Science Fair Log Books

Every science fair project must include a logbook, also sometimes called a research notebook, which should be a complete, permanent record of how you did your experiment/research project; it shows what you did and thought every step along the way. A log book is not just for an experiment but for case studies and innovations or for any form of scientific research.

LOGBOOK POINTERS:

1. Find a durable hard-bound notebook or black and white composition book, typically a lined journal works great. Do not attempt to use a spiral bound notebook or scarp books. They won’t hold up over the course of your experiment. Papers are too easily removed or torn from them, and before you realize it, important items are missing. Loose papers are a disaster waiting to happen. Just look in some of your follow students desks)

2. Label your logbook with your name, phone number, email address, and teacher’s name in a prominent location. Make logbook entries in pen not in pencil. Use a label or other way of putting on the information. This is a permanent record of all of your activities associated with your project.

   - make an entry every time you work on your project (date everything)
   - Number each page and create an index at the beginning. See example on page 6
   - date each entry, every document created, every event
   - make your notes in point form don’t worry about neatness; you do not need to re-copy your logbook to make Think of the logbook as your “Dear Diary” for science fair. It’s not just for recording data during the experimental phase of your project and it’s not just for your teacher.
   - But it should look “tidy”
   - organize your logbook into sections such as: schedule, daily notes and ideas, background research, contacts and references, experimental procedure/method, data collection sheets, observations/results in tables and graphs, conclusions, phone numbers, price of supplies. (Page 6)
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- Write everything down, even if it seems insignificant at the time; the information may be useful later on when you are analyzing your results.
- Make sure that you describe things in enough detail that you and anyone else reading your logbook in the future will be able to understand your thoughts and repeat the entire experiment exactly like you did it in the first place, just using your logbook.
- Log entries should include your brainstorming, calculations, library/internet searches, phone calls, interviews, meetings with mentors or advisors, notes from tours of laboratories, research facilities and other related activities. Remember that it's documentation of your work.
- You must create your logbook as you go; it is unacceptable to create your logbook on the computer after you have finished your project (don't depend on your memory).
- **NOTE:** The text that appears on your backboard/tri-fold is just a summary of what you write in your logbook; there is much more information in your logbook than what appears on your backboard/tri-fold.
- Glue, staple or tape any loose papers, photocopies of important items. Loose papers or other unsecured items are prohibited as they tend to fall out and can end up missing.
- **Always include any changes made to procedures,** mishaps, failures, or mistakes. As human beings, all of us make mistakes!
- The book is kept in a secure place, and care must be taken not to have anything spilled on the book, or otherwise damaged.

**LOGBOOK CONTENT:**

**Timetable:** Come up with a timetable for doing each of the steps of your project and try to stick to it.

**Choose a Topic:** make a list of topics that interest you, things that you are really curious about and that you want to find answers to; explain how you came up with your topic, why you decided to do it.

**Background Research:** Record your background research about your topic from
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books, magazines, TV programs, the Internet (be specific to your topic—there is nothing worse than having 500 places listed you went), people and companies. Keep a record about where you gathered your information for your bibliography/list of references and acknowledgements.

**Testable Question/Purpose:** Based on your background research, write down your testable question/purpose

**Hypothesis:** write down what you think the results of your experiment will be based on the research that you've done

**Materials:** List everything that you will need to do your experiment, such as equipment, ingredients, quantities of ingredients, measuring tools etc. Be very specific – give lots of details

**Procedure:** List the steps you will go through to do your experiment. If you make any changes to the procedure after you start your experiment, describe them in your logbook with an explanation about why you made the change(s) and if the change(s) will affect the results collected prior to the change.

**Variables:** list the controlled variables, the manipulated variable, and the responding variable

**Data:** record all of your measurements/raw data that you collected on data sheets in your logbook
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**Results:** record your collected data in charts, tables, graphs, pictures and use these to help you explain what happened in your testing; describe any problems you might have had while you were testing, any changes that you had to make to your original plans, and whether those changes would affect the results collected before you made the changes.

**Conclusions:** write down your conclusions, whether or not your hypothesis was correct and why. It is OK if your results do not support your hypothesis - the information you collected still supports science.

**Recommendations/Applications:** Make recommendations for improving your project, for further study, and applications I can make from my research.
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Organize your logbook. Make a table of contents, index, and create tabs for different sections within your logbook. This helps keep you organized for different activities. For example, have a data collection section, a section with contacts, sources, etc. and a section of schedule deadlines.

<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>Tab color</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadline Schedule</td>
<td>Red</td>
<td>1</td>
</tr>
<tr>
<td>Daily Notes &amp; Reflections</td>
<td>White</td>
<td>2</td>
</tr>
<tr>
<td>Background Research</td>
<td>Blue</td>
<td>2</td>
</tr>
<tr>
<td>Library &amp; Internet</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Information</td>
<td>Green</td>
<td>2</td>
</tr>
<tr>
<td>Contacts, Supply sources</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Experimental Setup</td>
<td>Yellow</td>
<td>3</td>
</tr>
<tr>
<td>Data collection</td>
<td>Purple</td>
<td>4</td>
</tr>
<tr>
<td>Results (pictures, graphs, summary tables)</td>
<td>Orange</td>
<td>5</td>
</tr>
<tr>
<td>Reflections</td>
<td>Light blue</td>
<td>6</td>
</tr>
</tbody>
</table>

Remember, keeping up a great logbook throughout the entire duration of the science project really pays off later! Not only will a nicely maintained logbook impress your teacher and the judges at the fair, it will also help you stay out of trouble later when you need to look back and provide details of what you did.
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Step 1: Choose a Topic—This is for Experiments not Case studies or Innovation

A good science fair project is an experiment. For an experiment you need to ask a question. The best projects come from a subject that you are really interested in. Think about things that you are really curious about and that you want to find answers to.

Things That Interest Me Are:
____________________________________________________________________________
____________________________________________________________________________

Once you have decided on a topic, the next step is to ask a question about your idea. The following guide can help you to ask a question in the proper form.

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

Which/what ________________ verb ___________________________?

  Foods  do  gerbils prefer
  Detergent makes  makes  the most bubbles
Step 2: Gather Information

Collect information about your topic from books, magazines, TV programs, the Internet (with supervision), people and companies. Keep a record about where you gathered your information from for your bibliography.

I will research information from these books, magazines, or the Internet:
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

I will talk to these people:
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

I will visit these places:
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
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Step 3: Set a Timetable

Preliminary Timetable:

Here is what I plan to do each week (subject to change). Adapt this schedule to fit the needs of your topic?

Week 1 (___________ to __________)
  a.
  b.
  c.
  d.
Week 2 (___________ to __________)
  a.
  b.
  c.
  d.
Week 3 (___________ to __________)
  a.
  b.
  c.
  d.
Week 4 (___________ to __________)
  a.
  b.
  c.
  d.
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Step 4: Use the Scientific Method

Here are the steps to the scientific method:

1. **State Your Question**
   What is the purpose of your experiment?

   The question I am trying to answer is: (be specific)

   __________________________________________
   __________________________________________

2. **State Your Hypothesis**
   Try to answer your question based on what you know about your topic. This should be in the form of a statement.

   This is what I think will happen (If..., then...):

   __________________________________________
   __________________________________________

3. **Materials**
   List everything that you will need to do your experiment. Be very precise about everything, especially what you are measuring, such as time, distance, and amounts of ingredients used.

   These are the materials I need to use in my experiment:
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4. Procedure
   List the steps needed to do your experiment. Be very descriptive.
   This is how I will conduct my experiment:
   1. ____________________________________________________________
   2. ____________________________________________________________
   3. ____________________________________________________________
   4. ____________________________________________________________
      (Add extra steps if necessary)

   This is how I will measure my experiment:

   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

   These are the variables that could affect the outcome of my experiment:

   ___________________________________________________________________
   ___________________________________________________________________

   This is how I will control the variables:

   ___________________________________________________________________
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5. Results
Record what happened in your experiment? Be very descriptive. Use charts, graphs, tables and/or pictures to explain what happened. Please see a sample Experiment on the website.

This is what happened during my testing:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

These are the problems that I encountered during my testing:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

These are the changes in my original plan that I had to make:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

These are my final results:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
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6. Conclusion
   Even if your research did not support your hypothesis, your experiment is not a failure. Remember that the information you collected still supports science.

My research (did or did not) support my hypothesis: Why or why not?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

These are the conclusions I obtained from my experiment:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

These are the applications I can make from my research:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

This is what I recommend for further or different experiments:
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Step 5: Presenting the Project

Display Board (available in office)

Display materials needed:
__________________________________________________________________________
__________________________________________________________________________

Materials needed:
__________________________________________________________________________
__________________________________________________________________________

Display graphs and charts I will need:
__________________________________________________________________________

Written data to be included on display: (check each one)
  o Name
  o Title
  o Question
  o Hypothesis
  o Procedure
  o Results
  o Conclusion

Visual Aids: (check all that apply)
  o Photos
  o Charts
  o Graphs
  o Artwork
  o Diagrams
  o Cartoons
  o Pamphlets
  o Brochures
  o Mural
  o Magazine Clipping(s)
  o Newspaper Clipping(s)
  o Drawing(s)
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Step 6: Write a Short Report
Include all of the information listed in this planning guide...

Step 7: Practice Presentation to Judges
Practice explaining your experiment to someone who can help you to prepare for the actual judging. Be ready to answer questions the judges might ask. Don't be scared if they ask questions, they are just making sure they understand what you did. The judges are very nice and will be very interested in your project.

Step 8: Bibliography
Keep an accurate record of where you obtained all of your information.

Examples of logbooks:


http://kirkwoodschools.org/faculty/ksdscifair/upload/4aaec4a5433d6.pdf

This document is a created from many different documents and I thank those who help compile this document.