



Exhibitor Manual

This Manual was updated January, 2017

Introduction

The Waterloo-Wellington Science and Engineering Fair is a non-profit registered charity that operates the regional science fair. We are affiliated with Youth Science Canada and are entitled to send some of our best projects to the Canada-Wide Science Fair. Over the past years, several of our exhibitors have been part of Team Canada at the Intel International Science & Engineering Fair.

Use this manual while you are creating your project and preparing it for the fair so you will encounter fewer problems.

If you find errors in this manual, please bring them to our attention by emailing John Ritchie website-manager@wwsef.ca

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NOTE: Forms for Human & Animal use in projects and other downloadable Manuals are available on our website Fair Information page.

Eligibility

<p><u>To be eligible</u> for participation in the Waterloo-Wellington Science and Engineering Fair (WWSEF)</p> <p>An exhibitor must:</p> <ol style="list-style-type: none"> 1. Be under twenty-one years of age as of June 30 in the year of participation; 2. Be registered as a regular day student in a public, private or parochial school, or the equivalent, in Waterloo Region or Wellington County, or with the Upper Grand District School Board; 3. Be in grades seven to twelve, and 4. Be approved by the school as one of the projects within the "Maximum Number of Projects" for the school. 5. Home-schooled exhibitors should contact the Registrar for a ruling on their eligibility before beginning work. 	<p>In addition:</p> <ol style="list-style-type: none"> 6. Group exhibits with a maximum of two exhibitors may be entered and placed in the category of the senior member of the group. 7. An exhibitor, or group of exhibitors, may not exhibit more than one project each year. 8. An exhibit cannot be entered in more than one school science fair per season registered for competition leading to participation in the Waterloo-Wellington Science and Engineering Fair. 9. An exhibit cannot be entered in the Regional Fair for more than one year without significant changes.
<p><u>School Entries:</u> Schools of different sizes are allowed to apply for at least five but no more than twenty science fair entries, depending upon the number of categories within the school and the number of students in grades seven through twelve. See the registration page for details.</p> <p>Generally, the Registrar must receive application forms by the Friday prior to the March Break. Application forms received after this date may not be accepted.</p> <p>Please check the registration page for the exact date for this year.</p>	<p><u>Note:</u> With school eligibility ranging from five to twenty projects the total number of applications could exceed the limit that can be reasonably handled and still provide a meaningful experience for the students. As a result, the Waterloo-Wellington Science and Engineering Fair <u>reserves the right to change these limits without notice and to reduce the number of projects sent to the fair, on a pro-rated basis,</u> after the application forms have been received. Schools are advised to rank applications in advance to avoid difficult, and possibly embarrassing, last-minute decisions.</p>
<p><u>The Canada-Wide Science Fair (CWSF):</u> Students eligible for the WWSEF, and adhering to all of its rules and regulations, are automatically eligible for the CWSF. Some of the exhibitors participating in the WWSEF may be selected to attend the next CWSF. There is a maximum number of exhibitors who may be selected for the CWSF.</p>	<p><u>The International Science and Engineering Fair (ISEF):</u> Exhibitors who attend a Canada-Wide Science Fair may become eligible for participation in a future International Science and Engineering Fair. While at the Canada-Wide Science Fair, exhibitors receive all of the necessary information needed in regard to possible participation in the ISEF.</p> <p>Several exhibitors from the Waterloo-Wellington Science and Engineering Fair have been selected to represent Canada at the ISEF in the past.</p>

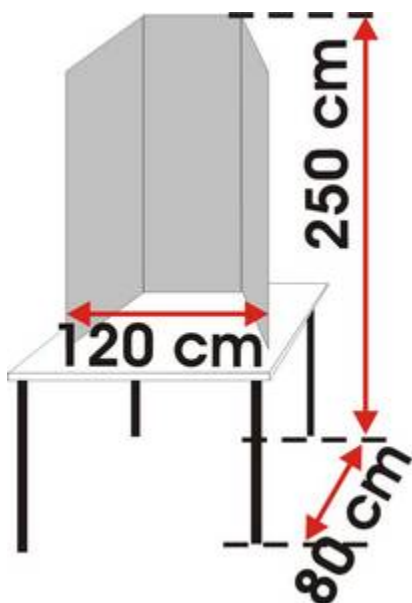
Rules and Regulations

All research projects will be checked during registration and those not meeting the regulations will need to be corrected before they are accepted for display and judging.

The rules and guidelines listed below are based on those used by Youth Science Canada at the CWSF.

There are also special rules if your research project involves animals or humans

Tip: If you are thinking of working with animals or humans check the special rules first, then, if you still want do the research, contact our Ethics Officer **before** doing a lot of work



I. Exhibits

1. Exhibits and accessories must not exceed 80 cm from front to back, 120 cm from side to side and 250 cm in height from the floor. All measurements must be made from the outermost points including framework and appendages and will be checked by the committee. Exhibits exceeding these dimensions will not be accepted.
2. Exhibits must be sturdy and self-supporting; adjacent walls may not be used for support. Moving parts must be firmly attached and approved for safety.
3. Glue all paper flat to the backboard, or tape all edges. Do not hang a collection of papers; put them in a binder.
4. One electrical outlet supplying AC110 volt 60 cycles will be supplied if requested during registration, but exhibitors should bring their own good quality (CSA approved) extension cord. No gas or water outlets will be available. Switches and cords must be the approved variety. Cell or battery-fed circuits should be safe in design and operation.
5. The exhibitor must supply all equipment except a display table.
6. Water may be available from sinks in the washroom near the exhibit hall. Bring your own pail to carry it and sponges to clean up.

II. General Safety

1. It is essential that safety be the prime consideration. Precautions must be taken to ensure that no serious personal injury, property damage or legal action could result.
2. Remove or otherwise protect all sharp edges or corners of prisms, mirrors, enclosures, glass and metal plates.
3. No compressed gas cylinders are allowed; partial vacuums will be assessed on site
4. Lengths of hoses or extension cords are to be kept to a minimum and placed out of the way to eliminate tripping hazards. Use tape for securing them.
5. Aisles and exits must not be obstructed.
6. Exhibits with potential hazards may be restricted to demonstration under conditions dictated by the Fair. Projects exhibited under these conditions must not be left unattended.
7. Remote controlled devices, flying devices and those launching projectiles are not to be activated except with the permission and direct supervision of fair officials.
8. Drugs (both over-the-counter and prescription), cleaners and solvents are not allowed.

III Fire Safety

1. Fire extinguishers of proper size and rating will be available in the exhibition area.
2. Combustible material must not be used near a heat source.
3. Open flames are not allowed, with one exception. If the use of an open flame is essential for the demonstration of a project, the flame may be used in the presence of judges, but only if satisfactory safeguards are provided. All flame-producing equipment (candles, torches, matches, etc.) must be stored by the safety inspectors at the front desk during the fair. Prior arrangements must be made for their use during judging.

IV. Chemical Safety

Toxic, corrosive or flammable chemicals are not allowed. The use of substitutes is mandatory. Common salt, for example, can be used to simulate ammonium nitrate; water can replace alcohol, ether, chloroform or other highly flammable liquids; and molasses can be used instead of petroleum products. When chemicals are simulated, they should be clearly labelled with the name of the substance they represent and the word "simulated". The judges evaluate work already done. Therefore, you do not need to demonstrate what you did exactly. They will not penalize a project for not having "real" chemicals present. Cleaning up spilled harmless substitutes is much simpler than toxic, corrosive or flammable ones.

Matching the Projects Fairly – Categories, Divisions & Types

FIRST

The Science fair projects are divided by Category into:

Junior Category: Grades 7 and 8.

Intermediate Category: Grades 9 and 10.

Senior Category: Grades 11 and 12

This is so that people of similar experience compete with each other.

SECOND The projects in each Category are put into one of four Divisions:

Biotechnology:

Biotechnology is the application of knowledge of biological systems to solve a problem, create a product or provide a service. Biotechnology projects will fall into one of these three subject fields:

Crop Development projects deal with plants that are involved in agricultural, horticultural or silviculture (forestry production). Projects in this area may investigate problems of herbicide tolerance, spacing, cultivation, irrigation, effect of soil variation, hybridization, etc

Animal Science projects pertain to animals involved in agriculture and aquaculture, those domesticated as pets, or for sport, as well as projects where humans are participating in wild animals' lives, perhaps through habitat revitalization, population management, or harvesting. All projects involving animals demand careful planning with respect to Youth Science Canada regulations.

Possible topics include enhancement of animal production, reproductive technologies, genetics and transgenics, animal health, housing, training and interactions

Microbial projects consider how microbials affect productivity in agriculture, horticulture and forestry. Possible topics include growth-promoting rhizobacteria, biological weed and fungal control, bio-fuels, etc

Engineering:

Any topic in applied science, using electricity and magnetism, robots, pulleys, gears, rocketry, solar energy, lasers, aeronautics, structures, chemical processes to achieve a purpose, development of computer hardware, software or applications, etc. are Engineering.

Life Science:

Projects dealing with living organisms, factors affecting growth, etc., whether biology or social science, are Life Science. These projects are more general in scope than biotechnology. Projects, which focus on the acquisition of knowledge about how something lives, should be registered as Life Science, not Biotechnology.

Physical and Mathematical Science:

Studies of chemical or physical phenomena, optics, colour and sound, radiation, comparison of similar products, corrosion, and studies in mathematics are examples of projects in this division. These projects are more general than engineering.

Note : Many projects contain elements of two or more divisions. The stated purpose or hypothesis of the project may be the best indicator of the exhibitor's thinking, and indicate into which division a project should be registered.

THIRD For each division there are three different types of project

An Experiment:

This is the most common type of project. A gold award project of this type should involve an original scientific experiment that recognizes and controls all significant variables and demonstrates excellent collection, analysis, and presentation of data. Significant positive findings are not essential to achieve a successful experiment. Design is more important than results

An Innovation:

This type of project would involve the development and evaluation of new devices, models, techniques or approaches in fields such as technology, engineering, and computers. A computer innovation may involve software or hardware. A gold award project should integrate several technologies, innovations, or designs; or construct an original system that will have commercial application or benefit society. It must demonstrate development and design based on sound understanding of scientific, engineering, or technological principles.

A Study:

This type of project involves the collection and analysis of data from other sources. Its intent is to reveal evidence of a fact or a situation of scientific interest. This could include cause and effect relationships, in-depth studies, or theoretical investigations of scientific data. A gold award exhibit in this area must demonstrate sound scientific techniques for data collection and show evidences of analysis with insight.

Note: If the exhibitor classifies the project as the wrong Type, no penalty will be assessed. The judges will assess the proper project Type so that the project will receive the fairest possible judging.

Notes on the distinctions between divisions:

Physical Science or Life Science?

A project examining the formation of acid rain would be Physical Science but one that investigates the consequential effect on micro-organisms and plants would be Life Science.

Physical Science or Life Science?

A project investigating the factors affecting bubble gum bubble size (time, brand, etc.) would be a Physical Science project, even though some factors to be considered (chewing and enzymes in saliva) are biotic. If the focus was on the effect of chewing and saliva as a digestive process, using gum as an indicator, it would be a Life Science project.

Physical Science or Engineering?

A project examining the variables involved in Bernoulli's Principle would be entered as Physical Science. Designing wings, sails or other devices, which use the principle, would be Engineering.

Measuring solar energy would be Physical Science whereas using it would be Engineering. Similarly, comparing the effectiveness of sunscreens would be a Physical Science project while formulating a new one would be Engineering. Comparing the properties of papers, even home-made, would be Physical Science while attempting to design a particular paper, or a new method for making the paper, would be Engineering.

Physical Science, Engineering or Life Science?

A project, which examines and/or compares the physical properties of materials, which absorb oil, would be placed in Physical Science.

A project, which developed a new material or a method, to clean up oil spills would be Engineering.

A project dealing with the effect of an oil spill on flora or fauna would be a Life Science project.

Biotechnology or Life Science?

Determining the optimum conditions for raising earthworms would be Life Science but designing a vermicarium would be Biotechnology.

A project, which examines the growth of weeds in a garden, would be Life Science, while one that measures the effects of weeding a garden, versus not weeding, would be Biotechnology.

Observing your dog's reaction to doorbell rings, telephone rings or smoke detector alarms would be Life Science, while training a dog to respond to the telephone to help a hard-of-hearing person, would be Biotechnology.

Regulations for Participation of Humans in Research

I. Statement of Ethics Review Requirements:

Youth Science Canada requires that all research involving human participants conducted as a project competing in the Canada-Wide Science Fair, or an affiliated Regional Science Fair, satisfy ethical and safety rules. This ensures that the safety and welfare of the participants as well as the researchers are considered and protected. The ethics review process **should** involve the exhibitor's supervisor, members of a bona fide research institution or hospital practiced in the ethics of human research, or the WWSEF Ethics Officer (see contacts page on the website), or the Ethics Committee of the Youth Science Canada. This will provide the researchers with an appreciation of the requirements and safeguards existing in law regarding experimentation in humans.

II. Ethics Review:

The WWSEF Ethics Officer (see contacts page on the website) invites inquiries regarding the ethics of any planned human (or animal) research project. The Ethics Officer will assist in the development of an acceptable research design and also reviews all WWSEF projects entered in the Canada-Wide Science Fair to ensure they are ethically acceptable and thus eligible for competition.

Note: Projects dealing with forensic science topics must preserve the anonymity of any human victims, and project displays must avoid sensational or gratuitous, macabre images.

Informed Consent requirements differ for low-risk and significant-risk projects. Further, as a management tool, teachers may implement Implied Consent for a number of low-risk projects.

III. Definitions of Human Research, Researcher, and Participant.

Human research refers to any project that involves the generation of data about persons beyond that which is necessary for the person's well being. This includes non-invasive methods such as: surveys, interviews, observations of, or field work with, individuals, administration of psychometric and other tests, examination of records, and exercise testing. It may also involve invasive procedures, such as blood sampling, tissue sampling, and insertion of cannulae.

A researcher is a student data or information collector, or assistant, involved in research activities involving humans.

A participant is a person, who by virtue of his/her participation in a data-generating situation or activity, is a source of primary data, and bears any risk as the research is being carried out.

IV. The Approval Application Form (elsewhere on the website)

Tip: If you are thinking of doing anything involving humans contact the Ethics Officer (see contacts page on the website) **immediately before you waste time on something that can't be accepted at the fair.**

Supervising teachers are responsible for ensuring the safe and ethical operation of projects dealing with human subjects. There is an Application Form for Review of Participation of Humans in Research (see below), which needs to be completed and approved **prior to the commencement of any experimentation**. If the proposed project is Low Risk the teacher can make decision regarding the ethics or refer the proposal to the WWSEF Ethics Officer. If the proposed project is Significant Risk the proposal must be sent to the WWSEF Ethics Officer. If there is any doubt in regard to the ethics of a proposed project this form should be completed and forwarded to the Ethics Officer (see contacts page on the website). The information will be checked and feedback will be provided as quickly as possible. Projects involving human participants that are deemed to be unethical may be disqualified.

The following instructions will provide assistance in completing the form as well as providing additional guidelines for conducting research involving humans.

1. **Student Researcher(s):** The student researcher(s) will collect the data. **All** students involved must be listed, even if assisting the principal investigators.
2. **Title of Project:** The title of project should be succinct, yet clearly describe the focus of the project.
3. **Supervising Teacher:** The supervising teacher supervises and **accepts responsibility** for the safe and ethical conduct of the project. The name, school and school telephone number of the supervising teacher must be given. If a non-teacher adult is supervising then the equivalent information and headings should be inserted.
4. **Purpose and General Procedure:** The purpose describes the reason for conducting the project, and briefly outlines literature that has shaped the project proposal. The general procedure to be used in the research is to be outlined.
5. **Participants and Procedural Details:** The participants who will be involved should be described with respect to age range, sex, numbers required and other identifying characteristics. Special consideration is needed for the involvement of children or other vulnerable participants. Describe the source of the participants and the manner in which they will be recruited. Attach a copy of any covering letter. Studies involving students and/or teachers often require the explicit permission of Board of Education officials. Researchers are reminded of the potential for certain participant groups to experience or perceive undue pressure to volunteer as research participants, and are to minimize this perception. Members of distinct cultural groups, legally incompetent people and children are examples of special populations that require special effort to ensure that informed consent is being given. Include details of any compensation for participation in the study. It should not be so high as to induce a person to volunteer, or cause a person to continue in a study past the point at which he/she would otherwise stop. Describe procedures in detail and in terms that can be understood by reviewers without specialized knowledge of the research area. For invasive procedures, indicate awareness of, and willingness to follow universal precautions for proper handling of blood and body fluids. These guidelines are widely available. If invasive procedures are used, give the name and title of the person conducting these procedures, as well as information about his/her training. When materials are to be ingested, give information on amounts, frequency and possible side effects. Drugs, whether prescription or otherwise, are not to be used. Studies involving exercise testing must include a description of all tests, a copy of the medical screening

form used to determine that the potential participants are in good health, and a statement about exclusion criteria. Describe arrangements for medical supervision of the testing. The 1986 American College of Sports Medicine Guidelines for Exercise Testing chart is a common guideline. For non-invasive studies, attach a copy of all test materials and indicate the time required for participation in the study.

6. **Risks and Benefits to Participants:** A complete and clear description of all known or anticipated risks and benefits of participation, whether physiological, psychological, economic and/or social in nature must be provided. Indicate how risk will be minimized to the extent reasonably possible. In cases of tasks involving psychological risk, indicate preparations to deal with any negative impact attributable to participation in the study. All studies must have some benefit in order to justify their conduct. Thus, a description of known and/or potential benefits to the participants, and/or society, is required.
7. **Informed Consent:** Participants must give informed consent to participate in any science fair project before it begins, and this is normally obtained in writing. Parental approval is required for the participation of minors as research subjects. Details which must appear in the consent letter to ensure the participants have been properly informed and thus given free consent, without pressure to participate include:
 - a. name(s) of investigator(s), school, supervising teacher, telephone number;
 - b. description of the procedures;
 - c. description of risks and benefits from participating;
 - d. details of time commitment;
 - e. details of any plan to re-contact participants;
 - f. details of remuneration;
 - g. plans to ensure confidentiality of data;
 - h. details about their right to withdraw at any time without fear of reprisal;
 - i. information about how to communicate a decision to withdraw from the study, and
 - j. a statement that the project has been reviewed and received ethics approval from whatever authority was consulted.
 - k. **Note:** There may be circumstances under which written, informed consent cannot be reasonably collected. For surveys, consent may be assumed by the completion of the survey. In these circumstances a detailed explanatory letter should accompany the questionnaire, and provide identical information as listed above.
8. **Anonymity of Participants:** The confidentiality and anonymity of all participants must be maintained. Use coded systems of references; no identifying information may be used. Also, appropriate safeguards for storage and access to data, or destruction of data, must be planned.
9. **Feedback to Participants:** Feedback of the findings to the participants, their parents and/or teachers should be part of the plan. If deception is used, provide details about the nature of the deception and why it was needed. Participants in such a study must receive adequate and immediate debriefing at the end of their participation. This debriefing, provided orally and as a written handout, should tell why the deception was required, offer the opportunity to answer any questions and then seek their written consent to use all information obtained from them.
10. **Additional Attachments:** Sample letters of consent, parent permission letters and pre-exercise medical screening forms should be included as appendices to the form.

Appreciation and acknowledgment for assistance in the development of these guidelines goes to Dr. Susan Sykes, Office of Human Research at the University of Waterloo, Dr. Carl L. von Baeyer, Professor of Psychology at the University of Saskatchewan, and Dr. Bill Ross, Faculty of Medicine at the University of Ottawa.

Regulations for Participation of Humans in Research

Low Risk

1. Introduction

A *Low Risk Project* - involves conditions where the risks of harm are not greater or more likely than those encountered in everyday life. Here is the short version:

- Some surveys
- Some food and drink projects
- Some caffeinated beverage projects
- Some absorption through the skin projects
- Some exercise projects

Section 3 below has a detailed discussion of each of these. A project is not Low Risk just because you think no one will be harmed. It is a project that fits one of these five criteria.

All other projects involving humans are to be treated as *Significant Risk Projects*, and must follow *Participation of Humans in Research – Significant Risk* regulations.

Low-risk projects can receive individual approval from teachers, or can be approved by the WWSEF Ethics Officer.

Teachers & students seeking parent permission for participation can do so one project at a time through individual Informed Consent Information Letters and Permission Letters, or through a general Implied Consent Information Letter and Implied Consent Permission form. See below.

Complete and submit Form 4.1A to your teacher or the WWSEF Ethics Officer for approval before beginning research on human subjects.

2. Definitions

Human Research refers to any project that involves the generation of data about persons.

A Student Researcher is one who takes data or collects information or assists in research activities involving humans.

A Participant is a person who takes part in a project or activity and so is a source of primary data, and bears any risk as the research is being carried out.

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 Youth Science Canada policy is followed. The Adult Supervisor is responsible for ensuring that the student's research is eligible for entry into the CWSF and related or other events sponsored by Youth Science Canada. Every project involving the participation of humans or the use of animals requires an Adult Supervisor.

3. Low Risk Projects

Surveys of Attitudes and Beliefs, Skill Tests, or Observations of Behaviour

These are generally Low Risk Projects. Be aware, however, that not all survey/skill testing studies are automatically low risk. For example, a project to measure the Body Mass Index of a class could cause considerable discomfort to students who perceive themselves to be overweight. Skill testing could be a difficult experience for a participant who scores well below the group average. It is the responsibility of the adult supervisor to ensure that participants are not put at risk, either physically or emotionally. Mechanisms such as discussion and debriefing should be used to minimize any remaining risk.

Food and Drink Projects

Projects involving the consumption of food or drink are considered Low Risk when they are designed only to assess the characteristics of a common food. This is defined as "any article manufactured, sold or represented for use as food or drink for human beings".

The foods to be considered are basic or common foods that contain permitted additives not exceeding Recommended Daily Intake (RDI) guidelines normally associated with those foods.

Evaluation of foods in youth (under the age of 19 years) must only involve participants who are not taking prescription medications, to minimize the risk of drug-food interactions.

Some provinces have put in place rules that govern ingestion of food by the public, and these take precedence over the rules in this section. Students doing ingestion projects must know the applicable procedures required for the safe handling of food.

Caffeinated Drinks

The daily limits of caffeine intake for Science Fair Projects are:

200 mg caffeine per day for subjects aged 13 and older.

85 mg caffeine per day for subjects aged 10 to 12.

No Projects involving caffeinated foods or drinks permitted in subjects under 10 years of age.

Caffeine is found in soft drinks, coffee, tea, iced coffee, energy drinks, and many other food and drink products. It is the responsibility of the student researcher and the adult supervisor to ensure that the above daily limits are not exceeded in any Science Fair Project. The *Youth Science Canada* website contains links and [background information on Caffeine](#) that should be referenced before undertaking any project involving caffeinated drinks. Health Canada has expressed concerns about excessive intake of caffeine by Canadians, especially children and youth. Thus the ingestion of caffeine in Science Fair Projects must be closely monitored and kept within reasonable limits according to Health Canada recommendations.

Absorption through the skin

Projects that involve absorption through the skin must satisfy the rules for a Low Risk project and involve a risk of harm no greater than that encountered in everyday life. Thus a project comparing different ways of removing bacteria using different brands of hand sanitizer is legal. A project that involves putting benzene on the skin is not.

Exercise Testing

All Exercise Testing beyond normal every day activities is considered Significant Risk, and must be carried out in accordance with those regulations.

4. Informed Consent

Human participants must be assured that they are safe, that they are treated with respect and dignity, and that the information they provide will be kept confidential. These ethical safeguards are primarily the responsibility of the science fair student researchers and their supervisors. The process of providing this information is called "Informed Consent".

The Adult Supervisor is responsible for supervision of ethical as well as scientific aspects of a Low Risk Project, and also sign Form 4.1A Human Participants – Low Risk ensuring that the essential elements of ethics review: consent, confidentiality and the right to withdraw are considered.

Participants must give informed consent before taking part in any science fair project. The project and their participation in it have to be explained to children in words they will understand. It must also be explained to children that they do not have to participate unless they want to, even if their parents have approved. Agreement to participate (assent) must be documented for each participant. Children over 9 years can be invited to indicate their assent by co-signing the same form their parent signed. Younger children can provide assent orally but the researcher must document it.

For any project other than those that are clearly of very low risk, if the participant is under the Age of Majority then the parent or guardian must also sign the Informed Consent Permission Form. If parents have been alerted that very low risk and brief projects are being conducted and have had the opportunity to have questions answered and are satisfied, **written consent may not be required.**

In the case of activities that are clearly of very low risk such as some surveys, or such as having participants listen to music, Informed Consent may be assumed by the simple act of agreeing to participate. *The parents or guardians must still be provided beforehand with the Implied Consent Information Letter, even though their signed informed consent will not be sought. The teacher or other supervising adult is responsible for deciding if signed Informed Consent is required for these types of projects or if Implied Consent is sufficient.*

It is sufficient in these cases to send one Implied Consent Information Letter to parents to cover several low-risk projects, inviting questions.

Samples can be found in the Forms & Samples section of the Fair Information page of our website.

Signed Informed Consent Forms are mandatory in all cases for food and drink projects, because of the risk of allergic reactions unknown to the teacher.

Informed Consent Information Letter

Answers to the questions 1) to 11) must appear in the *Information Letter* to ensure that the participants have been properly informed of all appropriate ethical issues:

1. What are the name(s) of the investigator(s); school; project title; the Adult Supervisor's name, email address and telephone number.
2. What is the purpose of this research?
3. What are the benefits to the participant from participating?
4. What are the risks to the participant from participating?
5. What time commitment is required?
6. No remuneration or reward will be paid.
7. How will the confidentiality of the data be guaranteed?
8. Is the following clearly explained in the Letter of Information? *The participant has the right to withdraw at any time for any reason without consequences of any kind.*
9. How does the participant communicate a decision to withdraw from the study?
10. How will the results of the research be communicated to the participant?
11. Are there any other issues that need to be included in the *Letter of Information*?

A sample for Informed Consent Information Letter is available in the Forms & Samples section of the Fair Information page of our website.

Informed Consent Permission Form

The Informed Consent Permission Form is a short document that contains:

1. The printed name and signature of the Participant.
2. The printed name and signature of the person obtaining the Informed Consent.
3. The signature of a parent or guardian.
4. A statement that the Participant has received and understood the *Informed Consent Information Letter*.
5. The date.

A sample *Informed Consent Permission Form* is available in the **Forms & Samples** section of the **Fair Information** page of our website.

Confidentiality

The confidentiality and anonymity of all participants must be maintained. Use coded systems of references; no identifying information may be used. Appropriate safeguards for storage and access to data must be planned. The date the data will be destroyed must be given.

5. Implied Consent

In situations where a teacher is facilitating several low-risk projects, they may choose to use Implied Consent. In this instances, a general Information Letter about projects in general is to be provided to parents alerting them that their children may be invited to participate in a science fair project that the teacher has deemed to be very low risk. The teacher could list potential projects by topic or title. Should parents have questions about the project they can contact the teacher.

6. Display

The project display may include pictures of participants only if prior permission has been obtained in writing.

Regulations for Participation of Humans in Research Significant Risk

1. Introduction

All projects with human participants that are not Low Risk are, by definition, Significant Risk.

Ethics Review Requirements

All Significant Risk projects need to be approved by the WWSEF Ethics Officer or by a Scientific Review Board in an institution that conducts research on human subjects.

Complete and submit Form 4.1B to the WWSEF Ethics Officer for approval before beginning research on human subjects.

2. Definitions

Human Research refers to any project that involves the generation of data about persons.

A Student Researcher is one who takes data or collects information or assists in research activities involving humans.

A Participant is a person who takes part in a project or activity and so is a source of primary data, and bears any risk as the research is being carried out.

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 Youth Science Canada policy is followed. The Adult Supervisor is responsible for ensuring that the student's research is eligible for entry into the CWSF and related or other events sponsored by Youth Science Canada. Every project involving the participation of humans or the use of animals requires an Adult Supervisor.

3. Informed Consent

Human participants must be assured that they are safe, that they are treated with respect and dignity, and that the information they provide will be kept confidential. These ethical safeguards are primarily the responsibility of the science fair student researchers and their supervisors. The process of providing this information is called "Informed Consent".

The Adult Supervisor is responsible for supervision of ethical as well as scientific aspects of a Significant Risk Project, and also sign Form 4.1B Human Participants – Significant Risk ensuring that the essential elements of ethics review: consent, confidentiality and the right to withdraw are considered.

Participants must give informed consent before taking part in any science fair project. The project and their participation in it have to be explained to children in words they will understand. It must also be explained to children that they do not have to participate unless they want to, even if their parents have approved. Agreement to participate (assent) must be documented for each participant. Children over 9 years can be invited to indicate their assent by co-signing the same form their parent signed. Younger children can provide assent orally but the researcher must document it.

For any Significant Risk project, if the participant is under the Age of Majority then the parent or guardian must also sign the Informed Consent Permission Form.

Samples can be found in the Forms & Samples section of the Fair Information page of our website.

Signed Informed Consent Forms are mandatory in all cases for food and drink projects, because of the risk of allergic reactions unknown to the teacher.

Informed Consent Information Letter (A sample for *Informed Consent Information Letter* is available in the Forms & Samples section of the Fair Information page of our website.)

Answers to the questions 1) to 11) must appear in the *Information Letter* to ensure that the participants have been properly informed of all appropriate ethical issues:

1. What are the name(s) of the investigator(s); school; project title; the Adult Supervisor's name, email address and telephone number.
2. What is the purpose of this research?
3. What are the benefits to the participant from participating?
4. What are the risks to the participant from participating?
5. What time commitment is required?
6. No remuneration or reward will be paid.
7. How will the confidentiality of the data be guaranteed?
8. Is the following clearly explained in the Letter of Information? *The participant has the right to withdraw at any time for any reason without consequences of any kind.*
9. How does the participant communicate a decision to withdraw from the study?
10. How will the results of the research be communicated to the participant?
11. Are there any other issues that need to be included in the *Letter of Information*?

Informed Consent Permission Form (A sample *Informed Consent Permission Form* is available in the Forms & Samples section of the Fair Information page of our website.)

The Informed Consent Permission Form is a short document that contains:

1. The printed name and signature of the Participant.
2. The printed name and signature of the person obtaining the Informed Consent.
3. The signature of a parent or guardian.
4. A statement that the Participant has received and understood the *Informed Consent - Letter of Information*.
5. The date.

Confidentiality

The confidentiality and anonymity of all participants must be maintained. Use coded systems of references; no identifying information may be used. Appropriate safeguards for storage and access to data must be planned. The date the data will be destroyed must be given.

4. Display

The project display may include pictures of participants only if prior permission has been obtained in writing.

Regulations for Animals in Research

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.

Preface

Regulations pertaining to projects involving animals and the display of those projects reflect strict standards. While students' investigations of biological processes are to be encouraged, they are subject to the same laws, ethics, and regulations as any other individual researching this field. In the **Criminal Code of Canada** and the **Animals for Research Act of Ontario**, all vertebrates are afforded protection. Also, schools and science fairs are explicitly included in the definition of "research facility" in Ontario.

The regulations below are written in view of these laws. The display of a project is further restricted by Youth Science Canada in view of the need to maintain a positive public image towards science fairs. The restriction is due in part to a lack of essential expertise on the part of the student investigators and their immediate supervisors. There is also a desire to maximize the efficiency of animal use and to impress this on the students, especially regarding scientific merit

Use of Invertebrate Animals in Research

Definition

An invertebrate is an animal lacking a backbone, such as an arthropod, mollusc, annelid, insect etc. Invertebrates comprise nearly 95% of animal species and about 30 different phyla. Invertebrates have small nervous systems, consisting of many small brains (ganglia). **Cephalopods (squid, octopi) have large - vertebrate-like central nervous systems and are treated like vertebrates.**

Regulation

Exhibitors may do experiments on invertebrate animals.

WWSEF reserves the right to disallow any project involving invertebrate animals that is of questionable scientific or educational value, or is judged to be unethical.

The Institute for Laboratory Animal Research (USA) has published a pamphlet listing 10 principles that define the ethical use of animals in a school or science fair setting. Youth Science Canada endorses and promotes these principles. Excerpts from the pamphlet are available in the Resources section of the Fair Information page of our website.

Use of Vertebrate Animals in Research

Definition

Animals with a backbone or spinal column, including mammals, birds, reptiles, amphibians and fishes. Cephalopods are invertebrates with large, vertebrate-like central nervous systems. This policy applies to vertebrates and cephalopods.

Canadian Council on Animal Care (CCAC)

The use of animals in experimental research and the associated care of animals is subject to the requirements of CCAC.

Regulation

All research involving animals is to be screened by a committee that is cognizant of current regulations. If such a committee is not readily available, or is unsure of certain aspects of an idea, please write or call our Ethics Officer (see contacts page on the website). Your request will be passed on to an appropriate authority for guidance and suggestions.

Form 4.1 C must be completed for every project that involves vertebrates or cephalopods, their embryos or their issue and submitted to the WWSEF Ethics Officer for approval before experimentation begins.

Vertebrate animals (birds, fish, mammals, reptiles, amphibians), and cephalopods (squids, octopi) are not to be used in any active experiments, which may be deleterious to the health, comfort or physical integrity of the animals. This permits observation of wild animals, animals in zoological parks, farm animals and pets. Only animals acquired from biological supply houses may be used in "experiments". Animals from pet stores or from one's own breeding program cannot be used for these purposes.

1. Observation of pets, farm animals, animals in zoos and aquaria and wild animals is permitted. 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.
2. Behavioural experiments with positive rewards are permissible only if the animal is not placed in a stress situation. 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).
3. Studies of embryos are similarly 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 normal incubation.
4. Cells and animal parts (including organs, tissues, plasma or serum) purchased or acquired from biological supply houses or research facilities may be used in science fair projects. Evidence of the source of the materials (e.g. bill of sale) must be available at the display.
5. The acquisition of animal parts should involve either the services of biological supply houses or research facilities, or involve salvage from sources where the animal has been killed for other legitimate purposes in a legal and humane manner. Salvage from found carcasses (e.g. road kills) is discouraged due to serious health risks. If the acquisition involves salvage from a research project, then the disposition to the science fair project must be part of the original research proposal, and such disposition must have been approved by the Research Committee or the Animal Care Committee of the institution involved. Reference to the original project should be made on the science project. If the acquisition involves salvage from the food industry, then the source must be acknowledged. If the acquisition involves hunting, fishing or trapping, then those activities must be done in accordance with prevailing regulations, and precautions must be taken to ensure the safety of the student(s). The taking of animals other than for food, without explicit approval, can constitute cruelty. Permits for research are available from conservation authorities.
6. Biological experimentation is subject to legal restrictions including, among others:
 - Criminal Code of Canada, Section 446, Cruelty to Animals;
 - Health of Animals Act, Bill C-66;
 - Animals for Research Act (Ontario), and
 - Guidelines of the Canadian Council on Animal Care and Youth Science Canada.

The Institute for Laboratory Animal Research (USA) has published a pamphlet listing 10 principles that define the ethical use of animals in a school or science fair setting. Youth Science Canada endorses and promotes these principles.

Display of Animals and Animal Parts:

Students working on biological projects may involve animals as outlined above. The display of the project is to be a report of completed work, and thus further restrictions are imposed. Also, science fair organizers should try to reduce the potential for adverse reaction from visitors and other exhibitors.

1. Live microorganisms and vertebrate or non-vertebrate animals shall not be included in the display, although appropriate photographs may be available in the report.
2. The only parts of vertebrate animals that may be displayed are those that are either naturally shed by an animal or parts properly prepared and preserved. Soft tissue specimens are not acceptable if they are preserved in formaldehyde, a dangerous chemical excluded under the chemical safety sections of these guidelines. Sealed tissue samples on microscope slides are permissible. Thus, porcupine quills (safely contained), shed snake skin, feathers, tanned pelts and hides, antlers, hair samples, skeletons and skeletal parts are permissible, while organ and tissue samples are not. However, photos, videos or slides of organ and tissue samples may be made available for viewing upon request but are not permitted to be placed on display.