



Use of Animals in Research

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1 Introduction

- 1.1 Biological experimentation is essential for an understanding of living processes. Such studies should lead to a respect for all living things. Capable students, anxious to pursue a career in biological sciences, must receive the necessary encouragement and direction. All aspects of the project must be within the comprehension and capabilities of the student undertaking the study.
- 1.2 While student investigations of biological processes are to be encouraged, they are subject to the same laws, ethics, and regulations as any other research.

2 Canadian Council on Animal Care (CCAC) Guidelines

- 2.1 All experimental care and use of animals in Canada is subject to the requirements of the Canadian Council on Animal Care (CCAC), a national, peer review organization founded in Ottawa in 1968. Its mandate is straightforward and concise: "to work for the improvement of animal care and use on a Canada-wide basis". The following excerpts from the Council's documentation outline the ethics of animal experimentation in Canada and, in particular, the role of YSF Canada in regulating pre-university animal research. Detailed information may be obtained from the CCAC web site – <http://www.ccac.ca>.

a) Ethics of Animal Investigation

- (a) The use of animals in research, teaching, and testing is acceptable ONLY if it promises to contribute to understanding of fundamental biological principles, or to the development of knowledge that can reasonably be expected to benefit humans or animals. Animals should be used only if the researcher's best efforts to find an alternative have failed. A continuing sharing of knowledge, review of the literature, and adherence to the Russell-Burch "3R" tenet of "Replacement, Reduction and Refinement" are also requisites. Those using animals should employ the most humane methods on the smallest number of appropriate animals required to obtain valid information.

b) Pre-University Use of Animals

- (a) Before the establishment of CCAC guidelines, pre-university use of experimental animals was governed by a one-page document prepared by the Canadian Federation of Biological Societies. The Federation required compliance with its Guiding Principles, and said that "all experiments employing animals must be carried out under the supervision of a qualified teacher."
- (b) At the present time, animal use in the school is subject to the requirements of legislation such as the Health of Animals Act (Bill C-66), the Criminal Code of Canada, Section 446, Cruelty to Animals, and provincial legislation, where such exists. Primary responsibility for animal use at the pre-university level now lies, however, with the Youth Science Foundation (YSF) Canada, which requires compliance with the CCAC guidelines in the conduct of biological research.
- (c) YSF Canada, amongst its responsibilities, regulates animal experimentation in science fairs. All research intended for science fairs must be screened by a committee cognizant of current requirements; if none is available, YSF Canada may be contacted. Science fair regulations permit use of lower forms of life (bacteria, fungi, protozoa, insects, plants and invertebrate animals). Vertebrate animals (birds, fish, mammals, reptiles, amphibians) "are not to be used in any active experiments which may be deleterious to the health, comfort or physical integrity of the animal..." Observation of wild animals, animals in zoological parks, farm animals and pets is permitted. It should be noted that, before any such projects are undertaken, adequate arrangements should be made for the care of the animal while in the classroom.

3 Russell-Burch 3R Tenet - Replacement, Reduction and Refinement

3.1 In 1954, William Russell, a brilliant young zoologist who happened to be also a psychologist and a classical scholar, and Rex Burch, a microbiologist, inaugurated a systematic study of laboratory techniques in their ethical aspect. This led to publication in 1959 of *The Principles of Humane Experimental Technique*, in which they classified humane techniques under the headings of Replacement, Reduction, and Refinement - now commonly known as the three Rs. In some ways this elegant classification was 25 years ahead of its time. Today the three R's are widely used by all responsible scientists and one hardly ever reads or hears a discussion on laboratory animal welfare that does not refer to them. The complete text of the book is available online at http://altweb.jhsph.edu/publications/humane_exp/het-toc.htm

- i) Reduction is a concept that covers any strategy that will result in less animals being used to obtain the same amount of information, or in maximizing the information obtained per animal and thus limiting or avoiding the subsequent use of additional animals.
- ii) Refinement signifies the modification of any procedures that operate from the time a laboratory animal is born until its death, so as to minimize the pain and distress experienced by the animal, and to enhance its well being.
- iii) Replacement refers to any experimental system that does not entail the use of a whole, living animal.

4 Definitions of Researcher, Adult Supervisor and Scientific Supervisor

- 4.1 A researcher is a student data or information collector, or assistant, involved in research activities involving animals.
- 4.2 The Adult Supervisor, a parent, teacher, professor or scientist, is responsible for ensuring that the student is aware of the ethical issues involved in the project and provides guidance and advice to ensure that YSF Canada policy is followed. The Adult Supervisor is responsible for ensuring that the student's research is eligible for entry into the CWSF. All projects involving the participation of humans or the use of animals require an Adult Supervisor.
- 4.3 The Scientific Supervisor, who will usually have an advanced degree, is involved in a complex project involving animals, which often takes place in a university, institutional or industrial setting. The Scientific Supervisor is responsible for ensuring that all provincial and federal laws governing safety, material and procedures are followed. The Scientific Supervisor may be the Adult Supervisor.

5 Statement of Ethics Review Requirements

- 5.1 Youth Science Foundation Canada requires that all research involving animals entered in the Canada-Wide Science Fair, or a YSF-Canada affiliated Regional Science Fair, comply with the CCAC guidelines in the conduct of biological research.
- 5.2 This policy applies to all projects involving animals, whether vertebrate or non-vertebrate.
- 5.3 For complex projects, often carried out in a university or research institute setting, the ethics review process should involve the student's Scientific Supervisor, often a member of a bona fide research institution or hospital practiced in the ethics of animal research, and a member of the Ethics Committee of the Regional Science Fair. This will provide the student researcher with an appreciation of the requirements and safeguards existing in law regarding experimentation involving animals. Universities have their own Ethics Committees, often called Scientific Review Boards (SRB) and they must approve the project. University rules may be more stringent than the rules given here, and must be followed. Projects may also be referred to YSF Canada's Ethics Committee.
- 5.4 Form 4.1C - Science Project Human/Animal Research Approval Form – must be submitted to the Canada-Wide Science Fair Host Committee at registration for any project involving the use of animals.

6 Use of Animals in Projects

- 6.1 The Adult Supervisor is responsible for ensuring the safe and ethical conduct of projects involving the use of animals. It is recommended that a Regional Science Fair Ethics Committee review all proposed research involving animals before experimentation is started. Projects involving animals, whether vertebrate or non-vertebrate, which are deemed to be unethical, may be disqualified.
 - a) Young scientists or their supervisors unsure about the acceptability of a proposed project should contact their Regional Science Fair, who can access appropriate authorities familiar with current regulations and relevant aspects regarding scientific merit, and for guidance and suggestions in performing the work.

7 Non-Vertebrate Animals

- 7.1 Students may do experiments on non-vertebrate animals, and exhibit their work in science fairs. Lower orders of life - bacteria, fungi, protozoa, insects, plants and invertebrate animals - can be used in experimentation to reveal valuable basic biological information.
- 7.2 It is recognized, however, that in regard to ethical issues surrounding the experimental use of animals it may be necessary to include some invertebrates insofar as consideration should be given to the complexity of the central nervous system of a species and its ability to perceive sensations, rather than any physical appearance and the evolution of its genetic relationships to the human.

8 Vertebrate Animals

- 8.1 Vertebrate animals (birds, fish, mammals, reptiles, amphibians) are not to be used in any science fair projects, with the following four exceptions:
- i) Observation of wild animals, animals in zoological parks, farm animals and pets is permitted. Vertebrate animals are not however to be used in any active experiments which may be deleterious to the health, comfort or physical integrity of the animals.
 - (a) Observation of wild animals falls within the definition of hunting in some jurisdictions. Students should obtain advice and permission from conservation authorities to ensure that they are not interfering with the animal's life, and to ensure that their project is permissible. A permit may be required.
 - ii) Behavioural experiments with positive rewards are permissible only if the animal is not placed in a stress situation.
 - (a) Training an animal to travel through a maze to receive a food reward is stressful, particularly if the animal is hungry, and is therefore not permissible. However, allowing an animal to make a free choice (of food, for example) is permissible, so long as the animal is not stressed before offering the choice (e.g. by withholding food).
 - iii) Projects may be conducted in a registered institution/laboratory where animal experimentation is taking place and in which:
 - (i) the student works only with material (e.g., tissue, blood) that has been supplied to the student by a Scientific Supervisor; and
 - (ii) the animal(s) involved is sacrificed for a purpose other than the research being done by the student
 - iv) Studies of embryos are restricted to observation, without intervention with drugs or other chemicals, or manipulations of physical condition to test the resiliency of the animal. If eggs are hatched, the offspring must be reared normally. Otherwise all embryos must be destroyed by freezing before 85% of the normal incubation.
- 8.2 Cells and animal parts, including organs, tissues, plasma or serum may be used in science fair projects. They can be obtained only in one of three ways:
- i) from biological supply houses;
 - ii) from registered institution/laboratory research facilities; or

- iii) salvaged from the food industry. Evidence of the source of the materials must be available at the project display

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4.1.2 Forms

A. Form 4.1C Science Project Human/Animal Research Approval Form

This form is required to ensure that all the ethical issues have been considered and that the finalist has followed the policy.

Science Project Human/Animal Research Approval Form

This form certifies that a project involving the use of vertebrate animals, animal or human tissues, or the participation of human subjects, meets the standards required by Youth Science Foundation Canada (YSF). The signature of the student certifies that the rules of the YSF have been read, understood and followed at the level appropriate for this project. The signature of the Adult Supervisor certifies that the project meets the rules of YSF. The signature of the Scientific Supervisor, if applicable, certifies that appropriate professional supervision was provided and, if relevant, also meets the rules and safety regulations that govern the research activities at the institution where the research was carried out.

Name of student _____

Title of Project _____

This project involves: Use of Vertebrate Animals ___ Yes ___ No
 Animal or Human Tissue ___ Yes ___ No
 Participation of Humans ___ Yes ___ No

Declaration by the Student Researcher:

I declare that I have read the rules that relate to my project and that I understand them at a level that is appropriate. My project satisfies the rules of Youth Science Foundation Canada.

Signature _____

Date: _____ Phone: _____ Email: _____

Declaration by the Adult Supervisor:

I declare that I have read the rules of the YSF that relate to this project, and that all ethical and safety regulations have been satisfied.

Name (print) _____ Signature _____

Date: _____ Phone: _____ Email: _____

Declaration by the Scientific Supervisor:

I declare that I have read the rules of the YSF that relate to this project, that appropriate professional supervision has been provided, and that all ethical and safety regulations have been fulfilled.

Name (print) _____ Signature _____

Date: _____ Phone: _____ Email: _____