

Science a-z

Science Fair Student Guide

Dear Families,

Date: 10/3/2017

Your child is about to begin his/her science fair project! It should be a fun learning opportunity for your child. This guide may be helpful during the next several weeks. Please remember:

- As a parent, your job is only to assist. This is an opportunity for your child to think and act like a scientist, and to create and discover his or her very own science project!
- Please allow your child plenty of time to make mistakes. He/she might even need to start the experiment again. Remember, real scientists constantly refine their studies and start over again.
- For safety reasons, please be available to assist your child with research and any portions of the experiment that may pose a safety risk.
- Please make time to visit the public library and use the Internet to assist your child with project research.
- It is recommended that you purchase the display board as soon as possible. Most craft stores, office supply stores, and superstores carry display boards for science fair projects.
- Remember, this is a multipart project. Your child must complete the science journal, research paper, display board, and presentation in order to receive full credit.

Thank you for your continued support!

Lisvet Cabrera

Teacher Signature

----- CUT AND RETURN -----

My child and I have read the Science Fair Student Guide in its entirety. We know when each section is due and that the project display board, science journal, and research paper must be completed and brought to school by _____.

My child understands that he/she is responsible for presenting his/her project to the class on _____.

Student Signature

Parent/Guardian Signature

Parent/Guardian phone number: _____

Parent/Guardian email address: _____

Project Timeline

The following is a list of due dates for each section of the project. Careful—falling behind makes everything more difficult! It is better to work ahead of the due dates in case problems arise. Remember, sometimes scientists need to redo a part of their experiment or even the whole thing!

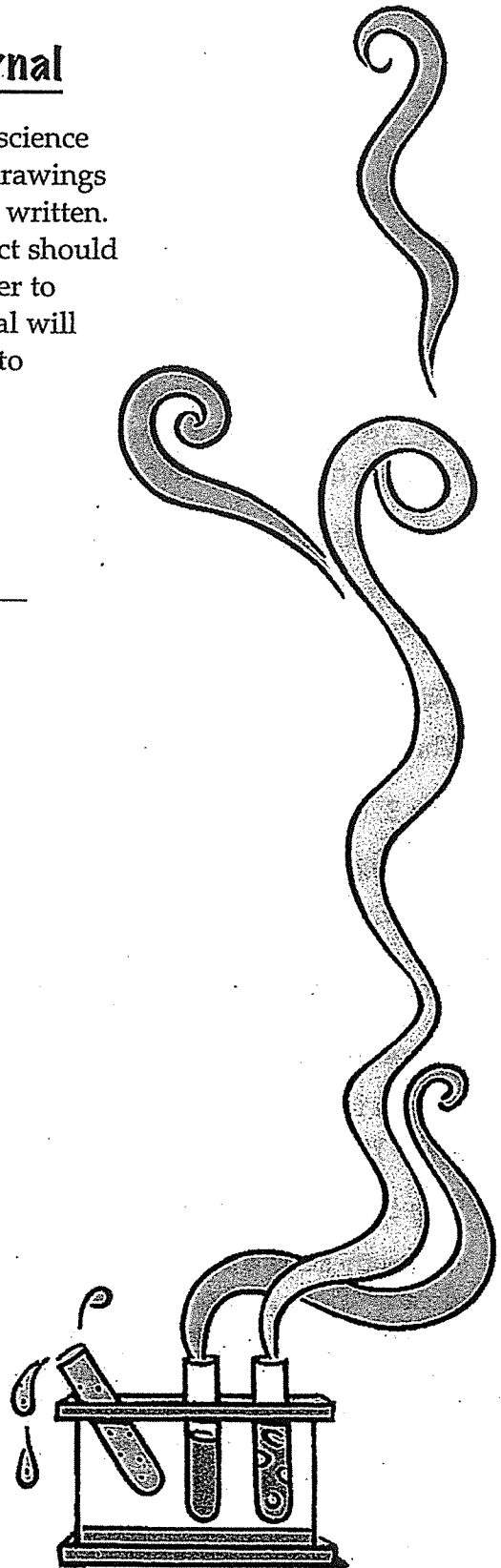
ASSIGNMENT	DUE DATE <small>(To be assigned by teacher)</small>
Select a Research Question and Purpose	10/13
Conduct Background Research and write the Bibliography . Change the Research Question and Purpose if necessary.	10/20
Write a Hypothesis .	10/20
Write the Materials List .	10/27
Write the Procedures .	10/27
Conduct the Experiment .	11/17
Complete the Results section, including any graphs or tables.	12/01
Write the Conclusion , which may include Reflection and Application	12/08
Display Board, Research Paper, Science Journal	12/22
Oral Presentation	12/22



Part One: The Science Journal

The Science Journal is one of four parts of a successful science fair project. This is where ALL ideas, thoughts, notes, drawings or sketches, research, information, results, and data are written. Everything that happens during your science fair project should be recorded here—the more detail, the better! Remember to write a date and time on every page. The science journal will be placed in front of your display board for the judges to read during the science fair.

The Science Journal may be a spiral or composition notebook. Once started, please do not remove any pages from your Science Journal or use it for other things. This notebook should be completely dedicated to your project. It is okay for there to be some mistakes—just be as neat and thorough as possible.



Part Two: The Research Paper

Using the Scientific Method of Investigation



The research paper may be typed or neatly handwritten. Each step must be explained thoroughly and clearly. Some of the steps require a rough draft that will be turned in to your teacher; others you will need to complete on your own. Rough draft worksheets are included at the end of this guide. Attach more pages if necessary.

Bring each of the rough draft pages to school for your teacher to review with you on the due date. After your teacher has reviewed and returned each page of your rough draft, you may write the final copy of your research paper, to be turned in with your project.

Step 1: State the Research Question

What question are you trying to answer? Ask a question that you can answer through observation or experimentation.

Step 2: State the Purpose

What is your reason for asking this question? What are you trying to discover?

Step 3: Background Research

The background research section may be optional for students in grades K-2. Check with your teacher.

Following your teacher's directions, write a background research section. This section should be used to help you make a hypothesis. For grades 3-4, include ten to fifteen facts and cite one to three sources. For grades 5-6, include twenty to thirty facts, and cite three to five sources.

Step 4: Write a Bibliography

Make a list of the sources you used to collect your background research. Your teacher can help guide you in using the proper format.

Step 5: Make a Hypothesis

A hypothesis is a statement that predicts the outcome of your experiment, based on what you already know, and proposes an explanation that can be tested. What do you think that the answer to your research question will be? Remember, hypotheses don't need to be correct—they just need to be informed guesses! Never go back and change your hypothesis once your experiment is complete. You will learn something important whether your hypothesis is proven or disproven! If you have researched the topic of your project, then your research should help you make a good hypothesis. Hypotheses are often written using an "If..., then..., because...." format.

Step 6: List the Materials

Every item that you will use to do the experiment should be listed in the materials section. A common format is to list items in the order in which you will use them.

Step 7: Describe the Procedure

The procedure describes the experiment in a step-by-step sequence. It may help to think of the procedure as a recipe, in which every step is clearly explained. How will your materials be used, and how and when will they be measured? Another person should be able to follow the procedure of your experiment and get the same, or similar, results.

Step 8: Perform the Experiment

Following the procedures from Step 7, conduct your experiment. If you realize that new steps or materials are needed, you may go back and revise those sections. But remember not to revise your original hypothesis.

Step 9: Record the Results

Record detailed records of the results of your tests and observations. Results should always be explained in a written format first, followed by graphs, charts, and/or tables.

Step 10: Make a Conclusion

After getting the results in Step 8, make a conclusion. According to your results, was your hypothesis proven or disproven? (Remember, it is okay for your hypothesis to be disproven!) Was there anything in the experiment that you would change if the hypothesis were retested? How could you change or expand this experiment if you were going to do it again? What did you learn from the experiment? How could this information be used to help people or to make the world a better place?

Step 11: Write an Abstract (recommended for grades 5-6)

An abstract is a one-page summary of your project. It should state your research question, purpose, and hypothesis. It should include your procedures, but you do not need to be as precise as you were in the procedures section; describe your steps more generally. Your results and conclusion should also be included. The abstract is meant to give a quick explanation of your project to someone before they start to read your paper and examine your display.

Step 12: Acknowledgments (optional)

Thank the people who helped you with your project.

Step 13: Create a Title Page and Table of Contents (optional)

The title page should include a title for the project. (It is okay to restate the research question if you can't think of a good title.) Also include your full name, your grade, your teacher's name, your school's name, and the school year. After placing each section of your paper in order, number your pages, and then write a table of contents.

Step 14: Proofread Everything Carefully!

The Final Order Of Your Research Paper Should Be:

Title page
Table of Contents
Acknowledgments
Abstract
Research Question
Purpose
Background Research
Hypothesis
Materials
Procedures
Results
Conclusion
Bibliography



Part Three: The Display Board

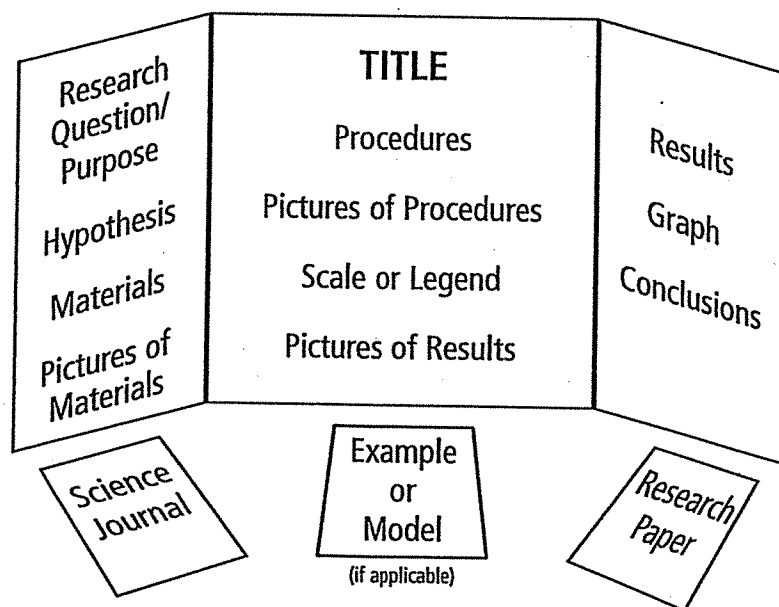


Standard display boards are 36" tall and 48" wide. For privacy reasons, and to make sure that the judges are impartial, most science fairs do not allow your name or any faces to be displayed on the front of your board or anywhere else in your displayed materials. Your teacher will provide you with any other special rules for your region.

Display boards should be easy to read and appealing to look at. They should have enough "flash" to make people interested, but not so much that it distracts them from understanding what you did for your project. Information on your display board should be typed and carefully proofread. Font sizes of each section heading should be large enough to clearly separate that section from the rest. Text size should be large enough to easily read when standing in front of your display board. The font size of titles should be large enough to read from across the room.

TIP The style of your font should not vary from one section of your text to another section—this will make your board look too "busy" when people are trying to read it. The project and section titles may have different styles from the text, but these should also remain consistent. Many people use colored construction paper mounted behind each section to make their boards stand out. Use rubber cement, a glue stick, or two-sided tape to stick each section to your board. School glue may make the paper wrinkle.

There are no hard-and-fast rules for exactly how to organize your board. Before you glue everything onto your board, place each section where you think it would look best. It is recommended that the amount of information in each of the panels look balanced, without too much empty space in any panel. Your board should include the following: Title, Research Question, Hypothesis, Materials, Procedure, Results (including any graphs, tables, charts, and pictures), and Conclusion. Many boards also include an abstract, background research, and bibliography. Where you place each of these on the board is up to you, but remember that people tend to start at the left hand side and read toward the right. In front of your display board you should place your science journal, your research paper, and examples or models that help explain your project (if applicable). Below is a common way to set up your display board:



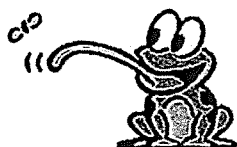
Part Four: The Oral Presentation

Your teacher may assign you a date on which you will present your science fair project to the class. Some schools also ask you to present your project to the science fair judges; if this is the case, then the class presentation will be excellent practice.

Tips for a great oral presentation:

- Make sure that your science journal, research paper, and display board are complete, neat, and proofread.
- Be prepared. Practice your presentation as many times as possible. Use index cards to write down your main points. Your index cards should not be read aloud; by practicing your presentation enough times, you should know what to say without even looking at your cards. They are to be used only if you need a reminder as you are presenting.
- Point to your board when explaining graphs or pictures, but do not read off your board.
- Practice in front of friends and relatives. Give them an opportunity to ask questions or provide feedback, and remember that it's okay to say, "I don't know." Remember, it is always better to say that you don't know the answer than to make one up!
- In case you are asked, make sure that you can clearly explain how your results were measured. For example, if you used a scale to measure weight, know what type of scale you used. Be able to show how to balance the scale and what weights you used.
- Be enthusiastic, and smile during your presentation. Stand straight and speak clearly and loudly enough to be heard by everyone in your audience. Make sure that your audience knows how proud you are of your project.
- Dress well. Wearing nice clothes shows that you are proud of your project and want to represent it in the best way possible.
- Stay within the length of time your teacher has provided for your presentation.

You may be expected to present your entire study, including your research question, purpose, background research, hypothesis, materials, procedure, results, and conclusion. Make sure that you share any special challenges or unexpected outcomes. Be prepared to answer questions at the end of your presentation.



Research Paper Rough Draft:

Research Question/Purpose

Name _____ Due Date _____

Parent/Guardian Signature _____ On Time? Yes/No

State the Research Question

What question are you trying to answer? Ask a question that you can answer through observation or experimentation.

State the Purpose

What is your reason for asking this question? What are you trying to discover?

Teacher Comments/Suggestions:

Research Paper Rough Draft:
Background Research/Bibliography

Name _____ Due Date _____

Parent/Guardian Signature _____ On Time? Yes/No

Background Research

Write a background research section. This section will be used to help you make a hypothesis. To start, collect facts that are related to your research question. You might use index cards, and write one fact on each card, or list them out on paper. Remember to put the facts in your own words! On the back of each fact card or under each fact in the list, write down all of the information about where you got the fact. This information will be used to write your bibliography. Once you have gathered your facts, organize them in an order that makes sense and write a background research section about your topic. Remember to break your writing into paragraphs, and include topic and closing sentences for each group of new ideas.

Bibliography

Teacher Comments/Suggestions:

Research Paper Rough Draft:
Hypothesis

Name _____ Due Date _____

Parent/Guardian Signature _____ On Time? Yes/No

Make a Hypothesis

A hypothesis is a statement that predicts how an experiment will turn out, and why it will happen that way, based on what you already know. What do you think that the answer to your research question will be? Remember, hypotheses don't need to be correct—they just need to be informed guesses. If you have researched the topic of your project, then your research should help you make a good hypothesis. Hypotheses are often written using an "If..., then..., because...." format.

Teacher Comments/Suggestions:



Research Paper Rough Draft: **Materials/Procedure**



Name _____ Due Date _____

Parent/Guardian Signature _____ On Time? Yes/No

List the Materials

Every item that you will use to do the experiment should be listed in this section.

Describe the Procedure

The procedure describes the experiment in a step-by-step sequence. It may help to think of the procedure as a recipe, in which every step is clearly explained. How will your materials be used, and how and when will they be measured? If each step is carefully explained, another person should be able to follow the procedure of the experiment and get the same, or similar, results. Use the back of the paper or separate sheets if you need more space.

Teacher Comments/Suggestions:

Parent/Guardian Signature_____ On Time? Yes/No

According to your results, was your hypothesis proven or disproven? (Remember, it is okay for your hypothesis to be disproven!) Was there anything in the experiment that you would change if the hypothesis were retested? How could you change or expand this experiment if you were going to do it again? What did you learn from the experiment? How could this information be used to help people or to make the world a better place? Write your conclusion below.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be from a notebook or a set of legal pads. The edges of the paper are slightly irregular, suggesting it might be a scan of a physical document. There is no handwriting or other markings on the page.

Science a-z **Science Fair Rubric**

Student's Name _____ Date _____

Project Title: _____

This rubric provides a general outline for scoring and may be used in conjunction with state and district performance standards. Modification of the rubric is encouraged in order to meet the needs of individual students and grade levels. For grades K-2, the research paper portion of the rubric may or may not be required.

SCORING GUIDE	
4	Exceeds performance standard
3	Meets performance standard
2	Approaches performance standard
1	Does not meet performance standard
0	Unable to score

Criteria

SCIENCE JOURNAL		CATEGORY SCORE
4	Science journal is neat, complete, and organized by date and time of entry. Journal gives the reader an exceptionally accurate, thorough, and well-organized understanding of the project and how it was carried out.	
3	Science journal is neat, complete, and organized by date and time of entry. Journal gives the reader a thorough understanding of the project and how it was carried out.	
2	Science journal is organized. The reader understands what the project was about and most of the important details about how the project was carried out.	
1	Science journal is incomplete and poorly organized. The reader is left confused about the project and how it was carried out.	
0	Science journal is not submitted.	

RESEARCH PAPER**CATEGORY SCORE** **PRESENTATION****SUBCATEGORY SCORE**

4	Research paper is neat, typed, thoroughly proofread, and attractive. The paper is well written with excellent transitions, grammar, punctuation, and spelling throughout.
3	Research paper is neat, typed, and attractive. The paper is well written with few errors; if errors exist, readability is not impeded.
2	Readability of the research paper may be slowed due to several errors in writing or organization, but the reader can still understand the project.
1	Readability is severely impeded due to many errors. The research paper is disorganized and messy.
0	Research paper is not submitted.

CONTENTS**SUBCATEGORY SCORE**

4	Research paper contains all required parts. All parts are thoroughly explained and creatively and exceptionally presented. The reader comes away with a thorough understanding of the project. The student has included reflections, implications for future research, and applications to the wider world.
3	Research paper contains all required parts. The reader thoroughly understands the project.
2	Research paper contains most essential parts, but other parts are missing or inadequate. The reader understands the project's purpose and its results, although there may be a need for additional explanation.
1	Research paper is missing some or most of its essential parts. The reader is left confused about the project's purpose and its results.
0	Science journal is not submitted.

DATA**SUBCATEGORY SCORE**

4	Results are clearly and neatly displayed. The reader is able to quickly and easily understand the data. All charts/graphs/tables are properly labeled and easy to read. All data from charts/graphs/tables are exceptionally well explained in the results section of the paper.
3	Results are clearly and neatly displayed. The reader is able to understand the data. All charts/graphs/tables are properly labeled and easy to read. Charts/graphs/tables are explained in the results section of the paper.
2	Results are displayed in charts/graphs/tables. The reader is able to understand the data, although it may take time to decipher.
1	Data is poorly displayed. Results are confusing.
0	Research paper has no results/data section.

DISPLAY BOARD**CATEGORY SCORE**

USE OF MATERIALS AND SPACE		SUBCATEGORY SCORE
4	Display board and use of space meet size requirements and privacy protection rules. The student uses display board and space creatively.	
3	Display board and use of space meet size requirements and privacy protection rules.	
2	Display board and use of space needs minor modification in order to meet size requirements and/or privacy protection rules.	
1	Display board and use of space needs major modification in order to meet size requirements and/or privacy protection rules.	
0	Display board is not submitted.	

PRESENTATION		SUBCATEGORY SCORE
4	Original and creative use of color and visuals. Well-organized, neat, typed, thoroughly proofread, and easy to read from left to right at 1 meter away. Well-balanced presentation of project in each of the sections. Captions are used for all pictures. All graphs, tables, and charts have titles and labels.	
3	Visually appealing, neat, and easy to read from left to right. Typed and proofread. Font style and size allows for reading from 1 meter away. Well-balanced presentation of project in each of the sections. Captions are used for all pictures. Graphs, tables, and charts have titles and labels.	
2	Neat, with few errors. Presentation lacks visual appeal, but is still readable.	
1	Readability is severely impeded by many errors or sloppy presentation.	
0	Display board is not submitted.	

CONTENT		SUBCATEGORY SCORE
4	All essential sections are represented. Information is clearly presented under the correct headings. Display includes an abstract, background research, and a bibliography.	
3	All essential sections are represented. Information is clearly presented under the correct headings.	
2	The essential sections are represented, although some of the information may be confusing or skeletal. Information is presented under the correct headings.	
1	Display board is missing some or most of the required sections. Information is unclear, missing, or presented under the wrong headings.	
0	Display board is not submitted.	

ORAL PRESENTATION**CATEGORY SCORE** **UNDERSTANDING OF TOPIC****SUBCATEGORY SCORE**

4	The student demonstrates an exceptional understanding of the topic.
3	The student demonstrates a solid understanding of the topic.
2	The student demonstrates a partial understanding of the topic. Some misinformation or confusion may be evident during the presentation.
1	The student is often confused or presents misinformation.
0	No oral presentation is given.

DESCRIPTION OF RESEARCH PROJECT**SUBCATEGORY SCORE**

4	The student clearly explains each of the essential sections. The student adds relevant details in addition to these sections, such as implications for future research, application of the research, or a project reflection.
3	The student clearly explains each of the essential sections.
2	The student explains most of the essential sections, though explanation may be skeletal.
1	Explanation is extremely skeletal or nonexistent for most of the essential sections of the project.
0	No oral presentation is given.

ABILITY TO ANSWER QUESTIONS**SUBCATEGORY SCORE**

4	The student is able to thoroughly answer all questions about the project.
3	The student is able to answer most questions about the project.
2	The student is able to answer some questions about the project.
1	The student is unable to adequately answer questions about the project.
0	No oral presentation is given.

ORATION**SUBCATEGORY SCORE**

4	The student speaks loudly, clearly, and enthusiastically about his/her project. The student faces his/her audience and presents with confidence. The student may reference the display board, but does not read from it or use notecards for his/her presentation.
3	The student speaks loudly and clearly and faces his/her audience. The student may reference the display board, but does not read from it or use notecards for his/her presentation.
2	The student lacks confidence in his/her presentation. The student's presentation is almost entirely (or entirely) read from notecards or the display board. The teacher may need to prompt the student to face the audience or to speak more audibly.
1	The student is not prepared for his/her presentation. It is extremely difficult to hear or understand the presentation, even with teacher prompting.
0	No oral presentation is given.

Science Fair Rubric

Student's Name _____ Date _____

Project Title: _____

Summary Scoring Form

SCIENCE JOURNAL	CATEGORY SCORE	
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RESEARCH PAPER	CATEGORY SCORE	
Presentation	Subcategory Score	
Contents	Subcategory Score	
Data	Subcategory Score	

DISPLAY BOARD	CATEGORY SCORE	
Use of Materials and Space	Subcategory Score	
Presentation	Subcategory Score	
Content	Subcategory Score	

ORAL PRESENTATION	CATEGORY SCORE	
Understanding of Topic	Subcategory Score	
Description of Research Project	Subcategory Score	
Ability to Answer Questions	Subcategory Score	
Oration	Subcategory Score	

OVERALL SCORE	
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COMMENTS