Project Basics for the Bewildered Parent

By Sandy Walker

Some fortunate students have parents who are teachers or scientists. ***Most do not!***

Help is here!

Are you having fun yet? At this point, your child may have the experimentation part of the project completed and now needs to transfer all of this great information into a notebook and onto a display board. Teachers are great, but students generally complete the displays and notebooks at home and they almost always need some parental help. If you have never been exposed to science fairs, you probably have little or no idea about how to guide your child through the process.

Visit our website http://basef.ca/2005/results/ to see a complete set of BASEF 2005 results. The "Gallery of Winning Projects" displays all of the winning projects with a photo of the display, abstract and list of awards. The photos are detailed enough to get some great ideas on winning project designs and the caliber of the projects. You can also view projects from some of our previous fairs.

A complete science project includes the following:

1. Project Journal or Logbook:
This is a handwritten diary listing the dates and actions taken with respect to the project.

2. Project Display:
The project display is a summary of the project and should highlight all of the key points. The display is worth 10% of the project mark.

3. Project Notebook:
The project notebook is the formal project report, prepared using a word processing program such as Word or Word Perfect and neatly organized in a labeled binder. The notebook is worth 20% of the overall project mark.

Basic elements of a good project notebook include:

1. **Background:** This is the information gathering and literature research part of the project.
2. **Purpose:** The purpose is a description of what the student will do.
3. **Hypothesis:** The hypothesis is an educated guess of what the student thinks will happen.
4. **Materials:** These are the equipment, chemicals etc. used in the experiment.
5. **Procedure:** A step by step explanation of how the experiment was done.
6. **Observations:** These are the measurements made (in metric) and usually presented in a table.
7. **Results:** These are the collection of observations presented in graphs.
8. **Conclusions:** Describe the outcome of the experiment and whether or not the hypothesis was correct.
9. **Discussion:** Include why the experiment was successful or why it wasn't, including sources of errors.
10. **Glossary of terms:** Definitions of words that may not be familiar to most people ***(optional)***

11. **Bibliography:** A list of the books, articles and specific web addresses that were used for research.
12. **Appendix:** Additional material such as raw data collected, survey sheets and copies of the internet research material, articles etc. ***(optional)***
13. **Acknowledgements:** A thank you to the people who helped with the project.

The following article was designed in the format of a science project notebook.

Background:

Most of the BASEF volunteers are experienced science fair parents who realize the value of science fair participation and the increased motivation, confidence and self esteem, not to mention monetary rewards, that a successful science fair experience can bring to a student.

Children need the support of their parents! Sometimes it's just a matter of proof reading the material or doing the dangerous stuff with power tools. At other times, the child needs help understanding scientific concepts, how to use a computer program such as Excel, or how to stick things on the display board so that they are neat and stay on. It's okay for a parent to handle the glue stick or use the paper cutter. Consider your assistance to be coaching and/or home schooling. Just remember to be patient and that your child is the one who has to perform the experiments, do the research and present the material to the judges.

Projects are judged out of a total of 100 marks. The judging criteria are available at http://basef.mcmaster.ca under the "Judges" heading. Points are awarded in the following sections:

Scientific Thought and Creativity: 45 marks
These marks make up the largest single component of the score. Even if the project is ***NOT*** a new idea, a student can still receive good marks if they did a careful job on the project and perhaps even did something just a little bit different.

Project Displays: 10 marks
You can refer to the judging sheets to get a more complete idea of what the judges are looking for. The procedure section contains further "how tos".

Abstract: 5 marks
An abstract is a short (one page maximum) summary of the project in a concise, complete and accurate way. The abstract should state the purpose, hypothesis, a brief description of the procedure, results and conclusions. It can also include applications and why the results are important.

Notebook: 20 marks
You can refer to the judging sheets to get an idea of what the judges are looking for. Further details are also found in the procedure section.

Interview: 20 marks
Helpful hints for a successful interview can be found in section C of the procedure.

Purpose:
The purpose of this article is to provide some basic information on preparing notebooks and displays, and the judging experience.

Hypothesis:
If your child has never participated in a science fair, then we assume you can use some help. Children who are coached perform better at science fairs than children who are left to their own devices. Children with supportive and involved parents have a better science fair experience.

Procedure:

This procedure is divided into three sections that include information on:
A. Notebook
B. Display
C. Interview

A: Notebook:
1. We recommend a small binder with a clear insert section on the front so that a title page can be inserted.

2. **Title Page:** Most projects have a catchy title such as "C" for Yourself followed by a more descriptive subheading such as: Quantitative Measurement of Vitamin C in Fruit Drinks and Juices. Also include the student's name, grade and school.

3. Use a table of contents and number the pages.

4. Label and number any charts, tables or figures (example: Figure 1: Products Tested)

5. Use sheet protectors if possible. (They make the binder bigger and protect all of the hard work your child has done).

6. Use binder tabs to separate the sections.

7. **Page 1** = repeat of title of page

8. **Page 2** = table of contents

9. **Page 3** =abstract

10. **Page 4-?** = background …the background is the literature review and research into the topic. A minimum of ten pages is not unusual for a good project.

11. Following pages:
    Purpose
    Hypothesis

Materials and Equipment Used
Procedure: include any reagents were made or how the testing station was built
Observations: what was measured and observed; tables can be used to display this data
Results: results of the experiment and any calculations that were done to get final results; charts and bar graphs done in Excel, Lotus, Quattro Pro are a good way to display results for the display and notebook
Conclusions: example: Brand B was better because it lasted longer and was the least expensive
Discussion: include any sources of error, how the project could be improved and some information on the next phase if there are plans to continue working on it
Glossary of Terms: if the project is complicated and uses terms that may be unfamiliar to most people, include a glossary

Acknowledgements: thank the people who helped with the project

Bibliography: List the books used and the internet addresses of the sites that were used. **Note:** do not cite computer programs such as Microsoft Office or web sites such as google.ca as references; for web sites you need the exact URL address and page; it is easiest to just copy and paste it. ***There is a specific format (APA) for bibliographies*** that should be followed. Information can be found at: www.apa-mla.com/formats/apapage.html

Appendix: The appendix is an additional section at the back of the binder for miscellaneous information. Internet research material that was printed off can be included as well as the observation sheets that were filled in by hand. Make sure that there is information in the Table of Contents as to what is in the Appendix so it is not overlooked.

B. Display:

1. All written work should be done in a font such as Arial, size 36 so that it can be read from a distance.

2. Paper should be neatly mounted coloured plain bond paper.

3. Titles such as Purpose, Hypothesis etc. should be larger and easily read.

4. Charts and tables should be clearly labeled with a title and on both of the axis.

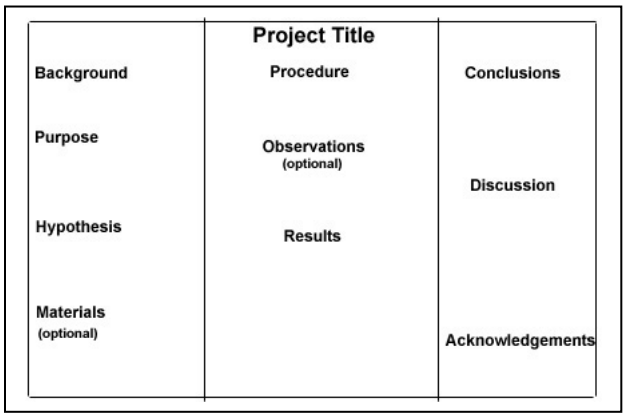
5. Avoid gluing across the folds in the cardboard display board. After the project is folded up a few times, the paper tends to come unglued. The project title can be done in pieces so that it doesn't have to be folded.

6. Make sure that there are no spelling mistakes.

7. Have a copy of the abstract in a sheet protector on the display table so that the judges and visitors can easily read a summary of the project.

Note: BASEF awards 5 marks to the abstract so it is important to have one that covers all aspects of the project in a concise, complete and accurate way. Make sure that it is well written with no grammar or spelling errors.

8. Suggested display layout:



Cardboard display boards are available at most office supply stores such as Office Depot or Staples. The display cannot exceed 1.2 meters in width. Displays are more interesting if they are neatly done, with the text pages mounted on coloured paper. (Please..no neon colours!) Pictures and graphs add to the display. Students often use small borders to decorate the board and often poster paint the board before mounting the paper. The table area in front of the display will hold the notebook, abstract and additional pictures or pieces of equipment. ***Note: There are very stringent safety rules for displays. Visit the BASEF website for further details.***

C: Interview:

1. The student should stand up and introduce themselves to the judges and offer them a chair.
2. Students must know where the information is on the display and in the notebook.
3. The presentation should be practiced until you know more than you ever wanted to know about your child's project.
4. **Neat** but comfortable clothes should be worn (neat jeans are OK).
5. The judges are not out to trick or confuse the students. They want students to do well and will give them every opportunity to do so.
6. Some judges start out asking questions and others will just want the student to go ahead and present the project. Make sure your child is prepared for either approach.
7. At the end of the interview, the judges should be thanked.
8. The judges may ask if the student has anything else they want to say. Students should be prepared with a brief statement such as "I really enjoyed working on this project because I learned so much about……(fill in something appropriate such as using chemistry equipment etc.).

Observations:

Measurements	Children who are not supported by parents	Children who receive support from parents
# of smiles during judging	3	10
Average project mark (%)	72 %	85 %
# of smiles during awards	3	12
Repeat Participation (%)	45 %	98 %

Table 1: Observations of Smiles, Marks and Repeat Participation

Results:

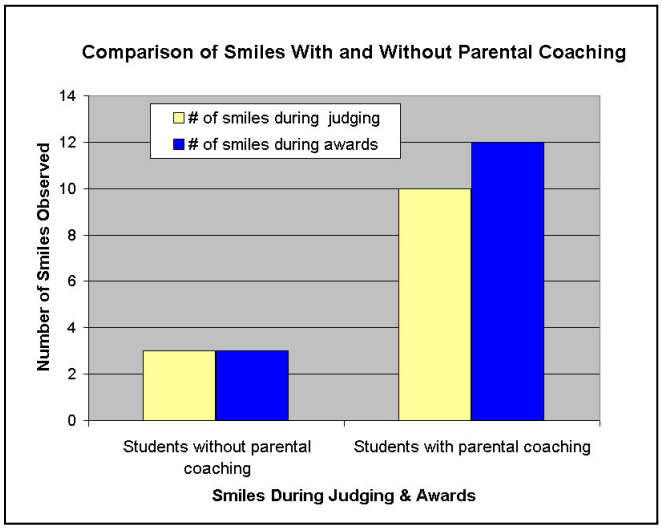


Figure 1: Number of Smiles Versus Parental Coaching

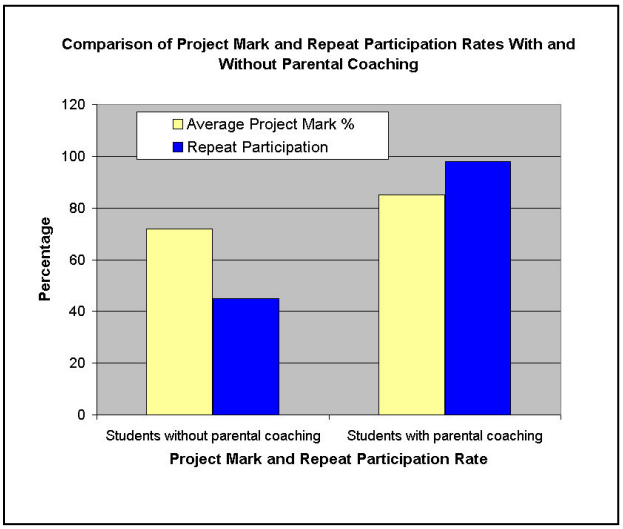


Figure 2: Project Mark and Repeat Participation for Students with and without Parental Coaching

Conclusions:

The results clearly show that our hypothesis was correct. Children who receive support from their parents perform better at science fairs. They received higher marks for their projects, enjoyed the judging and awards ceremony more and competed at subsequent science fairs.

Discussion:

Science fairs can be a very rewarding experience if the student is well prepared and knows what to expect. The same is true for parents. There have been many potentially great projects that produced disappointing results for students when they were judged. Guide your child using the information provided and above all, remain patient and supportive. Science fairs do not have to be a dreaded, compulsory school activity but can actually be quite enjoyable.

BASEF awarded more than $212,000 in cash, scholarships, awards and prizes in 2005. Included were 20 all expense trips to the Canada Wide Science Fair in British Columbia, (grade 7 to 12 students eligible) and for high school students only, 4 trips to the Intel International Science Fair in Phoenix, Arizona. While the prize purse for BASE 2006 has not been finalized, rest assured that it will be substantial.

If your child proceeds to this level of competition, there will be plenty of coaching offered by the experts from BASEF.

Acknowledgements:

We would like to extend our sincere thanks to the many teachers, students, volunteers and parents who have made the Bay Area Science and Engineering Fair a successful event for over forty years.

Bibliography:

I'm not going to include a real bibliography but our local libraries as well as the internet offer a multitude of resources for science fair project ideas and helpful hints.

Some of my personal favourite resources include:

Science Success!
This series of documents include a student workbook designed to help students in or out of a school setting create a complete science fair project. The materials were created by BASEF and available for download in the "Document" section of www.basef.ca

Since their publication in 2003, these materials have received rave reviews regionally, nationally and internationally.

Project Ideas:

www.sciencebuddies.org
This US organization was started by a parent who was impressed by the benefits of science fair participation. The web site has a wealth of information including a ***"Project Selection Wizard"*** that is designed to help students focus in on what aspects of science most interest them.

It also includes some project ideas and information by area of science as well as a section on **"Cutting Edge Science Projects"**.

www.discovery.com
This website has a section **"Science Fair Central"** with some excellent information and links to additional resources.

Sandy Walker was a Medical Laboratory Technologist, employed as the Diagnostic Unit Manager of Clinical Chemistry at McMaster University Medical Centre. Since her daughter Dayna competed at BASEF 2002, Sandy has been an active volunteer with BASEF and has coached numerous students for science fair competitions. Many of these students have advanced to regional, national and international competitions. Dayna has earned the unprecedented honours of being the first elementary student to win BASEF Best in Fair in 2003, followed by a second Best in Fair win in 2004.