


Towards Sustainable Teaching in Bioscience



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Introduction

- ◆ Sustainability
 - ◆ Relating sustainability to Bioscience Teaching
 - ◆ Undergraduate study
 - ◆ Case studies at UWA (labs, field study, teaching glasshouses, purchasing)
 - ◆ Limitations/solutions

 - ◆ Questions
- 
- A decorative graphic of a teal mountain range is located in the bottom right corner of the slide.

Aims of the project

The implementation of sustainability into the curriculum and delivery of education across the Biological Science sector.

Funded by HEA Bioscience

A stylized, layered mountain range graphic in shades of teal, located in the bottom right corner of the slide.

Definitions

◆ Sustainability

- “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundland report, 1987)

◆ Sustainability literacy

a sustainability literate person:

- understands the need for change to a sustainable way of doing things, individually and collectively;
- has sufficient knowledge and skills to decide to act in a way that favours sustainable development; and
- is able to recognise and reward other people's decisions and actions that favour sustainable development (Parkin *et al.* 2004)

◆ Sustainable teaching

- We recognise the importance of increasing 'sustainability literacy' among students and the growing demand for sustainability skills among employers. (HEA, 2007)

The Leaky Ship Scenario

Energy

Water

Food

Fuel

Equipment

People

Environment

Time

Resources



CO₂

CO₂

CO₂

£

£

Stationary

Bottles

Computers

Plastics

£

Pens

Chemicals

Equipment

Glass

Sanity

Paper

Plants

Reports

Electricity

Heat

CO₂

Soil

£

People

Time

CO₂

£

Books

Water

Clothes

Food

£

Money

Waste

Sustainability is about plugging the leaks by reducing the resources that are used and minimizing wastage.

Reduce... Reuse... Recycle.



Student feedback

183 student participants in the questionnaire

- 118, 40 and 25 were classified as being in years 1, 2 and 3, respectively

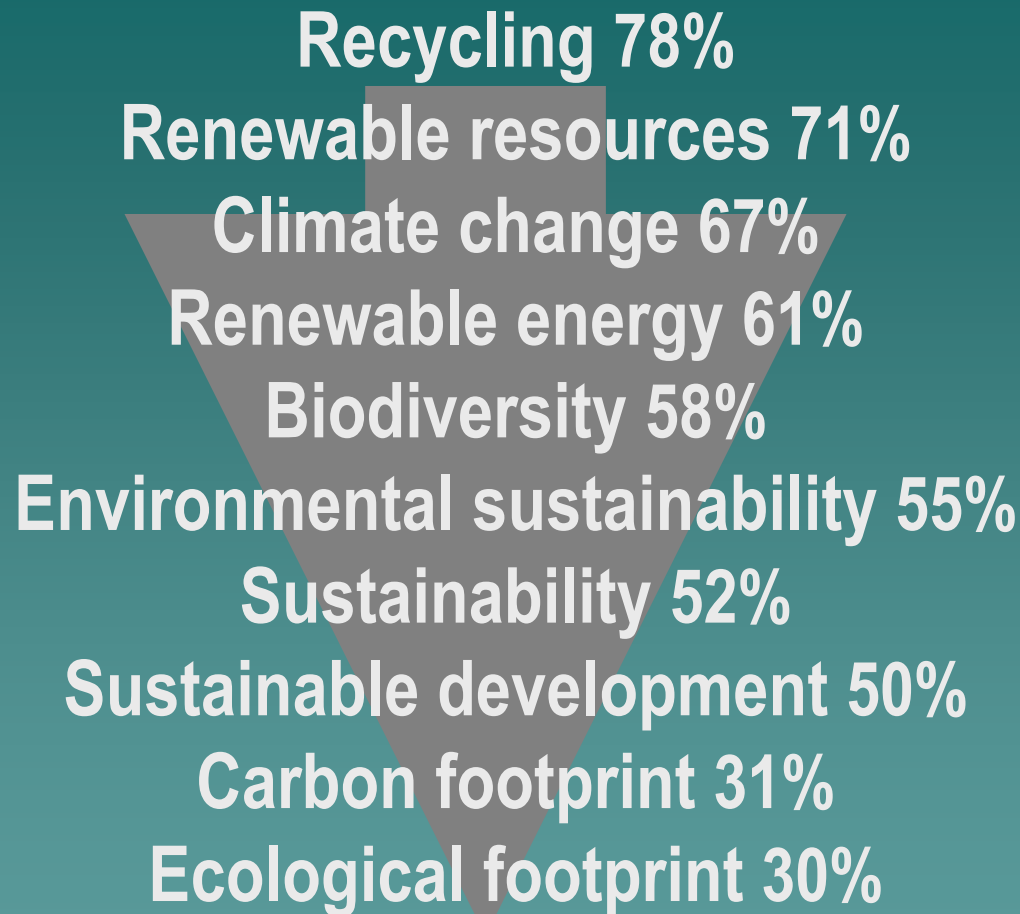
- ◆ 92% of students wanted a greater focus on sustainability in their degree programs.
- ◆ Year 1 and 2: sustainability should be integrated into relevant modules
- ◆ Year 3: online/written sustainability resources

Students Feedback

FIRST	SECOND	THIRD
School 69%	University 85%	TV 62%
TV 65%	Newspapers	School 62%
Newspapers 60%	Internet 64%	Newspapers
Internet 60%	TV 61%	Internet 57%
Books 57%	Env. grps. 61%	University 52%
University 57%	Books 53%	Books 48%
Env. grps. 39%	Journals 53%	Adverts 43%
Journals 39%	School 53%	Journals 43%
Family 26%	Friends 43%	Family 33%
Friends 23%	Employment	Friends 19%
Adverts 36%	Family 27%	Env. grps. 19%
Employment 19%	Adverts 15%	Employment

Where have you gained knowledge of environmental issues?

Student feedback



How do you rate your awareness/understanding of the following issues?

Laboratory research and teaching

Energy

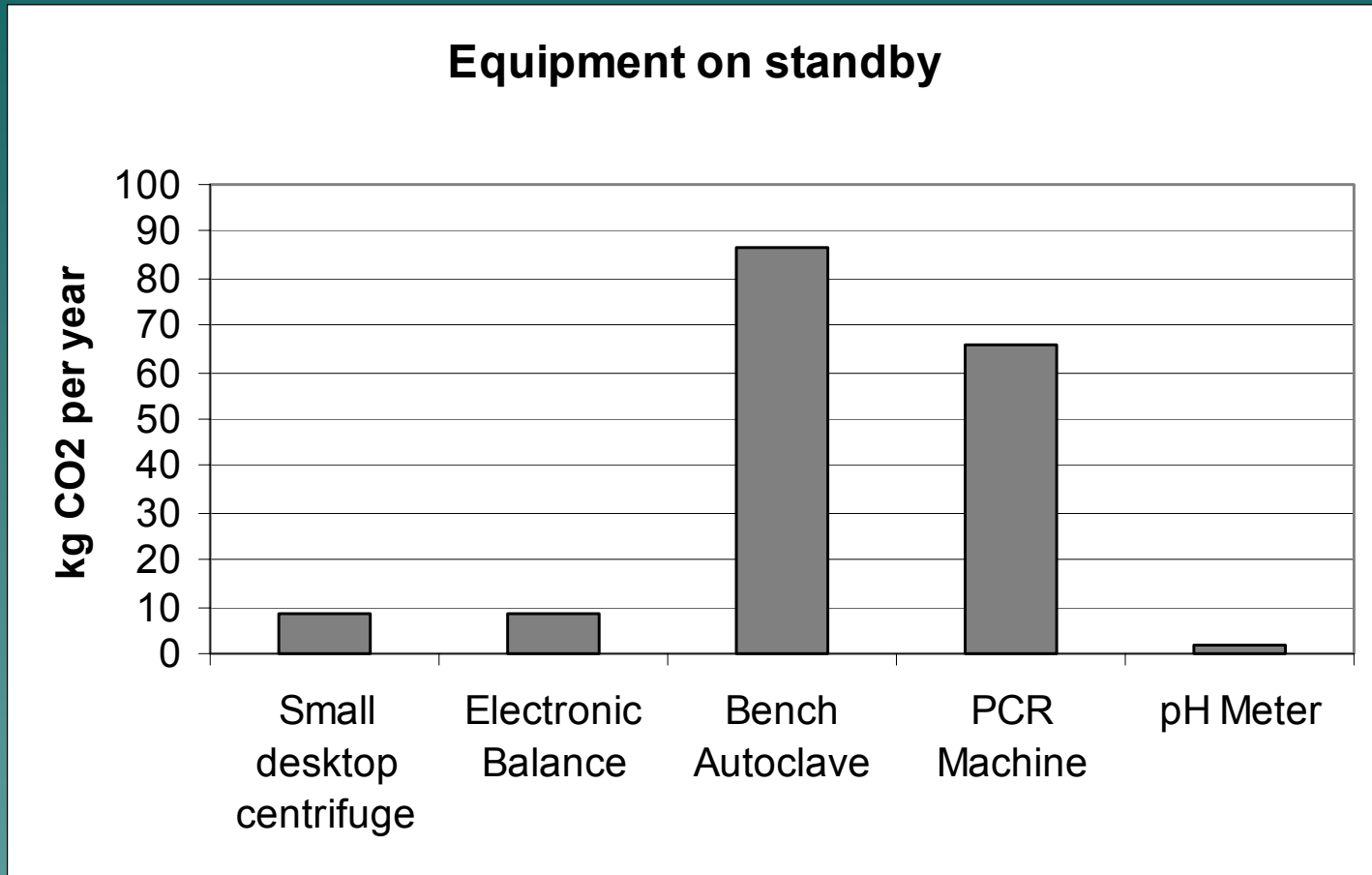
Water

Waste products

Equipment



Making targeted information available



Leaving a small bench autoclave on overnight, for a year, emits the same amount of CO₂ as driving about 300 miles in an average car.



Information technology



Energy use

Equipment outdated rapidly

Difficulty in disposal of materials

Growth Rooms



Disposal of organic waste

Energy use to keep light and temperature constant

Composting

Composting displays at the Centre for Alternative Technology (CAT) inspires IBS glasshouses to take up on-site composting



Over 2/3 of waste material can be composted

Field Study



Travel
Impact on ecosystem



Environmental Management Field trip goes local to reduce carbon footprint

2005 Indonesia and back

Total distance travelled: **16,344** miles

- ◆ Aberystwyth – Manchester by **car**
- ◆ 280 miles x 0.29 kg CO₂ = 81.2kg CO₂
- ◆ Manchester – Jakarta by **long haul flight**
- ◆ 14,658 x 0.18 kg CO₂ = 2638.44 kg CO₂
- ◆ Jakarta - Makassar by **short haul flight**
- ◆ 1406 x 0.24 kg CO₂ = 337.44 kg CO₂

CO₂ emissions *per person*:

3057.08 kg CO₂

2007 Pembrokeshire and back

Total distance travelled: **168** miles

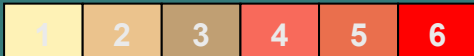
- ◆ Aberystwyth to Dale Fort, Pembrokeshire by **bus**
- ◆ 168 miles x 0.09 kg CO₂ = 15.12 kg CO₂

CO₂ emissions *per person*:

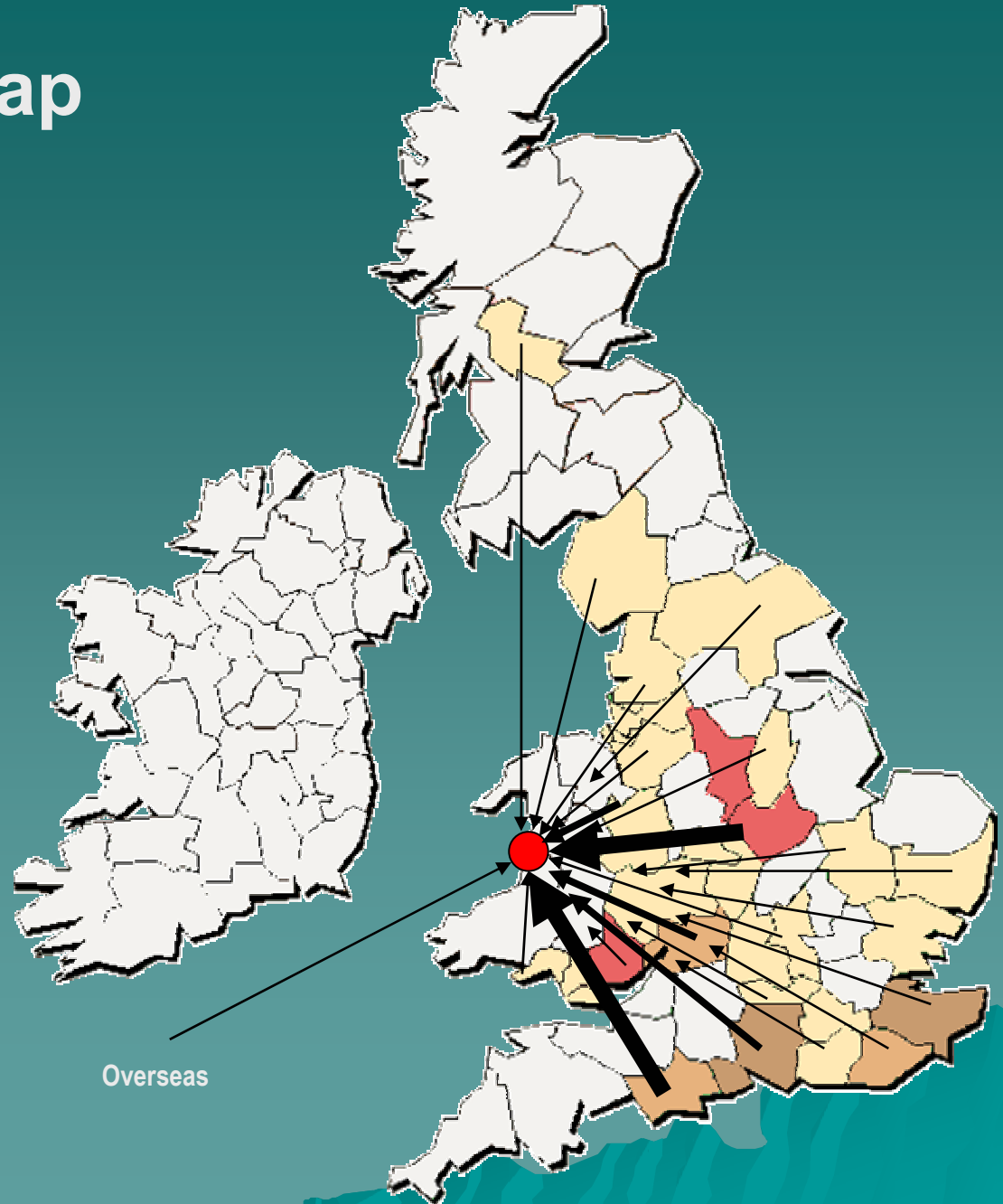
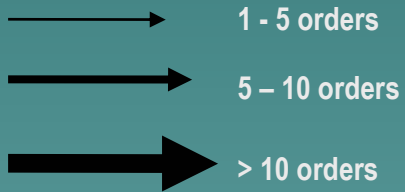
15.12 kg CO₂

Purchasing map

Number of suppliers by county:



Number of individual orders from county:



Support facilities

Food and catering facilities



Thousands of cups of tea and coffee each day

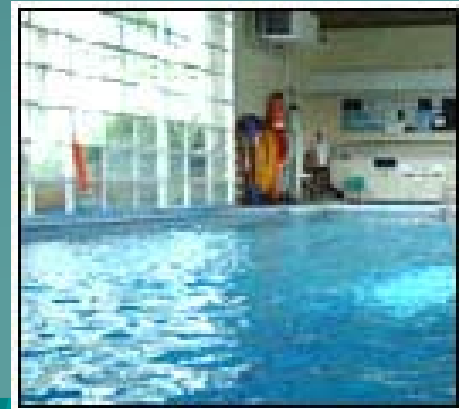
Toilets and washrooms



Sports and leisure activities

Transport

Administration



LIMITATIONS

Time - implementing new structures and practices difficult when added to a full workload.

Resources - financial constraints often limit new developments.

Tradition - there can be strong resistance to changing teaching practices.

Information - there is a lack of easy to use guidelines for sustainable practice

Motivation - sustainability issues may not seem relevant to the individual, or they may feel that it is not their role to be teaching it.

Curriculum - there are particular constraints in teaching biosciences, students need to be taught methods relevant to future employment.

POSSIBLE SOLUTIONS

Online resources

Best practice guidelines "Green Laboratories Manual"

Review of staff workloads

Sustainability training for staff

Evaluation of the curriculum

Support from management

Sustainability group

Permanent member of staff to facilitate the transition to sustainable teaching.

The Institute for Biological Sciences is going Green!

Green energy
Solar panels for the car park

Research Laboratories
Cutting energy consumption
Reducing the use of hazardous substances
Researching best practices & environmentally friendly protocols

Transport
Schemes promoting public transport, cycling and walking

Offices
Awareness raising campaign
Reduce Reuse Recycle!

Biodiversity
Increasing biodiversity across the campus

Teaching
Ecology & Climate change
Sustainable development
Demonstrating sustainability through good practice

'Sustainability in Research'
The University of Wales, Aberystwyth has been awarded a five year research grant to look at the environmental impacts of modern bioscience research and to investigate practical methods of improving sustainability. The project is funded by the Leverhulme Trust.
For more information contact Jane Wright
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'Towards Sustainable Teaching of Biosciences'
The University of Wales, Aberystwyth has been awarded one of three national grants to develop a UK blue print for teaching Biology in a sustainable way. The project is funded by the Teaching Enhancement Fund and supported by the Higher Education Academy.
For more information contact Jane Wright
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References and further reading

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