Hello Teacher!!

I am so excited that you have chosen to take on Science Fair. When this program was started, the ScienceExperience101 team would come into classrooms and work with the students, step-by-step through the entire Science Fair process.

As the program grew, we realized that there was no way to physically be a part of every classroom experience, and not wanting anyone to miss out on the joy of Science Fair, we have created this Teacher's Manual. The Teacher's Manual will take you through every aspect of the Scientific Methodology and show you the little in's and out's that help create successful and satisfying Science Fair Projects. What seemed so daunting at first… turned out to be fun and simple. We've laid out everything for you in what, we hope, will prove to be an easy map to follow.

With this Manual and with the online support you can find, there will be nothing left for guessing.

We hope you enjoy this experience.

Sincerely,

Cynthia Organ

Coordinator ScienceExperience101

"Humans love to wonder, and that is the seed of science."   Emerson

Science fair projects are divided into 2 groups

Demonstration and **Experimentation**

Demonstration projects *do not* use the Scientific Method. The most common demonstration projects are #1. The baking soda/ vinegar volcano and #2. The solar system… these projects display information but have no experimental aspect

Experimentation utilizes the Scientific method. The word COMPARE is what you are looking for. You want to test different things within the project, get results and compare them to one another.

Example: Build 4 volcanoes with different amounts of vinegar and the same amount of baking soda, and COMPARE the reaction.

At the back of this manual, as well as the student manual, I have included an on-line resource list for websites to search project ideas; some are experimental, some are demonstration but often, with a little tweaking, a demo project can be turned into an experiment.

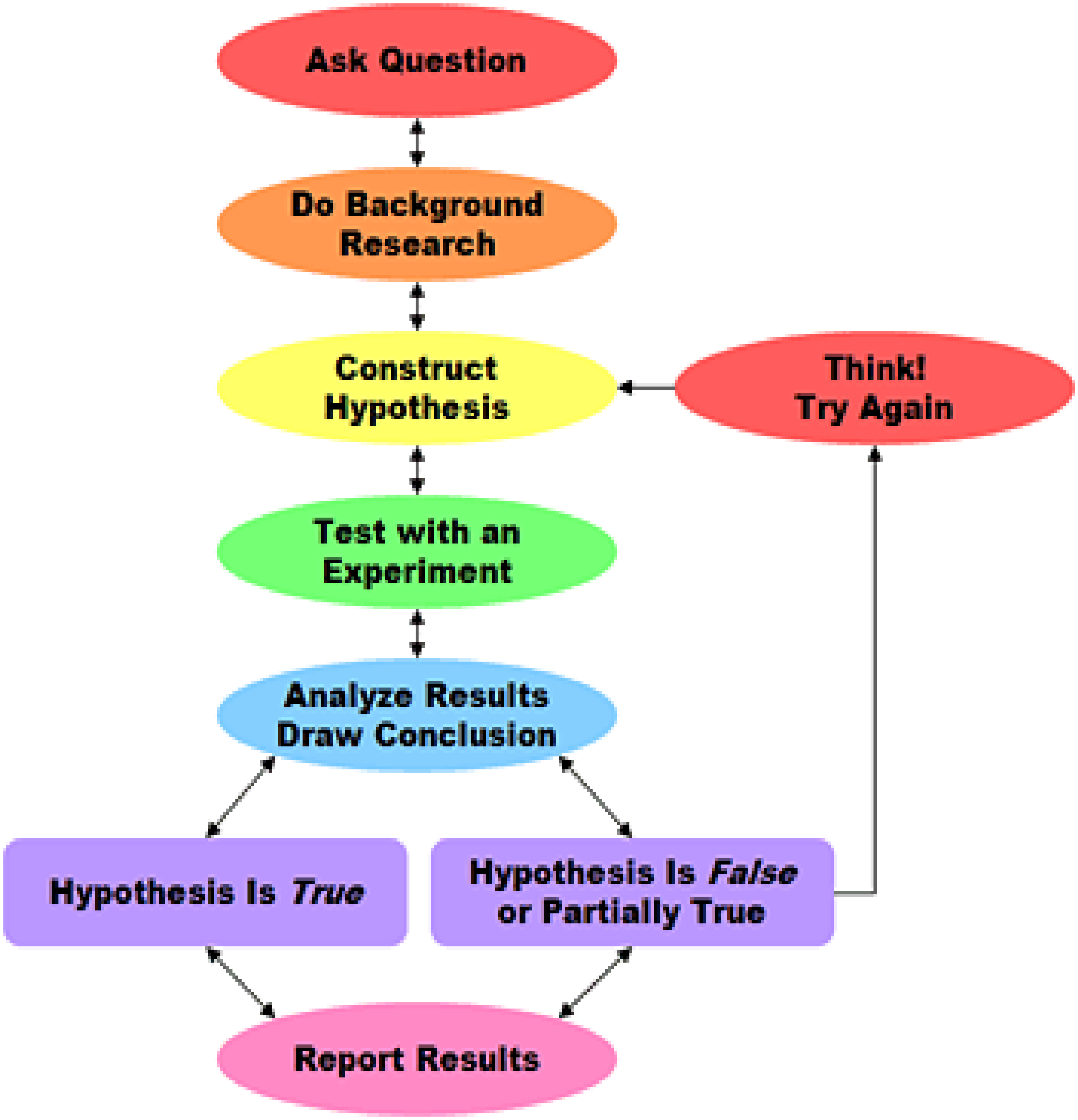
******it should be noted that demo projects do not do well at higher level competitions

STUDENT ACTIVITY PG.1

This should help the kids understand the concept of what is a demo and what is an experiment (DEMO- A,C,D) (EXPERIMENT- B,E,F)

For many years, Scientists have been using the **SCIENTIFIC METHOLODGY** to help with their experiments and we are too!

The **main** steps look like this.



We will be following this basic outline.

List of Fundamental Aspects of an Experimental Project

Your students also have this list (Pg. 3) and it will help keep them organized.

A **LOG BOOK** will help. There are certain parts of their project that they will need to have written somewhere else; EX. Their research, their materials and procedure lists and their observations. This manual and their **LOG BOOK** can easily be stored together in a folder or binder and it really helps to keep everything together.

- ☐ An EXPERIMENTAL project… are you COMPARING something?

☐ Question	☐ Manipulated Variables (3)
☐ A Control Variable	☐ A Responding variable
☐ 3 Fun Facts	☐ More Research
☐ Hypothesis	☐ Materials List
☐ Procedure List	☐ Multiple Trials
☐ Observations	☐ Graph/ Chart (with numbers and units)
☐ Conclusions	☐ Application
☐ Extension	☐ Sources of Error
☐ Thank You's	☐ Report
☐ Bibliography	☐ Display Board

It is important for students to follow all of these steps… but at the lower levels, it is ok to just touch on each one. The hope is that in the following years, they will become familiar with the process and be able to go into each one in further detail.

STEP #1- QUESTION (Picking a project idea)

In a classroom setting, having the kids brainstorm about their hobbies and interests can often get the ball rolling. (Student Manual PG. 4)

Hobbies are a good place to start, and then we need to talk about different aspects of that hobby.

EX. Dancing- types of shoes, types of materials, type of flooring, music, tempo

Hockey- ice, skates, stick, hockey tape, helmet, puck

Music- hearing, instruments, type of sound barriers, types of music

Skateboarding- wheels, bearings, bearing grease, angles of ramps, grip tape

****We are trying to get the students to think of all the things associated with their hobbies that they can later experiment with****

In an on-line search, kids can input their hobbies/ interests into the search bar and often ideas for a project pop up, having several to work with is a good idea. Remember to focus on the word **COMPARE.**

EX. "HOCKEY SCIENCE FAIR EXPERIMENTS"

…but first we need them to take some time and come up with several ideas. Save the GOOGLE direction for kids who really struggle

A really great project focuses on one aspect, changes it, and observes how that change affects the outcome.

EX. MUSIC- if I put a radio inside of a cardboard box, what material will best insulate the sound?

HOCKEY- what kind of hockey tape gives me the best accuracy while shooting?

****This is often the hardest part of the whole process; don't fret if some of the project ideas are very rudimentary, it's the process that is important… and the FUN!!****

STEP #2- FINDING OUR VARIABLES (PG. 6 student manual)

There are 3 variables in an experimental project

Manipulated- is the thing you are changing!!
Music- ***type*** of insulating material (egg cartons, styrofoam liners, cotton balls)- control is 'no insulating material'
Hockey- ***type*** of tape (packing tape, duct tape, electrical tape)- control is standard hockey tape
at the very least, urge for 3 things to test and 1 control

Responding- is the thing you are measuring. It is the variable that RESPONDS to the changes you make. This is where you get your results
Music- the ***distance*** from the box that you can still hear the music or the reading on a decibel meter at 1 meter of distance
Hockey- ***accuracy*** out of 10 shots

Control- the standard you use as your base reading
Music- the distance you can hear music with NO insulation
Hockey- accuracy with standard tape

If you decide to do some internet searching, you will find some sites use different words for the variables

Manipulated = Independent
Responding = Dependant

(the *responding* variable *DEPENDS* on the *Manipulated* variable… the *Dependant* variable *DEPENDS* on the *Independent* Variable)

In higher lever projects you can have 2 sets of manipulated variables
EX. **Types** of material on **types** of flooring
Types of tape on **types** of sticks

STEP #3- Fun Facts/ RESEARCH (PG. 8 student manual)

To start the students off, I often ask them to find 3 'FUN FACTS' about their project. Interesting little things that they didn't know before…

Ex. Ask them to research their topic and find a fact and then ask them to research a fun fact about each of their MANIPULATED variables.

***ingredients, *history, *how parts of your project are used, *how they are made… etc.**

Moving forward from this point, there needs to be more extensive research done for their report, but 'FUN FACTS' allow

1. Allows them to get excited about their project
2. Gives them easy to remember information
3. Will get them thinking about their HYPOTHESIS or EDUCATED GUESS
4. Practice recording websites/ books for their bibliography (simple bibliography at the back of this manual)

'Fun Facts' can be put on the display board in a very attractive way and are bits of info that people generally do not know, they are easy to remember, can easily be shared and are a wonderful way to introduce your project. They are a great pre-curser to the bigger research that will be done for the report.

RESEARCH

An important part of a project is the report… contained within the report are all the steps we will work through, and of course, more extensive research. One or two pages are generally enough and anything from ingredients, brand history, scientific discoveries and uses will work just fine. We just want to see that there was information gathered. Encourage students to talk to members of their family for personal interviews… members of the family generally have hobbies that could help your students! **TIP**- When students work with, for example, types of nail polish or shampoo, food brands or oils… getting the ingredient lists for each one and highlighting the similar ingredients contained in each type is an easy task, looks great on a display board and often opens up to new research… like, what are some OTHER uses for these ingredients?

STEP #4- FORMING THE HYPOTHESIS (PG. 9 student manual)

Thy Hypothesis is the student's educated guess as to what they think the outcome of their experiment will be. Hopefully they have stumbled across some information in their research that will help them with their decision. Feel free to have them do as much research as you see fit. There is no hard outline.

A hypothesis is generally stated as such

"***I think that*** the egg cartons will insulate the music ***because*** many recording studios use them regularly" or
"***I think the*** hockey tape will help with accuracy the most ***because*** all professional hockey players use it"

Judges will always ask "why did you make that hypothesis" if a reason is not displayed… these little details separate award winning projects from the others. Urge them to NOT change their Hypothesis during the process, disproving a hypothesis allows a students to think about their outcomes and, possibly, to add future extensions.

It also can be really fun to discover something that you didn't know and realize that this is what affected your results.

STEP #5- Building the Experiment
This is where the log book will really start to come in handy.
There are 2 fundamental aspects of an experiment that need to be recorded and displayed in list form.

1. **Materials List**
   Have your students think about some of the basic materials they will need, the "recipe" for their experiment.
   Whenever it is important to the experiment, have them record specific details
   Ex. Two **100mL** measuring cup
   One Tablespoon of **SKIPPY** peanut butter

Brands, amounts and sizes are important when it is something that directly affects the experiment.

It is not necessary to record brands of pens used, or the company that printed their log books

The materials list can be added to as the project evolves

IMPORTANT-> when testing your variables, it is very important to be testing the same amount/ weight of something.

MUSIC types of insulation- make sure the weights of each material match

HOCKEY tape- same weight/ or length/ or number of wraps

2. **Procedure List**

   The procedure is like the instructions of a recipe. It is the step-by-step that the students take to complete their experiment. We use these so

   a. another person could re-produce the experiment exactly
   b. we can look at possible "sources of error" (places where things could have went wrong)
   c. that for each manipulated variable/ trial, the student can ensure that they are doing things as identical as possible

EXAMPLE PROCEDURE LIST

The steps I took to do this experiment were:

1. I picked and folded my standard control airplane using the simplest and most common plane from my book
2. I picked 3 more different airplanes out of my book, all of which only used 1 piece of paper
3. I put I piece of electrical tape on the ground and used this as the point where I would throw and measure from
4. I threw each plane and measured a straight line from where I threw to where it finally stopped moving
5. I measured from the front of the tape line to the part of the plane that was the furthest away
6. I recorded my findings on a chart and averaged the distances

7. I did **3 trials of my experiment** (each plane was thrown 3 times = total 12 throws) to get the best results

TIP-> Have the students write down all the possible materials they will need… but they are allowed to add and subtract from this list as the project develops. In the log book, things are MEANT to be messy… on the display board and the report, they will have a chance to type an organized final list.

The procedure list will develop in the same way. Have the students write a rough outline of how they plan on conducting their experiment. This too will develop as steps and added and taken away.

Having them think of the process and focusing on being specific (weights, lengths, time of day, temperatures, how they will collect materials) is important.

Trials

Trials are a great way to confirm your results and allow your students to ensure that their measurements are consistent. Most simple projects can be done over and over quite easily

Ex. **10 shots** with **each** kind of hockey tape = **10 trials**
5 attempts at doing the most dance spins with **each** type of shoe = **5 trials**
3 throws with **each** type of paper plane design = **3 trails**

Of course, some experiments cannot be done over and over, whether due to cost, time or conditions… this is fine, but always encourage **Multiple Trials where possible**

Have the kids make up simple charts for their trials…

Trial #1

Type of Plane	Distance (m)
Control	
Plane #A	
Plane #B	
Plane #C	

… with each trial number having an identical chart.

If you have students working with projects where multiple trials aren't as clear… one master chart for their project will be fine… but most of the time you can work it so you will get multiple trials.

Ex. For students doing 'plant projects', have them plant 3 (or 5, or 7, or 10) seeds in each pot and count each plant in the pot as a 'trial'. They will have to be very careful about how to distinguish which plant is which OR they can take averages of the results per pot…

It is impossible to cover every variation or combination that you will find during the Science Fair process and it's ok to find a solution for you and your students that work within the time frame and materials that you have.

Step #6. Observations/ Collecting Data/ Results (PG. 12 student manual)

Observations- First get your students to decide what they are focusing on for their result…

Time, Distance, Height, Temperature, Weight, Color, Smell?

Consider- what aspect best represents the change? If you are collecting water, should you weigh the water? Or measure it in a cup? If you are looking at plants, should you measure its height? Count the leaves? Measure the stems width?

In some cases, students will have to record visual results, writing paragraphs of what they see, feel and smell.

This is where pictures can help… when using pictures and video, it is important that they be taken from the same distance and vantage point and preferably, at the same time of day.

<u>Collecting Data-</u> What tool will best help your students collect their info…

Stop Watch, Clock, Ruler, Measuring tape, Thermometer, Scale, Pictures, Video, Visual observations

Think of the tool that will help get the best results and be the best tool for a specific situation. Ex. When measuring something that is not straight, you could use string and then measure the string

****IMPORTANT**-> In science, all numbers generated must have units attached. If you are timing something, is it in seconds? Minutes? Hours? Units are very important!! Are you measuring in centimeters, meters?**

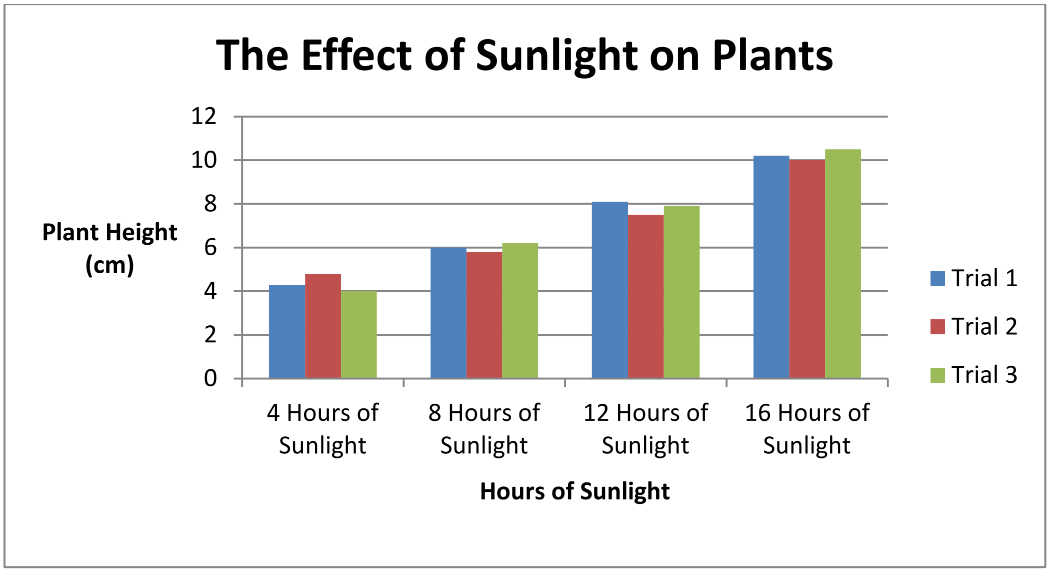
<u>Results</u>- Now we have to think of the best way to record our results. A simple chart is fine to start with during the process and then as things are fine tuned for the report and display board, the chart can be typed or transferred into graph format.

** BASIC RULES OF GRAPHING ** (PG. 20 student manual)

Charts and graphs are the most common and effective way to display the data you have collected from your experiment.

It allows you to organize your information in a manner that is

1. simple to read and understand
2. simple to explain, and
3. it looks very professional



Graphing Rules!

- The bottom **'horizontal axis'** is your Manipulated Variable (HOURS OF SUNLIGHT); it is what you are changing.
- The left hand **'vertical axis'** is your Responding Variable (PLANT HEIGHT) it is what you are measuring.
- All graphs must have
  - a main TITLE (what is your graph showing?)
  - a title for each 'axis', and
  - units… are you using 'hours' and 'cm', or 'type of fabric' and '# of spins', or 'type of hockey tape' and 'accuracy out of 10'?
  - A legend… students sometimes have trouble with this concept

Begin with a basic hand-written chart and move into graphing at the end when all data is recorded

Step #7. Conclusion (PG.13 student manual)

The conclusion is the answer to the hypothesis…

1. You guess
2. You test
3. You conclude.

Set it up in a format which includes all three steps

"I have proved/ disproved my hypothesis, which was __________. My results were ___________and I think I got these results because _______"

Try and focus on the fact that a hypothesis is never **WRONG**, only DISPROVED and encourage the students to think of this as a process… what did they learn? Could they go back to their research, or find more research to help explain what happened.

In a project, every student will have the opportunity to add an 'extension' (we'll get to that) and the extension is a great way to talk about what you would change, do differently, or add on in the future.

Congrats!! The basic steps of an "Experimental Science Fair Project" are done!!

Moving forward from this point, we will be adding a few little extras that help to put the finishing touches on things. We will also discuss display boards and final report

the EXTRAS zone…

Step #8. Applications (Pg. 14 student manual)

Application means 'how does the experiment and results *apply* to real life?'

Get your students to brainstorm and think of how their information can help people and how they can use it. It isn't necessary for students to come up with world-altering applications, but places in real life where this information can help. It can be as simple as saying that 'finding which bread moulds the slowest helps when you are going on a 10-day camping trip".

Step #9. Extensions (PG. 15 student manual)

Part 1. 'Extensions' are how students could ADD to their project. Perhaps taking the info they already learned and focusing on a different variable, or introducing a new one.
Part 2. This is also where students will say what they would have done differently.

Step #10. Sources of Error (Pg. 16 student manual)

Sources of Error help explain where things could have gone wrong in the experiments; if a scientist were to reproduce your experiment EXACTLY, and got different results, why? Students must be inventive here and brainstorm all the little 'whoops' that may have happened…

EX. Music- perhaps the insulation material did not cover all the way inside of the box.
Hockey- maybe the tape was wrapped tighter in one spot on the blade, which gave different results.

Different temperatures, different times of day, maybe some tools were dirty, maybe batteries on stop watches were old… this can be a tough one for students too

Step #11. Thank You's (PG. 17 student manual)

Of course, every student will be getting help, and it is important that they realize that much can be accomplished with support from the people around them. Have them think of the people that helped make their experiment a success.

Step #12. Report/ Bibliography (PG. 18 student manual)

The report is a necessary part of the science fair project. It is done to ensure all the Scientific Steps and information is located in one place.

It is often described as a portable copy of an experiment that can be taken with someone if they wanted; or, during a science fair, a judge could look through it if a student had to leave.

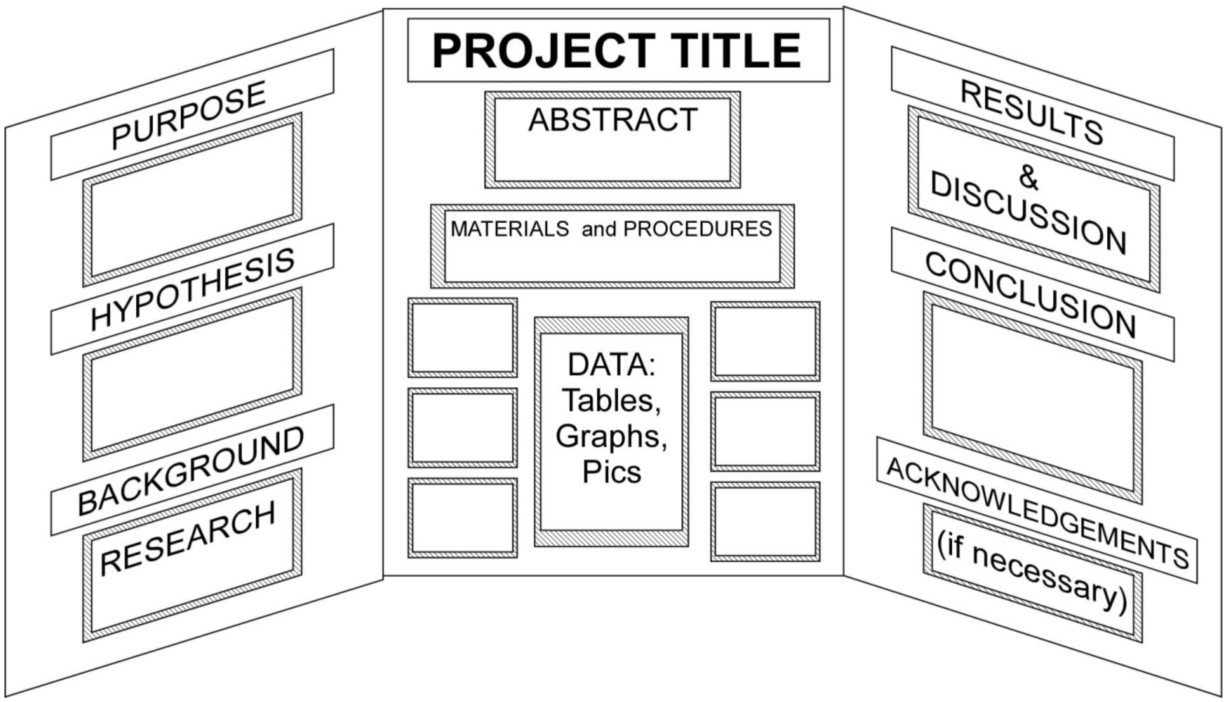
Everything on the checklist in the beginning will be located both

1. On the display board and
2. In the report

The differences are

- On the board, students are encouraged to decorate, use fonts, etc. to express themselves and to organize their information in an orderly, but personal, way. The report should be set up in logical steps and include a title page and a table of contents.
- FUN FACTS are to be displayed and the bulk of the extensive research INCLUDING the fun facts are placed in the report.
- In situations where the procedure is very long, place a summary on the display board and the entire procedure in the report.
- Book names and website names should be placed on the board, but proper bibliography's, including website addresses, should be in the report.

DISPLAY BOARD



Display boards can be purchased from local colleges, office supply stores and craft shops. Some have a long piece that goes across the top and connects the two side panels… either is generally fine.

Have the students organize their information in a way that makes sense and is easy for the eye to follow and then let them go crazy. Decorating is fun and eye catching, but science is neat and organized and so there board should be too.

Often, students will bring some aspect of their project to display in front of their board, or bring laptops or iPads, all of which is entirely up to you. On the above graphic, some aspects that are included in this manual are missing. If students run out of space, just be certain everything is in the report.

Generally the start is on the left, the data and results in the middle and the rest on the right.

Judging

Included at the back of this manual are a couple simple judging rubrics that you can use to mark or to give to your judges along with a "How to Judge" document for your in-house science fair.

The concept of being 'judged' can sometimes seem intense for students and there are a few pointers you can give them that really help.

1. PRACTICE!! Have your students practice with one another *explaining* their project. Try to encourage them not to read everything off their board word-for-word. Have them go through and focus on the main points, as opposed to going over EVERYTHING.
2. Always introduce themselves and offer the judges a seat (if you have the means to put a couple chairs in front of each project).
3. Let your students know that it is **OK** to say 'I don't know'. Not knowing is the essence of Science, and it is better to not know, then to try and make something up.
4. In the back of their log book or report, encourage them to write down the tips and advice from the judges… as they move on to Regional's or National's, some of these pointers could really help to bump their projects to the next level.

How to Judge a Science Fair with **ScienceExperience101**

Judging a science fair is a pretty easy task. Of course, doing anything new seems tough, but as you get used to this process, I promise, you'll have a ton of fun. At this particular level, we are looking at the students understanding of **scientific methodology** and, obviously, the amount of effort put into the project.

There are 2 types of projects; **Demonstration** and **Experimental**

Demonstration- think of the classic baking soda/ vinegar volcano or a display on the solar system. A demo project does not use the scientific methodology process and students are encouraged not to do these types of projects.

Experimental- the key word involved in an experimental project is COMPARE. Something is compared to something else. This is where the scientific methodology is used.

Let's walk through the scientific methodology steps first and I will give you some sample questions to ask the students.

1. **Problem Statement/ Question**- this is what they are trying to solve; "which cleaner works best on chocolate milk stains" or "what color of paper fades fastest in the sunlight"
   <u>Sample questions</u>- "that is a very interesting question, how did you come up with this idea?"

   **** let me pause right here. You will run into students who read this information right off their boards verbatim… I often stop kids and say, "how about I ask you the questions, and see how well you know your project, and then I will jump around the board a little bit." We don't need them to recite every material used (but they will try to) nor do we want them to recite their procedure step-by-step. Instead, ask them what they thought the most important material was or the most difficult procedure step.*

2. **Hypothesis**- this is the student's educated guess on the outcome of their experiment. Their hypothesis is based on their research which allows them to make an informed guess. A hypothesis is never wrong, only proved or disproved.
   <u>Sample questions</u>- "did you use your research to help you form your hypothesis?"
   "what information led you to your hypothesis?"

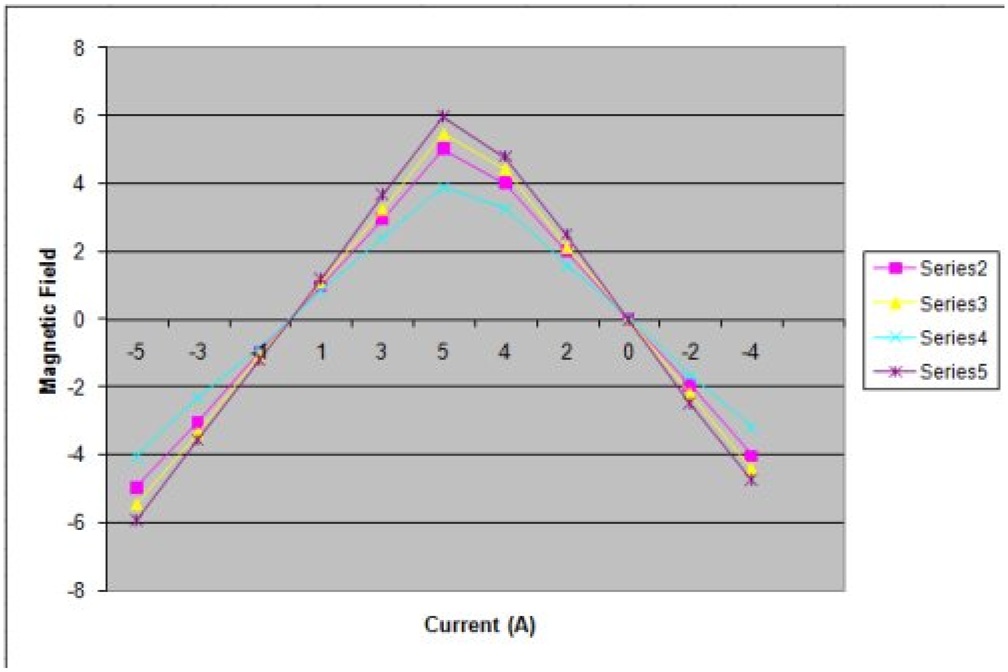
3. **Research**- Sometimes their research in condensed and put on their display boards, sometimes it is in report form on their table, and sometimes both. If they display their research and present it to you...
   Sample Questions- "Did you find out any information that was surprising or shocking?"
   "Tell me about your background research and where the information came from"

4. **Materials**- students are asked to record every material used so that if another scientist wanted to recreate their experiment, they could prepare and copy it exactly. For instance, if the experiment dealt with the staining properties of ink, the brand of ink or pen WOULD be important, and therefore, would be included. Notice how thorough the student is.

5. **Procedure**- This is THE EXPERIMENT that the student has devised to test their hypothesis... the procedure is the step-by-step process by which the student conducted their project's experiment. Students are asked to be meticulous and to record EVERYTHING. Dates, times, visual observations, etc. Often there is a log book present or a log book section of the report. Thumb through and ask questions if you notice a 'hole'... and this goes without saying, we're not here to attack these kids or put them on the spot... we're here to gently guide them through a process. Be supportive, but if you see them struggling, move on ☺

6. **Variables**- Variables are the things that are manipulated throughout an experiment. As projects get more advanced, so do the manipulation of variables.
   Control- this is the variable to which all others are COMPARED (remember?). For instance, water heated to 80°C, in a red plastic 500ML President's Choice brand cup, cools to room temperature in 32mins
   Manipulated- this is the variable the student changes. Wrapped the cup in a sleeve of cotton, one of polyester and one of wool.
   Responding- This DEPENDS on the manipulated variable. This is where the data, and ultimately, results come from. The cup wrapped in cotton cooled to room temp in 39 mins, the one in polyester in 35 mins and the one in wool in 43 mins.
   Sample Questions- "can you tell me why you picked the manipulated variables that you did?"

7. **Observations/ Results**- this is where the collected data is displayed. Ideally, we like to see a graph or a chart of some sort. Often, you will see pictures as well. The student should have the information displayed in such a way, that at a glance, it is obvious to see the results of their experiment.



The x axis (horizontal) always carries the independent variable and the y axis (vertical) carries the dependant, or the results. A graph should always have 2 labeled axis, a title and a legend.

Sample Questions- "how many times did you run your experiment?", "how long did your experiment take?", "are there any steps or materials you would add if you were to try this again?"

8. **Conclusion** - In the conclusion, the student states whether they proved or disproved their hypothesis and states their ultimate findings: "my hypothesis that Sunlight brand dish soap would be best for cleaning up chocolate mike stains was disproved, and I discovered that Dawn brand was the best".

   Sample Questions- "so who can this information help and how would it be useful in the world"
9. **Applications** – How does this information apply in real life?

10. **Sources of Error**- this may not pop up at the CAPE school, but it's a section where the students comment on variables that may have been out of their control. Perhaps there was something spilt on the carpet prior to the experiment that helped the

chocolate milk stain better, or maybe the temperature of the dish soaps was different, which helped one clean better than the other. Look for thoughtfulness and creativity.

11. **Extensions**- this is what the student would do if they were to keep their project base and expand on it in the following years. For instance, maybe the chocolate milk experiment could expand by testing the dish soaps on different KINDS of carpet. This may not be on their boards, but ask!! And, if you can, help the student come up with an idea to expand on for next year!

12. **Sources of Error**- these are places where things may have went wrong… or if someone else were to try the experiment following the procedure exactly… these are the things that could explain why there were varying results

13. **References/ Thank-you's**- all the information gathered should be credited to their sources and all people involved in the project should be thanked.

Demonstration projects- these, unfortunately, never go far in science fair. But ask, "What did you learn?", "Did anything surprise you?" and, if you feel up to it, see if you can't help the student devise an experimental project based on the information they have already learned.

Lastly, there are obvious things we look for that are not part of the scientific methodology.

Experiment originality
Neatness
Display creativity
Thoroughness
Attitude while being judged
Overall knowledge of material

STANDARD BIBLIOGRAPHY RULES

How To Build a Simple Bibliography

1. **Book with one author**:
   Blodgett, E.D. Alice Munro. Boston: Twayne, 1988.
2. **Book with more than one author**:
   Elwood, Ann, and Linda C. Wood. Windows in Space. New York: Walker, 1982.
3. **Article in a magazine**:
   Daglish, Brenda, "A Matter of Interest." Maclean's, February 15, 1993, pp.36-37.
4. **Article in a newspaper**:
   Smith, Beverly, "Canadians Skate to Gold Medal," The Globe and Mail, March 11, 1993. p. A1.
5. **Article in an encyclopedia**:
   Humber, William. "Bicycling." The Canadian Encyclopedia, 1988.
6. **Video or Film**:
   Shooting Stars. Videotape. National Film Board of Canada (Toronto), 1987. 49 min., 30 sec.
7. **Radio or television program**:
   "Haida Gwaii – Islands of the People." Nature. PBS, December 19, 1992.
8. **Interview**:
   Delaney, Daphne (musician). Personal interview, Toronto, April 10, 2006.
9. **Information from the Internet**:
   Include the web site address and the date the information was researched.
   http://library.barrie.ca/children/ (January 1, 2001)

** http://library.barrie.ca/children/homework/bibliography.htm**

ScienceExperience101 : Resource List

These are some really great sites that you can visit to get ideas for your students, helpful hints for projects and alternative explanations for methodology concepts.

*** Praxis@ http://www.praxismh.ca/ScienceFair.html#ScFairLinks ***

ScienceBuddies@ http://www.sciencebuddies.org

CoolScience@ http://www.cool-science-projects.com/index.html

Discovery-ScienceFairCentral@ http://school.discoveryeducation.com/sciencefaircentral/Getting-Started.html

MiniScience@ http://www.miniscience.com/SciProjIntro.asp?count=5

ScienceHound@ http://www.sciencehound.com/

AllScienceFairProjects@ http://www.all-science-fair-projects.com/

Education.com@ http://www.education.com/science-fair/

ScienceBob@ http://www.sciencebob.com/sciencefair/ideas.php

About.com@ http://chemistry.about.com/od/sciencefairprojects/u/sciencefair.htm

ScienceFairAdventure@ http://www.sciencefairadventure.com/

ScienceKids@ http://www.sciencekids.co.nz/

PlanetScience@ http://www.planet-science.com/categories/experiments/biology.aspx

MADSCI@ http://www.madsci.org

NASAscience@ http://spacelink.nasa.gov/instructional.materials/curriculum.support/index.ht

You can inspire your students with information regarding the Canada Wide Science Fair, along with showing them what it takes to compete on a national level @

https://secure.ysf-fsj.ca/virtualcwsf/

Judge: ____________________

SCIENCE PROJECT EVALUATION SHEET

Student(s) name(s): __________________________________ Grade: __________

Title of Project: ____

3 – Complete understanding **2** – Partial understanding **1** – Limited understanding

1. SCIENTIFIC METHOD

______ **a.** There is evidence that thought, study and effort were used throughout the project.
______ **b.** A definite plan was followed.
______ **c.** Accurate, scientifically verifiable facts were used throughout the project.
______ **d.** The project was controlled, logical and complete.
______ **e.** Multiple trials were used or the experiment was repeated often enough for accurate and valid results.

2. CREATIVE EFFORT, SETUP AND TECHNICAL SKILL

______ **a.** There are elements of creativity in the project.
______ **b.** The display is neat, attractive, easy to read and understandable.
______ **c.** There is a logical sequence and organization to the display.
______ **d.** The purpose of the project is clear.

3. KNOWLEDGE OF THE SUBJECT

______ **a.** The student/group seems to have learned something new by doing this project.
______ **b.** Any accompanying information (reports, charts, graphs etc.) are thorough and relevant.
______ **c.** The student/group is well prepared and able to describe the project in a confident and knowledgeable manner.
______ **d.** The student is able to answer questions about the project.

______

e. The student is able to explain the scientific concepts involved in the project.

Science Fair Judging Sheet

Mini Board

Name:

Judge: Date:

Period:

	Criteria				Points
	1	2	3	4	
Problem	Your sentence does not make sense. You started your sentence with I think, feel or believe.	Your sentence does not make sense.	Your sentence makes sense, but you either started it with, "I think, feel or believe" or it is not a complete sentence.	Your sentence makes sense. It is a complete sentence. It does not start with I think, feel or believe.	____
Research	Your sentences may not make sense. Your research may not be relevant to the topic. It may not be good background information, and more info is needed	Your sentences sometimes make sense. Your research may be relevant to the topic. It is good background information, but more info is needed	Your sentences make sense. Your research is relevant to the topic. It is good background information, but more info is needed.	Your sentences make sense. Your research is relevant to the topic. It is good background information. It includes what needs to be covered.	____
Hypothesis	Your sentence does not make sense. You started your sentence with I think, feel or believe/ My hypothesis is.	Your sentence may/may not make sense. It may/may not begin with I think, I feel or I believe or it is may/may not be a complete sentence. (2 or 3 above)	Your sentence may/may not make sense. It may/may not begin with I think, I feel or I believe or it is may/may not be a complete sentence. (1 above)	Your sentence makes sense. It is a complete sentence. It does not start with I think, feel or believe	____
Materials	Not all materials are listed. Did not use bullet points	All materials are listed. Did not use bullet points.	Most materials are listed using bullet points	All materials are listed using bullet points.	____

Procedure	Steps are not listed. Did not use numbers: 1. 2. Steps are not clear enough for someone else to follow exactly and get similar results.	Steps may/may not all be there. Did not use numbers: 1. 2. Some steps are not clear enough for someone else to follow exactly and get similar results.	Most steps are listed using numbers: 1. 2. Some steps may not be clear enough for someone else to follow exactly and get similar results.	All steps are listed using numbers: 1. 2. Each step is clear. Someone else could follow your steps exactly and get similar results.	____
Data Table	It has less than 3 trials. The average is not calculated. Labels are not in the correct places.	It has less than 3 trials. The average may/may not be calculated. Labels may/may not be in the correct places.	It has less than 3 trials. The average is calculated. All labels are in the correct places.	It has at least 3 trials. The average is calculated. All labels are in the correct places.	____
Graph	It does not have a title. The x any y axis are not labeled correctly or numbered appropriately. It is not the correct type of graph. It does not accurately represent the numbers in the data table.	It may not have a title. The x any y axis may not labeled correctly or numbered appropriately. It may not be the correct type of graph. It may not accurately represent the numbers in the data table. (3 or 4 above)	It may not have a title. The x any y axis may not labeled correctly or numbered appropriately. It may not be the correct type of graph. It may not accurately represent the numbers in the data table. (1 or 2 above)	It has a title. The x any y axis are labeled correctly and numbered appropriately. It is the correct type of graph. It accurately represents the numbers in the data table.	____
Results and Analysis	It is not written in complete sentences. It does not explain what your data table and graph are showing. It does not describe what happened during your experiment in detail. There is not a clear understanding of what you did and how it turned out.	It may/ may not be written in complete sentences. It may/may not explain what your data table and graph are showing. It may/may not describe what happened during your experiment in detail. There may/may not be a clear understanding of what you did and how it turned out. (3 or 4 above)	It may/ may not be written in complete sentences. It may/may not explain what your data table and graph are showing. It may/may not describe what happened during your experiment in detail. There may/may not be a clear understanding of what you did and how it turned out. (1 or 2 above)	It is written in complete sentences and explains what your data table and graph are showing. It describes what happened during your experiment in detail. If it is read, there should be a clear understanding of what you did and how it turned out. For analysis did you explain why it happened and relate what happened to the scientific concept that you researched	____

				to the results that occurred.	
Conclusion	It is not written in complete sentences. It does not explain if the hypothesis was right or wrong. It does not explain if your question was answered. It should not start with my conclusion is.	It may/may not be written in complete sentences. It may/may not explain if the hypothesis was right or wrong. It may/may not explain if your question was answered. It should not start with my conclusion is. (3 or 4 above)	It may/may not be written in complete sentences. It may/may not explain if the hypothesis was right or wrong. It may/may not explain if your question was answered. It should not start with my conclusion is. (1 or 2 above)	It is written in complete sentences. It explains if the hypothesis was right or wrong. It explains if your question was answered. It does not start with my conclusion is.	____
Presentation	The layout is not in the correct place. Each title does not have a border. The board is not decorated nicely. It does not have a creative design. (It does not show pictures of the experiment. N/A) It is not in color and it is not neat. (Not typed N/A)	The layout may/may not be in the correct place. Each title may/may not have a border. The board may/may not be decorated nicely. It may/may not have a creative design. (It may/may not show pictures of the experiment. N/A) It may/may not be in color and it may/may not be neat. (Not typed N/A). (3 or 4 above)	The layout may/may not be in the correct place. Each title may/may not have a border. The board may/may not be decorated nicely. It may/may not have a creative design. (It may/may not show pictures of the experiment. N/A) It may/may not be in color and it may/may not be neat. (Not typed N/A). (1 or 2 above)	The layout is in the correct place. Each title has a border. The board is decorated nicely. It has a creative design. (It shows pictures of the experiment. N/A) It is in color and it is neat. (Typed N/A)	____

				Total---->	____

Teacher Comments:
