging and facilitating the use of enriching and challenging activities.

Email: earlyyears@nationalstrategies.co.uk
primary@nationalstrategies.co.uk
secondary@nationalstrategies.co.uk

Web: www.nationalstrategies.co.uk

Science Learning Centres (SLC)

The national network of Science Learning Centres delivers inspirational and innovative subject-specific continuing professional development to teachers, lecturers, technicians and teaching assistants throughout the United Kingdom.

The Centres aim to reconnect teachers with their subject knowledge, to bring exciting contemporary science into the classroom and to enable science teachers to practise and extend their skills, particularly in practical work.

There are nine regional Centres in England and one National Centre to serve the UK. Each of the Centres also has a number of satellite venues throughout their region. Online resources which can be accessed by teachers from across the country are also available via their website.

Working with leading scientific and research organisations the Centres highlight the latest scientific research and its industrial applications. Their programme of courses translates educational research into relevant classroom practice and includes provision for teachers of citizenship, design and technology and other non-specialists. It also provides technicians and support staff with a combination of skills, knowledge and career-focused training.

Tel: 01904 328 300
 Email: enquiries@national.slcs.ac.uk
 Web: www.sciencelearningcentres.org.uk



The Association of Teachers of Mathematics (ATM)

The ATM was established in 1950 to encourage the development of mathematics education such that it is more closely related to the needs of the learner and provides opportunities to bring together all concerned with mathematics education for all age ranges. It supports local branches, informal support networks, courses and conferences.

The ATM produces policy statements and publishes responses to National and Government initiatives. It is a non profit organisation working on behalf of teachers and its members.

Its key functions are:

- Production of a bi-monthly journal entitled: 'Mathematics Teaching incorporating Micromath'.
- Provision of a public website with free downloadable resources and forums for discussing and sharing current topics for both members and non-members.
- An on-line ordering and payment system for purchasing ATM resources.
- The offer of professional development for teachers, lecturers, managers, teaching assistants and masterclasses for pupils at all key stages.



- The production of publications by teachers for teachers with 25% discount to members.
- Collaborative working with other mathematical associations and other associations.
- Representation for mathematics education on national bodies, e.g. the Joint Mathematical Council and The Council for Subject Associations.
- Organisation of an annual conference for all mathematics educators.

Tel: 01332 346599

Email: adminmanager@atm.org.uk

Web: www.atm.org.uk

The Mathematical Association (the MA)

The MA works to support and improve the teaching and learning of mathematics. Membership of the MA is an obvious indicator of commitment to teaching mathematics and will assist with meeting the standards set out by the Training and Development Agency for Schools.

The MA publishes four professional journals, two enrichment magazines, and books for the primary, secondary, post-16, further and higher education sectors. There is an option of six categories of membership dependent on the journal(s) chosen.

For Professional Development needs in addition to journals, there is a growing programme of one-day courses for secondary teachers, an annual conference featuring lectures given by excellent keynote speakers and a diversity of seminars and workshops all led by experienced professionals. There is also an extensive collection of books on mathematics in our library at the University of Leicester. Through involvement with committees, opportunities to work in small groups investigating specific aspects of mathematics teaching arise.

The MA has recent experience of developing STEM resources for GCSE mathematics (GE STEMNET AiM London Pilot) and the Association is a good source of information about the applications of mathematics in science, technology and engineering, with members involved in research within these areas.

Other enrichment activities include the Primary Mathematics Challenge, popular maths lectures delivered through regional branches, talks, lectures, hands-on activity sessions for teachers and students, and a website containing education and enrichment resources and activities.

The MA is represented on all major bodies concerned with mathematics education in the UK and has wide influence through its members, publications and activities. MA members – currently some 4,500 members both in the UK and internationally – are teachers in primary and secondary schools, lecturers in further and higher education, advisors, inspectors, practicing mathematicians, students, libraries and other institutions.

Tel: 0116 221 0013

Email: office@m-a.org.uk

Web: www.m-a.org.uk



The Association for Science Education (ASE)

The ASE is the largest subject association in the UK, with a membership that includes teachers, technicians, trainee teachers, tutors and lecturers in further and higher education, advisors, inspectors and consultants as well as representatives from industry and science organisations. The Association plays a significant role in promoting excellence in teaching and learning science in schools and colleges. ASE provides a UK-wide network bringing together individuals and organisations to share good ideas, meet the challenges in science teaching, develop resources and foster highquality continuing professional development.

The ASE also provides a comprehensive range of support for teachers and technicians in helping to enrich and enhance science teaching and learning. Its Annual and Area Conferences and regional meetings provide excellent opportunities to hear top class speakers and share ideas with other teachers and educators in science.

ASE produces four journals – *Education in Science*, *School Science Review (SSR)*, *Primary Science* and *Science Teacher Education* – and a wide range of publications.

It also manages several high quality web-based resources which include:

Upd8: www.upd8.org.uk

(in partnership with Centre for Science Education, Sheffield Hallam University)

Science Across the World: www.scienceacross.org

Schoolscience: www.schoolscience.co.uk

SATIS revisited: www.satisrevisited.co.uk

Tel: 01707 283000

Email: info@ase.org.uk

Web: www.ase.org.uk



The Design and Technology Association (DATA)

DATA is the recognised professional organisation for all D&T educators and those in associated subject areas. The Association is financed through membership fees, support from charitable foundations, industrial sponsorships and income generated through project management, publications, courses, conferences and consultancy.

DATA's objective is to inspire, develop and support excellence in design and technology education for all. This is achieved by providing:

- Subject updates and practical teaching materials through regular magazines, on-line resources and publications.
- Specialised training and professional development courses for D&T teachers.
- Access to expert advice from our team of D&T experts via telephone and email.
- Practical school D&T projects, often sponsored by the DCSF, to widen involvement in D&T – for example Digital D&T (Electronics and CAD/CAM), Food in Schools and Active Kids Get Cooking.
- Opportunities to input into decisions made at government level on the curriculum and the national development of D&T education.
- Networking opportunities through our annual conference and local branch meetings and workshops.
- Positive links with other curriculum areas, especially science, mathematics and art and design.
- Connections with industry and commerce to ensure that they permeate the curriculum at all levels.

Contact: Richard Green, Chief Executive, The Design and Technology Association

Tel: 01789 470007

Email: info@data.org.uk

Web: www.data.org.uk



Council for the Mathematical Sciences (CMS)

The Council for the Mathematical Sciences was established in 2001 by the Institute of Mathematics and its Applications (IMA), the London Mathematical Society (LMS) and the Royal Statistical Society (RSS). In 2008 the Edinburgh Mathematical Society (www.maths.ed.ac.uk/~ems/) and the Operational Research Society (www.orsoc.org.uk/) became members of the CMS.

The CMS aims to provide an authoritative and objective body able to speak on the role of the mathematical sciences in UK higher education, research, business, industry and the public sector, and to engage with and respond to policy decisions that affect the mathematical sciences in these areas. The CMS supports www.mathscareers.org.uk/, a website promoting the benefits of mathematical study and describing the wide range of careers mathematicians pursue.

Tel: 020 7927 0803
Email: cms@lms.ac.uk
Web: www.cms.ac.uk

The Institute of Mathematics and its Applications (IMA)

The IMA is the professional and learned society for qualified and practising mathematicians. Its mission is to promote mathematics in industry, business, the public sector, education and research. In 1990, the Institute was granted the right to award Chartered Mathematician status.



Education Grants

Individuals in secondary schools, colleges of further education and universities in the UK can apply for a grant, up to £600, to help with the costs of running or attending an educational activity relating to mathematics. The Institute is pleased that the Education Grants will help financially support such activities, which will help increase the popularity of mathematics with learners and encourage the take up of mathematics post-16.

School Speaker Scheme

The School Speaker Scheme has been established to promote the applications of mathematics. A member of the Institute, from academia or industry, can visit your school and talk to your students about their work and how mathematics plays an important role.

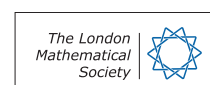
Mathematics Works Conference

This is a one-day conference, and will be of particular interest to teachers of mathematics, in both schools and colleges, who seek to broaden their knowledge and understanding of the many exciting and interesting applications of mathematics. It will provide an opportunity for those present to explore how mathematics is used in the workplace and how teachers might exploit this to stimulate further interest in mathematics in their classes.

Tel: 01702 354020
Email: post@ima.org.uk
Web: www.ima.org.uk

The London Mathematical Society (LMS)

The London Mathematical Society (LMS) was founded in 1865 for the 'advancement, dissemination and promotion of mathematical knowledge'. It is the learned society for mathematicians in the UK with over 2,600 members, who are mainly based in universities and are active in research.



The LMS works with other maths bodies and the mathematical education community to strengthen maths teaching and learning in schools. Many of the Society's members work closely with their local schools and colleges, communicating their passion to future generations.

The Society appoints Holgate Lecturers chosen for their ability to communicate the importance, excitement and beauty of mathematics. They offer to visit schools maths clubs to give free talks aimed at Year 8 to 13.

The Society has a small grants scheme to stimulate interest in mathematics from primary to postgraduate level. These have been used to ensure talks are free, produce materials for exhibitions, pay lecturers' costs and as competition prizes.

The Society organises an annual Popular Lectures event which may be of interest to teachers and A level students. Past lectures are released on DVD and are a valuable teaching resource.

Tel: 020 7637 3686

Email: lms@lms.ac.uk

Web: www.lms.ac.uk

The Royal Statistical Society (RSS)

The Royal Statistical Society (RSS) is the UK's only professional and learned society devoted to the interests of statistics and statisticians. It is also one of the most influential and prestigious statistical societies in the world. The Society has an international membership, and is active in a wide range of areas both directly and indirectly pertaining to the study and application of statistics.

For further information on the RSS Education Programme and Science Week:

Email: d.hurcomb@rss.org.uk

Web: www.rss.org.uk

Bowland Maths

Bowland Maths provides a collection of unusual resources for Key Stage 3. Its aims are to excite and engage pupils, and to help teachers with the new skills required. The approach supports the new Programmes of Study with its emphasis on Key Concepts and Processes.

There are two main components:

- About 20 very different interactive case studies that embed maths in diverse scenarios designed to make it fun and absorbing for pupils. There is extensive use of open questions, requiring problem solving and thinking skills. Pupils discuss ideas with each other and can work in teams or individually – and at different levels. Each case study supports 3–5 hours of classroom work, with materials and teachers' notes. Topics range from realistic issues to fantasy: alien invasions, hot pizzas, road accidents, risks, baby kangaroos...
- Five professional development modules to help teachers with the case studies and the new curriculum: helping pupils to tackle open, unstructured problems, fostering and managing collaborative discussion, the case studies and mathematics, using ICT effectively, developing reasoning.

The materials are free to UK schools on the web (www.bowlandmaths.org.uk), and there is a discussion forum on the NCETM website. The materials will also be on DVDs, available free to KS3 schools in England. They will be delivered through the secondary maths consultants in autumn 2008.

Tailored advice on activities

With the vast array of science, technology, engineering and mathematics (STEM) activities and schemes available, it is difficult to know which one fits your needs, or indeed where to start. STEMNET and its STEMPOINT contract holders offer tailored assistance on understanding this rich and diverse landscape.



STEMNET aims to ensure that more young people in the UK make a choice to enter STEM-related careers at all levels, and future generations are properly informed about the science and technology that surrounds them. With the support of its partners, it achieves this in two ways:

- By bringing STEM activities, experiences and excitement into classrooms throughout the UK, enhancing and enriching the curriculum.
- By linking those companies and other organisations that employ STEM educated people, and schools, in such a way that young people can get a clear idea of the diverse and exciting range of careers available to them.

STEMNET has recently awarded STEMPOINT contracts to a network of local organisations which understand the landscape of STEM Enhancement & Enrichment and are able to help you identify which schemes or activities can best help you meet your school/college and student needs.

Organisations holding STEMPOINT contracts are there to help you in a number of ways. For example they can:

- Provide you with information on the STEM schemes and activities available to you, including those in this directory and other schemes specific to your local area.
- Work with you to understand the specific requirements of your school and students, and what kind of activity may be appropriate for you.
- Based on a knowledge of the evaluation of activities, recommend specific activities to you or help you choose between various options.
- Collect your feedback on activities and use this to help scheme providers improve their offerings.

Science & Engineering Ambassadors

Did you know there are thousands of people using STEM in their work who are willing to come and help your students get excited about science, technology, engineering and maths? Environmental scientists, civil engineers, marine biologists, medical physicists, apprentices, professors, digital designers, financial modellers, energy analysts and many more. The Science and Engineering Ambassadors (SEAs) programme is co-ordinated nationally by STEMNET and managed sub-regionally by organisations holding SEAs Management Contracts.



Science & Engineering Ambassadors are all volunteers who are willing to give their time and energy to help you enthuse your students about STEM subjects and illustrate how STEM is used in the world around them. They are available to support the activities included in this directory or to help you with any other STEM-related activity you wish to run – at the same time acting as role models for careers in and/or from STEM.

If you would like to find a Science & Engineering Ambassador to help with an activity or to make a longer-term link with your school or college, please contact STEMNET to find out which organisation holds the SEAs Management Contract for your area.

STEMNET

Tel: 020 3206 0450

Email: info@stemnet.org.uk

Web: www.stemnet.org.uk

Did you know about...?

National Science and Engineering Week

In March each year, National Science and Engineering Week (NSEW) provides a focus for science, technology, engineering and mathematics (STEM) activities such as those listed in this directory. NSEW is a UK-wide, 10-day long celebration of science and engineering that happens each year in March. In 2008, 1.4 million people were estimated to have attended 3500 events across the country, with 25% of all schools getting involved!

NSEW is a great opportunity to organise events, activities or science-related trips within schools to inspire and engage children with science and engineering-related subjects. Mass participation activities, competitions, grants, resources such as challenge packs, free materials such as posters and bookmarks and advice are all available to schools that organise and register events.

The next National Science and Engineering Week is 6–15 March 2009.

Email: nsew@the-ba.net

Web: www.the-ba.net/nsew

Enterprise Week

Enterprise Week takes place each year in November (on 17–23 November 2008) and is a national celebration of enterprise with thousands of events and activities happening across the UK.

In 2007, there were over 5000 events and more than half a million people took part. Over 2000 organisations run events and activities during the week to encourage people to have ideas and make them happen. This can be by starting up a new business or social enterprise, or by having ideas and making them happen in the workplace.

Web: www.enterpriseweek.org.uk

Design and Technology Week

Design and Technology Week takes place each year in June (22–26 June 2009) and provides a focus for all aspects of D&T education. Examples include a design and technology challenge for whole year groups, having a designer in residence, industry-based design and make activities, mini-enterprise activities, exhibition of work in school or in the local community, visits to local companies, museums or activity centres and a design and technology conference for teachers.

Web: www.data.org.uk

The Royal Society of Chemistry Week (RSC)

The RSC Chemistry Week is a themed week of events that is held every two years to promote a positive image of chemistry and increase the public understanding of the importance of chemical science in our everyday lives.

Chemistry Week 2009 will take place between Saturday 7–Sunday 15 November 2009 and the theme will be 'Food'.

Web: www.rsc.org/Chemsoc/Activities/ChemistryWeek/index.asp

After-School Science and Engineering Clubs

The After School Science and Engineering Clubs project followed an announcement by the Government in March 2006 and started by launching 250 new clubs aiming to engage and inspire 11 to 14 year old students across science and engineering.

The project has now been expanded to create 500 clubs across England from September 2008.

The project is being implemented on behalf of DCSF by a consortium of STEM partners led by STEMNET and including the Association of Science Education, the BA, the network of Science Learning Centres, the Specialist Schools and Academies Trust and Ecsite-uk.

Schools are being encouraged to design and develop the clubs in such a way that there is a significant positive benefit on the wider school community, whilst forging links with local industry and businesses. A number of STEM enrichment and enhancement activities have played an essential role in many of the clubs across the country.

Email: clubs@the-ba.net
Web: www.the-ba.net/clubs

UK Young Scientists and Engineers Fair 2009

When: Between 10.00 and 18.00 on Wednesday 4 and Thursday 5 March 2009
Where: Queen Elizabeth II Conference Centre, Westminster, London

School groups will be invited to the UK Young Scientists and Engineers Fair in 2009. The Fair will take place over two days and there will be 200 student projects showcasing innovation and creativity and competing for national and international awards. For the visitors there will be the opportunity to see the projects and talk to the students who have completed them and also to experience the interactive exhibits, demonstrations and shows. Teachers and others will be able to bring students to be engaged and inspired, and also to nominate students to compete. The event will be free to attend.

The BA CREST awards and Young Engineers' competitions and awards will be decided at the Fair as well as many more awards and prizes including the National Science Competition. The event is being organised by the STEM community, in particular the BA and Young Engineers, with support from the Engineering and Technology Board (ETB).

Email: uksef@the-ba.net
Web: www.the-ba.net/sciencefair

Women into Science, Engineering and Construction (WISE)

The WISE campaign collaborates with industry and education to encourage UK girls of school age to value and pursue STEM or construction related courses in school or college, and move on into related careers.

What can schools get from WISE?

Large numbers of girls are qualified in STEM subjects, but most choose to move into different careers. WISE has links, games and resources on its website www.wisecampaign.org.uk to encourage girls to think differently about their lives, challenge their pre-conceptions, and seriously consider STEM careers. WISE also has examples of good practice and templates on their website to support teachers, and links to female Science and Engineering Ambassadors who will visit schools.

Email: info@wisecampaign.org.uk
Web: www.wisecampaign.org.uk

Further Help

More useful resources for teachers and lecturers, gathered from providers who submitted entries for the STEM Directories:

CPD

Council for Mathematical Sciences: MathsCareers www.mathscareers.org.uk

Teaching Resources

Arbelos www.arbelos.co.uk
BEAM Education www.beam.co.uk/resources.asp
IBM UK Ltd www.TryScience.org
Institute of Physics Affiliated Schools & Teacher Network www.iop.org
Open University: Young Applicants in Schools and Colleges www.open.ac.uk/yass
Podcasting university lectures and science education project www.pulse-project.com
Tarquin Books www.tarquinbooks.com
UK Mathematics Foundation:
National Mathematics Teachers Summer School www.nceim.org.uk/coursesandevents

Role Models

FutureMorph – careers and role models across STEM www.futuremorph.org
New Outlooks in Science & Engineering www.noisemakers.org.uk

Science Festivals

Ecsite UK's list – divided by time of year www.ecsite-uk.net/events/science_festivals.html
British Council's list www.britishcouncil.org/science-uk-festivals.htm

Science and Discovery Centres

Ecsite-uk 2008 members

Adrian Fisher Mazes www.mazemaker.com
Armagh Planetarium www.armaghplanet.com
At-Bristol www.at-bristol.org.uk
BIAZA www.biaza.org.uk
Bolton Technical Innovation Centre www.uktic.org
Catalyst www.catalyst.org.uk
Centre for Alternative Technology www.cat.org.uk
Centre for life www.life.org.uk
Centre of the cell www.centreofthecell.org
Continuum Group www.continuum-group.com
The Deep www.thedeep.co.uk
The Eden Project www.edenproject.com
Edinburgh International Science Festival www.sciencefestival.co.uk
Engineered Arts Ltd www.willjackson.co.uk
Eureka! The Museum for Children www.eureka.org.uk
Event Communications www.eventcomm.com
Glasgow Science Centre www.glasgowsciencecentre.org
Graphic Science www.graphicscience.co.uk
Science Communication Unit www.uwe.ac.uk/fas/graphicscience

Horniman Museum	www.horniman.ac.uk
Institute of Physics	www.iop.org
Intech	www.intech-uk.com
Ironbridge Gorge Museum Trust	www.ironbridge.org.uk
Jodrell Bank Science Centre	www.jb.man.ac.uk/viscen
Kelham Island Museum	www.simt.co.uk
King's College London	www.kcl.ac.uk
Liverpool Museums	www.liverpoolmuseums.org.uk
The Living Rainforest	www.livingrainforest.org
The Look Out Discovery Centre	www.bracknell-forest.gov.uk/lookout
The Magic Mathworks Travelling Circus	www.magicmathworks.org
Magna	www.visitmagna.co.uk
Museum of Science & Industry in Manchester	www.msim.org.uk
National Marine Aquarium	www.national-aquarium.co.uk
National Maritime Museum	www.nmm.ac.uk
National Museums and Galleries of Wales	www.museumwales.ac.uk
National Museums of Scotland	www.nms.ac.uk
National Space Centre	www.spacecentre.co.uk
National Stone Centre	www.nationalstonecentre.org.uk
The National Trust, Woolsthorpe Manor	www.nationaltrust.org.uk/main/w-vh/w-visits/w-findaplace/w-woolsthorpemanor
Natural History Museum	www.nhm.ac.uk
NESTA	www.nesta.org.uk
Our Dynamic Earth	www.dynamicearth.co.uk
The Oxford Trust	www.oxtrust.org.uk
Prodir Limited	www.prodir.com
Royal Botanic Garden Edinburgh	www.rbge.org.uk
Royal Botanic Gardens Kew	www.kew.org
The Royal Institution	www.rigb.org
Royal Observatory Edinburgh	www.roe.ac.uk
The Royal Society	www.royalsociety.org
Sandford Mill Engine House Project	www.chelmsford.gov.uk
Science Alive	www.science-alive.co.uk
Science made simple	www.sciencemadesimple.co.uk
The Science Museum	www.sciencemuseum.org.uk
Science projects	www.science-projects.org
Scottish Executive	www.scotland.gov.uk
Scottish Seabird Centre	www.seabird.org
Sensation Dundee	www.sensation.org.uk
Snibston Discovery Park	www.leics.gov.uk/museums/snibston
Techniquet@newi	www.tqnewi.org
The Science of ...	www.scienceof.com
Thinktank	www.thinktank.ac
Tyne and Wear Museums	www.twmuseums.org.uk
w5	www.w5online.co.uk
The Wellcome Trust	www.wellcome.ac.uk
Electrosonic Systems Techniquet	www.techniquet.org
The BA	www.the-ba.net
The Museums Association	www.museumsassociation.org

Online Resources

Online resources that use animation/interactivity:

www.cut-the-knot.org

Excellent interactive mathematical miscellany (700+ java applets).

www.nrich.maths.org

Problems, games, discussion boards and more via the MMP at Cambridge.

www.shodor.org/interactivate

Interactive explorations with supporting resources for instructors.

www.geogebra.org

GeoGebra – free dynamic maths software for geometry, algebra, calculus ...

http://schools.ednet.ns.ca/avrsb/732/hainstoc/briefcase/techintegpage_math_all.htm

Links to many resources – MySkool (has an interactive number line), NCTM Illuminations, NUMB3RS, ...

www.censusatschool.ntu.ac.uk/

Census At School – sample and use data from, and participate in, a project involving schoolchildren across the world. Also check out www.gapminder.org/

<http://understandinguncertainty.org>

Examples and animations on uncertainty, probability and risk.

www.simonsingh.net

Download Simon Singh's excellent interactive CD-ROM of The Code Book.

www.rigb.org/christmaslectures2006

Activities building on the 2006 RI Christmas Lectures, The NUM8ER MYSTERIES. Access webcasts of 30 years of past Christmas Lectures at www.rigb.org

<http://www.fi.uu.nl/wisweb/en>

Wisweb, mathematical applets from the Freudenthal Institute.

<http://mcs.open.ac.uk/jhm3/>

Professor John Mason's Structured Variation Grids.

<http://nlvm.usu.edu>

Virtual Manipulatives, including algebra tiles.

www.counton.org

A variety of resources, including a (limited) listing of UK maths 'performers'.

<http://www.pims.math.ca/knotplot>

KnotPlot is a fabulous resource for playing with knots. A good introduction to knots is available at <http://www.popmath.org.uk/exhib/knotexhib.html>

www.sunsite.ubc.ca/DigitalMathArchive/Euclid/java/html/pythagoras.html

Pythagoras animated.

http://www.nikon.com/about/feelnikon/universcale/index_f.htm
Experience sizes, from nano to ...

Further online resources:

For mathematical topics, search <http://mathworld.com>,
or www.wikipedia.org

www-history.mcs.st-andrews.ac.uk
The extensive, indexed MacTutor history of maths archive.

<http://mathforum.org>
Math Forum – one of the most comprehensive maths education resources.

<http://illuminations.nctm.org>
From the US: Diverse activities, lessons, e-examples and links.

www.galileo.org/math
A great collection of problems, investigations, resources and links.

www.stat.auckland.ac.nz/~iase/islp
International Statistics Literacy Project resources.

<http://plus.maths.org>
Online magazine – window onto a world of maths
– in art, science, sport, ...

SCHEME	PAGE	GEOGRAPHICAL COVERAGE											
		SCOTLAND	WALES	NORTHERN IRELAND	NE ENGLAND	NW ENGLAND	YORKSHIRE & THE HUMBER	EAST MIDLANDS	WEST MIDLANDS	EAST OF ENGLAND	LONDON	SE ENGLAND	SW ENGLAND
4x4 Schools Technology Challenge	11	•	•	•	•	•	•	•	•	•	•	•	•
Architecture Workshops	11	•	•	•	•	•	•	•	•	•	•	•	•
At Home in Space	12	•	•	•	•	•	•	•	•	•	•	•	•
BAE Systems Education Programme	31	•	•		•	•	•			•		•	•
Bolton Science and Technology Centre	31					•							
BP Educational Service	12	•	•	•	•	•	•	•	•	•	•	•	•
Bubblz the Mathematical Clown	12	•	•	•	•	•	•	•	•	•	•	•	•
Cambridge Science Festival	32											•	
Catalyst Education Programme	32					•							
Club Maths	13	•	•	•	•	•	•	•	•	•	•	•	•
CREST Awards	13	•	•	•	•	•	•	•	•	•	•	•	•
CREST Investigators	13	•	•	•	•	•	•	•	•	•	•	•	•
Daresbury Laboratory: Talking Science and Site Visits	32					•							
Dr Mark's INSPIREducation	14	•	•	•	•	•	•	•	•	•	•	•	•
Engineering Education Scheme	33	•			•	•	•	•	•	•	•	•	•
Engineering Inspirations	33				•		•						
Enterprising Science	14	•	•	•	•	•	•	•	•	•	•	•	•
F1 in Schools – The Formula One Technology Challenge	14	•	•	•	•	•	•	•	•	•	•	•	•
FIRST LEGO League	15	•	•	•	•	•	•	•	•	•	•	•	•
FunMaths Roadshow	15	•	•	•	•	•	•	•	•	•	•	•	•
Further Mathematics Network	33				•	•	•	•	•	•	•	•	•
Go4SET	34	•			•	•	•	•	•	•	•	•	•
Hands on Science	15	•	•	•	•	•	•	•	•	•	•	•	•
Hands-On Maths Roadshow and Enigma Project	16	•	•	•	•	•	•	•	•	•	•	•	•
Headstart	16	•	•	•	•	•	•	•	•	•	•	•	•
In-company educational events	34		•		•	•	•	•	•	•	•	•	•
Independent Bosch Technology Horizons Award	16	•	•	•	•	•	•	•	•	•	•	•	•
Inspirational Science Theatre Company	17	•	•	•	•	•	•	•	•	•	•	•	•
Interactive STEM Workshops	17	•	•	•	•	•	•	•	•	•	•	•	•

SCHEME	PAGE	GEOGRAPHICAL COVERAGE											
		SCOTLAND	WALES	NORTHERN IRELAND	NE ENGLAND	NW ENGLAND	YORKSHIRE & THE HUMBER	EAST MIDLANDS	WEST MIDLANDS	EAST OF ENGLAND	LONDON	SE ENGLAND	SW ENGLAND
Jaguar Cars Maths in Motion Challenge for Schools	17	•	•	•	•	•	•	•	•	•	•	•	•
Learning at Head of Steam	35				•	•	•						
LM Interactive	35		•		•	•	•	•	•	•	•	•	•
Magic Mathworks Travelling Circus	18	•	•	•	•	•	•	•	•	•	•	•	•
Mathematics in Education and Industry	18	•	•	•	•	•	•	•	•	•	•	•	•
Maths in a Suitcase	18	•	•	•	•	•	•	•	•	•	•	•	•
Maths in the Pipeline	35	•											
Maths inspiration	36				•	•	•	•	•	•	•	•	•
More Maths Grads	36						•		•		•		
Motivate	19	•	•	•	•	•	•	•	•	•	•	•	•
Museum of the History of Science Schools Education Programme	36											•	
North East Process Industry Cluster Education Engagement Programme	37				•		•						
NRICH	19	•	•	•	•	•	•	•	•	•	•	•	•
Personal Finance Education Group: 'Learning Money Matters', 'What Money Means' and 'Use Your Expertise'	37				•	•	•	•	•	•	•	•	•
Planet SciCast	19	•	•	•	•	•	•	•	•	•	•	•	•
Plus	20	•	•	•	•	•	•	•	•	•	•	•	•
Primary Engineer	20	•	•	•	•	•	•	•	•	•	•	•	•
Primary Mathematics Challenge	20	•	•	•	•	•	•	•	•	•	•	•	•
Primary Outreach Programme	38	•											
Primary schools education programme	38	•											
RAF Education Programme	21	•	•	•	•	•	•	•	•	•	•	•	•
Researchers in Residence	21	•	•	•	•	•	•	•	•	•	•	•	•
RoboFesta-UK	21	•	•	•	•	•	•	•	•	•	•	•	•
Royal Institution Christmas Lectures	22	•	•	•	•	•	•	•	•	•	•	•	•
Royal Institution Mathematics Masterclasses	22	•	•	•	•	•	•	•	•	•	•	•	•
Royal Society Partnership Grants	22	•	•	•	•	•	•	•	•	•	•	•	•

SCHEME	PAGE	GEOGRAPHICAL COVERAGE											
		SCOTLAND	WALES	NORTHERN IRELAND	NE ENGLAND	NW ENGLAND	YORKSHIRE & THE HUMBER	EAST MIDLANDS	WEST MIDLANDS	EAST OF ENGLAND	LONDON	SE ENGLAND	SW ENGLAND
Royal Statistical Society Education Workshops, Schools Lecture and Student Science Conference	23	•	•	•	•	•	•	•	•	•	•	•	•
Rutherford Appleton Laboratory: Talking Science and Site visits	38							•			•	•	•
Science Museum Learning	23	•	•	•	•	•	•	•	•	•	•	•	•
Science, Technology, Engineering, and Maths Workshops	39								•				
Scottish Science & Technology Roadshow	39	•				•							
Shape the Future STEPS at Work	40		•		•	•	•	•	•	•	•	•	•
sodarace	24	•	•	•	•	•	•	•	•	•	•	•	•
Space Academy	40							•					
Study Days for A-level and GCSE Students	40									•	•		
Techniquet @NEWI	41		•			•				•			
Techniquet outreach programme	41		•										
The Arkwright Scholarships Trust	41	•	•		•	•	•	•	•	•	•	•	•
The Magic of Maths	24	•	•	•	•	•	•	•	•	•	•	•	•
The Nuffield Science Bursaries	24	•	•	•	•	•	•	•	•	•	•	•	•
The Smallpeice Trust	25	•	•	•	•	•	•	•	•	•	•	•	•
The Year in Industry	25	•	•	•	•	•	•	•	•	•	•	•	•
TrackNAVCHALLENGE	26	•	•	•	•	•	•	•	•	•	•	•	•
UH PAM Outreach Group	42										•	•	
United Kingdom Mathematics Trust	26	•	•	•	•	•	•	•	•	•	•	•	•
University of Southampton National Cipher Challenge	26	•	•	•	•	•	•	•	•	•	•	•	•
whynotchemeng	26	•	•	•	•	•	•	•	•	•	•	•	•
Widening Participation STEM Activities	27							•			•	•	
Women in Science, Engineering and Technology	27	•	•	•	•	•	•	•	•	•	•	•	•
Wondermaths: Gifted and Talented Maths	27	•	•	•	•	•	•	•	•	•	•	•	•

About the Directories

The National STEM Programme

Across industry, societies, charities, universities and government, there is a wealth of expertise, resources and commitment to inspire and engage students with science, technology, engineering and mathematics (STEM).

The STEM Framework aims to bring coherence to the wide range of activity on offer, creating a clear path for students and teachers to access the support available while enabling funders and providers to see where they can make a difference.

The Government's 2004 10-year Science and Innovation Investment framework identified the priorities for action to improve education in the STEM subjects. Building on this the STEM Framework consists of 11 Action Programmes, defining and leading on key areas of activity across STEM education.

For each Action Programme, a lead organisation has been identified to act as a focal point, bringing together existing schemes and resources and enabling new projects to deliver activity that is relevant, effective and coordinated.

Action programmes are centred on:

- Recruitment of teachers and lecturers.
- Continuing Professional Development of teachers and lecturers.
- Enhancing and enriching the curriculum, both inside and outside the classroom, to motivate students towards STEM.
- Improving infrastructure and delivery mechanisms.

For further information about the STEM Programme

Contact: Professor John Holman
National STEM Director
Email: j.holman@slcs.ac.uk

Who has created the STEM Directories?

The STEM Directories project is part of the National STEM Programme and has provided a rare and unique opportunity for the science, technology, engineering and maths communities to come together to meet a common objective.

The Directories seek to enhance and enrich the curriculum and to motivate students towards STEM by providing a coherent resource and signpost to the many and varied E&E activities taking place across the UK.

The project is led by a strategic management group of key organisations in the UK STEM Community and is supported by the Department for Children, Schools and Families (DCSF) and the Department for Innovation, Universities and Skills (DIUS).

The strategic management group comprises:

ACME – The Advisory Committee on Mathematics Education

The Advisory Committee on Mathematics Education (ACME) is an independent committee which aims to influence Government strategy and policies with a view to improving the outcomes of mathematics teaching and learning in England and so secure a mathematically enabled population.



ACME was established in January 2002, by the Royal Society and the Joint Mathematical Council of the UK with the explicit backing of all major mathematics organisations. It is supported by the Gatsby Charitable Foundation and DCSF.

Web: www.acme-uk.org

SCORE – Science Community Representing Education

The Science Community Representing Education (SCORE) is an independent partnership of key players in the science community. Working together, the partners aim to strengthen science education by providing coherent, strategic leadership on science education policies.



SCORE was launched in October 2006 and the founding partners are the Association for Science Education, the Biosciences Federation, the Institute of Biology, the Institute of Physics, the Royal Society, the Royal Society of Chemistry and the Science Council. SCORE is supported by the Gatsby Charitable Foundation and the Department for Children, Schools and Families (DCSF).

Web: www.score-education.org

The Royal Academy of Engineering

As Britain’s national academy for engineering, the Royal Academy of Engineering brings together the country’s most eminent engineers from all disciplines to promote excellence in the science, art and practice of engineering. The Academy’s strategic priorities are to enhance the UK’s engineering capabilities to celebrate excellence and inspire the next generation and to lead debate by guiding informed thinking and influencing public policy.



Web: www.raeng.org.uk

STEM Directories Project Management

The STEM Directories project is being run and managed by a consortium, comprising three well-established organisations in the STEM education and E&E field.

The Consortium enjoys vast experience and expertise in the field of enrichment and enhancement and heritage in science education and science engagement. As providers of STEM initiatives, the three organisations fully understand the challenges faced by learning providers in encouraging young people to engage and study STEM subjects, particularly at post-16 level, and the difficulties that providers of STEM initiatives face.

Contact: Juliet Upton

Email: directories@stemdirectories.org.uk

The Royal Institution of Great Britain

The Royal Institution (RI) is an independent charity dedicated to connecting people with the world of science. The Christmas Lectures for children are probably the most famous activity, but the RI also has plenty of other special programmes for children to find out more about science, engineering and maths. Adults too will find plenty of thought-provoking events to attend throughout the year.

Web: www.rigb.org



The British Association for the Advancement of Science

The BA (British Association for the Advancement of Science) exists to advance the public understanding, accessibility and accountability of the sciences and engineering. For well over 25 years, the BA has been involved in leading science and technology enhancement and enrichment activities and currently runs the CREST and CREST ★ Investigator award schemes. Other programmes include the BA Festival of Science, National Science and Engineering Week and the Science Communication Conference.

For further information, please go to www.the-ba.net



The University of the West of England, Bristol

The University of the West of England, Bristol (UWE) forms part of the new National Coordinating Centre for the Beacons for Public Engagement. It also hosts the Science Communication Unit, which is internationally renowned for its diverse and innovative activities designed to engage the public with science, as well as training programmes and professional development for scientists, teachers and science communicators.

Web: www.publicengagement.ac.uk or www.scu.uwe.ac.uk



Why have the Directories been created?

The Directories are being created in direct response to teachers' needs. Research has shown that there are an extraordinary and vibrant range of projects, programmes and initiatives which have as their aim the support and improvement of STEM education in schools and colleges.

However, the absence of a single point of reference and a consistent approach on the part of providers of all these activities means that the sheer scale and variety of provision is daunting.

Teachers and lecturers have said that they need:

- A one-stop shop approach.
- Clear coordination and signposting of support and resources which they can trust.
- Events or experiences that cannot be delivered with school contacts and resources.
- Schemes and activities that are relevant to them and their students.
- Ways to tie these to the curriculum so that the impact and outcomes can be sustained.
- Links with industry that makes the curriculum relevant.

The Directories aim simply to provide clear, easily accessible information for schools and colleges in three distinct volumes, with enough detail for teachers to identify quickly and easily the activities and support that are likely to meet their needs.

How have teachers been involved?

Teachers across the UK have already had access to the pioneering work of the Royal Academy of Engineering. Shape the Future was published in 2007 as one of the first directories of engineering and technology enrichment activities for schools and colleges.

The feedback gained from this publication and from teacher focus groups conducted for the Directories early in 2008, was very positive and showed that teachers across STEM subjects would highly value directories that could also do this for science and mathematics. Teachers provided constructive comments about content, design and layout of these proposed directories which greatly informed how the publications you have in your hands have been developed.

This consultation process is ongoing, and feedback from both teachers and providers involved in using the current Directory is very welcome – see 'next steps' on p.69.

How have the schemes and activities been selected?

A call to all STEM providers of activities and schemes across the UK was issued in the spring of 2008, through a targeted communications campaign and using a wealth of information provided through the Government's STEM Mapping Review in 2004, ACME's mapping work in 2007 and the Royal Academy of Engineering's Shape the Future campaign.

Providers were asked to complete a detailed online questionnaire and were required to satisfy criteria, set by the STEM Directories Strategic Management Group. These criteria relate to a wide variety of areas, from basic health and safety to whether or not they could provide teachers' feedback on their particular scheme.

The objective for the STEM Directories in 2008/9 is to try to be inclusive in terms of the range of schemes available. In this way, we intend to create a comprehensive map of the STEM E&E landscape, with a view to providing teachers with a coherent and comprehensive resource over the next three years.

Teachers and lecturers can be assured that all schemes and activities in the main entries of this directory have stated that they have an up-to-date health, safety and risk policy and that, where necessary, personnel involved with the scheme have been CRB-checked.

For reasons of tight timeframe and space in the printed directories, only UK-wide and regional schemes have been included. (Definitions of UK-wide and regional are given on p. 1 of this directory.)

All schemes have stated that they have funding for at least the next academic year and that they are committed to monitoring and assessing the impact of their schemes with teachers and students over time.

Where activities are web based, the activity has only been given a main entry listing if it can demonstrate that it has human STEM expertise interacting with the teacher or student on an on-going and regular basis.

The next steps for this project

The STEM Directories are being developed over three years and whilst this first set of publications marks a milestone, it is only the beginning of much consultation to be conducted, both with teachers and lecturers and with the STEM community of providers of schemes.

Following publication in September 2008, the STEM Directories Team will be conducting a consultation programme with teachers and STEM scheme providers to review initial reactions and to build constructive feedback into the second phase of the project, which is likely to be an online resource for launch in 2009.

Comments, queries or suggestions

The STEM Directories in 2008/9 are only a staging post for further development. The STEM Directories team would be delighted to receive any comments (both positive and negative) about the Directories themselves OR any of the schemes or activities listed within them.

Please complete an online feedback form at **www.stemdirectories.org.uk** or contact the project at **feedback@stemdirectories.org.uk**

What are the STEM directories?

The 2008/9 Mathematics Directory is part of a family of three publications, launched in September 2008, called the STEM Directories. (STEM: Science, Technology, Engineering and Mathematics.) Three separate directories have been produced in 2008 to serve the needs of science, mathematics and design and technology teachers across the UK.

Led by the key players in the STEM community and funded by the UK Government, the directories aim to improve coherence and coordination of STEM schemes and activities by providing STEM teachers and lecturers with a reliable and comprehensive overview and signpost to enrichment and enhancement activities across the UK.

"The STEM Directories are a mine of useful information. They provide a comprehensive summary of the rich and relevant schemes and activities designed to help us teach and enthuse our students about the wonder and opportunity across science, engineering and mathematics. Essential for every teacher in the country." (Secondary teacher)

To find out more go to: www.stemdirectories.org.uk
or email directories@stemdirectories.org.uk

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The Royal Institution supporting the
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