Dissection Fact Sheet

In this factsheet...

Introduction

NO State Education Department in Australia has made dissection compulsory.

It is left to the discretion of the teacher within the guidelines for the syllabus, yet virtually all science teachers still include dissection in biology classes.

However the study of anatomy can be carried out effectively with non-animal alternatives such as models, videos and computer programs.

Not Needed for Other Courses
Most students who take biology at second level will not persue it or any related course at tertiary level leading to a career. Dissection is therefore a waste of animals' lives and a non-justifiable cost.

Dissection is not an essential preparation for students who will study medicine or veterinary science.

Outmoded

Dissection continues in schools because of 'tradition', and in spite of the advances in alternative teaching aids.

Not the Most Effective Tool

Dissection is not the most effective tool to use in teaching aspects of biology. Students using non-animal alternatives have been shown to perform better than those cutting up dead animals.

Hands-On Approach Not Essential
Biology and other science students have to learn about many essential aspects in their courses without a hands-on approach (such as learning about particles which require an electron microscope to be seen.)

Better Ways to Learn Manual Skills
The manual dexterity learned in performing animal dissections can be achieved by "dissecting" readily available inanimate mechanical objects, such as a worn out clock, watch or other delicate mechanism. These also have the added advantage that they can be put back together again.

Coercion May Discourage Learning
Students who approach dissection reluctantly, or have been coerced into doing it, are unlikely to benefit from an experience which revolts them or is contrary to their beliefs. It may even cause them to give up science altogether.

Dissection Is Unethical

The killing of thousands of animals every year (millions world-wide) merely for dubious educational purposes perpetuates the acceptance of animals as "things" which can be used for any human purpose without ethical justification. It can cultivate indifference in young people towards all living organisms.

Why Dissection Is Unethical and Unnecessary
Although dissection is still practiced widely in secondary schools in Australia, many students are refusing to dissect, or observe dissections. Forcing reluctant students to dissect may alienate them from science altogether or, if they persevere, desensitise them.

There are more ethical ways of studying "the science of life". What has been for decades (dissection was introduced to schools in the US in the 1920's) the acceptable method of learning basic anatomy is being replaced by more and more sophisticated non-animal teaching tools. Traditional justifications for dissection in schools are losing credibility, and the ethics of killing thousands (millions worldwide) of animals each year is being called into question.

A waste of Animals Lives
As most biology students in secondary school will not continue biology-related courses after leaving school, dissection for them is merely an exercise in curiosity and a waste of animals' lives.

Not an Aid to Learning

The belief that the hands-on experience of cutting open a dead animal to observe its organs cannot be matched by a model or computer program has been challenged. One US study showed that students tested on their knowledge of anatomy after seeing dissections on film, performed better than those who had cut up animals. Another showed no difference in knowledge between students who had dissected a real frog and those who had used a computer simulation.

In fact, many alternatives provide better opportunities for students to study the functions of organs. Videos, for example, allow the same procedures performed by expert dissectors to be studied over and over. Details can be enlarged on the screen, and images can be frozen. Students can proceed at their own pace and return again and again to check out or master a difficult area.

Learning manual dexterity is sometimes cited as an advantage of dissection, but developing such skills requires more practice than can be gained from occasional dissections. Dexterity and precision can be practiced in a number of ways without using animals.

Medical School Requirements

In Australia most medical schools (exceptions are Adelaide and Newcastle Universities) use animals in teaching.

In America, a survey in 1988 by the Physicians Committee for Responsible Medicine found that most medical schools do not require participation in animal labs, and several medical schools do not offer animal labs to their students at all. Of 127 US medical schools only three said they would penalize students who declined to participate in live animal labs.

In Britain animals are not used to demonstrate medical procedures.

Dissection Does Not Teach Respect for Life

Rather than teaching students a respect for life, as some dissectors claim, dissection is more likely

to create indifference. Killing thousands of animals every year so that secondary school biology students can look inside them reinforces the belief that animals are just 'things' which umans may use for any purpose.

Because dissection requires the wholesale destruction of animals (every student can have a dead rat), it can desensitize students, whether they are required to kill them or the animals are provided already dead. The knowledge that the animals have been specially raised and killed for their fleeting use is likely to encourage a low estimation of animals' worth. Even the use of animal parts (such as eyes and other organs) obtained from a slaughterhouse, where animals have been killed for another purpose, is based on the assumption that animals' lives are expendable, and have no value except for human exploitation.

Animal Suffering

Rats, the animals mostly used in dissection in Australian schools, are intelligent and inquisitive and, when confined in cages, they have opportunities for normal behaviour. Most are raised in animal houses in universities and sold to school suppliers.

Housing, feeding and general care varies in quality from one institution to another.

All animals suffer stress when roughly or repeatedly handled, transported and kept in cages.

There is also the problem of humane disposal of excess and unwanted live animals.

In the US animals used for dissection in schools include rats, cats, fetal pigs, frogs (captured from the wild), earthworms and mink from fur farms (who are killed by suffocation or electrocution).

Cost and Benefit to Schools of Alternatives to Dissection

Advantages of a video:
Operation Frog and *The Ratstack* are useful computer-based alternatives but require multiple copies for each school. Each student requires access to a computer, and not all schools have computer laboratories. A video is cheaper because a whole class may view one copy. At this stage, the resolution of fine detail is still inferior on computers, an important point when illustrating small structures in an animal. A new Australian-made interactive video, *Investigation of a Mammal (Rat)*, provides an interesting and inexpensive alternative.

The following simple calculation illustrates how more than $300,000 could be saved over five years by using alternatives.

Average Cost to Victorian Education Dept over the next 5 years for schools in Victoria:

- Rat—$10 ea. x 33,000 = **$330,000**
- Video—$60 ea. x 200 = **$12,000**
  (Note: 5 years is the estimated life of the video)

No Adequate Legislation Covers Dissection in Australian Schools

In Victoria, for instance, the Prevention of Cruelty to Animals Act 1986 provides for the registration of users of animals for research and teaching, and submission of returns to the Victorian Department of Agriculture, but no records are kept of the number of animals reared and killed for dissection in schools. Nor are they in any other state.

Most states require that any scientist in a university wishing to perform dissection for teaching purposes must have the proposals approved by an Animal Experimentation Ethics Committee, yet this is not a requirement for use in biology or general science courses in primary or secondary schools

Overseas

- In 1987, the Argentinian government banned dissection in schools and stated that *...iology is the science of life, and it is not consistent to teach it at the expense of the death of other beings ... experiments on animals are part of a dangerous process which tends to desensitize the mind to pain, suffering, to respect and to life itself.*
- In Britain, "invasive uses of vrtebrates" in schools is illegal. It is believed that the harm caused to animals through dissection outweighs any slight educational benefit. The University of London School Examinations Board has removed from the A-Level Biology course work the requirement to dissect a small mammal. Liverpool City Council has banned dissection totally.
- The Dutch Ministry established a project to reduce the number of animals in universities, and provided grants for the development of alternaties. They have achived a 40 per cent reduction so far.
- Four American states, New York, California, Pennsylvania and Florida, now guarantee students the legal right to be given a humane alternative to classroom dissection without compromising their grade.
- In India the Blus Cross has developed an interactive computer program for biology education. Compufrog simulates dissections which are routinely carried out in Indian schools.

But...
In March 1994, the World Society for the Protection of Animals (WSPA) uncovered a large scale importation of preserved cats from Mexico to the US for classroom dissection.

Operators were paying $US1.00 per cat brought to them, and in impoverished areas this method of earning money meant many pet cats were being sold without their owners' knowledge, then killed and shipped to American biological supply firms who provide schools with animals for dissection. The comapny in Mexico not only killed (usually by drowning which is not a humane method) and preserved thousands of cats, but also other animals such as frogs, fish and rabbits.

WSPA estimated that over 6 million animals a year are killed for dissection in biology classes in the US.

Alternatives

Alternatives to animal dissections include anatomical overlays using projection transparencies, detailed models of the anatomy of animals and humans, computer simulations, videos of actual dissections (for which only one or two animals have had to be killed, thus saving the lives of thousands), and clinical observations.

Computer Simulations
The ***MAC Series***of biological and medical simulations, such as ***Macman*** (cardiovascular system), ***Macpuf***(respiritory system), ***MacPee*** (renal physiology) and ***MacDope*** (the effects of drugs on the metabolism), are available from Oxford University Press, GPO Box 2784Y, Melbourne, 3001.

Bodyworksuses animation and graphics to identify human organs and their function, and a more recent anatomy program called ***Adam*** has narration as well as animation. Enquiries to : Dataflow Computer Services, PO Box 202, Waterloo, NSW 2017.

The Ratstackis a popular alternative that has been developed into a laser video disk called ***Rat Anatomy Disk***. It includes moving, full-colour video clips, still frames to highlight important features, a zoom option to enlarge a single organ to the size of the screen and many histological sections to show the cellular detail of different organs. As with most computer programs, students can move back and forth within the program.

Virtual Frogis a computer dissection on the Web:
http://george.lbl.gov/ITG.hm.pg.docs/dissect/dissect.html (http://george.lbl.gov/

ITG.hm.pg.docs/dissect/dissect.html)

Models
Making models of animals, hollowing them out and placing models of organs such as lungs, heart, intestines etc. in the correct positions
gives a 'hands on' approach to learning anatomy. Various commercial models are available.

A human torso model
is supplied by Haines Educational, PO Box 11, Huntingdale, 3166.

The bio-LOGICAL Frog Model
for classroom demonstrations is 100cm high, and has 22 removable parts. Similar but smaller is the 20cm ***MI-OWN Frog Model*** for students which comes with instructions, questions and diagrams. Enquires to Serrata Pty Ltd, PO Box 73, Galston, NSW 2159. This company also offers **rat, earthworm, flower (lily)** and **hydra** dissection models.

Field Experience
More educational for students than dissecting deteriorating dead animals is observing a veterinarian performing *needed*operations on live animals. This emphasizes compassion for animals and respect for saving life, rather than killing animals and throwing them away.

Computer Software
Operation Frog is computer software provides a lifelike simulation of the dissection of a bullfrog, enabling students to participate in every major step of the dissection procedure. It features graphics, colour and sound, as well as on-line reference which enables students to point and click with the mouse to identify organs. Comparative anatomy option to compare frog and human anatomy. For school years 5-10, aavailable for MS DOS or MAC.

Video - Investigation of a Mammal (Rat)

Contents:
VHS video (31 minutes)
6 page handout
Set of 4 photographs and 4 overheads

Produced by Wendy Van Dok. B.Sc. (Hons). Financed by the Australian Humane Research Foundation. Filmed by Waterfront Pictures. Rats dissected by Dr Sue Peirce, Box Hill TAFE.

- The format of the video allows a flexible approach to teaching and encourages student interaction.
- It is organised into sections, ie external organs and structures, the circulatory system, the respiratory system, the digestive system and the urogenital system. The whole dissection may be viewed in one lesson, or viewed section by section when students have more time to assimilate the extensive amount of information generated from a dissection.
- A question is asked at the end of each section and there are two exercises. Educators may use their discretion to stop the video and allow for student participation as each question or problem is presented or at the end of the video.
- Graphics in the video enable students to view the circulatory and respiratory systems in motion, a feature not possible in a conventional laboratory dissection.
- Enlarging organs and structures on the screen helps to overcome the limitations of dissecting such a small animal as a rat.
- The handout provides answers to the questions and exercises interspersed throughout the video and includes further information and exercises about mammals and rats.
- Colour photographs and overheads of different stages of the dissection assist students to understand how these organs are connected and organized.

Some comments on the kit:
"Very well presented - clear, interesting and the computer simulated graphics complement the actual dissection. A practical alternative to using animals because it may be used repeatedly and studied section by section as different systems are covered in the course. Value for money and far cheaper than using animals."

—Bronwyn Van Den Nouwelant
Biology Teacher, Rowville Secondary College.

"The video uses a combination of real dissections, using male and female rats, and animations which are very well done. The video goes into good detail about the structure and function of the various organs within each system. ... It takes less time than a student dissection ... and the student will be able to identify the various organs probably better than a hands-on experience. ...I have used this with my year 11 Human Biology students and they thought it was very valuable. I will use it again as it is good value for money."

—P. Chancellor
Ocean Reef SHS (WA); review, Australian Science Teachers Journal, Vol.41.(74)

"Brilliant. Strongly augments the dissection part of the course. Balances theory with practical and allows self-pace work for students. Some parts are also suitable for junior science."

—**Gary Stopor**
Biology Teacher, Emerald Secondary College

"Excellent. The physiology is clear and easy to understand, more so than in a dissection. The system and function are demonstrated well, and there is no cruelty."

—**Tamara Schermer**
student

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