Science Fair Newsletter

Volume 1, Issue 4 July 2003

for the Calgary Youth Science Fair April 5 – 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.

Characteristics of an Experimental Project

When an experiment is carried out using the scientific method, it 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 they would like to investigate.

Problem: the specific question the students are investigating in their experiment. For example, "How can soil erosion be controlled?"

continued on page 2

INSIDE THIS ISSUE

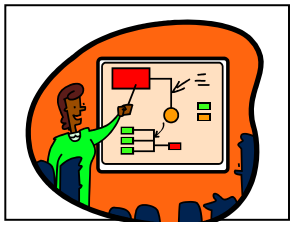
Presentations

What do judges look for in a project presentation?

Laura Schorn
Calgary Youth Science Fair Society

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 an Experimental Project" (see pp. 1-2)



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

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.

Graphs, tables and charts should be presented in the results and observation section. Graphs should have clearly labeled axes (responding variable on the y-axis

continued on page2

Experimental … continued from page 1

Hypothesis: what the students think will happen in the experiment based on their background research. In their experiment, students are testing their hypothesis.

The hypothesis should be written using the "If, then, because" format. For example: **If** grass and nasturtiums are planted in separate containers on the same slope angle, **then** the grass will prevent erosion better **because** grass shoots will grow more densely spaced and hold the soil in place.

Variables:

Controlled variable: a quantity, value or state that is held constant throughout the experiment; what you keep the same in experiment; e.g., time for growth, temperature, amount of water for plants, etc.

Manipulated variable: ONE quantity, value or state that is purposely changed in the experiment; what is changed in order to see what happens in the experiment; e.g. type of plant planted in the container

Responding variable: a quantity, value or state that changes when a variable is manipulated; what happens as the result of changing something; e.g., the amount of soil eroded in the containers of grass and nasturtiums.

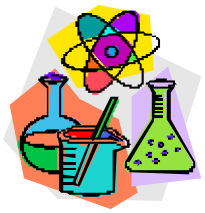
Materials: a list of all materials used in the experiment, e.g. 9 plant trays, Nasturtium seeds, etc. Bullets can be used to identify each new material. It is better to list materials separately than include them in the procedure.

Procedure: a step-by-step explanation of what occurred during the experiment, including the number of trials and sample size in each trial. The experiment should have at least three trials (whole procedure conducted three times) for proving "reproducibility" of results – this is a frequent omission in science fair projects. An adequate sample size would be, for example, three containers of grass and three containers of nasturtiums per trial.

Results/Observations: a complete set of data should be collected and recorded in a log book. The raw data should then be summarized in a table or presented visually in a graph with axes correctly labeled and units of measurement indicated.

Conclusion: the final outcome of the investigation as supported by the data/observations; the conclusion must prove or disprove the initial question/hypothesis researched or studied.

Application/Extension: explanation of why people would be interested in knowing the results and what they can use them for. How the experiment can be done differently in future or be improved upon.



Presentations … continued from page 1

(vertical) and the manipulated variable on the x-axis (horizontal)).

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, prior to 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; even though there is lots of information to cover, there is plenty of time for them to complete their presentation.

continued on page 3

Log Book

A log book/report contains all the information necessary to show the reader how the experiment was carried out and what happened 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 activities on the experiment.

The log book should include:

Planning:

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

Experiment:

- Shopping for materials – list of materials, date, where they found all their materials.
- Set up of experiment – description of location and set up – a photograph could be taken to show students setting up experiment or performing the experiment.
- Procedure of how experiment will be carried out. If any changes are made after the start of the experiment this should all be recorded in the log book with an explanation of why it was done and if the change will affect the results collected prior to the change.

Results:

- Include date, time, location, data collected (e.g. height of grass and nasturtiums, amount of soil eroded, etc.), and any other aspects that might affect the experiment (i.e. temperature dropped to 5^{o}C which could affect plant growth), etc.

A log book **IS 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 experiment was carried out, not just an iteration of what appears on the board.

Presentations … continued from page 2

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 board (i.e. graphs, diagrams, photographs, model or display). Students should not chew gum or eat food while presenting 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 and end with a discussion of the project's practical applications and what they might change if they were to do the experiment again and 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 experiment. 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 an honour just making it to the Calgary Youth Science Fair!

Calendar of Events for The 2006 Calgary Youth Science Fair

LOCATION: Big Four Building, Stampede Grounds, Calgary, Alberta

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.qesnrecit.qc.ca/schools/olp/webquest/sciwq.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?

A: 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?

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