

Activities

The following hands-on/interactive activities were used during the Biomedical Horizons events in either the workshops or on stands in the drop-in exhibition. They were used with visitors ranging in age from 12 years old to adult. They could be used in a variety of ways and you will hopefully find them useful either as interesting stand alone activities, as part of a hands-on careers event or as a tool to aid discussion about biomedical science and/or careers.



Practical activities

Antibiotic Antics Workshop

(developed for Biomedical Horizons by the Scottish Initiative for Biotechnology Education – SIBE)

This 30 minute workshop presents participants with various patient case studies. Participants use a variety of laboratory evidence cards to diagnose what micro-organisms are causing the patient's illness and make recommendations on the most appropriate antibiotic to treat the patients with.

Download printed workshop materials, Powerpoint presentations and teachers' notes from the SIBE website:

<http://www.biology.ed.ac.uk/public/sibe/resources.htm>



Extracting iron from breakfast cereal

(thanks to the School of Chemistry, University of Edinburgh)

1. Take two cupfuls of any breakfast cereal which contains iron.
2. Add some warm water.
3. Add a magnet, preferably one which is a light colour.
4. Stir gently for 30 minutes. (We would use a stirrer hotplate for this in which a white magnetic stirrer bar would be used. This may be something which you could borrow from a university department).
5. Remove the magnet and check for iron filings sticking to it.

Explanation: The iron in breakfast cereal is present as iron filings not as a chemical compound of iron.



Osmosis

(thanks to the School of Chemistry, University of Edinburgh)

Submerge a raw egg, still in its shell, into household vinegar and cover the container. After a couple of days the eggshell will have dissolved away leaving the contents of the egg contained in its semi-permeable membrane. The egg will be noticeably larger. Osmosis causes the egg to swell. Now place the enlarged egg into a 50:50 (glucose:water) syrup solution. This results in a smaller than normal egg.

Explanation: When placed in vinegar the calcium carbonate of the egg shell reacts with the ethanoic acid (acetic acid) of the vinegar. Inside the egg there is a high concentration of protein (mostly albumin) so water enters the egg in an attempt to make the solute concentration equal on both sides of the semi-permeable membrane. Thus the egg gets larger. When the egg is placed in the syrup solution, a higher solute concentration (glucose) is outside the egg so water leaves the egg in an attempt to dilute the more concentrated glucose solution outside. Thus the egg gets smaller.

Discussion activity

The following discussion activity has been contributed by Tissue Services of the Scottish National Blood Transfusion Service (SNBTS).

Handouts are given to students outlining a real situation that occurred in a hospital in England in July 1998.

Students are first presented with the dilemma and encouraged to discuss what they would do. Once they have reached a decision they are presented with the action outcome and encouraged to discuss this further.

Possible discussion points and sources of further information are included on the following page.

The Dilemma

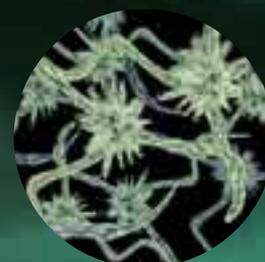
You are a Transplant Co-ordinator. Your role is to take bereaved families through the hard decisions they must make when giving consent for organ and tissue donation.

You are with the family of a young man who has been diagnosed as brain stem dead and is therefore a candidate for organ and tissue donation. The family have listened to all the information you have given them. As a family they have decided that they will give permission for donation to go ahead providing the organs go to a white person only. They are adamant about this.

This patient can donate two kidneys, liver, heart, lungs and pancreas. Seven people's lives could be transformed for the better.

You know that there is a white patient dying of liver failure locally who only has 24 hours to live without a liver transplant. The tissue typing results match donor and recipient.

Would you accept these conditions and go ahead with the retrieval?



The Outcome

The Transplant Co-ordinator accepted the conditions the family put on the organs and transplantation took place. As it transpired all the recipients were white. There was no match for a patient from an ethnic minority.

The investigation into this incident found that any condition attached to donation is unacceptable. This is because it *"...offends against the fundamental principle that organs are donated altruistically and should go to patients in the greatest need"*.

They disagreed with the minority of clinicians who felt that the overriding principle should be that of saving lives.

The policy which now stands for all Transplant Co-ordinators is that they cannot accept any organs or tissue that a family have put conditions on. This is supported by the Department of Health.

If this situation were to arise again the Transplant Co-ordinator and the Transplant Surgeon could be prosecuted under the Race Relations Law of 1976.



The Dilemma: Possible discussion points

Should donation take place irrespective of conditions attached?

Is saving a life the most important issue here?

Should families of the donor be given the choice to accept or refuse donation?

If an individual registers that in the event of their death they wish to donate should this override the families' wishes if they, the family, refuse to give consent?

At present in England the black and ethnic minorities population are four times more likely to need a kidney transplant than the white population. Statistics show that at present the relative refusal rate to donate amongst ethnic minorities is six times that of white relatives. Why should this be?

Note: At present the family have the final say regarding donation even if the deceased has registered on the Organ Donor Register. The new Human Tissue Act which will be out in September 2006 states that the deceased being registered should take precedence over the families' wishes. In reality Tissue Services would require full co-operation from the family for donor screening and therefore would respect the families' wishes. However from September 2006 Donor Co-ordinators will be able to positively encourage families to agree to donation placing emphasis on the deceased's wishes and the legality of the registration.

Discussion activity: Websites and articles

www.uktransplant.org.uk

www.hta.gov.uk

What's not wrong with conditional organ donation? T.M. Wilkinson Journal of Medical Ethics 2003 29: 163-164

www.dh.gov.uk Policy and guidance. *Investigation into Conditional Organ Donation*

'More Black and Asian organ donors needed.' The Londoner. July 2006

www.london.gov.uk/londoner

Suggestions for using the job descriptions from Part 1

The job descriptions in Part 1 can be used in a number of ways e.g. as a reference tool to find out about different careers or with a class group as part of a careers related activity. To start you off here are a few suggestions:

- A quiz: let students pick a set of skills and then work out what jobs they could do with that skill set.
- Interviews: invite a role model in to interview people in the class for some of the jobs or get students to interview each other.
- Match the job title to the job description.
- Give students a job description and get them to write a job advert for the position OR a covering letter to apply for that job.
- Research: students should select a job and then find out how to get the required skills and qualifications OR decide what advice would they would give someone wanting to move into that job.

Useful websites and contacts

The following links outline just some of the resources and opportunities available. These types of resources could be used as part of your own hands-on, science & careers event or activity. For example you could: **build a school careers event around a visit from a science outreach provider; download interactive activity ideas and integrate them into an existing careers event or invite Science and Engineering Ambassadors to be interviewed by students about their daily working life.** Your local SETPOINT (see General Information) should be a good starting point to find out what is available in your area. For careers information and websites see the Useful Websites section at the end of Part 1. *(Please note the following list is not comprehensive and is intended to give examples of the types of opportunities available. All websites listed were accessible as of August 2006)*

General information

www.wellcome.ac.uk – the Wellcome Trust website (project funding body). Content includes, for example; details of other Wellcome Trust funded projects, reports and articles on the latest discoveries in science and medicine, details about their education programme and a “What’s On” section.

www.careers-scotland.org.uk – Careers Scotland’s website which has a database of careers information about jobs and also includes details of your local Careers Scotland centre, services and their online resources.

www.setnet.org.uk – the UK Science, Engineering, Technology and Mathematics Network website – includes information about STEM activities and the UK Science and Engineering Ambassadors programme.

www.setpointscotland.org.uk – the Scottish Science, Engineering, Technology and Mathematics Network website – includes Information about STEM activities in your area. Some SETPOINTS can assist in running STEM activities.

Examples of science providers from the University of Edinburgh

www.scifun.ed.ac.uk

The Scottish Science Technology Roadshow.

www.biology.ed.ac.uk/sibe

The Scottish Initiative for Biotechnology Education website. Click on “Projects” for details of the workshops they run and resources available for download (including the Antibiotic Antics workshop from Biomedical Horizons).

School of Chemistry – outreach or visits to the School of Chemistry:

- Contact the Schools Outreach Officer E. Stevenson email: **e.stevenson@ed.ac.uk** phone: 0131 650 4823

OR

- If you are based outside of Edinburgh and would like someone to come to your school or community contact the Chemical Connection – **www.chemicalconnection.org.uk**

www.setpointscotlandseas.org.uk – the Scottish Science and Engineering Ambassadors website. Science and Engineering Ambassadors are practitioners who work with schools on a voluntary basis, providing support and encouragement as well as role models for young people and children in science, technology, engineering and maths areas.

www.sciencelive.net – an on-line guide to UK science presenters and outreach shows.

<http://horizons.bio.ed.ac.uk> – the Biomedical Horizons website – to download free copies of this resource pack, get further information about the project and view the final report.



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Thank you also to the following organisations and their staff who supported the project and contributed to the events and this resource:

<i>Aptuit</i>	www.aptuuit.com
<i>Ardana Plc</i>	www.ardana.co.uk
<i>Careers Scotland</i>	www.careers-scotland.org.uk
<i>Careers Service, University of Edinburgh</i>	www.careers.ed.ac.uk
<i>Chest, Heart & Stroke Scotland</i>	www.chss.org.uk
<i>City of Edinburgh Council</i>	
<i>Crosshouse Hospital</i>	
<i>Fitness Assessment And Sports Injuries Centre (FASIC), University of Edinburgh</i>	www.ed.ac.uk
<i>Fountain Park Leisure Complex</i>	www.fountainparkcentre.co.uk
<i>Haptogen</i>	www.haptogen.com
<i>Ingenza</i>	www.ingenza.com
<i>LUX Biotechnology</i>	
<i>Marks & Clerk Scotland</i>	www.marks-clerk.com
<i>Mast Group Ltd</i>	www.mastgrp.com
<i>Medical Physics Science Communication Team, University of Edinburgh</i>	www.scicomm.mph.ed.ac.uk
<i>Monklands Hospital</i>	
<i>Moredun Research Institute</i>	www.mri.sari.ac.uk
<i>MRC Human Reproductive Sciences Unit</i>	
<i>Murgitroyd & Company</i>	www.murgitroyd.com
<i>Musculoskeletal Tissue Engineering Collaboration, University of Edinburgh</i>	
<i>Napier University (including Herbal Medicine)</i>	www.napier.ac.uk
<i>QIAGEN Ltd</i>	www.qiagen.com
<i>Queen Margaret University College</i>	www.qmuc.ac.uk
<i>NHS Lothian University Hospitals Division</i>	www.nhslothian.scot.nhs.uk
<i>Scottish Colleges Biotechnology Consortium</i>	www.scottishbiotech.org.uk
<i>School of Chemistry, University of Edinburgh</i>	www.chem.ed.ac.uk
<i>Scottish Initiative for Biotechnology Education</i>	www.biology.ed.ac.uk/sibe
<i>Student Recruitment & Admissions, University of Edinburgh</i>	www.sra.ed.ac.uk
<i>The Forensic Institute</i>	www.theforensicinstitute.com
<i>Tissue Services, Scottish National Blood Transfusion Service</i>	
<i>Tower Mains Limited</i>	www.towermains.co.uk
<i>University of Edinburgh</i>	www.ed.ac.uk
<i>Upstate, now part of Millipore</i>	www.upstate.com
<i>The Wellcome Trust</i>	www.wellcome.ac.uk
<i>Wellcome Trust Centre for Cell Biology, University of Edinburgh</i>	www.wcb.ed.ac.uk

Lastly, we would like to say a special thank you to all of the visitors to the Biomedical Horizons event. In particular to those whose work features in this resource.

