



Science Fair Newsletter

Volume 2, Issue 3

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for the Calgary Youth Science Fair April 5 to 8, 2006

What is the Scientific Method?

The scientific method is the universally accepted, organized approach to the study of science. It comprises the following steps: a reasonable hypothesis is defined after a student has completed background reading, relevant research (often including experiments) is conducted to evaluate the hypothesis, and a conclusion relating directly to the hypothesis is reached. A discussion and explanation of the results (unexpected or expected), including ideas on how the project might be expanded and how results might be applied in the future is essential.

Experimental versus Research Projects

Experimental projects deal with measurable phenomena that allow conclusions to be drawn about cause and effect. The experimenter controls independent variables and observes their effect on dependent variables.

Research projects include surveys, model construction, computer programming, engineering design, and literature surveys.

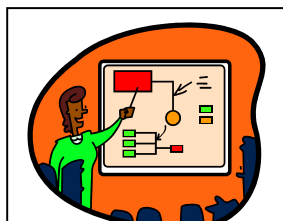
This newsletter explains Research projects, although

Presentations

What do judges look for in a project presentation?

Students will be judged at least 3 times on the morning of April 7, 2006. Each judge will spend from 20 to 30 minutes at each project. When judges come to a project, they will introduce themselves and ask the students to explain their project. If two students did a project together, each should present an equal part of the project.

A complete presentation includes both an oral component and the information presented on the tri-fold backboard. The backboard should contain all information discussed in "Characteristics of a Research Project" (see p. 2)



The information on the tri-fold should be presented in a logical order.

The information on the board should be typed on the computer or written in a clear and legible manner, with grammar and spelling checked. The font or writing should be large enough so it is easy to read from a distance. Students often mount their project write-up on construction paper to add colour to their tri-fold. Pictures and diagrams are worth a thousand words! Students can bring their experiment/apparatus with them to show the judge the set-up, but will not have time to do the experiment.

Relevant graphs, tables and charts from other published research should be presented to clarify explanations. Graphs should have clearly labeled axes (responding variable on the y-axis (vertical) and the manipulated variable on the x-axis (horizontal)).

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the concepts presented are true for both research and experimental projects. If you wish a copy of a previous discussion on Experimental projects, check "Information for School Coordinators" at www.cysf.org.

Characteristics of a Research Project

A good research project will include the following components:

Background research: research conducted to gain a greater understanding of the topic. The information researched often helps students decide on a "testable question" that the students would like to investigate.

Problem: the specific question the students are investigating in their research. For example, "How do archaeologists date wood samples?"

Hypothesis or Thesis: In many instances, students write a thesis based on their background research. Students write a hypothesis if they propose to challenge current thinking or analyse a subject in a new way. Students use the hypothesis/thesis to keep their research focused on a goal. The thesis can be written in many forms. For example: "Dendrochronology (tree ring dating) is combined with Carbon-14 dating to determine the actual calendar age of a tree." **OR** "Potassium/Argon dating will provide comparable results to Carbon-14 dating combined with dendrochronology."

Research: Extensive research should be undertaken and

documented. A wide variety of sources should be consulted: books, internet, scientific journals, interviews with experts in the field. If a controversy is uncovered, it is important to explore and understand both sides of the issue.

Scientific Principles: The underlying scientific principles of the problem should be understood. Often a small demonstration of the underlying scientific principle or "Law" is valuable; students should also be able to explain the conditions for known deviations from the principle.

Concepts: The key points, problems and issues related to the subject matter should be explored. Students should ensure that their information is accurate and complete for their level of knowledge and understanding. Relevant graphs or tables from other workers' research may help to summarize the concepts.

Results: a complete record of research, research materials, and evolution of thought should be collected and kept in a log book.

Conclusion: the final outcome of the investigation as supported by the research; the conclusion must directly address the initial question/hypothesis.

What Next? A discussion of how the research could be taken further, or what experiments might be undertaken to support the conclusion. Includes an explanation of why people would be interested in knowing the results and what they might be used for.

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Students should also bring their log book with them and show it to the judge at the end of their presentation. The judge can look through and see the work the students have put into their project. (Info on Log books, page 3)

The following key points for a presentation should be reviewed with the students, before their presentation. The Calgary Youth Science Fair judges understand that many children have not presented before attending the fair. These tips should help nervous students with their presentation. The six key points for an effective oral presentation are:

1. **Voice** – speak clearly, don't whisper or shout; the Big Four Building can be very loud, with all the students presenting, so the students must adjust their voices accordingly. The students should not rush through their presentation; although there is lots of information to cover, there is plenty of time for them to complete their presentation.
2. **Body Language** –eye contact is an important aspect of a good presentation. Students should stand in front of their project (not sit) and move off to the side when showing the judge different aspects of their project (i.e. graphs, diagrams, photographs, model or display). Students should not chew gum or eat food while presenting

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Log Book

A log book contains all the information necessary to show the reader how the research was carried out and the students' thoughts at each step. It is one area where students consistently lose marks as they do not realize that the log book is a journal of their research activities.

The log book should include:

Planning:

- How students decided on their research topic: did they read it in a book, see a show on TV, search the internet, etc.?
- The thought process the students used to define their hypothesis. Rough copies of possible problem and hypothesis (based on background material).
- People the students spoke to regarding their research: parents, teachers, friend's parents, professor at university, email or telephone correspondence, etc.
- Background research: information that is gathered on the research topic from books, articles, journals/ magazines, internet search, encyclopedia, etc. This information will help the students answer questions from the judges and increase their overall knowledge.

The Study or Research:

- Scientific Principles and Key Concepts essential to the development of conclusions in the study.
- Problems and issues relevant to the subject. Areas for further investigation. Incomplete investigations.
- Summary of relevant data.

Depending on the method of study the students should include:

- Illustrations or schematics of models.
- Measurements of the reliability, accuracy, efficiency, and effectiveness of the design.
- Survey results in tabular and graphic form.
- Computer code and documentation.
- Systems design analysis.
- New ideas generated.

Conclusion:

- What data support OR disprove the conclusion? How certain are the students of their conclusion? Where does their conclusion lead them next?

A log book is usually not computer generated. The log book **IS** handwritten in an exercise booklet or coil booklet. The log book is **a complete record** of how the research or study was carried out, not just an iteration of what appears on the board.

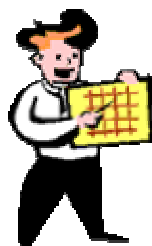
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their project.

3. **Structure of presentation** – students should go through their project in a logical, sequential and paced manner. Students should start by introducing themselves, the title of their project and how they came up with their idea for the project. Students should then go through their project from problem to conclusion including a discussion of the project's practical applications, how the research could be taken further, and what experiments might be undertaken to support the conclusion. The students should indicate they are finished by asking the judge if they have any questions.
4. **Appearance** – students should dress in nice, clean clothing or their school uniform.
5. **Audience** – students are presenting to a judge who has a love of science and understands the scientific method – however, the judge may not be very familiar with the subject area. The judge's main job is to determine if the students understand the scientific method and how they have applied it in their research. Judges also look for how well the students understand the subject matter and are able to explain their results.
6. **Practice** – students should practise their presentation, practise relaxing, practise adjusting their voice, practise, practise, and practise! Students should try not to read from their board or a script. We encourage the use of cue cards (with #s on them in case they are dropped), with the main points of the presentation written on them.

Teachers, remember to congratulate your students.

*It is a honour just making it to the
Calgary Youth Science Fair!*



CALENDAR OF EVENTS FOR CALGARY YOUTH SCIENCE FAIR

**LOCATION: Big Four Building, Stampede
Grounds**

REGISTRATION

WEDNESDAY APRIL 5, 2006

12:00 TO 6:00 PM

Students must come with their projects, and signed registration and safety forms. Once the students have registered their project, they are assigned a location in the Big Four Building where they go and set up their project. If the students require a power outlet, they must simply indicate this at the point of registration. If students wish to sit next to a friend, they must register at the same time.

JUDGING – MEDAL ROUND

FRIDAY APRIL 7, 2006

8:00 AM TO NOON

Students should be at their project by 8:00 AM as judging starts promptly at 8:15 AM.

JUDGING – SPECIAL AWARDS ROUND

FRIDAY APRIL 7, 2006

1:00 TO 3:30 PM

Students who have scored in the upper quartile from the morning judging will be judged again for the chance to win the major floor and stage prizes. All students **MUST REMAIN AT THE BIG FOUR** until 3:30 PM.

PUBLIC VIEWING

SATURDAY APRIL 8, 2006

9:00 AM TO NOON

**THE PUBLIC IS INVITED TO COME AND VIEW ALL OF THE
SCIENCE FAIR PROJECTS AND TO ASK STUDENTS
QUESTIONS ABOUT THEIR PROJECTS.** MEDALS ARE
PRESENTED TO THE STUDENTS AT THEIR PROJECT
LOCATIONS STARTING AT 11:00 AM.



AWARDS CEREMONY

SATURDAY APRIL 8, 2006

NOON TO 1:00 PM

Stage awards are handed out to students.

Reference Links:

Youth Science Fair Project Guide:

<http://www.ipl.org/div/kidspace/projectguide/>

Math Ideas for Science Fair Projects:

<http://mathforum.org/teachers/mathproject.html>

The Science Club: <http://scienceclub.org/>

Agricultural Project Ideas:

<http://www.ars.usda.gov/is/kids/fair/ideasframe.htm>

It's Science Fair Time:

<http://www.cecm.winnipeg.mb.ca/resources/tours/Marlene/sciencefair.html>

Science Fair Web Sites:

http://www.gesnrecit.qc.ca/schools/olp/webquest/sci_wq.htm

Science and Engineering Email Mentorship for Girls:

<http://www.scibermentor.ca/>

QUESTIONS AND ANSWERS

Q: I have more questions about the Calgary Youth Science Fair. Where can I find information?

Check out our website at www.cysf.org or you can phone one of our directors:

President – Fraser Head: 241-9513

Elementary Projects – Chuck Buckley: 284-4937
elementary@cysf.org

Secondary Projects – Danny Glin:
secondary@cysf.org

Elementary Entries – Fraser Head: 241-9513

Secondary Entries – Fraser Head: 241-9513

Safety, Human Subjects, Ethics, and Animal Use –
Leslie Sears 241-3287 safety@cysf.org

Q: Where can I see the results from last year?

On our webpage www.cysf.org there is information on past winners under the Info button.