Southeast Kootenay Science Fair Project Guide

Junior Project Primer

Grades 7 and 8

The materials enclosed will help you in planning your science project. They came from a variety of sources. Where the sources are known they are cited. Many materials have been passed along third or fourth hand and the sources are unknown.

We hope you enjoy your science discovery this year. See you at the Fair.

Compiled by:
Darcy Verbeurgt, with help from Sandra Whales, Jan Tymchyna and Barb Ryeburn

---

Science Fair 2004 Committee
School District #5 (Southeast Kootenay)

SCIENCE FAIR

Southeast Kootenay District Science Fair
March 6th, 2004

The Southeast Kootenay District Science Fairs are an annual one-day fair for students from Kindergarten to Grade 12 attending public, private, parochial or home school in SD#5 area. Entrants exhibit their projects to peers, a team of judges, and the public. This experience provides students with an opportunity to pursue some aspect of science in which he or she is interested, and become involved with the scientific process.

Fair Dates

Check with your school for **School Science Fair** dates.
The School District #5 **District Science Fair** (K - Gr. 12) will be held March 5th and 6th, 2004 at the COTR. The **East Kootenay Regional Science Fair** (Gr. 4 - 12) will be held April 3rd, 2004 at the COTR.
The **Canada Wide Science Fair** (Gr. 7-12) will be held May 15th to May 23rd, 2004 in St. John's, Nfld.

All inquiries concerning the District Science Fair can be answered by your school science fair contact, or may be addressed to:

Science Fair 2004 Committee

Mailing Address: c/o Cranbrook District Teachers Association
202 – 11 – 14th Avenue South
Cranbrook, BC V1C 2W9

Personal Contact: Darcy Verbeurgt 489-2236
E-mail Address: **dverbeurgt@shaw.ca**
Website: members.shaw.ca/EK_sciencefairs

SCIENCE FAIR RULES

1. One student does individual Projects only. Two students do Group Projects. Class Projects must have a minimum of five and a maximum of fifteen students from the same classroom.

2. A student may participate in only one project in the science fair.

3. All projects from grades seven to twelve must submit a one page typewritten report summarizing the project. The report will be given a value of ten marks in the judging.

4. The maximum sizes for projects, including backboards, are 0.8 metres from front to back, 1.2 metres from side to side and 3.5 metres high from the floor.

5. Projects must be durable and safe. Please inform your teacher if you need an electrical outlet. The student must provide their own extension cords.

6. Projects must be designed and assembled by students, although exhibitors may seek advice from various sources.

7. Dangerous chemicals, faulty wiring, open flames, explosives and living creatures will not be allowed in the fair. Maximum power consumption should not exceed 500 watts.

8. Living vertebrate animals are not to be used in experiments except for observations in a free-living state or observations of pets, fish or domestic animals.

SAFETY

There are strict safety requirements, which must be adhered to at all times. Safety requirements are constantly being reviewed and updated. Please contact the BC Science Fair Coordinator for the most recent revision.

Live animals are not to be displayed and procedures, which could harm or distress animals are not to be used.

PROTECTION OF INTELLECTUAL PROPERTY

Students are encouraged to recognize their innovation and invention has value and can be owned and registered. The patent process is a mechanism that is used to declare owner-ship.

This ownership can then be a benefit to all and can facilitate technology transfer

SCIENCE FAIR

Dear Student,

So you're going to do a science fair project. Great! Your work could be chosen as an entry in your school fair and even in regional, or national competitions. As a participant in any science fair, you'll get to show off your work and possibly receive achievement awards. But most important, you'll also learn a lot about science by observing and sharing with other science fair participants.

A science project is like a mystery in which you are the detective searching for answers. Science projects let you practice and exhibit your detective and science skills. You not only get to select which mystery to solve, but you can creatively design methods for uncovering clues that will lead to the final revelation of who, what, when, where, how, and why. This guide will give you guidance and ideas. It's your job to discover the answers!

A Successful Science Project:

1 Represents your work-not that of an expert or your parents
2 Indicates an understanding of the science area chosen
3. Shows careful planning that would eliminate a *"rush"* project
4. Has a notebook showing a complete record of all your work
5. Has a simple well-stated title and neat lettering
6. Includes photographs, charts, pictures, graphs, etc., that might be necessary to explain your work
7. Has accurate, valid, and correct observations
8. Tells a complete story-Problem and Solution
9. Is original in approach and presentation
10. Is self-explanatory
11. Is attractive and organized
12 Does not have to cost much money
13. Is best if it is an experiment, but it doesn't have to be
14. Is one that gives credit to those who gave help

A Science Fair Project is Not:

1. Only a report
2 Necessarily a new discovery or an original piece of research
3. Constructing a plastic model from a hobby kit
4. An enlarged model or drawing
5. A week-end chore
6. One, two or even three posters
7. Something done by your parents or teacher

SCIENCE FAIR

Steps in Making A Science Project

- ❑ **Choose a topic** and discuss it with your teacher. Ask your teacher for help and suggestions. Use the Choosing a Topic sheet. You can get ideas for primary students from level 1 and 2 and for elementary students from level 2 and 3. The internet has many ideas - make sure your child can do the topic.
- ❑ **Research your topic**. Find out as much about the topic a possible. Keep a record of your readings (title, author, publisher, year, pages) for your bibliography. Keep a project notebook (exercise book or duotang). Record all of your thoughts, preparations, and ideas.
- ❑ **Choose a project type** (Experiment, study, Innovation/Invention). Check the criteria for these areas and the level of complexity you want.
- ❑ **Plan your time!** Work on your project a little each day, don't wait until the last minute. Use the six or ten week planning sheet.
- ❑ **Design** your project. Follow the design sheets provided or do it on your own. Collect the materials needed for the project. Check with your teacher for suggestions and materials, he or she can save you time, excess, work, and money.
- ❑ **Do your project.** Record what you see happening in your project (observations). Analyse your data (results and conclusion)
- ❑ **Write a project report**
- ❑ Construct your **display** and make letters for your signs. Mount your pictures, graphs, charts, etc.
- ❑ **Prepare an oral presentation**. Plan what you are going to say to your teacher, your class, a judge. Practice on your parent.
- ❑ Present your science project at **the fair**.

- **Choosing a Topic**

The first and sometimes the hardest part of a science project is to get a clear idea of the problem that you are investigating. Where do you look for a problem that interests you? It is important to work on something you like. Often the environment around your home will give you an idea. Perhaps you might find topics discussed in the newspaper or on the television; particularly if they are local problems that look to scientific methods for solution.

If these fail to yield an idea then you might check your science textbook for suggested projects. Many science textbooks contain lists of project work. If you are still undecided then a trip to the library may help. A librarian can direct you in your search. As you scan lists of projects, try to stay close to the subject area that you are studying in school or to a subject area that really interests you. Perhaps a talk with your science teacher might help you find a topic. Finally after considering hundreds of ideas, you will eventually settle on the best one for you.

Narrow your topic.
Most often your first idea is too broad or general for a science fair investigation and will need to be narrowed down. A poor topic would be, "How Plants Grow." Consider "The Effect of Acid Rain on Bean Growth." This second topic is narrow enough to investigate.

The easiest way to narrow your topic is to learn more about it. The library is the place to get this information. An encyclopedia will provide general information. From this information the subject area of the card catalogue will be of more use. Use the library to learn enough about your subject so that you can define a specific problem.

It is not uncommon for a professional researcher to consult with his colleagues; you too should seek help when necessary. Other students, your teacher, parents, or even other experts can help you narrow your topic. Once a clear statement of your topic is complete, you can begin the real work of investigating.

SCIENCE FAIR

Choosing a Topic

List all of your interests and choose one.

_____

_____

_____

What questions can I ask about this toplc?

_____

_____

_____

Is there an experiment that I can do to answer one of these questions?

_____

_____

_____

My choice of toplcs for the Science Fair:

_____

_____

My question for the Science Fair:

_____

_____

SCIENCE FAIR

Ways to find a science fair project idea

1. Look at lists of science categories and pick one that you are interested in, then narrow that down to a project. (Example, say you pick psychology, then narrow it to the differences between boys and girls, then to a topic like "Do boys remember boy-type pictures (footballs) better than girl-type pictures (flowers)?" (Two lists of categories attached)

2. Use your experiences Remember a time you noticed something and thought, "I wonder how that works?" or "I wonder what would happen if..." then turn that into a project. Check the school library for books on science projects. Browse and look at book titles, then look inside the ones that look interesting to you. Also thumb through encyclopedias and magazines. Good magazines for ideas are National Geographic, Discover, Omni, Popular Science, Popular Mechanics, Mother Earth News, High Technology, Prevention, and Garbage. Perhaps go to the downtown Library.

3. Think about current events. Look at the newspaper. People are hungry in Africa because of droughts - a project on growing plants without much rain, which types grow ok with little water? Or the ozone hole over Antarctica - how can we reduce ozone? -A project on nonaerosol ways to spray things. Or oil spills. how can we clean them up? -A project on how to clean oil out of water

4. Watch commercials on TV. Test their claims. Does that anti-perspirant really stop wetness better than other ones? What are the real differences between Barbie and imitation Barbie dolls? Can kids tell the difference between Coke and Pepsi if they don't know which they are drinking?

More Ideas:

Take these ideas and add something of your own, for example, change Are dogs colorblind? Are cats colorblind? Or look at another of the 5 senses of dogs and test their sense of taste...

* What material is the best insulator
* Do soap bubbles last longer on warm or cold days
* What is the best method, other than heat, to melt ice
* What soils are best to build a house on
* How do plants react to different kinds of fertilizer, different light, colors, and different photoperiod

Try putting different words in these blanks...

What is the effect of _____ on _____?

detergent ------- germination of seeds
temperature--------the volume of air

How/to what extent does the _____ affect _____?

humidity----------growth of fungi
color of a material----------its absorption of heat
fertilizer ----------the growth of plants

Which/what _____ (verb) _____?

detergent---------- makes --------- --the most bubbles

From: Science Primer
< http://users.erols.com/tedrowan/moreideas.html>

SCIENCE FAIR

❑ Research

This is where you find out as much as you can about your topic. Chances are that someone has studied this area before and has written about it. As you narrowed your topic you will have found some of this information. You could look at how other scientists have approached this area before. What experiments have they done? What were their results? All of this pre-reading will help you design your project and it will help you understand what you observe.

Make sure you keep a Project Data Book: A project data book should contain accurate and detailed notes to demonstrate consistency and thoroughness to the judges and to assist you with your research paper. It would include your research notes as well.

SCIENCE FAIR

❑ Choose Category and Project Type

Choose an Exhibit Category

- **Computing and Mathematical Sciences:** Project deals with computing, math models, innovative software or hardware design, or use of math to solve theoretical problems.
- **Engineering Sciences:** Project applies physical science knowledge to solve a problem of achieve a purpose.
- **Life Sciences:** Project examines some aspect of the life or life style of an organism. Biology, Zoology, Botany or aspects of pure or applied medicine are part of this category.
- **Physical Sciences:** Project studies an abiotic phenomenon in order to understand the relation of identified factors. Physics and Chemistry comprise this category.
- **Biotechnology:** The application of knowledge of biological systems to solve a problem, create a product or provide a service in one of three subject fields: crop development, animal science or microbial. study.
- **Earth & Environmental Sciences:** Projects dealing with the study of earth and space science, along with the impact of environmental factors on biological systems. Include the fields of ecology and oceanography.

Choose Your Type of Projects

- **Experiment:** An investigation undertaken to test a specific hypothesis.
- **Study:** A collection and analysis of data to reveal evidence of a fact, situation or pattern of scientific interest. It could include a study of cause and effect relationships or theoretical investigations of scientific data.
- **Innovation/Invention:** The development and evaluation of innovative devices, models, techniques or approaches in technology, engineering, or computers.

❑ Planning Your Project

Use the following six- or ten-week project plan as a general guideline. You will likely need more than six to ten weeks so adjust the time according to the dates of the fair and guidelines that your teacher may give you. However you use it, the project plan does provide you with a planning page so you can cover all of the steps.

The more time you give to a project, the better it will be.

Science Fair Central

Starting Your Project - Six-Week Schedule

Taking on a science fair project might seem like a huge task, but it doesn't have to be an overwhelming experience. Use the timetable below to think through the steps in the process and follow a clear schedule.

Date of the science fair _____

Date to begin working on project _____
(Six weeks before science fair opening date)

Scheduled Weekly Events	Scheduled Completion Date	Actual Completion Date
Week 1 * Choose a topic or problem to investigate. * Start a journal to keep all your notes and research along the way. * Begin primary research: Write for information from experts, such as scientists, businesses, and government agencies. Set up interviews when necessary. * Begin secondary research: Search printed sources (books, journals, magazines, and newspapers) and electronic sources (Internet and software).		
Week 2 * Change your topic or problem if necessary. * Decide how to set up your investigation or experiment, including the procedure and necessary materials. * From your initial research, write your hypothesis. * Continue your research using the best resources you found. * Interview experts for more information.		

Starting Your Project - Six-Week Schedule

(Page 2)

Scheduled Weekly Events	Scheduled Completion Date	Actual Completion Date
Week 3 * Complete initial research. Set up outline for written report. * Start your experiment or demonstration collection. Record observations in your journal. * Begin collecting or buying materials for your display.		
Week 4 * Work on first draft of written report. * Continue to record observations from your experiment in your journal. * Write down or sketch preliminary designs for your display.		
Week 5 * Write second draft of your report. * Start assembling display unit. * Begin designing signs, labels, charts, graphs, or other visual aids for display. * Write text for background of display and plan its layout. * Continue to record observations from experiment. * Take any photographs you need.		
Week 6 * Complete your experiment or collection. Analyze observations and write up your results. * Write, type, and proofread final version of written report. * Have photographs developed and enlarged. * Type explanations or background information and mount them on your display. * Finish constructing your display, including graphs, charts, and visual aids.		

SCIENCE FAIR

❑ Investigation and Design

- Computer Sciences: the project should deal with some facet of computer technology— hardware or software.

- Engineering Sciences: the project involves the design and/or physical construction of some device, appliance, machine or process that has an application.

- Life Sciences: the project should involve biology, zoology, botany or aspects of pure or applied medicine.

- Physical Sciences: the project should be related to physics, chemistry or mathematics. Its primary objective is a consideration of the cause and effect of some abiotic process or activity.

- Biotechnology: the project should demonstrate the application of knowledge of biological systems to solve a problem, create a product or provide a service in one of three subject fields: crop development, animal science or microbials.

- Environmental Sciences: the project deals with the study of earth and space science, along with the impact of environmental factors on biological systems. Projects in this category would include the fields of ecology and oceanography.

SCIENCE FAIR

Experimental Project

In an experimental project you need to have the following sections.

Each section will appear as a panel on your display board

You also need to have your workbook (or duotang) on display with the backboard. Your workbook will also have all of these sections plus your detailed materials, procedures and results.

A title page for your workbook would be a good idea.

- Purpose
- Hypothesis
- Summary of background research
- Materials and procedures
- Results and observations
- Conclusion
- Application
- Bibliography

If you wish to have a workbook on this section it is available from the school contact.

SCIENCE FAIR

Study Project

In a study project you need to have the following sections.

Each section will appear as a panel on your display board

You also need to have your workbook (or duotang) on display with the backboard. Your workbook will also have all of these sections plus your detailed materials, procedures and results.

A title page for your workbook would be a good idea.

- Purpose
- Summary of background research
- Materials and procedures
- Results and observations
- Conclusion
- Application
- Bibliography

If you wish to have a workbook on this section it is available from the school contact.

SCIENCE FAIR

Innovation / Invention Project

In an Innovation / Invention project you need to have the following sections.

Each section will appear as a panel on your display board

You also need to have your workbook (or duotang) on display with the backboard. Your workbook will also have all of these sections plus your detailed materials, procedures and results.

A title page for your workbook would be a good idea.

- Purpose
- Summary of background research
- Materials and procedures
- Results and observations
- Conclusion
- Application
- Bibliography

If you wish to have a workbook on this section it is available from the school contact.

SCIENCE FAIR

Written Materials

Abstract: An abstract is written once your research and experimentation are complete. It should include a statement of the problem/purpose of the experiment, the procedures used, your data and your conclusions. For the Canada-Wide Science Fair, your abstract must not exceed five double-spaced typewritten pages. Check locally for requirements of your regional fair. Abstracts are distributed to the judges to familiarize them with the project. The abstract is evaluated as part of the project.

Project Data Book: A project data book should contain accurate and detailed notes to demonstrate consistency and thoroughness to the judges and to assist you with your research paper.

Research Paper: A research paper includes the following:

- Title Page: Center the project title and put your name, address, school and grade at the bottom right.

- Introduction: Includes your hypothesis, an explanation of what prompted your research and what you hoped to achieve.

- The Experiment: Describe in detail the methodology used to collect your data or make your observations. Include enough information for someone to repeat the experiment. Include detailed photographs or drawings.

• Discussion: Thoroughly discuss exactly what you did in your project. Your results should be compared with theoretical values, published data, commonly held beliefs and/or expected results. A discussion of possible errors should be included as well as how the data varied between repeated observations, how your results were affected by uncontrolled events, what you would do differently if you repeated the project, and what other experiments should be conducted.

• Conclusion: A summary of your results.

• Acknowledgements: Credit individuals, businesses and educational or research institutions which assisted you. Identify financial support or in-kind donations.

• References: List any documentation that is not your own (i.e., books, journal articles).

SCIENCE FAIR

Display and Presentation

The project should attract and inform, be easy to assess the study and results, and make the most use of space with clear and concise displays.

Displays must conform to the official Canada-Wide Science Fair maximum-size restrictions: 1.2 metres wide; 0.8 metres deep; 3.5 metres high from the floor.

The display should include headings that stand out, posters containing written material and charts, clearly drawn and correctly labeled graphs and diagrams, and some of the apparatus used so that key aspects of the project can be demonstrated.

Backboards are an essential element for display of projects. Backboards are to be constructed of materials that are unlikely to ignite and in the presence of fire will not allow flame to spread readily or produce toxic fumes. Allowed backboards and title boards include Sintra, InteFoam, Flame Out, metal, plexiglass or acrylic, wood and wood products 6mm thick or thicker and other UL-94 approved synthetic materials.

Additional backboard suggestions:

- Air pockets should not be left behind any paper used to decorate your backboard.
- Overlapping sheets of paper are not acceptable
- Panels may be painted with any common paint.
- Pegboard allows flexibility for arranging thre-dimensional exhibits.
- White pine should be used for bracing, framing and other woodwork.
- Removable pin hinges and wing nut bolts save assembly time and assist maintenance.

Parents Section

SCIENCE FAIR

Dear Parents,

The enclosed materials should assist you in helping your youth in doing their science fair project. As these materials are directly related to the students that will travel on to regional and national fairs it is suggested that all of the guidelines be followed. Note that if students have IEPs and are adapted or modified, they can enter the fair and will be allowed the adaptations or modifications that they are accustom to having in their regular schoolwork.

To confirm that we have received the fair registration forms, summary reports, and fees (where applicable), we are requesting you contact the science fair contact at your school. They will have the appropriate forms and information about the district science fair for you. The contact person could be a teacher, Principal/Vice Principal, or PAC member.

In the week prior to the fair (no later than March 1st, 2004) the contact person from each school will contact us to confirm that:
1. the students' summary reports (mail or email) have been received
2. the registration forms have been received
3. the registration fees for non-SD#5 schools have been received*

* SD#5 provides a sum of money that covers the SD#5 students. Schools outside of the public system of SD#5 will provide a fee of $10.00 per project to a maximum of $500.00 per school/group.

The District Fair Co-chairs may be contacted if there is no school contact.

Personal Contact: Darcy Verbeurgt 489-2236
E-mail Address: **dverbeurgt@shaw.ca**
Website: members.shaw.ca/EK_sciencefairs

Why Science Fairs?
Information for Students and Parents

Creating and presenting a science fair project assists students in learning valuable job skills: communication, critical and logical thinking, the ability to evaluate situations, solve problems and make decisions, life-long learning, a positive attitude and self-confidence, a sense of responsibility, the ability to manage time and other resources, adaptability to changing circumstances, and team-work skills.

Students work as scientists, experiencing the excitement, pleasure, frustration and collaboration connected with scientific research. Working on a project develops creativity and enterprise, challenges construction and artistic skills, strengthens communication abilities and provides opportunity for self-expression.

At science fairs, students learn from the experience of presenting their work to judges and general public, from the feedback and suggestions of the judges, from seeing and discussing the work of other entrants and from meeting other students with similar interests.

Exhibiting their projects provides students with recognition of their scientific endeavours and encourages young people to take a serious interest in science as a career.

For further information on science fairs and science fair projects, please contact your teacher and / or school principal.

- **Exhibit Categories**

Computing and Mathematical Sciences: Project deals with computing, math models, innovative software or hardware design, or use of math to solve theoretical problems.

Engineering Sciences: Project applies physical science knowledge to solve a problem of achieve a purpose.

Life Sciences: Project examines some aspect of the life or life style of an organism. Biology, Zoology, Botany or aspects of pure or applied medicine are part of this category.

Physical Sciences: Project studies an abiotic phenomenon in order to understand the relation of identified factors. Physics and Chemistry comprise this category.

Biotechnology: The application of knowledge of biological systems to solve a problem, create a product or provide a service in one of three subject fields: crop development, animal science or microbial. study.

Earth & Environmental Sciences: Projects dealing with the study of earth and space science, along with the impact of environmental factors on biological systems. Include the fields of ecology and oceanography.

- **Types of Projects**

Experiment: An investigation undertaken to test a specific hypothesis.

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

Innovation/Invention: The development and evaluation of innovative devices, models, techniques or approaches in technology, engineering, or computers.

- **Fair Dates**

Check with your school for **School Science Fair** dates.
The School District #5 **District Science Fair** will be held March 28th and 29th, 2004 at the COTR.
The East Kootenay **Regional Science Fair** will be held April 12th, 2004 in Creston.
The **Canada Wide Science Fair** will be held May 200 in Calgary, Alta.

For further Information contact: Sheilah Moore at 426-4309-or Karen Bailey-Romanko at 426-5021.

School District No. 5
Science Fair
Statement of Authorship

The use of unauthorised material as an information source in a Science Fair Project is a serious form of cheating.

"Plagiarism" is the submission of written work by a student containing ideas; words or actual textual material, which are not the original, work of the student, and are not acknowledged in an appropriate way. Plagiarism is cheating and as such is considered to be a serious matter.

It is the responsibility of every student to avoid committing plagiarism by learning the proper procedure for the acknowledgement of the work of others.

Students suspected of cheating or submitting a project which is shown to contain plagiarised- material would be disqualified prior to, or, at any time during the Science Fair. Any student disqualified after the Science Fair will forfeit all prizes and monies awarded to him/her.

_____

Science Fair 2004 Committee
School District #5 (Southeast Kootenay)