



battle



SCI-FUN at the 2005 Edinburgh International Science Festival

SCI-FUN is taking part in the 2005 Edinburgh International Science Festival, under the banner of *Discover Science with the University of Edinburgh at the Royal Museum*. In collaboration with the MRC Human Reproductive Science Unit (and sponsored by the MRC and Ardana Biosciences), a new exhibition entitled "*SCI-FUN and The Battle of the Sexes!*", targeting teenagers and adults, will open on April 1st.

In addition to some of the familiar SCI-FUN activities, there will be exhibits on the theme of the differences between the sexes. Daily workshops on DNA and heredity will also take place, hosted by the SCI-FUN team.

We will also be delivering our *Science in Sport* show as part of the Festival's lecture series, and the PP4SS project will be showcasing exhibits, including its particle accelerator simulator, in the museum's *Science Zone*.

Find out more, in the rest of the newsletter.

The MRC HRSU at the Science Festival

The UK Medical Research Council (MRC) promotes research into all areas of medical and related science with the aims of improving the health and quality of life of the UK public.

The MRC Human Reproductive Sciences Unit is the leading institution undertaking research in reproductive health in the UK with integrated programmes on male and female infertility, contraception and hormone dependent diseases (such as prostatic, testicular and cervical cancer, and endometriosis).

Studies are undertaken at molecular, cellular, physiological and clinical levels to further the understanding of the regulation of the human reproductive system in health and disease, with particular attention to mechanisms that might be exploited for improved reproductive health.

Scientists and students at the Human Reproductive Sciences Unit have teamed up with SCI-FUN to showcase the unit's work at the Edinburgh Science Festival. The HRSU has combined their own research interests with SCI-FUN's experience of bringing science to life for schoolchildren for "SCI-FUN and the Battle of the Sexes!". The event will encompass a range of shows and hands-on activities that are representative of the research interests of the unit, along with an entertaining exploration into the differences between the sexes.

In particular, the following three experimental areas will be available, with quizzes, computer programs, videos and hands-on microscopy:

1) What a difference a Y makes!

Explores the differences between boys and girls at the chromosome level, and how these differences lead to the expression of different genes, and in the development of male and female bodies.

2) Shaping our bodies – hormones make it happen

This section will follow a timeline through the development process of boys and girls as hormones programme their bodies, and will explore the differences between males and females.

3) The contraceptive challenge – One egg but many sperm

The third area discusses the differences in methods of contraception for women and men (and why it has been easier to develop methods for the former), and will describe current research being carried out at the unit into better and more effective methods for both sexes.

The Science Festival runs from 1st-10th April, and all of SCI-FUN's events will take place in the Royal Museum, Chambers Street.

Find out more about all of the festival events at www.sciencefestival.co.uk



Original artwork by Lizzie Burns

More SCI-FUN Events at the Edinburgh Science Festival

Particle Physics on Your Desktop



The Particle Physics for Scottish Schools (PP4SS) project is part of the Science Zone. Called *Particle Physics on your Desktop*, it introduces newcomers to the exciting world of subatomic particles, cosmic rays and Einstein's Theory of Relativity!

Visitors will see the real-time detection of cosmic ray showers as they pass through the museum (and its occupants!), and will be able to drive their own accelerator: injecting particles into the giant 27 km CERN rings (above); accelerating and guiding them with huge electric and magnetic fields, then smashing them together, generating temperatures and pressures not seen since the Big Bang. And, just perhaps, the lucky ones may be able to find traces of the holy grail of particle physics: the as yet undiscovered Higgs Boson...

The Science in Sport

The "Science in Sport" show, presented once each day of the Festival, is a 45-minute talk with demonstrations and audience participation, based on the two shorter shows in the current schools programme.

We will be introducing our most recent purchase: a Batak reaction timer (shown below). When not being used in the show, the Batak machine will form part of "SCI-FUN and the Battle of the Sexes!", and will be available for members of the public to test the speed of their reactions (and, perhaps, to highlight any differences between males and females...)



Testing our new Batak reaction timer...

DNA and Heredity Workshops

We will be hosting two workshops during the Science Festival, giving the audience the chance to build their own DNA molecules... and babies!

1) Pink or blue? Gender, genes and cues

Until the 16th century, scientists believed that women were poorly developed men... Five centuries later, the Science Festival sees the birth of a new SCI-FUN workshop aimed at teenagers and adults who fancy a more updated version of the story. Handling chromosomes themselves, the participants will be faced with the task of making baby boys and baby girls.

This journey will take them behind the scenes, through the challenges, tricks and surprises held by our genes, boys and girls alike!

2) DNA Workshop

Why not try your hand at making a strand of DNA from its constituent parts? Learn how the molecule is put together, and how it can then be used to control the building of proteins, which make up most of the structure (and carry out most of the tasks) in your body.

SCI-FUN and the Battle of the Sexes!

April 1st-10th, in the Hawthornden Court

Particle Physics on your Desktop:

April 6th-10th, in the Science Zone

The Science in Sport:

April 1st-10th, in the main Lecture Theatre

The Year So Far – A Brief Review

SCI-FUN Director Dorothy McMurrich writes:

Over the last six months the SCI-FUN Roadshow has visited approximately 60 secondary schools: Oban High School was the most northerly, Kircudbright Academy the most westerly and James Gillespie's High School being probably the closest to King's Buildings. At least half of these were return trips to schools visited previously and, in some cases, schools which we have visited each year since the launch of the new roadshow in 2001. Team members and shows change, but the enthusiasm to engage pupils in Science remains; this is what teachers find valuable in encouraging their pupils to choose Science. With the current shortage of Science teachers, halting the declining interest in Science and inspiring pupils to pursue the subject is now more important than ever.

This message was reinforced by Euan Robson MSP, Deputy Minister for Education and Young People in the Scottish Executive, on his visit to James Gillespie's High School, Edinburgh, on February 1st. Accompanied by Mike Pringle MSP for Edinburgh South (and a barrage of media including the BBC), the Minister spent an hour at the event, speaking to pupils about Scotland's strong reputation for Science and innovation and joining in with them in trying out the spinning chair and the giant bubble.

"Scotland has a reputation for producing world-class scientists and we must maintain this position if Scotland's economy is to continue to prosper.

"By allowing Science teachers to update and improve their skills, we will ensure pupils get the

best Science education, informed by the latest ideas and research. Inspirational, well-motivated teachers bring subjects alive for pupils, helping to increase the take-up of Science subjects.

"Scotland's Science curriculum requires a radical overhaul; that's why this is a priority area for the curriculum review. This, coupled with continued training for teachers and better facilities, thanks to our continued investment, will make Science a more attractive choice for pupils.

"But youngsters need to know that Science can be fun and fascinating as well as opening doors in the future. Today's SCI-FUN event is designed to do just that, giving pupils an insight into the appliance of science by showing them the contribution that Physics, Chemistry and Biology make to sport."



SCI-FUN continues to expand the scope of its activity as well as becoming more widely recognised. In the past year we have introduced new programmes for other audiences: evening sessions for pupils and parents; subject-specific talks and demonstrations suitable for Higher and Advanced Higher science classes; and SCI-FUN Primer for P7 classes and teachers. The evening sessions before New Year sponsored by the Motorola

Foundation, and after New Year sponsored by the Institute of Physics in celebration of Einstein Year, have regularly attracted 50 to 100 people, even on occasions when the coordinating teacher tried to cancel the evening event in case nobody turned up! (The same teacher last year tried to cancel our visit three weeks beforehand but ended up thanking me for "bullying" him into going ahead by convincing him that there really was not a lot of work and chasing around required!) He isn't alone: another teacher recently commented that she had forgotten how effortlessly and professionally SCI-FUN delivers a programme which leaves a lasting impression on pupils, and it all fits in with the school timetable with little disruption or anxiety.

Bookings for 2005/6

Bookings for session 2005/6 open on April 18th. Contracts with councils in Edinburgh and the Lothians, East Renfrewshire, Inverclyde and Dumfries & Galloway guarantee a number of events in these areas. The number of events available to any geographical area is limited so early booking is recommended. Provisional bookings can be held to enable checks on venue availability and funding. Once a booking is confirmed, plans for additional activities such as SCI-FUN Primer can be made well in advance to maximise the impact and minimise the worry!



science and technology for primary schools

We are pleased to announce that, after months of hard work, SCI-FUN Primer – our new initiative for Primary schools – is getting underway.

The success of SCI-FUN's activities in Secondary schools in Scotland is well known. With SCI-FUN established, and with requests for a similar activity for Primary schools, it was decided that a new venture should be embarked upon.

SCI-FUN Primer is based upon the original SCI-FUN concept of taking Science into schools, instead of schools arranging a visit to a fixed location. The idea of producing the exhibits on individual boards has also been retained, but these have been scaled down in size to suit the Primary classroom environment.

When SCI-FUN visits a Secondary school, the associated Primary schools will be given the opportunity to host a SCI-FUN Primer event for their Primary 7 classes. A member of the team and one of our volunteers will visit the Primary schools, spending an hour with each class. We hope that a member of the Science staff from the Secondary

school will also be involved, strengthening links between the Primary and Secondary schools, and helping to give a 'point of contact' for the Primary teacher.

Each session involves: a short opening talk about Science and its importance in everyday life; a hands-on period; and a final short talk to encourage the children to consider studying Science when they go to Secondary school.

Around twenty brightly-coloured hands-on activities on small boards have been developed (see below), and are placed on desks within the classroom area. Each activity is shared by two pupils who work together to carry out the task in front of them. There are instruction sheets, which give the pupils some guidance, but the aim is to allow the pupils to discover for themselves. After a few minutes the pupils move on to the next activity until, time allowing, they complete all the activities. The exhibits cover Maths, Physics, Chemistry, Biology and Technology.

Pupils are encouraged to discuss between themselves what they are discovering and what they are learning from their experience. Each activity is accompanied by a bright explainer board with relevant tips and questions for the pupils to use towards their learning outcome. The class teacher and members of SCI-FUN team will be available to encourage the pupils to get the most from each activity without giving them too much direction.

Comprehensive notes will be left with the class teacher along with contact details and information about where further information can be found. It is hoped that, with the Secondary school's involvement, this will strengthen relationships, aid

the transition between the schools, and ultimately to enhance the teaching of Science.

The aim of SCI-FUN Primer is to "prime" the children into thinking about how Science affects them in their everyday life, and to appreciate that Science is all around them. They will also be encouraged to think about studying Science at Secondary school. The class teacher will have an opportunity to see ways in which they can use everyday familiar things to study Science.

The initial pilot events have been very encouraging, and there has been great enthusiasm from both teachers and pupils. Some comments:

"The whole class enjoyed the experience and wished you could have stayed longer."

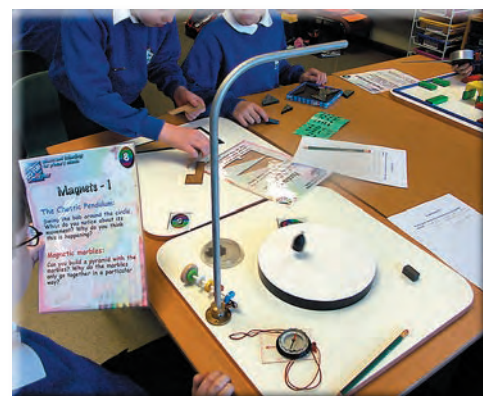
"The children were surprised that there was science in toys."

"I really thought it was really cool."

"It was interesting; I learnt a lot."

"Oh, quality man!"

"Great fun, even though it was educational!"



The pilot presentation of SCI-FUN Primer at Dunblane Primary School.

SCI-FUN Primer Exhibits – Science, Maths and Technology

Here is a brief overview of the current SCI-FUN Primer exhibits (more are under development):

Reverse Handwriting

Can you train your brain to write a message while only seeing the image in a mirror?

Anatomy (see below)

How does the body work? How can we work out how far an object is from us? How can our food travel uphill during digestion? Why does our heart muscle never get tired?



The Primer Anatomy exhibit

Strings and Curves

It's possible to make curves from a series of straight lines.

Puzzles 1

How to pack objects into spaces.

Magnetix

Learn the properties of magnets while making shapes with the rods and ball bearings.

Magnets 1

A pendulum with chaotic behaviour and marbles which appear to have minds of their own show the properties of magnets.

Optics

A variety of experiments showing the properties of prisms, lenses and mirrors.

Remote-control Cars

Guiding the car around the course tests hand/eye coordination as well as looking at how signals can be used in remote controls.

Alternative Energy

Alternative energy is a greener way of producing electricity. Learn how the power of the wind can be harnessed to produce electricity.

Magnets 2

This demonstrates how the magnet in a compass allows the needle to point North.

Genetic Faces

Try different combinations of features to make as many different faces as possible. By making

a mum and dad and combining their features to make their child we can see how we often resemble our parents.

Puzzles 2

Puzzles to test your problem solving skills.

Molecular Memory

A memory game: all the components of a molecule must be found to score a point.

Puzzles 3

Arrange the pieces to fit into the cube.

Molecular Models

Using only a few atoms, many different types of molecules can be made.

Hot and Cold

Investigate the temperature and heat conduction of objects.

Friction Road

Why are cars more likely to skid on icy roads? A look at the forces of friction and gravity, showing their effect on cars using a friction ramp.

Sloping cones

Four cones of varying slopes illustrate the principle of forces and friction, in this case related to the ability to grip an object, using a variety of materials.

Snook

Similar to snooker, with a ramp instead of a snooker cue. Pot the balls by changing the angle of the ramp to the target ball.

SCI-FUN – changing lives...

An article by Claire Taylor, a postgraduate student at the MRC Centre for Inflammation Research, who recently spent some time with us.

Not everyone is destined to become a professional researcher, and at the beginning of this year I was beginning to have doubts about my PhD. Nothing but hard work and disappointment so far, and everything to finish in seven months! What was I going to do with a PhD anyway? Did I really need to finish?

In a break from my research, I went to a two day course on Science Communication, run by the University of Edinburgh. There I met Donna Dalgetty, SCI-FUN's Development Assistant, and Lindsay Hogg, Lead Presenter. Donna's enthusiasm was infectious and a week later, I was helping with my first roadshow in Glasgow!

The first thing that struck me was the scale and the professionalism of the organisation. Seeing the 7.5 tonne lorry, loaded with exhibits, turning up at the school was impressive enough, but the efficiency and teamwork required to set up and run the show was truly amazing. As a SCI-FUN novice, the array of exhibits, posters and gadgetry was overwhelming at first; my debut was limited to setting up tables and preparing the poster boards.

During the first show I was struck by how slick the presenters were: the transitions between

props, audience participation, slides and video ran smoothly despite the best efforts of seventy second-year pupils... By the second day, I had seen the show repeated three times and was (almost) ready to try presenting a section myself. The presenters guided me through the show outline, emphasising the essential points to communicate and encouraged me to express things in my own way... and I was off! It soon became apparent that even when one presenter is not speaking, there is still plenty to do: moving the video camera and adjusting contrast so that the whole audience could see what was happening on the front demonstration bench; putting the props to hand for the presenter who's speaking (slide changer, reaction cards or model arm); and setting up the 'muscle cell' trolleys for the audience participation.

I found the whole SCI-FUN team fantastically supportive, allowing me to present each section as I felt ready, filling in the gaps and forgiving my mistakes. Having never worked with any age of children, a huge group of 13-14 year olds definitely felt like being 'in at the deep end'.

The experience has helped my confidence enormously, and now, when speaking, I've developed a better awareness of my audience, and use a greater variety of voice and movement to hold their attention. I feel more comfortable with explaining the exhibits and I'm better at focusing on problem areas and helping pupils who are



Postgraduate student Claire Taylor

looking uncertain. My mission is always to make sure that the basic scientific message gets passed on, but without seeming intrusive or overbearing. A particular favourite of mine now is doing the Careers Show presentation, with help from the experiences of all my scientific friends.

I'm tremendously grateful to the SCI-FUN team for lending me both their patience and expertise over the last six weeks. Helping with roadshow was a fantastic experience, and has really reawakened my enthusiasm for science. I now plan to restart my PhD research at the beginning of July, and to finish by the end of January. Meanwhile, I intend to gain as much science communication and media experience as possible; perhaps I could even find a future in it. SCI-FUN changed my life!

SCI-FUN – School(s) in Focus

We've only space for a few of the articles received from schools; visit our website to see them all.

Lauren Treadgold, S6, Williamwood High:

SCI-FUN is one of the highlights of our S2 Careers Programme: all S2 pupils take part in and thoroughly enjoy the event.

I was asked to get together a team of S6 students to assist the SCI-FUN team in the many different activities and workshops. It wasn't hard to find eager volunteers. We were given a brief training session in which the team explained to us how each experiment worked and how to present it to our S2 pupils. Although not experts, we did our best and all enjoyed the event. It was great to interact with the younger pupils. The favourite workshops were the "Bubble Tyre" and the "Spinning Chair". At the end of the day the chair was put through its paces as all the seniors had a shot. (Thankfully we all remained in one piece!!)

There was also an evening workshop for P7 pupils from our associated primaries Netherlee and Carolside. This was both fun and educational for pupils and parents alike.

Overall the event was a great success! We had a real hands-on experience and were ably directed by the Edinburgh University Team.

Colene Dougary, S5, Lochgelly High:

When I was told that SCI-FUN was coming to Lochgelly High School, I didn't know what to expect. I volunteered to help out without thinking but now I'm glad I did.

Before the S2 pupils arrived at the concourse the SCI-FUN team showed us around and explained the Science behind the displays. It was a lot more interesting than I first imagined: there were lots of different things to catch your attention and most of the displays were hands-on which made it really fun. The only problem was, there were so many displays I didn't know which one to go to!

Although the main show was aimed at the younger pupils I found it great to watch. Afterwards it was our job to show the younger pupils around the displays. This was a great experience as we got to see how the kids responded to the displays and we got to interact with them and share our knowledge. The kids were all eager to take part in the experiments and you could tell that they really enjoyed the day.

Callum Hunter, S2, The Royal High School:

On the 2nd of February my class attended a SCI-FUN event which took place in the Assembly Hall. Each class went at different times and mine went last.

First of all they showed us some really exciting experiments with loud explosions and bangs. Then we were put into groups to investigate the equipment placed around the hall.

My own favourite was the spinning chair [*What, again? Ed*] which would only move if you stuck your arms out.

I also took part in an experiment where I had to lift up a heavier boy using a long plank of wood. I found it was easy to lift him if the plank was long.

Overall my friends and I enjoyed SCI-FUN a lot.

The day appeared to have been a great success for all concerned and will, we hope, become a regular highlight on our S2 calendar.

Ken Hogg, PT Biology, Royal High

For more information, or to book the Roadshow for your school, contact:

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