BASEF

Bay Area Science & Engineering Fair

sponsored by The Ontario Trillium Foundation

THE ONTARIO TRILLIUM FOUNDATION

LA FONDATION TRILLIUM DE L'ONTARIO

BASEF gratefully acknowledges the financial support of the Ontario Trillium Foundation, an agency of the Ministry of Tourism, Culture and Recreation. The Foundation receives annually $100 million in government funding through Ontario's charity casino initiative. It provides grants to eligible charitable and not-for-profit organizations in the arts, culture, sports, recreation, environment and social service sectors.

TEACHER'S HANDBOOK

Revision – Jan. 27, 2003

"To encourage young people in science, engineering and technology."

The 2003 Bay Area Science & Engineering Fair
April 2-5 2003 at McMaster University

General information: *http://basef.mcmaster.ca/*

Registration information: *http://basef.mcmaster.ca/2003/registration.shtml*
To download this Handbook: *http://basef.mcmaster.ca/2003/teachers*

Calendar

April 2, 2003	-	**Project Setup, 4:00 p.m. to 8:00 p.m.**
April 3, 2003	-	**Judging without students, 8:00 a.m. to 12 noon** **Judging with students, 1:00 p.m. to 4:00 p.m.**
April 4, 2003	-	**Activity Day, 8:00 a.m. to 4:00 p.m.**
April 5, 2003	-	**Public Viewing, 10:00 a.m. to 12 noon** **Awards Ceremony, 1:30 p.m. to 3:30 p.m.**

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1.0 Calendar

Following are some of the more important dates. Detailed schedules for the fair days will be made available in early 2003.

Project Registration	Feb. 12 – Mar. 10
Judges Registration	Jan. 1 – Apr. 1
BASEF at McMaster University	Apr. 2 – 5
Canada-Wide Science Fair 2003	May 10 — 18
Intel International Science and Engineering Fair 2003	May 11 – 17

2.0 Project Registration

While it is true that BASEF uses "on-line registration", such a simple statement is perhaps misleading. There are in fact several stages to the registration process, one of which is to fill out our on-line form (between Wed. Feb. 12 to Wed. Mar. 10). We suggest that you review the eight steps outlined below as soon as you can so that you understand what's required well in advance of the actual on-line registration period.

Please note:

- you *must* fill out the Scientific Review Forms described in step 2; we recommend that you begin this step as soon as possible.
- Steps 3, 4, and 5 can only be done during the on-line registration period (Wed. Feb. 12 to Wed. Mar. 10).

Step 1 - Print & Fill Out Rough Copy of Registration Form

Print and fill out a rough copy of the registration form. Use of this draft form will help you make sure that you have all of the information that you need for the official entry form. Once you have all of the required information, have your teacher or sponsor review it before filling out the on-line form (step 2). Please check for spelling and grammar -- the information that you submit will be published in the directory as-is.

The rough copy registration form can be obtained online near the start of Registration.

Step 2 - Print & Fill Out Required Scientific Review Forms

The relevant scientific-review forms must be filled out and submitted before the end of the registration period. Links to the forms (which are in Adobe Acrobat format) are found on the Project Rules & Regulations page. Junior projects use the YSF forms. Intermediate and senior projects use the IISEF forms.

Step 3 - Fill Out Official On-line Registration

Once you have the rough copy of the form filled out and reviewed, you're ready to fill out the official registration on-line. When done, please make note of your registration id and password; you will need it for step 3.

Note that only *one* registration form is to be filled out for each project (not one per student).

The on-line registration form will be available from Wed Feb. 12 to Wed. Mar. 10.

Step 4 - Print Record of Registration

Each student and the teacher/sponsor should have a printed copy of the Record of Registration.

Did you see any mistakes on your registration form? Do you want to make changes? See step 9 below.

Step 5 - Print & Fill Out Approval Form

It is imperative that each student gets his/her parents/guardian and school-sponsor signature on the entry form.

The permission form will be available after the start of the registration process

Step 6 - Fax Registration Forms

Before the end of the registration period, fax all of your registration forms (all applicable scientific-review forms from step 2 and your approval form from step 5) to:

BASEF 2003 Registration
905-560-0046

Step 7 - Print Your To-do Checklist

Here, as a final reminder of what needs to be done for a complete registration, is a to-do list for your project registration.

To Do . . .

- ☐ Print and complete the BASEF 2003 draft registration form (*step 1*)
- ☐ Complete the Official BASEF 2003 Registration form on-line (*step 3*)
- ☐ Fax the completed Parent / Guardian & School Sponsor Approval form (*step 5*) and the applicable Scientific-Review forms (*step 2*). The fax number is 905-560-0046. Please fax all forms together, as early as possible within the registration period.
- ☐ Bring your completed Safety Check List (*step 8*) with you to the fair, and keep it with your project.
- ☐ Keep your Record of Registration (*step 4*), and give your school sponsor a copy.
- ☐ Bring your printed Record of Registration (*step 4*) to the on-site Registration Desk upon arrival at the fair to setup your project on Wednesday April 2 (after 4PM).

NB You can view or edit your project registration at any time during the registration period (12:00 Noon Wednesday February 12 to 12:00 Noon Wednesday March 10). See step 8 below.

Step 8 - Print & Fill Out Safety Checklist

You will need to complete the Safety Checklist, bring it to the fair, and keep it with your project.

The safety checklist will be available in January.

Step 9 - Optional: Make Changes/Corrections to Registration Form

In order to make changes you will need your Registration Number and Password (printed on your Record of Registration) handy. Note that the date you are considered to have registered will be changed each time you modify your registration; this may affect your choice of activities (priority for some activities may be assigned by registration date).

After you have made any changes, be sure to print out a new Record of Registration (step 3).

Unavailable until start of registration period.

Confirmation of Acceptance

You will receive a copy of your registration information via email if you include your address on the registration form. This does not count as your confirmation of acceptance to the fair; it simply confirms for you that your information has been received.

You will receive your final confirmation of acceptance through your school during the week of March 17th.

3.0 Projects

3.1 Projects - Levels & Divisions

3.1.1 Contents

1. Levels
2. Divisions
3. Classifying Your Project

3.1.1.1 Levels

Student compete primarily with others in their own level, although judging for some awards (e.g. trip awards, best in division) is done across levels. Note that students working in pairs must both be in the same level.

Junior	Grades 7 & 8
Intermediate	Grades 9 & 10
Senior	Grades 11 - OAC

3.1.1.2 Divisions

Projects must be entered in one of the following divisions. If you are unsure as to the division into which the project should be submitted, either choose the nearest fit or contact the chief judge (basef.judging@mcmaster.ca). Note that the Chief Judge may recommend a change of division to allow for the fairest adjudication of the students' work.

Life Science

A **Life Science** project examines some aspect of the life or lifestyle of an organism.
Life Science projects include botany and zoology, as well as psychology and kinesiology.
Examining plant growth, animal behaviour, human perception or the mechanics of human movement are examples of Life Science. Some phenomenon, such as digestion, are both Life Science and Physical Science. To determine the best placement, consider whether the exhibitor's intent was to study the chemistry of the process, or the role of the process in the life of the animal (eating, production of enzymes, handling of waste, etc.) Does the exhibitor's view of the problem extend to include the organism?

Biotechnology

A **Biotechnology** project 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 three subject fields: crop development, animal science, and microbials.
Biotechnology includes crop development, animal science, and microbial science.
Within Biotechnology, crop development underscores that the interest is not in just plants, but in plants which are involved in an agricultural, horticultural or silvicultural (forestry) production. Projects in this area may investigate problems of herbicide tolerance, spacing, cultivation, irrigation, effect of soil variation, hybridization, etc.

Animal science projects would 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 YSF Canada Regulations. Study-type projects should be considered by pupils with an interest in animal science. Possible topics include enhancement of animal production, reproductive technologies, genetics and transgenics, animal health, housing, training and interactions.

Microbial projects consider how microbials are affecting productivity in agriculture, horticulture and forestry. Possible topics include plant growth-promoting rhizobacteria, biological weed and fungal control, bio-fuel cells, etc.

Projects which focus on the acquisition of knowledge about how something lives should be categorized as Life Science, not Biotechnology. The distinction is similar to that between Physical Science projects and Engineering projects. In both cases projects in the latter division deal with an application of knowledge to solve a problem. Often the discriminating factor is in the student's conceptualization of the project. There will be situations where the choice is not clear.

Physical Science

A **Physical Science** project studies an abiotic phenomenon in order to understand the relation of identified factors, perhaps including a cause and effect relationship.

Physical Science projects study the relationship of factors in fields such as physics, chemistry, astronomy, geology, oceanography, mathematics and meteorology.

Some projects entered as physical science may be more accurately entered as engineering. For example, experimenting to find "Which Materials Absorb Oil Best?" is only physical science, although there is an implied application in the work, such that it is almost "Which Materials Can Absorb Oil From an Oil Spill?" Determining the exhibitors intent should help clarify. Comparison testing of products, as it is descriptive, would be included.

Engineering

An **Engineering** project applies physical science knowledge to solve a problem or achieve a purpose.

Engineering projects investigate the utility of innovations and inventions.

Although a complete engineering project will include an outline of the need, the development of the innovation and some work on introducing the innovation to the community, many projects focus on just the development phase.

Engineering projects can focus on a new process, or a new product. A study of Bernoulli's principle would be Physical Science, while the application of such a principle to aerodynamics and wing design, would be Engineering.

Mathematics and Computer Science

A **Mathematics and Computer Science** project is a project that may involve computer design, programming,

languages, techniques and general operations. If mathematical in nature, it involves calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability and other topics in pure and applied mathematics.

Mathematics projects generally consist of the development of formal logical systems or various numerical and algebraic computations, and the application of these principles -- calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability. Computer Science projects involve the study and development of computer hardware, software engineering, Internet networking and communications, graphics (including human interface), simulations, virtual reality or computational science (including data structures, encryption, coding and information theory).

Projects that use computers just to store and manipulate data should be exhibited in the division suggested by the nature of the data. If the focus is an innovative way to use the computer or mathematical model, then the data is secondary and the project should be entered in Mathematics and Computer Science.

Topics in this category may include:

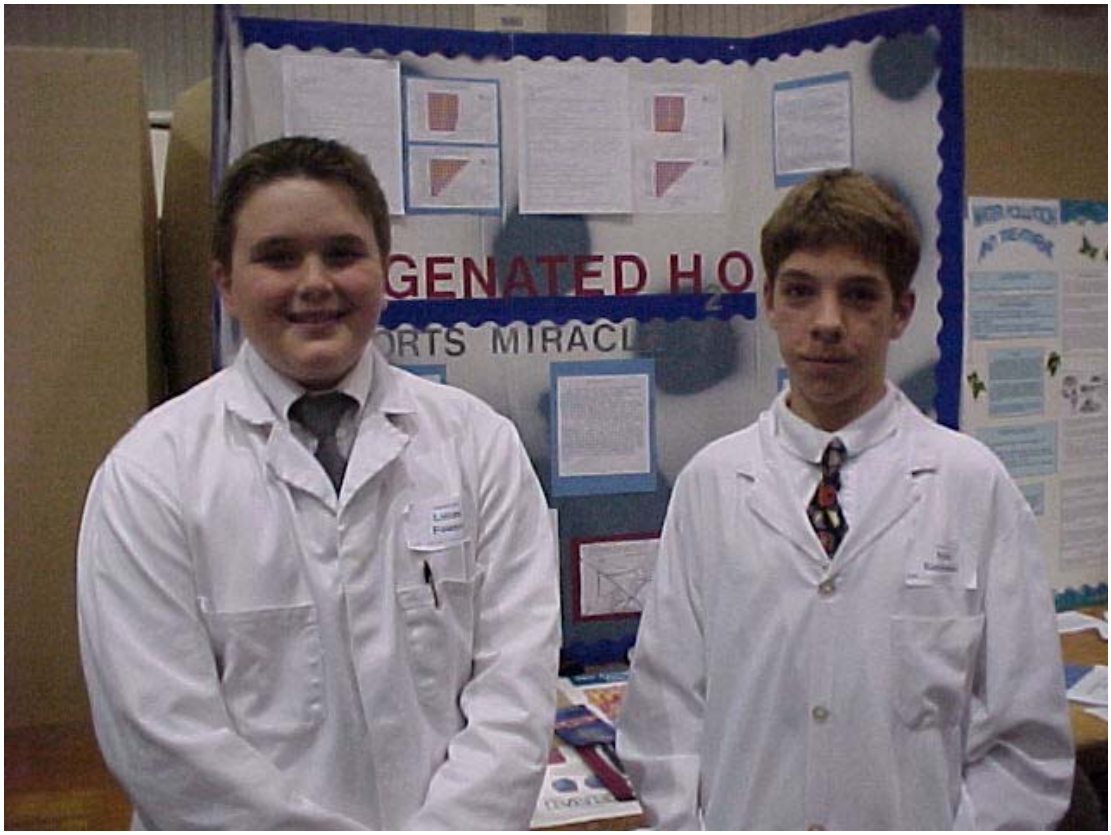
1. writing an original program and comparing it to an existing one,
2. developing a new language,
3. investigating the properties of a mathematical relationship,
4. Calculate the average distance to a McDonald's.

Earth and Environmental Science

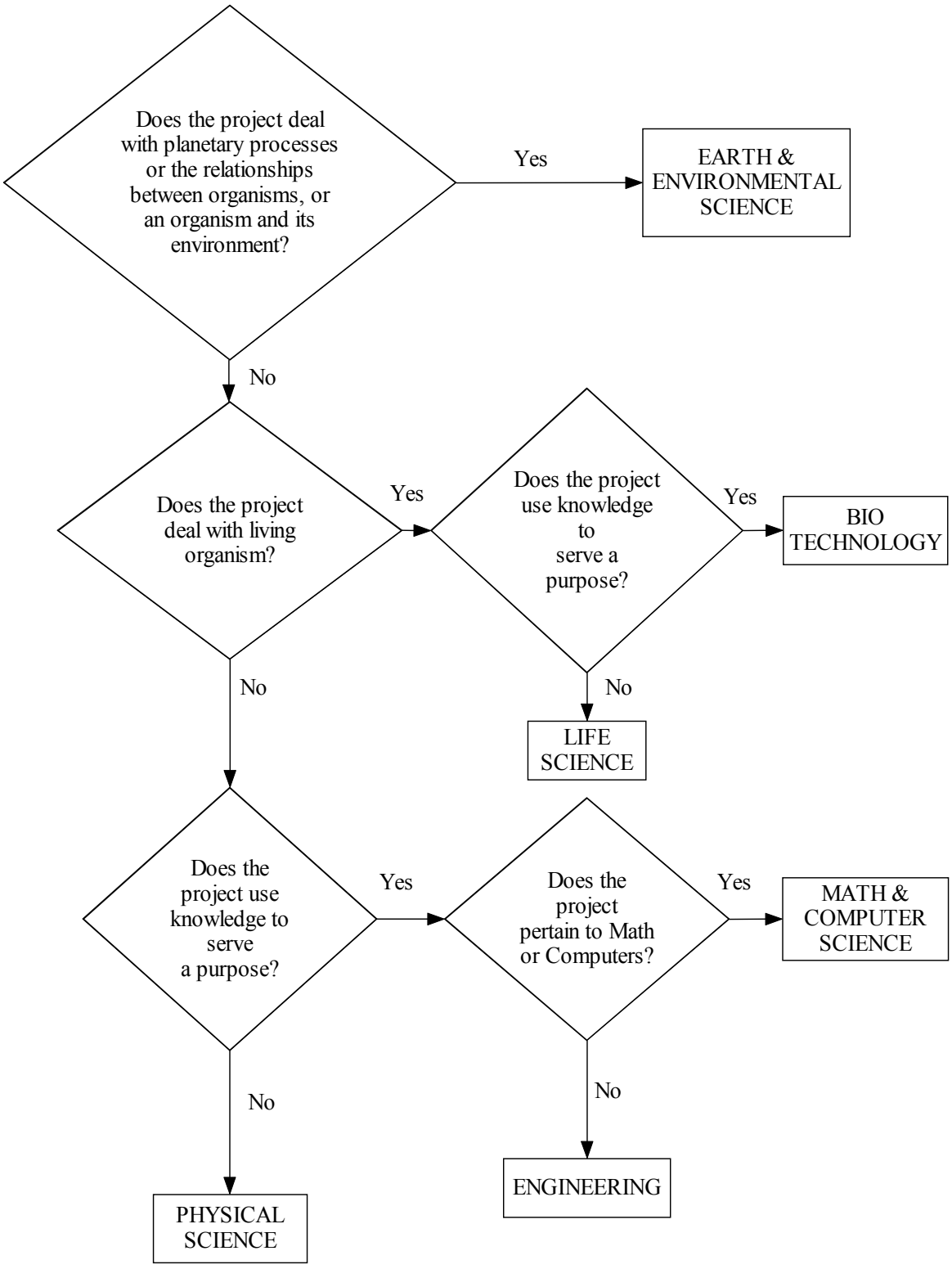
An **Earth and Environmental Sciences** project has as its focus either a topic relating to planetary processes or the relationships of organisms to those processes, or between or among organisms.

An Earth and Environmental Sciences project has as its focus either a topic relating to planetary processes or the relationships of organisms to those processes, or between or among organisms. Projects in this division can include the pursuit of knowledge in any of the following scientific disciplines: Geology, Mineralogy, Physiography, Oceanography, Limnology, Climatology, Seismology, Geography and Ecology. Earth and Environmental science involves the study of pollution (air, water and land), its sources and control. It can also involve studies of biotic and/or abiotic factors in an environment where such studies enhance our understanding of biological relationships and abiotic cycles.

Studies dealing with resource management or sustainable development would fall into this category. Examples of such studies might include capture/recapture studies for estimation of population densities, determination of bioproductivity in a specific ecosystem or niche, studies of plate tectonics and examination of mineral cycles (e.g. salt mills in the oceans).



3.1.1.3 Classifying Your Project



3.2 Project Rules & Regulations

All projects will be checked as part of registering at the fair 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 provided by YSF Canada for use at Regional Science Fairs and the Canada Wide Science Fair (CWSF). *Some forms need to be completed before experimentation begins!* We recommend that you print and complete the forms you will need as soon as possible.

Grade 7 and 8 students are eligible for the CWSF and must complete all required YSF forms.

Projects submitted by High School students are also eligible for the Intel International Science & Engineering Fair (IISEF). To meet both CWSF and IISEF requirements, high school students are asked to complete all required IISEF forms *instead of* the YSF forms.

Eligibility

The Bay Area Science & Technology Fair (BASEF) is open to all students in grades seven to OAC under the age of twenty one who attend any public, separate, or private school, or who are home-schooled, in the City of Hamilton or the Region of Halton.

If your school conducts a school science fair, you may only advance to BASEF through your school's fair. In case of over registration, acceptance will be based on earliest On-line Registration date and time.

If your school does not conduct a science fair, you may enter into BASEF directly; your school official must still approve your participation.

All registrations from any source are subject to the maximum number of entries per school. Each elementary school is restricted to 8 entries, and each high school is restricted to 16 entries per level at which it is eligible to participate.

For grades 7-OAC, projects developed by a maximum of two students may be entered and shall be entered in the division of the oldest member of the group.

A student may not exhibit more than one project each year.

A project cannot be entered into the fair more than one year without significant changes. If you are entering a project which is a continuation of previous year's work, you must complete a Continuation Projects Form, and submit it with your project registration.

Students are encouraged to enter early. Places are limited by the fair's host site capacity, and entries may have to be returned.

All release forms must be signed by a parent or guardian and a teacher or principal.

Project Dimensions

All exhibits, including all accessories, must be confined to a table or floor space not to exceed 0.76 metres, front to back; 1.2 metres side to side; and 2.74 metres maximum height from the floor. All measurements will be made from the outermost points, including framework and appendages, and will be checked by the safety and ethics committee. Exhibits exceeding these dimensions must be modified or will not be accepted.

General Safety

Safety of the public is a prime consideration. Suitable precautions must be taken to prevent the possibility of personal injury, property damage, and the legal action that could result from a lack of concern for safety.

- All sharp edges or corners on prisms, mirrors, enclosures, and glass and metal plates must be removed or otherwise protected. The length of hoses or extension cords is to be kept to a minimum and out of the way to eliminate tripping hazards. Use tape for securing.
- Aisles and exits must not be obstructed.
- Moving exhibits (e.g., radio-controlled vehicles, robots) should be restricted to the regulation display space. The committee will endeavour to provide an area to safely demonstrate to judges, projects that require more space than the regulated exhibit display space. Powered aircraft may not be activated.

- 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.
- Glue all paper flat to the backboard, or tape all edges. Do not hang overlapping sheets on the backboard; put them in a binder.
- One electrical outlet supplying AC110 volt 60 cycle will be supplied if requested. Each 15A circuit will be shared by several projects. Exhibitors should bring their own good quality (CSA approved) 3 prong extension cord, since outlets may not be adjacent to each project's display space. No gas or water outlets will be available. No cable or telephone circuits will be available. Switches and cords must be the approved variety. Cell or battery-fed circuits should be safe in design and operation.
- Water will be available near the exhibit hall. Bring your own pail to carry it if needed. Your display must be confirmed as safe by the safety committee both before and after including the water. You must also demonstrate arrangements for removing and disposing of the water safely and without spillage.
- The exhibitor must supply all equipment except display tables.
- The exhibit must comply with all safety, animal care and ethical regulations as outlined below, and in the Safety and Regulation Checklist.

Fire Safety

The organizing committee will work with the Safety Officer of the host site to meet all requirements for safety and security, and to communicate those requirements as necessary to participants during the science fair. The organizing committee will establish an exhibit hall layout that satisfies the host site's requirements for fire safety and emergency evacuation purposes.

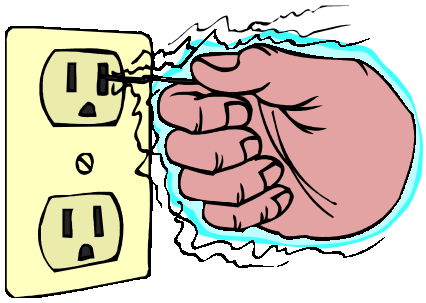
- Certain restrictions have been defined for the construction of displays to reduce the possibility of accidental fire during the fair, and in the event of fire, to allow for safe evacuation of the building.
- The committee will be responsible for ensuring that fire extinguishers of proper size and rating are available in the exhibition area.
- The committee will establish a fire evacuation plan, and an exhibit hall layout that minimizes long rows in order to reduce flame spread.
- Combustible material must not be used near a heat source. Open flames must not be used. Packing material must not be stored in the exhibit hall.

Chemical Safety

- No containers of toxic or flammable chemicals are allowed.
- Dangerous chemicals are not allowed - this includes prescription drugs, over-the-counter medication and many kitchen and laundry supplies. Substitutes for toxic and corrosive chemicals must be used. Common salt, for example, can be used to simulate chemicals such as ammonium nitrate. Water may be used instead of alcohol, ether, and other highly flammable liquids. Molasses can be used to represent petroleum products. When chemicals are simulated, they should be labeled with the names of the substance they represent preceded by the word "simulated" No project will be penalized because the key (but potentially dangerous) components were not on display.
- If you are in doubt about any material, then use a substitute in your project display.

Electrical Safety

- As low a voltage as possible must be used.
- At the end of the day or the viewing period, all electrical exhibits must be disconnected, and power bars switched off. Power bars must have a switch for this purpose.
- Only CSA-approved extension cords in good repair shall be used.
- Where practical and necessary, it is recommended that pilot lights be used to indicate that the voltage is on.
- Cord-connected electrical appliances shall have a 3-wire conductor with ground or be CSA-approved.
- An insulating grommet is required at the point where the service enters any enclosure.
- Electrical devices must be protectively enclosed as far as it is practical.



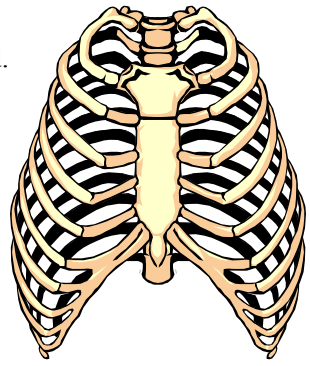
- Any enclosure must be noncombustible. All non-current carrying metal parts must be grounded.
- No exposed live parts over 36 volts are allowed. Current (amperage) must be low so as not to cause any discomfort or danger if touched.
- Wet cells shall not be used because of the hazardous chemicals involved.

Structural & Mechanical Safety

- Exhibits must be of a safe design with adequate stability to keep from tipping.
- Dangerous moving parts such as belts, gears, pulleys and propeller blades must be suitably guarded.
- Pressurized vessels should have a safety valve.
- Compressed gas cylinders are not allowed to be displayed. Small (table top) air or other fluid compressors may be displayed, but must be rendered inoperable for the duration of the fair. Associated pressure systems must be purged of any contents other than ordinary air, and must be open to the atmosphere, to ensure they are at room pressure. Pressure systems of any type are considered hazardous equipment. You must complete a Designated Supervisor form and it must be submitted with the project registration.

X-Ray or Radiation-producing Equipment

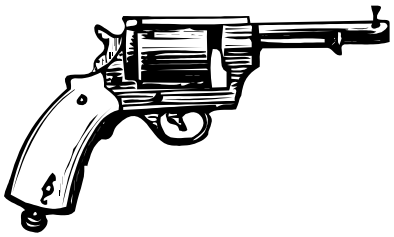
- If an exhibit uses x-ray equipment or any other equipment capable of emitting high energy radiation, registration of ownership with the Ontario government is required.
- Plans for structural protection must be submitted to the provincial government and approval requested.
- A formally trained and qualified individual must be identified to exercise supervision of the operation and to take responsibility for safe performance. It will be an obligation of this individual to satisfy the Chief Inspector by exposure rate measurements or other suitable documentation that the operation is safe.
- Projects involving voltages above 10 kV should be considered to pose a potential x-ray hazard.



- Lasers and x-ray or radiation-producing equipment may not be operated during public viewing periods.
- You must complete a Designated Supervisor form and it must be submitted with the project registration.

Firearms, Explosives and Hazardous Materials

- YSF Canada and Regional Science Fairs allow students to conduct research involving hazardous equipment



and firearms as long as students adhere to federal and provincial regulations and guidelines that are designed to protect the safety of the researchers.

- Use of hazardous equipment, dangerous goods, explosives and firearms requires proper supervision by a Designated Supervisor. This Supervisor must be directly responsible for overseeing student experimentation. In some cases, the Designated Supervisor must possess a Firearms Possessions Certificate / Hunter Safety Certificate and/or a Canadian Firearms Safety Course equivalent, and be knowledgeable in the use of the firearms or devices that will be used in the experimentation. In all cases, the Designated Supervisor must be at least 18 years old. The Supervisor must provide proof at time of project Registration of his/her licencing and expertise in the use of a firearm, volatile substance or device, and/or explosives, or the project will not be accepted.
- You must complete a Designated Supervisor Form, and it must be submitted with the project Registration.
- The Regulations and restrictions relating to Firearms, Explosives and Hazardous Materials are extensive and complex. If you are considering this type of project, we encourage you to get in touch with us. We will provide further details, and help put you in touch with appropriate authorities familiar with current regulations and relevant aspects regarding scientific merit, and for guidance and suggestions in performing the work.

Microorganism Safety & Biohazards

The following hazardous biological materials may not be displayed:

1. Radioisotopes or compounds containing radioisotopes at activities above normal background
2. Biological toxins
3. Microorganisms (the use of mixed cultures obtained from the environment - e.g. soils, mouth swabs - is acceptable for experimentation, but not for display)
4. Cells or tissues infected with animal or plant viruses
5. No cultures are allowed for exhibition (photographs or simulated cultures may be used)
6. No plant tissue, soil or material which could decompose shall be exhibited

Experimentation involving biohazards must be carried out under controlled laboratory conditions and supervision. Evidence of this supervision, including the supervisor's name, institution, and qualifications must be included in the Contribution From a Recognized Institution form, and must be submitted with the project Registration.

Recombinant DNA and Biotechnological Safety

Projects involving the manipulation of recombinant DNA molecules or animal viruses are allowed if conducted under qualified supervision. Evidence of this supervision, including the supervisor's name, institution, and qualifications must be included in the Contribution From a Recognized Institution form, and must be submitted with the project Registration. Biotechnological investigations involving enzymes pose risks of allergic reactions. Work involving DNA technology can be accomplished safely if simple precautions are taken. The use of DNA is, in itself, usually safe, but hazards arise from chemicals and electrical equipment employed in the manipulation of DNA. Extremely hazardous chemicals, such as ethidium bromide, used to stain DNA, should be avoided. Electrophoresis of DNA fragments should use low voltages or equipment that prevents access to connections at high voltages.

Live tissue samples used in such investigations must be taken either from a continuously maintained tissue culture line already available to institutional researchers, or from animals already being used in an on-going institutional research program. Proof of where such material has been acquired (invoice or letter from supplier) must be available at all times during the fair, and submitted

with the project Registration. These animal tissues may only be displayed at the fair if they are prepared and sealed (lamella, plastination).

Regulations for Animal Experimentation in Science Fairs

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.

I. General

While student investigations of biological processes are to be encouraged, they are subject to the same laws, ethics, and regulations as any other research. 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 described here, based on CWSF rules, are written in view of these laws. Guidelines for the care and use of experimental animals are available from the Canadian Council on Animal Care .

Biological experimentation is subject to legal restrictions including, among others:

1. Criminal Code of Canada, Section 446, Cruelty to Animals
2. Convention for International Trade on Endangered Species
3. Canadian Wildlife Service
4. Health of Animals Act, Bill C-66 Guidelines of the Canadian Council on Animal Care
5. Animals for Research Act (Ontario)

II. Regulations:

An adult familiar with current regulations should review all research involving animals. A Non-Human Vertebrate Animal Form is included in the forms section. If vertebrate animals are used in any way in your science project, this form must be completed and included with the project Registration. Projects involving non-human animals that are deemed to be unethical shall be disqualified. If you are unsure about the status of any proposed project, please contact us, and we will help put you in touch with appropriate authorities familiar with current regulations and relevant aspects regarding scientific merit, and for guidance and suggestions in performing the work.

Lower orders of life (bacteria, fungi, protozoa, insects, plants and invertebrate animals) can be used in experimentation to reveal valuable basic biological information.

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 animals. This permits observation of wild animals, animals in zoological parks, farm animals and pets.

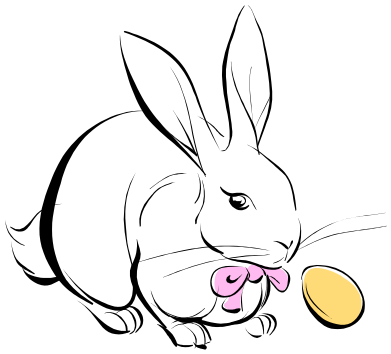
Observation of wild animals falls within the definition of hunting in some jurisdictions. Students should obtain advice and permission from conservation authorities to ensure that they are not interfering with the animal's life, and to ensure that their project is permissible. A permit may be required. 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).

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.

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.

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 and must be available at the display.

III. 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.

Live microorganisms and vertebrate or non-vertebrate animals shall not be included in the display, although appropriate photographs may be available in the report.

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.

Guidelines for Research Involving Human Subjects

The following rules and guidelines for research and/or science fair projects involving human subjects are adapted from those of the Youth Science Foundation Canada “Guide for Ethics Review of Human Research”.

I. Statement of Ethics Review Requirements:

The Foundation 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 student's supervising teacher, members of a bona fide research institution or hospital practiced in the ethics of human research, or the Ethics, Animal Care and Safety Committee of the Youth Science Foundation Canada. This will provide the researchers with an appreciation of the requirements and safeguards existing in law regarding experimentation in humans.

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.

II. Ethics Review:

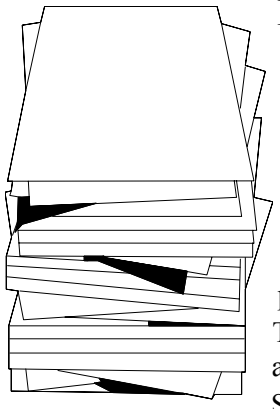
The Foundation's Ethics, Animal Care and Safety Committee invites inquiries regarding the ethics of any planned human (or animal) research project. It will assist in the development of an acceptable research design. It also reviews all projects entered in the Canada-Wide Science Fair to ensure they are ethically approved and thus eligible for competition.

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

Human research refers to any project which 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 Application Form:

Supervising teachers or other adults are responsible for ensuring the safe and ethical operation of projects dealing with human subjects. An Application For Review of Research with Human Participants is included in the forms section. This form must be completed and included with the project Registration. Projects involving human participants that are deemed to be unethical may be disqualified. If you are unsure about the status of any proposed project, please contact us, and we will help put you in touch with appropriate authorities familiar with current regulations and relevant aspects regarding scientific merit, and for guidance and suggestions in performing the work.

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

Student Researcher(s): The student researcher(s) will collect the data. All students involved must be listed, even if assisting the principal investigators.

Title of Project: The title of project should be succinct, yet clearly describe the focus of the project.

Supervising Adult: The supervising adult supervises and accepts responsibility for the safe and ethical conduct of the project. The name, address and telephone number of the supervising adult must be given.

Purpose and General Procedure: The purpose describes the reason for conducting the project, and briefly outlines literature which has shaped the project proposal. The general procedure to be used in the research is to be outlined.

Participants and Procedural Details: The participants who will be involved should be described with respect to age range, gender, 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 which 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 which 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. 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 dosage, frequency and possible side effects. Drugs, whether prescription or otherwise, are not to be used. Oral or topical applications of test materials are the only acceptable methods of administration. 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.

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.

V. 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.

If the research involves physical activity, invasive procedures, tasting, smelling or exposure to any abnormal factors, such as noise, temperature, dust, etc. then you **MUST** obtain written informed consent from every participant.

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:

- name(s) of investigator(s), school, supervising adult, telephone number;
- description of the procedures;
- description of risks and benefits from participating;
- details of time commitment;
- details of any plan to re-contact participants;
- details of remuneration;
- plans to ensure confidentiality of data;
- details about their right to withdraw at any time without fear of reprisal;
- information about how to communicate a decision to withdraw from the study, and
- a statement that the project has been reviewed and received ethics approval from whatever authority was consulted. A sample Informed Consent form is provided.

Note: There may be circumstances under which written, informed consent cannot be reasonably collected. For surveys only, 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.

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.

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.

Additional Attachments: Sample letters of consent, parent permission letters and pre-exercise medical screening forms should be included as appendices to the form.

3.3 Types of Projects

1. Experiment

An investigation undertaken to test a scientific hypothesis using experiments. Experiments are contrived situations in which variables can be controlled. The goal is an understanding of cause and effect relationships.

2. Innovation

The development and evaluation of innovative devices, models or techniques in technology, engineering or computers (hardware or software). The goal is the design of a useful product or technique, rather than understanding.

3. Study

Meta-Analysis

A collection and analysis of data to reveal evidence of a fact or a situation of scientific interest. It could include a study of cause and effect relationships or theoretical investigations of scientific data.

Qualitative Study

An examination of a situation in which the researcher taking charge of changing variables would not make sense, either because it cannot be done, or because it would be inappropriate. The goal is to increase understanding of the situation, not to control what will happen. Qualitative studies are context dependent, so the results cannot be generalized; however, others who hear about the study might find conclusions which are transferable to their own situations. As an example, three students each do a project on acid rain. One student sets up a display that informs the public about acid rain, with facts obtained by reading about this subject (study). The second student collects specimens in areas affected by acid rain and compares them with specimens collected from an unaffected area (experiment). A third student devises a technical solution for the measurement of acidity in the rain (innovation). In all three projects, diagrams, illustrations, tables or assembled models.

4.0 Display of Previous Awards

Awards, certificates, prizes etc. won by you or your project at previous science fairs or competitions are not to be displayed or discussed at the BASEF on Judging day. We are pleased that you have done well, but do not want to bias our judging process.

You may display previous awards only at the Public Viewing on Saturday.

5.0 Project Resources

There are a number of people and places that you can turn to for help with picking a subject, conducting research, and putting together your presentation: your teachers, your parents, college and university instructors, and, of course, the Web. We've begun collecting links to on-line resources here. If you find something that you think others should know about, mail us at: **basef.webmaster@mcmaster.ca** with "Resource Suggestion" as the subject.

Contents

1. Ideas & Activities
2. Tools, Methods & Guidelines
3. Presentation & Polish
4. Resources for Teachers & Parents
5. Others Lists of Resources

Ideas & Activities

There are a number of sites which have ideas for projects and activities designed for elementary and high-school students. Not all of these sites have to do with science fairs specifically, but they all give you ideas of things that you can experiment with at home or school.

YES I Can! Science (http://yesican.yorku.ca/home/)
This site is aimed at teachers, to "provide [them] with the classroom resources and background material", some of the lessons and examples might get you thinking about ideas for a junior or intermediate project.

KidSpace at the Canadian Space Agency (http://www.space.gc.ca/kidspace/)
Ideas for space-related projects for students and teachers.

Science Fair Central from Discovery.com (http://school.discovery.com/sciencefaircentral/)
A comprehensive site with, among other things, ideas for projects and links to other resources.

Environmental HotLinks (http://www.kortright.org/hotlinks.html#renewable)
A list of environmental Web sites, many of which will have useful information for projects in the Environmental Sciences category.

ExploreScience.com and **ExploreMath.com** (http://www.explorescience.com/) (http://www.exploremath.com/)
Activities and ideas which could be the starting point for a Junior or Intermediate level project.

ScienceFairs (http://www.stemnet.nf.ca/sciencefairs/)
"...this homepage is designed to aid students in the most difficult aspect of their science fair experience; getting an idea."

Science Fair Project Ideas (http://www.anderson2.k12.sc.us/sfair/projideas.htm)
Lots of links to sites offering ideas for projects.

STATS (http://stas.edu.pe.ca/)
"STAS, the Prince Edward Island Science and Technology Awareness Site, is a bilingual resource for students and teachers to learn, teach, and discover." The site contains ideas for projects and resources for teachers and science-fair organizers.

Tools, Methods & Guidelines

Science Fair Central from Discovery.com (http://school.discovery.com/sciencefaircentral/)
A comprehensive site with, among other things, a handbook covering research and analysis methods.

Statistics Every Writer Should Know (http://nilesonline.com/stats/)
"Here, described in plain English, are some basic concepts in statistics that every writer should know." Not aimed at students, but an excellent overview of important statistical methods.

Canadian Council on Animal Care (http://www.ccac.ca/)
This is a fairly comprehensive and dense site, but high-school students doing work with animals should have a look, especially at the **Guide for the Care and Use of Experimental Animals, Volume 2 .** (http://www.ccac.ca/guides/english/toc_v2.htm)

Presentation & Polish

Science Fair Central from Discovery.com (http://school.discovery.com/sciencefaircentral/)
A comprehensive site with, among other things, a handbook including suggestions for reports and displays.

Science Fair Project How-tos (http://teenwriting.about.com/library/blextras/blextra203.htm)
Some tips for documenting and presenting a project.

Resources for Teachers & Parents

The following sites are about science and education in general, but may be help teachers and parents think about and emphasize the role of science and technology in a student's education.

Science-Fair Crash Course (http://basef.mcmaster.ca/2003/projects/school_presentation.shtml)
Have a science-fair veteran help your students get started on projects or your school started on it's own fair.

Let's Talk Science from the University of Western Ontario (http://www.letstalkscience.uwo.ca/)
"Let's Talk Science is striving to improve Science literacy through innovative educational programs, research and advocacy. [They] exist to motivate and empower young Canadians through Science education."

The Learning Partnership (http://www.tlp.on.ca/)
"The Learning Partnership develops linkages among business, education and community through partnership projects, which excite and challenge thousands of students and teachers across Canada in the publicly funded education system to grow and become life long learners."

Scientists in School
"Scientists in School is an incorporated, not-for-profit organization and registered charity that brings science to life for i elementary classrooms through fun and exciting, 'hands-on', natural and applied science and technology programs."

STATS (http://stas.edu.pe.ca/)
"STAS, the Prince Edward Island Science and Technology Awareness Site, is a bilingual resource for students and teachers to learn, teach, and discover." The site contains ideas for projects and resources for teachers and science-fair organizers.

Intel in Canadian Education (http://www.intel.com/ca/education)
Resources for teachers to help inspire interest in math, science and engineering.

Youth Science Foundation - Teachers! (http://www.ysf.ca/fairorganize.html)
How to run a school science fair, from start to finish. There are some good tips for students buried in here, too.

Others Lists of Resources

Theses sites contain little content of their own, but have good lists of sites with ideas, guidelines and tools.

Science Fair Project Resource Guide (http://www.ipl.org/youth/projectguide/)
An overview of the process of creating a first project, with links to several good sites resources.

London District Science & Technology Fair links page (http://www.physics.uwo.ca/sfair/sflinks.htm)
The LDSTF links page, which has sections for "help with projects" and "science education sites."

Hamilton Public Library - Science & Math links
http://www.hpl.hamilton.on.ca/internet/links/search/subject_results.php?id=100
A list of resources and other lists of resources.

6.0 Judging

Contents

1. Philosophy of Judging
2. Registration
3. Judges' Schedule
4. Judging Form

Philosophy of Judging

Science fairs provide a unique learning opportunity for students, teachers, and members of the community to explore science and to increase public awareness of science and the world we live in. Though science fairs are generally a competition, they also provide opportunity for students to display their creative scientific activity beyond the classroom and in the world. The young person comes into direct contact with the scientific and industrial community within the project development.

The judging official, a member of the scientific community is an essential piece of this experience. The onus is on the judge to provide an experience that is positive and enriching. The experience of judging contributes directly to the student's learning experience as well as the judge's. All judging interviews should be a positive experience for each exhibitor. Most students enjoy the chance to talk about their project with someone both knowledgeable and sympathetic who represents scientific authority. This interaction may directly influence the future scientific activity of the student. The judge must be encouraging, positive, constructive in criticism, and should discuss future research possibilities with the student. All students should be treated fairly in the amount of time given to them for interviews, and in the type of comments made. Judging is a difficult task and should be viewed as an individual process with each student. A student's score should be graded independently, using their knowledge, comprehension and foresight as indicators of their mark. This allows students to compete against themselves in the knowledge basis and experience when being evaluated. Only after scoring is completed does relative ranking take place for the competitive aspect of the science fair experience.

Registration

Do you agree with the BASEF judging philosophy? If so, visit http://basef.mcmaster.ca/2003/judges-registration.shtml to register on-line as a judge for the 2003 fair.

You will receive a personal confirmation of acceptance from the Judging Committee shortly after you register.

Judges' Schedule

Thursday, April 3rd, 2003

8:00 Meeting of Category chairs and judge in chief.

8:30 General welcome and introduction.

8:45 Category meetings with all judges and category chair persons.

9:00 Begin preliminary judging without students present.

11:30 Meeting with category chair person, discussion of preliminary judging; report findings to judge in chief.

11:45 Start of Judges' luncheon.

1:00 Begin judging with students present; recommended judging interview time is 10 -15 minutes per project.

3:30 Tally of scores; report to Category chair persons.

4:15 Judge in chief, category chair and awards committee meeting.

Judging Form

Projects are judged using a five-part form designed to help judges focus their impressions and to weight the judging criteria. See the attached sample judging form.

7.0 About BASEF

The Spectator's Roy Middleton was instrumental in founding The Hamilton District Science and Engineering Fair in 1960. Since that time many thousands of young people from the regions of Hamilton Wentworth and Halton have benefited from their participation in this event. Some have gone on to achieve further success at the national and international levels, and many are now active in careers related to science and technology. Several continue to be involved with the fair at the organizational level.

The fair attracts 400 participants annually, from grade seven to OAC. We are affiliated with the Canada Wide Science Fair and the Intel International Science and Engineering Fair, and several of the top projects from our fair are sent on to compete at these events. Our students have competed favourably against the top young minds in the world, and have brought home many prestigious national and international awards over the years.

7.1 Our New Name

Some of you may be wondering what happened to the "Hamilton District Science and Engineering Fair" or the "Hamilton-Wentworth & Halton Science and Engineering Fair"; the BASEF is still the same organization serving the same towns and cities around the bay, along and below the Niagara Escarpment, from Stoney Creek around to Oakville. Rather than changing the name of the fair with each change in municipal or regional nomenclature, we've named the fair after the bay, call it Burlington Bay or Hamilton Bay, from around which all of our students, teachers and

volunteers are drawn. We don't think that the Bay is going anywhere, so our name shouldn't be changing again any time soon (but if we're wrong, then someone might have a fantastic topic for an environmental science project).

7.2 Our Mission

To encourage young people in science, engineering and technology.

7.3 Our Goals

- To encourage interest in science, engineering and technology.
- To conduct an annual fair for the exhibition and competition of scientific, engineering and technology projects by students in grades seven to OAC from all schools within the Region of Halton and the new City of Hamilton.
- To award prizes and to send competitors to the Canada-Wide Science Fair and the Intel International Science and Engineering Fair.
- To co-ordinate activities in science, engineering and technology as a part of the fair experience.
- To promote career awareness.

7.4 Contact BASEF

Mailing Address

Bay Area Science and Engineering Fair
c/o McMaster University, JHE-A214
1280 Main Street West
Hamilton, ON, Canada L8S 4L7

Voice Mail

Hamilton Area: 905-974-7975
(Hamilton, Dundas, Glanbrook, Flamborough, Ancaster and Stoney Creek)

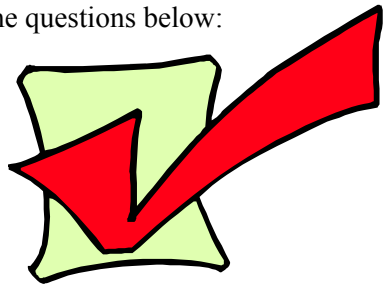
Oakville Area: 905-693-7076
(Oakville, Milton, Halton Hills, Acton, Burlington, etc.)
Please leave your name, your number, and the reason you are calling, and we'll get back to you as quickly as we can.

Email

General Email	basef@mcmaster.ca
Committee Chair	basef.chair@mcmaster.ca
Outreach Chair	305pri@ms.hwcdsb.edu.on.ca
Registration	basef.registration@mcmaster.ca
Judging	basef.judging@mcmaster.ca
Awards	basef.awards@mcmaster.ca
Activities	basef.activities@mcmaster.ca
Alumni	basef.alumni@mcmaster.ca
Volunteers	basef.volunteers@mcmaster.ca
Fund raising	basef.fundraising@mcmaster.ca
Treasurer	basef.treasurer@mcmaster.ca
Webmaster	basef.webmaster@mcmaster.ca

Project Rules : Safety Checklist

Go over the checklist below, make sure that you can truthfully answer "Yes" to each of the questions below:



1. The Exhibit conforms to the Rules on maximum size: No more than 2.74 m high, 1.2 m side to side or 0.76 m front to back.
2. The exhibit is self-standing and stable.
3. Any hazardous moving parts are protected.
4. No pressurized containers are being displayed.
5. No open flame is being used.
6. Any flammable or poisonous chemicals (solid, liquid, gas) are simulated.
7. Any radio-isotopes present are sealed and at normal background activity.
8. Any electrical power cord is CSA approved and provides necessary grounding.
9. Any electrical connection has been insulated.
10. Any non-current carrying metal parts are connected to the ground lead.
11. Any exposed live parts are at a potential of less than 36 V to the ground. Current is low so as not to pose any problems.
12. No voltages above 10 V are being generated.
13. Lasers are not being operated during public display.
14. X-ray or other high energy radiation sources, if used, have been registered and approved by provincial authorites.
15. Have animals been used?
16. If answer to 15 is yes: Live animals are not being displayed.
17. If answer to 15 is yes: Active procedures which could harm or distress the animals were not used.
18. Have microbiological organisms been used?
19. If answer to 18 is yes: Non-toxic microbiological cultures being displayed are all sealed.
20. If answer to 18 is yes: There have been no experimental manipulations with recombinant DNA or animal viruses.

Non-Human Vertebrate Animal Form (YSF5)

Required for all research involving non-human vertebrate animals. Complete before experimentation.
Include with BASEF Project Registration and keep a copy in the Project notebook.

Student(s) & Project: Student Name (1):	Student Name (2):
School, City:	
Project Title:	

To be completed by Student Researcher:

1. Genus, species and common name of animal(s) used. (use separate form for each species used).

2. Where will animals be obtained?

3. How many animals will be used? _____ Average weight _____

4. Cage size _____ Number of animals per cage _____

5. Type of food:

6. How often fed and given water

7. Type of bedding used

8. Where will animals be housed?

9. Name the veterinarian who will provide veterinarian medical and nursing care in case of illness or emergency
Dr.

Facility: Phone:

10. Will animals be euthanized? _____ Yes _____ No
11. If yes, why and by what method? By whom?

12. If no, what will happen to the animals after experimentation?

To be completed by Animal Care Supervisor:

Printed Name:

Position:

Institution: Phone:

I certify that I have discussed this research with the student prior to its start and will supervise and will accept primary responsibility for the quality of care and handling of the live vertebrate animals used by the above named student(s). I further certify that I am knowledgeable in the proper care and handling of laboratory animals, and meet prevailing animal care supervisory requirements. When an animal must be euthanized, I certify that I will perform the procedure, using recommended agents.

Signature Date Signed

Informed Consent Form (YSF4B)

Recommended for all projects involving human subjects, required for all involving risk. See Rules for details.
Use a separate form for each test subject. Attach additional pages as required.
Complete prior to experimentation, and keep in the Project Notebook.

Student(s) & Project: Student Name (1):	Student Name (2):
School, City:	
Project Title:	

To be completed by Student Researcher:

1. What are the research procedures in which the subject will be involved?

2. What are the possible discomforts or risks, and benefits that may reasonably be expected by participating in this research?

3. What procedures will be used to minimize risks?

4. How much time is required of each participant?

5. Will participant be re-contacted after experiment is over? If so, explain when and how.

6. Will participant receive any remuneration? If so, provide details.

7. Describe how confidentiality of participant data will be ensured.

Student Researcher's Signature(s) Date Signed

To be completed by Supervising Adult:

As Supervising Adult, I have reviewed this project and agree it satisfies ethical requirements.

Supervising Adult's Printed Name: Signature Date Signed

To be completed by human subject prior to experimentation:

I have read and understood the conditions listed above, and I consent to participate in this research procedure. I realize I am free to withdraw my consent and to withdraw from this activity at any time.

Participant's Printed Name Signature Date Signed

If participant is under 18 years of age, a parent / guardian signature is required. If the subject of this experiment or parent/guardian has any questions about this experiment, the Supervising Teacher / Responsible Adult should be contacted.
I have received and reviewed a copy of any test, survey or questionnaire used in the research.
Yes No.

Parent / Guardian's Printed Name Signature Date Signed

BASEF V1.1 Dec 2001

Designated Supervisor Form (YSF3)

Required for projects using hazardous materials or devices. Complete before experimentation.
Include with BASEF Project Registration, and keep a copy in the Project notebook.

Student(s) & Project: Student Name (1):	Student Name (2):
School, City:	
Project Title:	

To be Completed by Designated Supervisor:
Printed Name:

Position:

Institution:

Address:

Phone:

List or describe your responsibilities in supervising the student(s). Include all hazardous substances and devices used in this research and safety precautions to be employed:

Signature of Designated Supervisor:
I certify that I have been trained in the techniques to be used by this student prior to the start of experimentation and that I will provide direct supervision.

Signature Date

Contribution From a Recognized Institution (YSF1)

Include with BASEF Registration, and keep a copy in the Project notebook.

Student(s) & Project:

Student Name (1):

Student Name (2):

School, City:

Project Title:

Project Type (circle one only) : Experiment Study Innovation

Recognized Institution:

Name and Address of Institution that contributed to this project:

Name(s) and Qualifications of Supervisor(s)

Institution's Contribution:

Please summarize the ways in which your Institution contributed to the completion of this project:

Based on your knowledge of this project's field of study, does this project verify, replicate or present existing scientific knowledge? How is this project innovative? Did the original idea come from the student or a member of your institution?

Experimental Projects Only:

Did the project involve the use of hazardous biological materials (bacterial pathogens, viruses, DNA, etc.)?
Yes No

If hazardous biological materials were used, please indicate whether they were handled under the supervision of qualified personnel in a facility equipped to handle such materials?
Yes No

Did the project involve the use of laboratory animals?
Yes No

If animals were used, please indicate whether they were handled under the supervision of an ethics committee that complies with the rules and standards of the Canadian Council on Animal Care?
Yes No

If animals were used, please specify whether they were vertebrate or invertebrate.
Vertebrate Invertebrate

Display, Presentation & Written Report:
Have you discussed the content of the project's display and presentation with the student?
Yes No

If yes, does the display and presentation accurately reflect the original contribution of the student(s) and clearly identify the contribution of your institution and it's personnel?
Yes No

Have you read the written report of the project prepared by the student(s)?
Yes No

If yes, does the written report accurately reflect the original contribution of the student(s) and clearly identify the contribution of your institution and it's personnel?
Yes No

If yes, does this report include a complete listing of relevant references?
Yes No

Authorization to Present Results:
Is/are the student(s) authorized to present these research results in public?

Comments:

Signature of Supervisor or Representative of Recognized Institution:
Printed Name and Position:

Signature: Date:

Continuation Projects Form (YSF7)

Required for projects that are a continuation from a previous years' project.
Include with BASEF Project Registration, and keep a copy in the Project notebook.

Student(s) & Project: Student Name (1):	Student Name (2):
School, City:	
Project Title:	

To be completed by Student Researcher:

1) How does the current year's project document new and different research?

2) Please briefly explain former year's work on this project, emphasizing how it is different from the current year.

Signature of Student(s):

I certify that the above information is correct and that the current year project display properly reflects work done in the current year.

Signature(s) Date

Application For Review of Research with Human Participants (YSF4A)

Print or type, attach additional sheets as necessary.
Include with BASEF Project Registration and keep a copy in the Project notebook.

Student(s) & Project: Student Name (1): Address: Phone:	 Student Name (2): Address: Phone:
School, City:	
Project Title:	
Supervising Adult: Name: Address:	Phone:

Summary of Proposed Research:

1. Briefly describe the purpose of this project.

2. Who, and what number of participants will be involved in this project?

3. How will the participants be recruited for this project? (Attach a copy of any recruitment notice or letter)

4. Outline what the participants will be expected to do. (E.g. surveys, interviews etc.) Attach a copy of test materials, surveys, questionnaires or interview questions to be used.

5. What are the potential risks (physical, psychological, emotional) to the participants in this project?

6. What are the potential benefits of this project (e.g. to the participants, to society)?

7. Will informed consent of the participants be obtained in writing? If not, explain why. Attach a copy of the informed consent form to be used.

8. How will you ensure anonymity of the participants and confidentiality of their data?

9. Describe your plans to provide feedback or a summary of the study to the participants.

10. Additional Attachments: Sample letters of consent, parent permission letters and pre-medical screening forms should be attached.

Signatures:
I have read the YSF and BASEF Guidelines for Research involving Human Subjects and agree to comply with the Guidelines. Further, I agree to notify BASEF / YSF Canada of any changes to this project.

Signature of Student Researcher (1):	Date:
Signature of Student Researcher (2):	Date:
Signature of Supervising Adult:	Date:

Ethics Review Committee Comments:

Signature of Ethics Committee Chairperson:	Date:

Bay Area Science and Engineering Fair 2003
Judging Form

Project: _____ Judge: _____

A		B		C		D		E		TOTAL
	+		+		+		+		=	

Scientific Thought **(maximum 45 marks)**

1. Select whether the project is either an experiment, study, or innovation.
2. Determine the level of the project by matching the description with the project. Circle the deserving mark out of a maximum of 45.

Definition	**Level 1** (acceptable)	**Level 2** (fair)	**Level 3** (good)	**Level 4** (excellent)
Experiment Investigation undertaken to test one or more hypothesis.	Duplication and reporting of an experiment to test a previously confirmed hypothesis.	Extension of a known experiment through modification of its procedure, data collection, analysis or application.	A new approach to the design, modification or application of an existing experiment with control of some variables.	A new experimental approach to a research problem in which most of the significant variables are controlled.
Study A collection and analysis of data showing evidence of a correlation, or pattern of scientific interest. Variables are identified and controlled.	Study and presentation of printed material related to the basic issue.	Study of material collected through compilation of or expansion of existing data and through observation. The study attempts to address a specific issue.	Study based on new observations and research of a previously studied topic. Appropriate analysis of data and correlations made.	A new approach to the study of a problem which correlates information from a number of sources. The report also offers new insights or solutions to the problem.
Innovation The development and evaluation of models or innovative devices, using techniques or approaches from the field of technology or engineering.	Building models or other devices that duplicate existing technology; minimal reporting.	Make improvement to an existing technology or use an existing technology for new applications.	Design and build an innovative adaptation of an existing technology for a new application.	Build a novel technology or integrate technologies to form an innovative system that has commercial or human benefit.
Score out of a possible 45 marks.	15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35	25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

A	**Score:**

Display **(maximum 20 marks)** **Skill** (maximum 10 marks) • Is workmanship neat and carefully done? • Is lettering clear? • Are colours strong and suitable? • Is the layout complete, logical and self-explanatory? • Is the content clearly and logically presented? **Circle: 1 2 3 4 5 6 7 8 9 10** **Dramatic Value** (maximum 10 marks) • Is the display simple and visually balanced? • Does it capture attention? • Does it have impact? • Is there good balance and use of contrasts? • Do the blackboards, table and all displays meld together? **Circle: 1 2 3 4 5 6 7 8 9 10**	***B***	**Score:**
Notebook / Work Journal (maximum 10 marks) • Is the notebook clear, concise and neat? • Is it different from the backboard display? • Is it well organized? • Is there a journal summarizing actual work noting both successes and failures? • Is there a bibliography? • Are there acknowledgements? **Circle: 1 2 3 4 5 6 7 8 9 10**	***C***	**Score:**
Abstract (maximum 5 marks) • Is the abstract present? • Does the abstract contain all aspects of the project? • Is the information concise, complete, and accurate? • Is the abstract well written? (grammar, syntax and spelling) **Circle: 1 2 3 4 5**	***D***	**Score:**

Interview (maximum 20 marks)

Student is unsure of the material or the process of the project and has difficulty answering questions about the project.	Student can summarize the project adequately and can answer the majority of questions about the project.	Student explains the project well and can answer all questions about the project clearly and logically.		
Circle: **6 7 8 9 10**	**Circle:** **11 12 13 14 15**	**Circle:** **16 17 18 19 20**	***E***	**Score:**

Please note some constructive comments for students.

BASEF 2003 Grades 9 to OAC Required IISEF Forms Flowchart

(Scientific Review Committee V1.1 – Dec / 2001)

Please read carefully, check and complete all that apply.
Complete IISEF rules may be obtained from:
www.sciserv.org/isef/isefform.asp. Click Rules and guidelines.

Step 1: To be done by all Grade 9 to OAC Students:

LEGEND:

Required forms

Forms may be required

Checklist for Adult Sponsor (1)

Research Plan (1A)

Approval form (1B)

Step 2: If your project involves any of these topics, also complete the forms below that topic:

❑Research conducted or equipment used at an institutional or industrial setting	❑ Recombinant DNA	❑ Human subjects studied in this project	❑ Non Human vertebrate animal subjects studied in this project	❑ Pathogenic Agents or Controlled substances used in this project	❑ Human and / or animal tissue(s) used in this project	❑ Hazardous Substances or Devices Used in this project

Registered Research Institutional /Industrial Setting Form (1C)

Exempt and Non-Exempt

Qualified Scientist Form (2)

Designated Supervisor Form (3)

Surveys (if applicable)

Human Subjects Form (4A)

Informed Consent Form (4B)

Non Human Vertebrate Animals Form (5)

Qualified Scientist Form (2)

Designated Supervisor Form (3)

Qualified Scientist Form (2)

Designated Supervisor Form (3)

Human and Animal Tissue Form (6)

Qualified Scientist Form (2)

Designated Supervisor Form (3)

IRB Decision (more than minimal risk involved)

IRB Decision (minimal risk involved)

Qualified Scientist Form (2)

Designated Supervisor Form (3)

BASEF 2003 Grades 7 & 8 YSF Forms Flowchart

(Scientific Review Committee - V1.1, Dec / 2001)

Depending on your project, you may need to complete one or more of the forms listed below.
Note: Some forms need to be completed before your experimentation begins! Read each form carefully!

Please read carefully, check and complete all that apply. If you do not include all required forms, your project cannot be accepted for registration. Complete rules and forms may be obtained from: basef.mcmaster.ca/2003/projects .

LEGEND: Required forms | Forms may be required

If your project involves any of these topics, also complete the forms below that topic:

❑Project is a continuation of a previous year's work.	❑ Human subjects studied in this project.	❑ Non human vertebrate animal subjects studied in this project.	❑ Research conducted or equipment used at an institutional or industrial setting.	❑ Firearms, Explosives or other Hazardous Materials or Equipment used.
Continuation Projects Form (YSF7)	Application for Review of Research with Human Participants (YSF4A)	Non Human Vertebrate Animals Form (YSF5)	Contribution From a Recognized Institution (YSF1)	Designated Supervisor Form (YSF3)
	Informed Consent Forms (YSF4B)			

NOTES:

A. These forms are in addition to:

1. Your on-line project registration.
2. Your Parent and School Approval form
3. Your Safety and Rules Checklist.

B. Many common chemicals used at home are considered Hazardous (or poisonous, or dangerous, etc.). Look for warning labels; if found, then consider them Hazardous and include a Designated Supervisor form.