# Cape Breton Regional Science Fair 2017

## Important Dates:

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| School Registration Deadline: | Wednesday. November 30th, 2016 |
| Online Participant Registration Opens: | Wednesday, February 8th, 2017 |
| Online Participant Registration Closes: | Wednesday, March 8th, 2017 |
| School Confirmation of participants: | Thursday, March 9th, 2017 |
| Cape Breton Regional Science Fair : | Wednesday, March 29th, 2017 |
| Public Viewing / Awards Ceremony: | Thursday, March 30th, 2017 |

Each school science fair contact will receive a detailed guideline concerning online registration, ethics, safety and student participation.

As the school science fair contact, you are required to review this information with your students and be sure their projects adhere to the safety and ethical guidelines.

A participant information sheet will be also sent to each school science fair contact once registration is complete. This is to be printed and passed to each participant.

Participants will be required to submit a CBRSF Permission form (to be printed once registration is completed) and a SIP form (available on website). These are to be passed in to the school science fair contact and then submitted to the CBRSF committee.

# Cape Breton Regional Science Fair 2017

Each year, thousands of students across Nova Scotia participate in Science Fair. Science Fair projects meet many of the curriculum outcomes identified by the province of Nova Scotia and allow the student to investigate and research topics they choose.

Science Fair is an independent project that meets the criteria for advanced science courses at the high school level.
A good science fair begins with a central question upon which the entire project is based.
(www.srsf.ednet.ns.ca)

| **What a science fair project is.** |
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| 1. A unique project that aims to test a specific hypothesis and draw a conclusion based on that hypothesis.<br>2. A study that has a focused question, and a design to answer that question.<br>3. An experiment, innovation or study designed by the researcher with a specific goal in mind.<br>4. A chance to explore science from one's own perspective and examine topics of individual interest.<br>5. Students behaving as scientists and examining their skills with the scientific method. |
| **What a science fair project is not.** |
| 1. The repetition of an experiment or study that is found online or in text.<br>2. A research paper with a presentation.<br>3. An assignment that can be successfully completed on one weekend.<br>4. An easy activity.<br>5. An explanation of how something works, if it is already known how it works.<br>6. An instruction manual for a piece of technology or scientific principle. |

## Steps for Science Fair

### Choosing a topic

When selecting a topic, choose a topic that you are genuinely interested in., something that will inspire you to learn more. Remember: everything you see on line is not necessarily for you nor is it always an idea that will lead to a successful science fair. Find something that you really like and that will allow you to explore and make discoveries that interest you!

Your topic is the basis of your science fair and is the most difficult part of the entire process.

# Project Classification

The following are the seven possible divisions for projects at the Regional Science Fair based on the guidelines of Youth Science Canada, which focus on issues that are important to Canada's youth, the future of our country and our world. They reflect the growing trend in current Canadian science, technology and innovation to focus on specific multi- and interdisciplinary global, national and provincial issues. Youth Science Canada's Challenges are meant to inspire youth to exercise their curiosity and creativity by doing a project that addresses one of these Challenges:

## Energy

Improve our use of current energy sources, enable the transition to alternative energy sources, or reduce our energy footprint

## Environment

Reduce our impact on, improve our understanding of, and ensure the quality of water, air, soil, and the diversity of living things.

## Health

Increase our understanding of the human body, or apply science and technology to improve health, control disease, or support an aging population.

## Information

Enhance communication and use of information using digital and networking technologies, or applications of new media.

## Innovation

Combine scientific principles with your creativity to develop a new material, structure, device, or system to solve a problem or improve an existing solution.

## Resources

Develop better ways to use our natural resources that provide sustainable sources of food, products, or prosperity.

## Discovery

Create new fundamental knowledge based on your curiosity by asking a question and using the techniques of scientific inquiry to develop an answer.

Please ask your teacher / mentor for guidance if you are unsure on which category best suits your project.

## Project Summary (Adapted from: https://smarts.youthscience.ca/)

**Introduction:** The introduction is exactly what it says - an introduction to your project. Here you talk about why you chose the project that you did, and what the results may imply for society (you don't talk about your actual results as yet).

**Background:** The background consists of the important information you found in your research. Usually, the background will contain a lot of facts and material from your sources. Remember to clearly cite anything that you found in another source, including quotes, statistics and results from previous experiments and studies. The information here should be relevant and important, and lead up to the purpose of your experiment.

**Purpose:** In the purpose, talk about what exactly you hoped to find - specifics. The purpose is generally no longer than a paragraph.

**Hypothesis:** In the hypothesis you are making an educated guess about what you believed would happen. This is generally based on your research, including previous studies. Usually, you try to predict results that answer the questions in your purpose. This is also usually no longer than a paragraph or two. Go back to Step 6 for a more detailed description of the hypothesis.

**Methodology (Procedure):** In the methodology, state the materials and methods you used to conduct your project. State exactly how you conducted your experiment. For an innovation, describe how you designed and built your device.

**Results, Analysis:** The results are basically the statistical data or observations drawn from your experiment. Examine your data; look for patterns, draw conclusions, Graphs, statistical analysis, tables, qualitative and quantitative results. Raw data are not usually included -keep that in a separate binder.

**Discussion:** After the design of the experiment, this is perhaps the most important part of the report. The discussion section gives your interpretation of the data, including comparisons with previous studies.

**Conclusion:** In your conclusion, relate your findings to your hypothesis. Was your hypothesis correct? Why or why not? Also, how do your conclusions affect society? The conclusion is usually no longer than two paragraphs.

**Future Directions / Improvements:** This is the section to talk about how you could possibly continue your project and in which direction you would go. This is also the section to talk about possible sources of error in your project, improvements in the experimental design, innovation, or data collection to do a more accurate study or experiment.

**Acknowledgements:** Remember all the people who helped you throughout your project? They could have been parents, friends, family, teachers - anyone! This is where you thank them for their help and support.

**References**

You've undoubtedly done a lot of research during your project. You should have also used many citations within your report. Here is where you list your citations and other references you used throughout your project - a bibliography, if you will.

**Appendixes:** all ethical and permission forms, raw data, tests, surveys, etc.

## Abstract

The abstract is a brief overview of your project, no longer than 50 words. In the abstract, you should state and describe the purpose of your experiment, study or innovation and give a quick conclusion of what you found.

## Display

Displays MUST BE SELF-STANDING. All exhibits, including all accessories, must be confined to a table or floor space not to exceed 0.8 metros, front to back; 1.2 meters side to side; and 3.5 meters maximum height from the floor. The display should include:

- Place information in a logical order
- Information on board should be a summary - Highlight the key components of your project
- Graphs, diagrams, photos and other visual aids should be a main focus
- Larger than normal font for easy reading (minimum 16 font)
- Creativity - make your board stand out! Have a color theme, an interesting title and be well organized.

## Log Book

Keep a journal of your experimental process. Record your thoughts, your observations, your successes and your challenges. Note changes you made throughout the science fair process.

## Photographs / Video

You are not always permitted to include a demonstration or a testing of your project at science fair so take photos or a video to highlight important points of your science fair process.

## Project Ethics and Safety

Your project must meet the safety and ethical guidelines set our by the Youth Science Association of Canada. . These regulations are set up for your own personal safety as well as the safety of any of your research subjects. Any project that involves **human participants** must have a ***permission form*** completed by each participant. The forms must be reviewed by your teacher and completed before research begins. Do not start your research without getting project approval from your teacher.

## Ethical Guidelines and Permission Forms

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.

A ***Low Risk Project*** *is* a survey of attitudes and beliefs, skill tests, or observations of behavior with the participants' consent. There is minimal risk to the Participant.
A ***Significant Risk Project*** refers to all other projects that involve human participation.

**Permission forms MUST be used in project involving human participants.** See attached sample

Names are to be kept confidential throughout project. (Ex: Participant #1 instead of a name)

Any photos /videos taken throughout the project must be with the signed permission of the participant.

All projects must meet the following minimum safety and ethical guidelines as set out by the Cape Breton Regional Science Fair Committee and the Youth Science Foundation of Canada. Projects that do not meet these guidelines will not be displayed at the regional science fair.

Here are the general project guidelines:

The following web site contains guidelines and policies in regards to ethics and human participants. http://ethics.youthscience.ca/

**Low Risk:**
**http://ethics.youthscience.ca/node/728/**

**Significant Risk:**
**http://ethics.youthscience.ca/node/729/**

# Project Safety

## General Project Guidelines:

1. All projects require the approval of a supervising teacher.
2. Projects involving dangerous materials, potentially dangerous experiments or techniques must be done under the supervision of a qualified adult. (Accompanying paperwork must be included.)
3. The maximum size of the exhibit, including presentation materials and experimental devices is 3.5 m high, 1.2 m wide and 0.8 m deep.
4. All backboards must be stable and self-standing. No flimsy, unstable backboards are permitted.
5. All papers on backboards must be secure on all sides. No open edges.
6. All paperwork should be contained in binders or folders.
7. Moving exhibits (e.g., radio-controlled vehicles, robots) shall be restricted to the regulation display space.

## Chemical-Fire Safety Guidelines:

1. No toxic, radioactive or flammable materials may be displayed.
2. Open flames are not permitted.
3. No pressurized containers may be displayed.
4. Chemicals involved in projects may be represented by models or artificial samples.
5. The total quantity of liquids displayed at a project shall not exceed 1 liter.

## Material-Electrical Safety Guidelines:

1. All electrical devices must be CSA approved.
2. Student constructed electrical devices must be properly insulated and grounded and inspected by an electrician. Any exposed wires must be contained inside the display.
3. No electrical devices that produce a voltage greater than 36V may be displayed.
4. Sharp or dangerous objects or devices must be guarded and protected. Models are recommended where possible.

## Biological Safety Guidelines:

1. No bacteria, viruses or other pathogens may be displayed.
2. All plants must be modeled or displayed in a covered display.
3. Animal studies must be done under the supervision of a qualified adult.
4. No live animals may be displayed.

5. Projects involving the ingestions of food, drugs or natural products or the alteration of the regular diet of an individual are not permitted unless carried out in coordination with a licensed research facility and the prior approval of the researcher and the Cape Breton Regional Science Fair.
6. All human and animal research must conform to YSF guidelines.
http://ethics.youthscience.ca/

**Ethical Guidelines:**

1. No vertebrate animal may be harmed during research.
2. Before any research involving humans begins, researchers must have informed consent from all research subjects and their parents when necessary. (Including survey type projects.)
3. Human research that may cause undue duress to research subjects must be discussed and approved by appropriate medical personnel.
4. Guidelines are available at (http://ethics.youthscience.ca/)

**Materials NOT PERMITTED:**

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| Aerosols (full or empty) |
| Animals |
| Biological toxins |
| Firearms, ammunition, explosives, or dangerous goods |
| Flammable, toxic or dangerous chemicals (corrosives or acids such as bleach, ammonia, detergent, household cleaners) |
| Fragile glass items |
| Gas cylinders |
| Hot appliances or lamps (no bulbs stronger than 60 watts) |
| Human tissues, fluids or teeth |
| Microbes (bacteria, fungi) |
| Medications of any kind |
| Open flame, candle or torch |
| Petroleum products |
| Radioactive material |
| Sharp metal edges, knives |
| Soil containing organic matter |
| Sulfur |

There are many good substitutes for the above-mentioned items. Photographs will do for most of the items if not, mock-ups are suitable replacements.

# The main parts of the Cape Breton Regional Science Fair judging form

**Scientific Thought (50%)** In this section, judges are looking at the scientific thought behind your project. As you can see, each type of project (experiment, innovation or study) has its own marking levels for Scientific Thought. Is the science in your project logical, accurate and feasible? Does it make sense? It's clear from the judging form that replicating existing projects garners lower marks, while higher marks are given to original experiments, studies and innovations.

**Originality & Creativity (33%)** you will also be scored for creativity. Here, the judges are looking for whether you used a novel approach and tapped into your imagination. Judges want to see that you are scientifically skilled, knowledgeable AND imaginative, because it takes all of these characteristics together for science to truly advance.

**Skill & Presentation (17%):** In this section, you are judged on both the content of your board and its aesthetics. You will be marked on whether your display is logical and easy to read. This also includes the legibility of your text, neatness and order of your display content.
Your logbook is also part of this mark. This is where you are marked on how well you speak, answer questions and explain various aspects of your project.

# Sample Permission Form - Low Risk

# Permission Form 2016: SURVEY

**INSERT SCHOOL NAME HERE Science Fair**

This project is being completed for the **SCHOOL NAME** science fair under the guidance of **TEACHER'S NAME.** This science fair project is **INSERT BRIEF DESCRIPTION OF PROJECT- 2-3 Lines.**

In order to complete this study, a survey will be conducted. ...**INSERT NUMBER OF STUDENTS /Grade/ AGE.** The information collected in the survey will be used to come up with a scientific conclusion to the hypotheses. No names or personal information will be presented in this project and all information will be anonymous. This is a low risk human study that does not involve any personal information about the participant. Your participation is appreciated.

Thank You

STUDENT NAME and EMAIL (CONTACT INFORMATION)

Signature: _____

Teacher's Name: _____

Signature: _____

Participant Name: _____

Participant Signature: _____