schools affiliate scheme

news

CONNECTING TEACHERS TO THE WORLD OF MATERIALS, MINERALS AND MINING

Issue 38

Summer Term 2011

Is it the summer holidays yet?

Hello and welcome to the final SAS newsletter of the 2010-2011 year. It has been a busy time for us here at the Institute as we have been going through a major staff reorganisation and a reviewing all of our activities. You can find out more on page 4.

This term has been unusually hectic for me in terms of visits. I have spoken at many conferences and courses for teachers and it has been great to meet new people and catch up with some of you that I have known for years! We took over providing the admin support for the very successful Polymer Study Tours this year and the 2011 courses filled up pretty quickly. The dates for the 2012 courses are now available and you can find out more on page 2.

Bookings for the 2011 Autumn Open Day programme are also open and the dates have been available on the website for a few weeks. You can find out more on page 3 or visit www.iom3.org/content/autumn-open-day-programme to download a booking form.

Also in this issue you will find the final instalment of the Ultimate Guide to Ceramics and details of a rather interesting experiment that you can do with two balloons.

Finally I must apologise for the delay in producing this edition, I hope you find it better late than never. As we approach the start of a new year can I remind you again that this is your Scheme and your comments and suggestions are always very welcome; please drop me a line if you have anything to say, it would be great to hear from you!

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IOM3 The Institute of Materials, Minerals and Mining

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ARMOURERS AND BRASIERS / TATA SIXTH FORM SCHOLARSHIPS

Do you have any students in year 12 that are showing an interest in materials science and engineering, perhaps after undertaking a research project as part of one of their courses? If so you could encourage them to apply for one of the Armourers and Brasiers / Tata Sixth Form Scholarships.

Ten awards of £350 will be made in December 2011 to students at the start of their upper sixth year that have an interest in the materials discipline. If they then go on to study materials at one of the participating universities the bursary will continue for the duration of their undergraduate course. If however they decide that Materials is not for them there are no strings attached and no obligation to take their materials studies further.

If you would like to find out more please get in touch with Carolyn Green in the Materials department at the University of Birmingham on 0121 414 5175 or by emailing c.a.green@bham.ac.uk.

CONFERENCES FOR 2011-2012

Our next conference for teachers will be taking place on 25 June 2012 at Queen Mary, University of London as part of Congress 2012, the Institute's major biennial conference. Congress will be centred around the Olympics and the focus of the teachers' event will be sustainable materials for construction. The final programme will be launched and bookings opened in autumn but it would be worth clearing the date in your diary! For more information about the Congress visit www.iom3.org/events/Congress2012.

Many other organisations will also be running courses for students and teachers throughout the upcoming academic year. It would be worth looking out for the following:

Polymer Study Tours 2012

The dates for the 2012 Tours have been made available earlier than ever before this year. Next year these excellent residential courses will be taking place at the following venues:

Edinburgh Napier University 17 to 20 June
London Metropolitan University 24 to 27 June
Manchester University 8 to 11 July

Although the courses cost in excess of £750 per delegate to put on, thanks to sponsorship from the polymer industry and the Worshipful Company of Horners they are free for teachers to attend. All we ask for is a £50 deposit to secure your place which will be refunded after you have attended the course.

For more information visit www.polymer-teaching-resources.com or email diane.aston@iom3.org.

Other materials courses for teachers

A number of other organisations also run successful courses relating to materials during the summer term.

The Royal Society of Chemistry will be running their summer school for teachers in conjunction with us and the Armourers and Brasiers Company in a new format in 2012. Full details are not yet available but it would be worth keeping an eye out on their website for more information
www.rsc.org/Education/Teachers/CPD/forthcomingevents.asp

Many of the update courses for teachers organised by the Institute of Physics have a materials-related session in them, again supported by the Armourers and Brasiers Company. For more information about courses visit
www.iop.org/education/teacher/index

NOVEMBER OPEN DAYS 2011

Do you teach Physics, Chemistry, Design & Technology or Engineering at post-16 level?

Would you like the opportunity to take your students out of the classroom for a chance to perform experiments in world class research facilities?

Well if you answered yes to either of these you need to take your students along to one of the Autumn Open Day Programme events happening at a university near you.

We have been working with the materials departments around the UK for many years now to put on a programme of events that is specifically designed to enrich the teaching of materials in post-16 courses. You will have access to equipment not normally available in school and experts in materials that your students can question.

This year the following events will be taking place:

Venue	Max number	Dates available (time of session)
University of Birmingham	30	16, 23, 30 Nov (1330 to 1630)
Edinburgh Napier University	40	02, 23 Nov (1230 to 1530)
Imperial College	20	02, 09, 16, 23, 30 Nov (1230 to 1600)
University of Leeds	40	09, 23, 30 Nov (1230 to 1600)
University of Loughborough	15	08, 10 Nov (1330 to 1530)
University of Manchester	25	23 Nov (1400 to 1600)
University of Oxford	20	09 Nov 1300 to 1500
Queen Mary, University of London	40	09, 16, 23 Nov (1030 to 1500)
University of Sheffield	20	09, 16, 23 Nov (1300 to 1500)

For the most up to date list of available dates or to download a booking form please visit www.iom3.org/content/autumn-open-day-programme. **NOTE this year the only way to book is by downloading a form from the website.** Bookings are allocated on a first come first served basis so get in early to avoid disappointment.

These events are free of charge for you and your students to attend; you just need to make your own arrangements to get to and from the venue.

Typical activities

The exact nature of the activities varies from venue to venue, but they are all designed to give students a greater insight into the world of materials and link in with the curriculum.

Typical activities include:

- Mechanical testing. Tensile testing and impact testing of a range of materials to look at how properties are related to structure.
- Optical and electron microscopy. Students will be able to view materials on a range of scales.
- General introductory lecture on materials and their uses.
- Special sessions on biomaterials, smart materials, nanomaterials, magnets and forensics.

If you would like to know more about the activities at a specific venue please contact me.

Once you have booked you can contact the member of staff in the department to discuss your exact requirements so that the session can be tailored to your specific needs.

For more information please contact Diane Aston on 01476 513882 or diane.aston@iom3.org

SAS PAGE

IOM3 Reorganisation

Since the beginning of the year we have been going through a major staff reorganisation. This has been a trying time for all and has had a significant impact on the Education Team.

Sadly, at the end of April, Sarah Harrison left the Institute and I'm sure you will join me in thanking her for her efforts over the past two years. Through the reorganisation it is hoped that the Education and Training activities of the Institute will be able to work more closely together and Emily Drury has now taken on the administration for both activity streams. However, for the time being if you have any queries regarding the Schools Affiliate Scheme or our activities relating to 11 to 19 education please address them to me. You can give me a call on 01476 513882 or if you would prefer to email my address is Diane.aston@iom3.org. My job title has also changed to Training and Education Executive but my focus is still supporting materials education.

Over the past few months we have also been reviewing the Schools Affiliate Scheme and our education activities in general. I have a proposal for some significant changes working its way through the relevant channels at the moment and passionately believe in supporting materials in schools. Please bear with us while these important discussions continue.

School visits

The programme of school visits has been continuing throughout these changes and I would like to thank all the schools I have been to over the last term for their warm welcome.

The diary is open for visits in the autumn term so if you would like to book a visit please get in touch. We introduced a charge for visits last year and these remain unchanged at £150 for one talk of up to an hour and a half or £200 for two talks of up to an hour and a half each.

SAS website

I hope that you have had a chance to use your login details and taken a look at the new SAS website. Those of you that I have heard from have provided some very positive feedback. I hope to add further content over the summer break, particularly relating to the Materials Discovery Boxes so do keep going back for another look!

DIG IT TO BUILD IT!

The first ever DigIT! to BuildIT! Awards ceremony was held at Carnforth High School in Lancashire on 15th June with Jack Berridge of the Quarrying and Mining Journal presenting the prizes. The ceremony recognised the achievements of the students who participated and drew attention to the opportunities available in the industry.

Students from Carnforth High School visited Back Lane Quarry, which gave them valuable insights into how the industry works, and representatives from industry were on hand to answer any questions.

The DigIT! to BuildIT! Programme aims to encourage students to consider a career in the building products, extractives and minerals processing industries. Opportunities are available for careers in a variety of areas, including fitting, operating mobile plants and quarry management; roles which all hold a great deal of responsibility.

If you would like more information about the project visit www.digittobiuldit.org.uk or contact the Team at Proskills on 01235 432018 or email digittobuildit@proskills.co.uk

PRIMARY, SECONDARY AND ADVANCED LEADERS AWARD FOR STEM

The Leaders Award is open to all students between the ages of 5 and 19 years and this free annual Award is an ideal way to increase students' awareness of the breadth of career opportunities available to them through STEM subjects – by meeting people in those fields.

To participate teachers are asked to register their school, students are asked to write a letter of application to become a Leader for STEM in the school or college, and to complete the award they interview a person working in the field of STEM. Interviews can be entered into the Special Award categories and all students who pass the criteria receive certificates.

Interviewee's can be accessed through the STEM Ambassador programme, local Industry and as some students have shown - by writing directly to people who interest them!

Clare Kemp (age 16), student at Wirral Grammar School for Girls writes "I believe that there is a common misconception as to where you can go with science and so students aspire to be doctors, dentists, vets and chemical engineers; as though their choices are restricted. But the beauty of science is that it is versatile in where it can take you."
Jan Smith, Wilmington Grammar School for Boys said "Students are excited and inspired by the people they are interviewing and develop their personal learning and thinking skills."

Special Awards for students

There are currently 8 Special Awards for pupils, each of which challenges students to conduct interviews with a particular focus. Students are not restricted to the number of interviews they submit – the idea is to encourage their curiosity of the different fields. The prizes range from solar powered media players, USB microscopes, to the opportunity to be a staff reporter with the Institute of Mechanical Engineers or meet the team behind BLOODHOUND SSC; each year more awards and prizes are added. Additionally, there are teacher's awards and school competitions.

Special Awards for Teachers

NCETM Special Award for Teachers is aimed at all teachers, college lecturers, NQTs, PGCE students and undergraduates on education courses. The theme is to find out how maths is used within different careers. This award has prizes of up to £250.

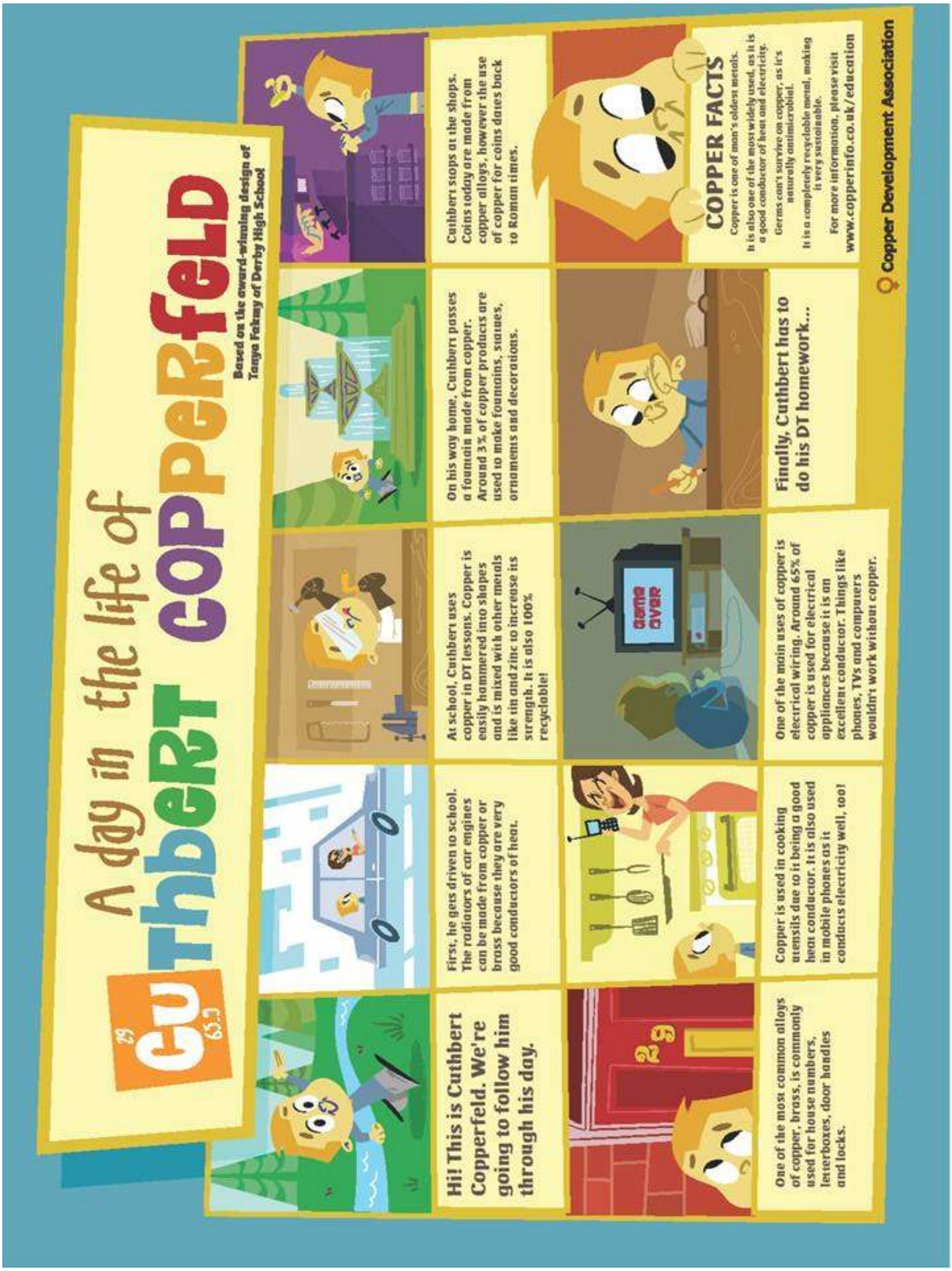
Primary Engineer and The Leaders Award

This award has been created by Primary Engineer to celebrate the work of pupils who have helped others with STEM projects and to help encourage students find out about careers by asking the questions that are important to them. The work of Primary Engineer is to deliver training courses to encourage and support primary teachers to deliver practical maths and science through design and technology across all primary year groups.
On the 26th March in Manchester, over 120 pupils attended a celebratory National Final supported by over 500 teachers, families and friends. The work the children showcased to judges and tested in front of an audience was outstanding and a truly great day was had by all.

For more information about the Leaders Award visit www.leadersaward.com
Tel: 0161 205 0184 or Email: virginia.harvey@leadersaward.com.
Primary and Secondary Engineer: www.primaryengineer.com Tel: 0161 205 0184 or Email: christine.james@primaryengineer.com

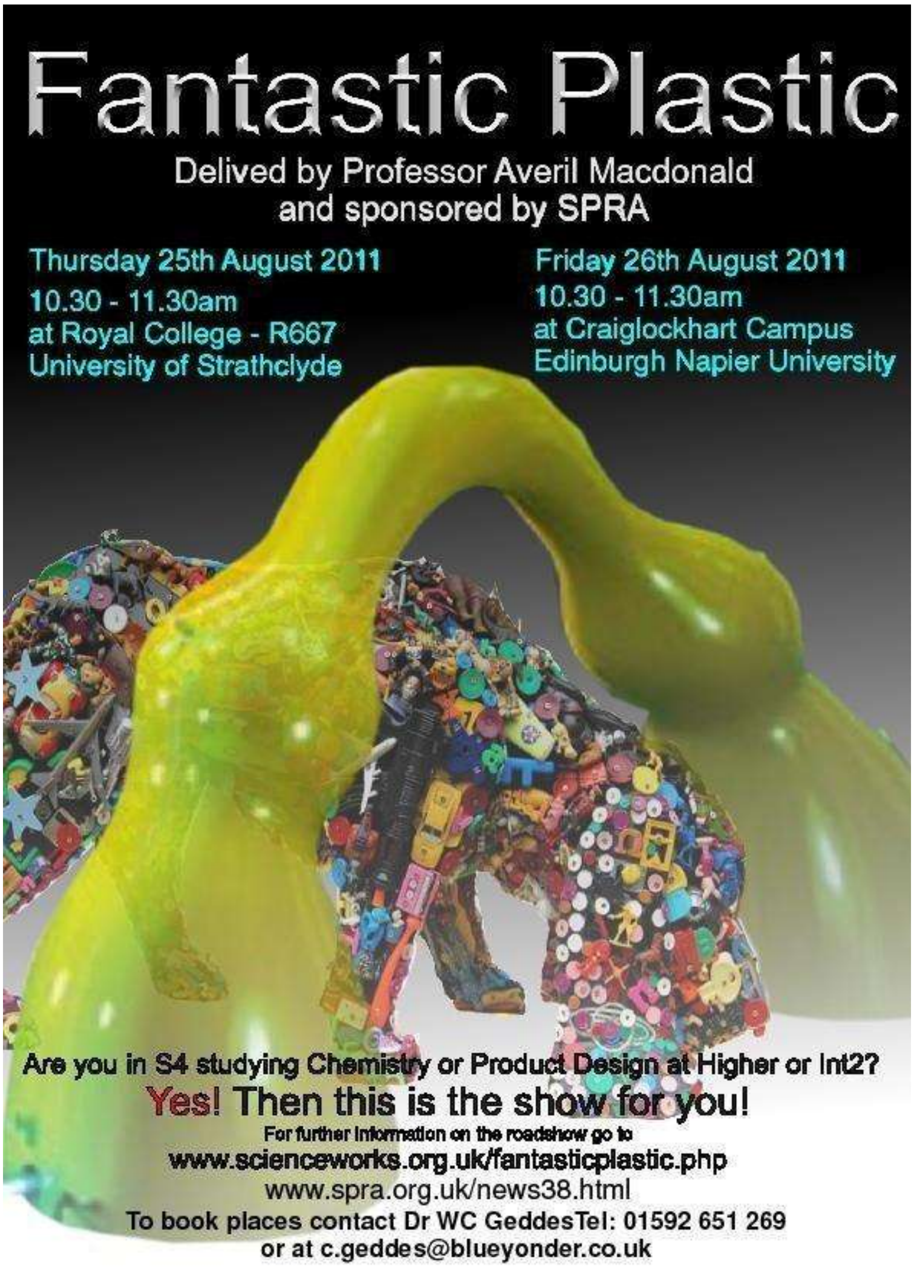
COPPER COMPETITION WINNER

The Copper Development Association's 2010 poster competition attracted entries from schools across the country, challenging students to design an eye-catching and informative poster that showed how copper is used in our daily lives, which could adorn classroom walls. Now, the winning poster has been specially illustrated and laid out for schools, based on the design of Tanya Fahmy of Derby High School. To download the poster at print-quality size, go to www.schoolscience.co.uk.



FANTASTIC PLASTIC

If you are teaching in Scotland or the North of England you should certainly consider taking a group along to one of these events. Averil Macdonald is an inspirational speaker and will have you and your students spellbound!



The lecture is heavily punctuated by demonstrations, for example showing how polymer gels and coagulation of natural rubber latex are used in every day products such as disposable nappies, oil slick recovery, toys, RFID tags and futuristic lighting effects.

You can find out more about the lecture and how you could get Averil to visit your school free of charge by visiting her website, www.scienceworks.org. The site also contains a wealth of other information about careers in science and how plastics are helping to change the world!

POLYMER TEACHING RESOURCES

This relatively new website that has been set up as a hub for information about plastics and resources for teachers that relate to polymers.

The site is managed and run by people who work in plastics education, and plastics manufacture. The principal input to the site is from secondary school teachers of technology and science, Edinburgh Napier University, and the Scottish Plastics and Rubber Association who sponsor the site.

At the moment the site contains information about the Polymer Study Tours, Fantastic Plastic and school projects.

The school projects which include downloadable worksheets, currently include:

- Slime making – a range of recipes for fun slime and the chemistry of this interesting material.
- Rocket car racing – a fun activity to introduce engineering to your students.

I would strongly recommend regularly visiting www.polymer-teaching-resources.com to see new resources!

ULTIMATE GUIDE TO CERAMICS PART III

In the previous issues we have considered how ceramics can be defined, their structure and properties and how they can be processed. In this final instalment of the ultimate guide to ceramics the applications of these useful materials will be explored.

Figure 1 – Bricks made from fired clay are an excellent construction medium. From http://en.wikipedia.org/wiki/File:Concrete_wall.jpg

Figure 2 – Bradford City Hall, like many building is made from cut stone, in this case sandstone from local quarries. From http://commons.wikimedia.org/wiki/File:Bradford_Town_Hall.jpg

Figure 3 – Insulator on a high voltage power line separating the cable from the pylon . From http://commons.wikimedia.org/wiki/File:Infrared_1080967.jpg

Introduction

Ceramics are a group of materials that we encounter everyday that we often don't notice and that we certainly take for granted. They are used in a broad range of activities from the simple building brick to the more complex piezoelectric actuator in a fuel injection system.

Structural ceramics

Ceramics have been successfully used in the construction industry for thousands of years. The clays that are used for making bricks and tiles are commonly occurring and relatively easy to process and the excellent stiffness and compressive strength of these materials once fired means that they are ideally suited to building. Indeed in many instances cut stone which is a mixture of minerals is used for building as it can be very hard wearing and able to be carved in to complex shapes.

Whitewares

We are all familiar with the use of whitewares for making crockery and sanitary ware. Clay-based materials are used for making stoneware, earthenware and porcelain and once glazed and fired these materials are very versatile as they are hardwearing and can be easily cleaned. The downside is that they break all too easy as demonstrated when you drop your favourite mug!

Refractories

Refractory materials are those that retain their strength to high temperatures, typically over 500°C. They are used for making furnace linings and vessels used to contain molten materials and as such must be chemically and physically stable in their working environment. The most important minerals in the manufacture of refractories are the oxides of silicon, aluminium and magnesium, though zirconia can be used for very high temperature use and silicon carbide and carbon can be used to at extreme temperatures, provided oxygen is excluded. Fire clays can withstand temperatures in excess of 1515°C and are a mixture of alumina, silica and other oxides

Engineering ceramics

Engineering ceramics include a large number of different materials that can be grouped on the basis of their composition. However, it might be more useful in this instance to group them according to their use:

Electrical insulation. Ceramics are generally good electrical insulators in the solid state as all of the electrons in the structure are tied up in bonding and it is therefore difficult for them to move through the structure to carry a current. Materials such as alumina are used as electrical insulators on electricity pylons and car spark plugs.

Thermal insulation. Most ceramics are excellent thermal insulators. The Space Shuttle Orbiter is coated in 22,000 insulating tiles made from silica and a carbon-carbon composite. The silica is in the form of fine fibres arranged in such a way as to include many voids.

Peizo, pyro and ferroelectric ceramics. The piezoelectric effect was first identified in 1880 by Pierre and Jacques Curie who did extensive research in to the magnetic and electrical properties of materials. They discovered that an electrical potential was generated when quartz crystals were compressed and in 1881 they also showed the reverse effect, i.e. if an electrical potential was put across a quartz crystal it would experience a shape change. The piezoelectric effect can be seen in a number of natural materials such as tourmaline, topaz, cane sugar, and most notably quartz. In order to increase the piezoelectric effect man-made ceramics have been developed including barium titanate (the first piezoelectric man-made ceramic), lead titanate, potassium niobate, lithium tantalite and the most commonly used man-made ceramic, lead zirconate titanate or PZT. Peizoelectric materials are used in a wide range of applications including fuel injections systems in cars and energy harvesting.
Pyroelectric materials produce an electrical potential with a change in temperature and again the phenomenon occurs because of a tiny change in structure. The most common applications of pyroelectric materials are in intruder alarms which sense the heat of the body and in heat sensing thermal imaging cameras.
Ferroelectric materials are spontaneously polarised and the direction of polarisation can be switched by the application of an external field. The behaviour of these materials can be compared to ferromagnetic materials. Ferroelectric materials are vital to today's electronics-led society as they can be used for electronic components such as capacitors and memory cells. The materials are used to make RAM for computers and radio frequency identity cards. These applications utilise a thin film of ferroelectric material as this allows a high field to be generated, to switch the polarity, with the application of only a moderate voltage.

Superconducting ceramics. Superconducting materials have the ability to have zero electrical resistance below a critical temperature. Complex ceramic materials have led the way in terms of high temperature superconductors (i.e. those that superconduct at liquid nitrogen temperatures) since the mid 1980s. Yttrium-barium-copper-oxide (YBCO) has a critical temperature of 92K or -181°C. A critical temperature of 138K (-135°C) was achieved in 1993 in a ceramic consisting of thallium, mercury, copper, barium, calcium and oxygen. A new family of high temperature superconductors based on iron was discovered in 2008. Superconducting magnets form the basis of MRI and NMR imaging and have potential uses in many other areas

Figure 4 – Space Shuttle Orbiter has an advanced thermal protection system. From http://en.wikipedia.org/wiki/File:Thermal_protection_system_inspections_from_ISS_-_Shuttle_nose.jpg

Figure 5 - Thermal image of a group of people. From http://commons.wikimedia.org/wiki/File:Infrared_1080967.jpg

Figure 6 – Superconductor levitating above a magnet. From http://upload.wikimedia.org/wikipedia/commons/3/3c/Stickstoff_gek%C3%BChlter_Supraleiter_schwebt_%C3%BCber_Dauermagneten_2009-06-21.jpg

Where can I find out more?
http://en.wikipedia.org/wiki/Ceramics
http://en.wikipedia.org/wiki/Fire_clay
http://en.wikipedia.org/wiki/Refractories
http://en.wikipedia.org/wiki/Piezoelectric_material
http://en.wikipedia.org/wiki/Thermal_imaging
http://en.wikipedia.org/wiki/Superconductivity
http://en.wikipedia.org/wiki/Space_Shuttle_thermal_protection_system

In this article Dr Francisca Wheeler, IOP Teacher Network Co-ordinator for Greater Manchester and Dr Russell Goodall, Lecturer in Metallurgy in the Department of Materials Science and Engineering at the University of Sheffield describe a simple and interesting experiment that you can do with your class that relates to the behaviour of blood vessels...

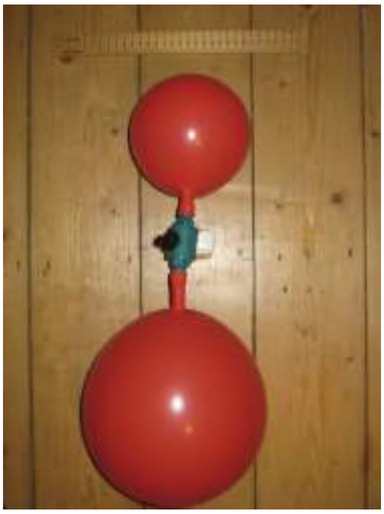


Figure 1 – The set up with the tap closed.

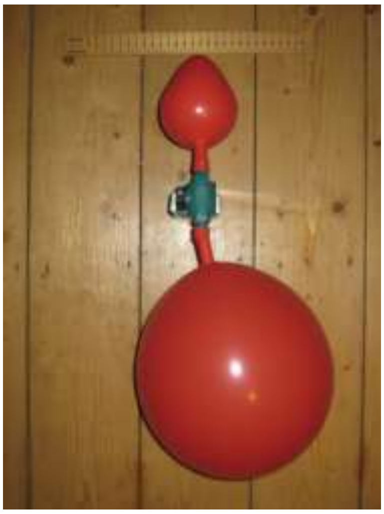


Figure 2 – The small balloon gets even smaller when the tap is opened.

AN EXPERIMENT ON ELASTICITY USING BALLOONS

Rubber balloons are always fun things to have at celebrations for children and adults alike, but you can also use them in the classroom to demonstrate a variety of scientific concepts.

The party balloon has an interesting history with the first rubber balloons being made by Michael Faraday in 1824 for use in his experiments with hydrogen at the Royal Institution in London. They were named “caoutchouc” (raw rubber) after the material from which they were made. “The caoutchouc is exceedingly elastic” wrote Faraday in the Quarterly Journal of Science, the same year. Faraday made his balloons by cutting around two sheets of rubber laid on top of each other and gluing the edges together.

Inflated rubber balloons rely on a delicate balance between the elasticity of the rubber skin and the difference between the pressure of the air on the inside and on the outside of the balloon, with the pressure inside being higher than the atmospheric pressure outside. When air is forced into the balloon the pressure inside increases and the balloon expands. The expansion stops when the forces inside and outside balance. The force inside, pushing the walls of the balloon outward, is due to air pressure, while outside are the combined forces due to atmospheric pressure and elasticity of the continuously stretching rubber, which try to contract the balloon.

The elasticty of rubber varies throughout the streching process. At first the balloon expands as air is blown into it until the internal pressure increases to a maximum, typically when the balloon is 40 per cent larger in diameter than when it is unstretched. Anyone who has tried to blow up a balloon by mouth will have found how difficult a task it is at first but afterwards the balloon stretches easily.

Two-balloon experiment

The two-balloon experiment is a demonstration that can be used in the classroom to illustrate the effect that the non-linearity of the stress-strain function has on the air pressure inside it.

The set-up

The simple experiment involves two identical balloons connected by a tube with a tap which controls the flow of air between them. The balloons have both been inflated but to different sizes, as shown in Figure 1. When the tap is opened, air is free to flow between the balloons.

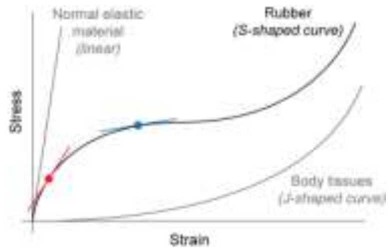


Figure 3 - A schematic stress-strain curve for rubber and some other elastic materials.

The result is surprising because most people watching the demonstration expect both balloons to end up the same size. Instead, the smaller balloon gets smaller and the balloon with the larger diameter inflates even more!

The key to understanding the behaviour of the balloons is in the difference in the pressure of the air inside each balloon which is related to the amount of stretching undertaken by each balloon. When the tap is opened air flows from the balloon at higher pressure to the balloon at lower pressure. The smaller balloon has the higher pressure because its rubber exerts a greater elastic force and it pushes the air into the larger balloon, whose rubber exerts a lower elastic force. The air flow ceases when the pressure in the two balloons is the same.

The Elasticity of Rubber

Rubber is a polymer, made up of long chains of mostly carbon and hydrogen. In the normal state, these chains are, like many polymers, tangled around each other in random shapes. Unlike other polymers, the chains are linked together (referred to as cross linked) with chemical bonds, which are much stronger than the intermolecular forces.

When we deform rubber elastically, the molecules uncoil. When the rubber is released, the molecules recoil and it returns to the original shape. In most materials, elastic behaviour is due to the stretching of interatomic bonds under load, and them contracting to pull the material back into shape. Rubber is elastic because of entropy; as a coiled up molecule is stretched out, the number of different ways of arranging the links decreases, thus increasing the order in the system (lower entropy). When unloaded, the entropy can be increased (the direction for a spontaneous change) by the system becoming more disordered as the molecules coil up and the rubber contracts.

This leads to unusual behaviour of rubber, see Figure 3. We describe this as an S-shaped stress strain curve. As the molecules untangle and stretch out, the entropy change with additional stretching is less, and further stretching becomes easier (compare the slope – the local "elastic modulus" - at the red and blue points). Eventually, as the molecules become fully extended, the force starts to pull against the cross links, and further stretching becomes more difficult again.

This is why balloons are hard to blow up at first, then easier. When we look at the effect this behaviour of rubber has on a balloon, we find that it means that the pressure is not linearly related to the inflation (just as the stress-strain curve in Figure 3 is not linear) and different inflations can be stable at the same pressure as a result. Therefore, what we are seeing in the two-balloon experiment described above is the system stabilising at two different inflations under the same pressure.

Interestingly, natural tissues, like blood vessels, do not show this type of behaviour. If they did, there would be the risk of a slight bulge developing into a dangerous swelling; an aneurism. They have J-shaped, rather than S-shaped curves, which tend to resist swelling. As these materials are stretched they become more resistant to further extension.

More on rubber, balloons and the elastic properties of biological tissues can be found in the Teaching and Learning Packages on http://www.doitpoms.ac.uk/tlplib/stiffness-of-rubber/index.php and http://www.doitpoms.ac.uk/tlplib/bioelasticity/index.php.

Lithium

- Lithium has atomic number 3 and atomic mass 6.941. It is one of the alkali metals and sits in Group I of the Periodic Table to the left of beryllium and with hydrogen above and sodium below.
- Lithium melts at 180.54°C and boils at 1342°C and has a density of 0.534gcm^{-3} making it the least dense solid element and the lightest metal.
- Lithium has a body centred cubic crystal structure and is a soft, silvery-white metallic material. The silvery lustre soon tarnishes when exposed to moist air, turning grey and eventually black as the surface corrodes.
- Although not as chemically reactive as its fellow alkali metals, lithium still reacts vigourously in water and as such is usually stored under oil.
- The lithium-containing ore Petalite was discovered in 1800 but it was not until 1817 that the presence of a new element in the ore was detected. It took a further 4 years for the element to be isolated by William Thomas Brande who used electrolysis to split lithium oxide.
- Lithium occurs in the Earth's crust at a concentration of around 20 milligrams per kilogram. It is mainly found in igneous rocks and the largest deposits are found in South America. Lithium also occurs in sea water and brine deposits are often used as the source of the element.
- Today lithium is produced commercially by the electrolysis of a mixture of lithium and potassium chlorides which are obtained from the water from mineral springs, brine pools and brine deposits.
- The largest single use of lithium is the form of lithium oxide used in the processing and manufacture of glass and ceramics. It is used as a flux in the processing of silica to give improved flow properties and as an additive to materials used for ovenware.
- The high electrochemical potential of lithium along with its high charge-to-weight and power-to-weight ratios means that is well suited to use in batteries and rechargeable lithium-ion batteries have become commonplace for use in modern devices such as digital cameras and mobile phones.
- Lithium-ion batteries are also being used in hybrid and fully electric cars as they are much lighter than traditional lead-acid batteries.
- Compounds of lithium such as lithium niobate are used as resonant crystals in mobile phones and optical modulators.
- Naturally occurring lithium is a mixture of two isotopes, Li^6 and Li^7 of which the latter is by far the most abundant (92.5%). However, Li6 is a useful source material for tritium production and can be used as a neutron absorber in nuclear fusion reactions.
- Lithium metal has a very high specific heat capacity and as such is used in heat transfer applications.
- Lithium compounds are used in medicine as mood stabilisers. Drugs containing lithium ions are used to treat bipolar disorder and depression.

Metallic lithium stored under oil to prevent corrosion has a silvery-white lustre. http://upload.wikimedia.org/wikipedia/commons/a/ae/Lithium_paraffin.jpg

Petalite, also called castorite is a lithium aluminium silicate mineral with formula $LiAlSiO_4$. http://upload.wikimedia.org/wikipedia/commons/0/01/Petalite.jpg

Lithium-ion mobile phone battery. http://upload.wikimedia.org/wikipedia/commons/6/6a/Lithium_Ion.JPG

Where can I find out more?

http://en.wikipedia.org/wiki/Lithium
http://en.wikipedia.org/wiki/Electric_car
http://en.wikipedia.org/wiki/Lithium-ion_battery
http://en.wikipedia.org/wiki/Lithium_(medication)