



“Science & Society” projects

*An academically equivalent alternative to wet, laboratory-based
final year research projects*

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Why “Science & Society” projects?

- Traditional lab projects- budgetary, staff & space constraints
- Projects more suited to final career destinations
- Need to engage in science outreach, particularly with young people



- Develop alternative projects where students would create and deliver interactive “Science and Society” activities for local school pupils
- Establish links with selected “Partner” schools
- Promote science and careers in science



Suitable projects

- Fit National Curriculum
- “Curriculum enhancing”
 - Ethics-based; “*Embryos & ethics*”
 - Other topics: “*Spinal cord injuries*”; “*Science behind healthy lifestyle choices*”
- Interactive format
 - Group discussions
 - Discussions + practical activities
 - Practical activities
- Suitable for different year groups/session durations
- Capable of evaluation
- Delivery
 - Schools carousel
 - National Science Week / Leeds Festival of Science



- Not “*mass market*” project type
- The “*ideal*” student
 - Outgoing
 - Good communication skills
 - Interested in science comm. and/or teaching
 - Enthusiastic
 - Capable of interacting with/inspiring young people
 - Ideally, used to working with young people
- Rankings and choices



- Any research or teaching/scholarship background
- Has broad attitude to FY projects
- Flexible
- Enthusiastic
- Interested in Science Comm. and/or teaching
- Previous experience of Science Comm.?
- Knowledge of National Curriculum?



- Create and deliver interactive teaching session to.....
(age group(s) , session duration(s), date(s))
- Broad topic area (matching supervisors interests)
- Free choice on format
- Must include evaluation of student/staff experiences & matching to learning outcomes
- Must be trialled on focus groups
- Delivery during Leeds Festival of Science and/or via schools carousel
- The “stick”- prevention of delivery



Animal experiments: Cruel or necessary?

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Presentations for & against

Animals in research:
Please make up your OWN mind

Anwar Faraj

Diseases Completely Eradicated thanks to Animal Research

Smallpox

Vivisection !

Imagine having your body left to science while you're still in it.

CovanceCruelty.co.uk PETA

Your mind would do this to another animal?

Discussion questions (group then plenary):

45% of animals used have been "made in the lab"- genetically modified.

Growing organs for transplants "Glow in the dark" mice Cystic fibrosis mouse

Should we be using genetically modified animals?

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Saviour Siblings

A *saviour sibling* is a child selected as a result of genetic screening that is capable of donating life-saving tissue to an existing brother or sister.



- Embryo screening
- Genetic match
- Embryo selection
- Donor to sibling
- Stem cells, etc.

What can you see as the benefits and problems of creating designer babies to save the lives of a sick brother/sister?

- Brief scientific background
- Film clip
- Discussion question
- Different viewpoints

The Opinions





Introducing cutting edge science

How far will we go in the future?



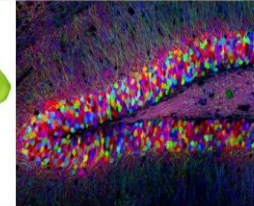
Snuppy



The Future – Fluorescent Genes



Glow in the dark



The Brainbow

- Cloning
- GMOs
- Development of public opinion & acceptance

How far should we take this with humans?

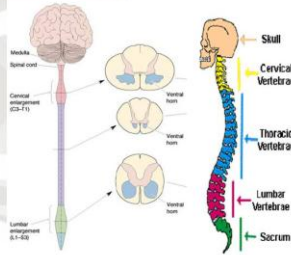




Spinal cord injuries

The Spinal Cord

- Approx. 1 Billion neurones
- Located inside vertebrae – cervical to sacral
- Sensory stimulus (pinch) – spinal cord sends signals up to brain
- Motor stimulus (flex arm) – brain sends signal down spinal cord to bicep
- Changes in heart rate/ blood pressure/breathing all use spinal cord



Demonstration: Reaction Time

Drop
 ing brain processing from
 through spinal cord to
 muscle – time can vary!



Distance	Time
0-5 cm	100 ms
6-10 cm	140 ms
11-15 cm	170 ms
16-20 cm	200 ms
21-25 cm	230 ms
26-30 cm	250 ms
31-43 cm	300 ms
44-61 cm	350 ms
62-79 cm	ASLEEP
80-99 cm	DEAD

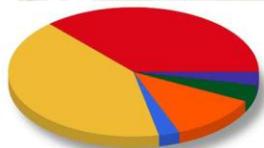


- Science then practical

Spinal Cord Injury

- In the USA - 12,000 survivors of spinal cord injury are admitted to hospital each year
- These injuries lower life expectancy significantly and can cause sudden fatality in many cases.
- The average age of injury is 28 years old

(Statistics from NSCISC April 2009)



• Many other causes – tumours, developmental problems etc.

Animal Research

physiology

e for new
 nans -
 nt

spinal cord



- Science, discussion, cutting edge research



How are these projects assessed?

- Same criteria as wet-lab projects
- Project specific requirements
 - Introduction- pedagogy, national curriculum, current resources, learning objectives etc
 - Methods- development, focus groups, delivery, evaluation
 - Results- knowledge & effectiveness
 - Discussion- suitability, evaluation of feedback, met L.O. etc
 - Appendices- all teaching materials
- Process mark
- Dissertation Assessors
- Equivalent mark outcomes



- Strict deadlines (& stick to them) & time management
- Clear guidance of what is required
 - Fun for participants (interactive, engaging, balanced content / delivery, **novel science**)
 - Limit content
 - Trial on focus group
 - Reflection & feedback
- Enthusiastic schools & key contacts
- Counselling / advice / meetings for both students & staff
- The “stick”- option to withdraw delivery

- Student training
 - University Access Unit volunteer training
 - Survey design & analysis seminar
 - Observation of interactive large group teaching
- Getting schools
 - National Science Week / LFoS
 - Carousel
- Costs
 - Travel/consumables £100
 - CRB/VBS checks (2010-11 £64)





“Science & Society” projects

A students perspective

Clare Steen

3rd Year BSc Human Physiology

Why do a Science & Society project?



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- Introduce cutting edge science into schools
- People orientated- medicine
- Macro rather than micro



- Challenge of designing a session
 - Short time to develop
 - How to make the teaching effective?
 - Making it interactive
 - Choosing topics - curriculum
- Adapting to different ages / session durations
 - Variety increased enjoyment
- Changes during development
 - Input from focus groups
 - Distinct cut off points



- Initially daunting
- Easier the more relaxed I was
- Benefits of providing enthusiasm
- Class control
- Feedback from Staff
- Post-session reflection / development

Was it successful?



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- Very positive feedback staff/pupils
- Undergraduates effective in improving science interest
- Invaluable work experience – young people/teaching
- Increased my confidence
- Improved my ability to think/react quickly to challenges



- Academically equivalent alternative to wet projects
- Fulfills need within curriculum
- Encourages students to be enterprising and innovative
- Enhances employability
- Valuable tool in:
 - promotion of public understanding of science
 - encouraging pupils to consider science careers
 - promoting own Institution
 - developing partnerships with schools
- **Future developments?**



Further details, student guidance notes or assessment criteria?

Email me: d.i.lewis@leeds.ac.uk

or case-study on UK Centre for Bioscience website:

<http://www.bioscience.heacademy.ac.uk/ftp/casestudies/lewis.pdf>