

Park Forest-Chicago Heights School District 163

Science Fair Handbook

2nd -8th Grade



Science
Fair!



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Staff Responsibilities

Principals:

- Set date for 2nd grade Science Exposition (by April 18). Consult with Science Depot.
- Set date for Science Fair 4th-8th grade before ISAT, 2ND and 3rd after ISAT by April 18.
- Set date for Science Fair Parent Night.
- Create school science team to review and approve applications.
- Announce student names at awards ceremony.
- Determine how to set up science fair boards for entire school for viewing.
- Create a structured plan for all students to view science fair boards without causing damage to the boards.
- Provide student supervision during Science Fair.
- Create a plan for Science Fair set ups & communicate plan to custodial & lunch staff.

Building Secretaries:

- Photocopy and distribute science fair packets to each classroom.
- Receive and store science fair boards for their school.
- Distribute science fair boards to classroom teachers for science fair.

School Science Teams:

- Conduct and manage 2nd grade Science exposition or 3rd – 6th grade science fair.
- Read and review Science Exposition/Fair applications.
- Place ribbons and certificates by display board after judging is completed.
- Get direction from school science fair coordinator.
- Assist with Science Exposition/Fair awards night.
- Conduct family science fair night to assist parents & students create science projects by Thanksgiving break.
- Review with parents science fair packet and application.
- Gives each building secretary science fair packet to photocopy.

Staff Responsibilities

School Science Teams Continued:

- Print awards certificates.
- Type out student names on rubrics.
- Assign BEST projects to go to school board meeting.
- Print out rubric and certificates for 2nd grade science exposition or 3rd – 6th science fair.
- Review questionable applications for 2nd grade science exposition or 3rd – 6th science fair.
- Attend School Board meeting with students displaying BEST projects.

Teachers:

- Teach scientific method, experimental design, proper scientific ethics and process.
- Conduct grade level experiment.
- Conduct class session on correctly completing the Science Fair application. Provide class time for students to complete the application and assist students as needed.
- Create science fair timeline for students.
- Review science fair timeline with students.
- Identify projects to be selected for final judging.
- 3rd-6th grade teachers view scientific method/science fair online learning module on the Y: drive in the Building Meeting video file the week of **October 11th**.
- Prepare students for oral project presentations.

Forest Trail Science Fair Coordinators: (7th/8th grade science team)

- Coordinate and manage science fair.
- Coordinate and manage science fair parent night provided by school science team.

Forest Trail Science Fair Coordinators (7th/8th grade science team) Continued:

- Review questionable applications.
- Print out rubric with student name for each science fair board.
- Print out certificates for each student.
- Assign **BEST** project to go to school board meeting.
- Attend school board meeting with student displaying **BEST** projects.
- Attend Regional Science Fair with student representatives.
- Prepare Regional Science Fair student representatives for IJAS. Requirements (Illinois Junior Academy of Science).
- Submit project titles and student names to IJAS.
- Provide IJAS with names of monitors and judges.
- Register Forest Trail for IJAS BY December 1.
- Announce IJAS winners at Forest Trail and Board meeting.

School Activities and Events Coordinator: (currently Sandi Gordon)

- Assist in coordinating all science fair dates with technology department and maintenance.
- Coordinate set-up for parent nights and science fairs with school science team for each school's science fair.
- Invite all science fair and science exposition judges for each school's science fair.
- Coordinate snacks for science fair judges.
- Send thank you letters to judges.
- Coordinate delivery of **BEST** projects student awards to School Board meeting.
- Coordinate all science fair dates with principals.
- Order and distribute all ribbons, medals, certificates and trophies.
- Give order information to Instructional Services office.

3rd-8th Grade

Science Fair

Project

3rd-8th Grade Science Fair

What is the Scientific Method?



The Scientific Method is a step by step process that scientists use to answer questions!

1. Ask a question
2. Gather information
3. Form a Hypothesis
4. Design and experiment
5. Collect data
6. Analyze data and draw conclusions
7. Communicate the results

Steps of the Scientific Method

1. PURPOSE

- ❖ What problem do I want to solve? You should investigate ONE problem only.
- ❖ What question do I want to answer? The question is usually the title of the project.

2. HYPOTHESIS

- ❖ What do I predict will happen during my experiment?

3. PROCEDURE

- ❖ How will I test my hypothesis?
- ❖ Will the test be safe and follow the rules?
- ❖ What materials will I need for my experiment?
- ❖ What kind of data do I need to collect?
- ❖ What will I change on purpose (independent variable)?
- ❖ What will change as a result of my experiment (dependent variable)?
- ❖ What factors will I control?

4. RESULTS/DATA

- ❖ What happened in the experiment?
- ❖ Do I see any trends or patterns?
- ❖ Are my charts and graphs clear, accurate, and neat?

5. Conclusions

- ❖ What did I learn?
- ❖ Did I prove or disprove my hypothesis?

What are VARIABLES??

Independent Variable-

The one thing you purposely change in your experiment.

Controlled Variables

Everything in the experiment remains the same, such as the soil type, the size of the pot, the amount of water, etc.



Science Fair Rules

1. The following **MUST** be neatly displayed on the front of your board: Title of project, student's name, school, teacher and grade.
2. No hazardous chemicals, open flames, burners.
3. Cultures of mold and bacteria **MUST** be thoroughly sealed.
4. Safety precautions when displaying electrical or mechanical equipment **MUST** be followed at all times.
5. You **MUST** complete an application to participate in the Science Fair. **Upon approval** of your application, the Science Fair Team will provide a free display board to you – **then you may begin your project.**
6. You **MUST** use 3 different resources (i.e.: books, magazines, Internet).
7. **NO HUMAN OR ANIMAL EXPERIMENTS ALLOWED.**
8. You **MUST** repeat your experiment 2 more times!
9. You **MUST** display and explain your controlled and independent variables on your board.
10. You **WILL** present your science project to a judge if you are chosen by the Science Committee.

DISPLAYING YOUR SCIENCE FAIR PROJECT

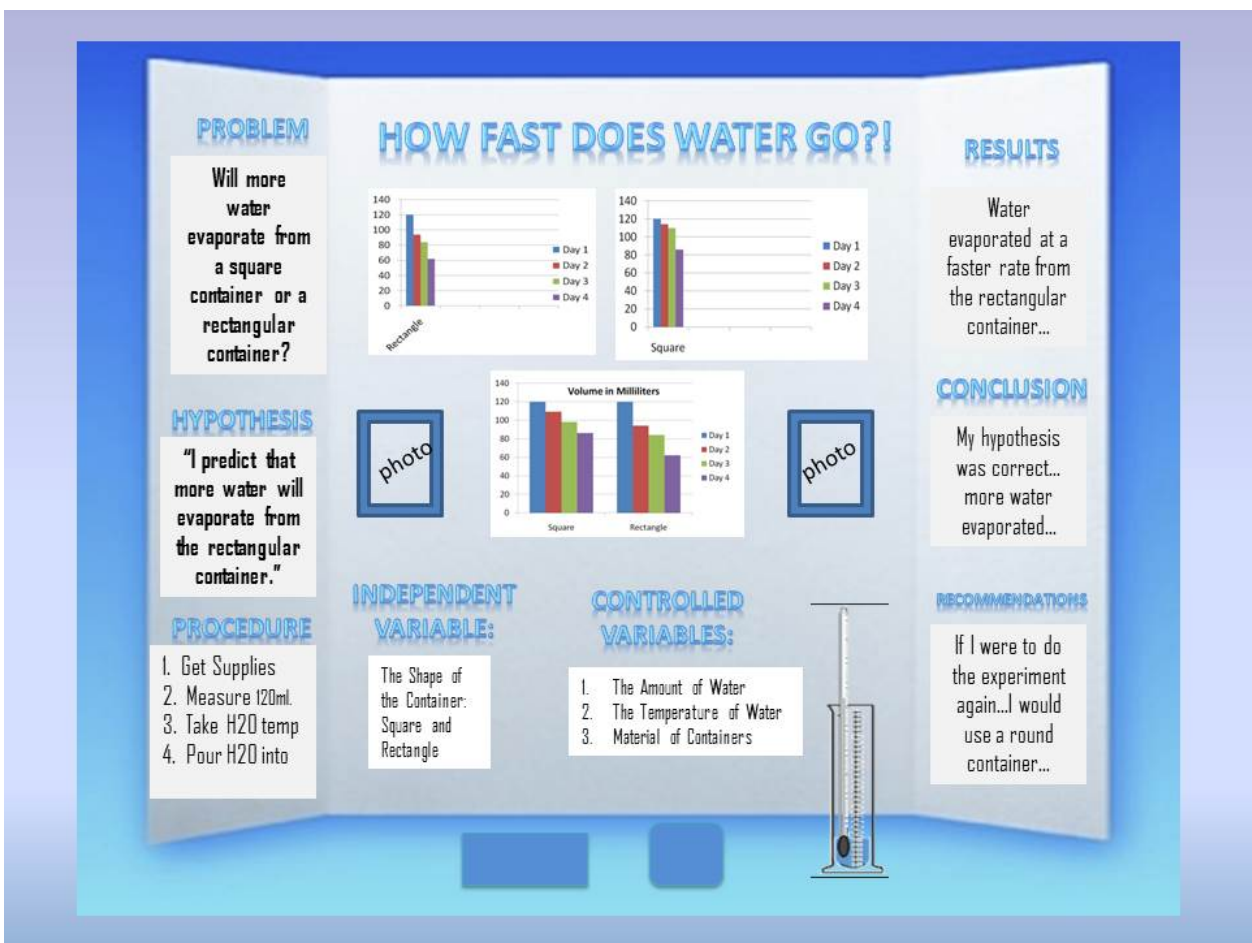
Your Science Fair board will represent all of the learning you have done for your project. The display should be eye-catching and creative, yet easy to read and organized!

- **NO** visible tape – use double-sided tape or glue stick
- **NO** pencil allowed – type your pages if possible
- Draw a rough sketch of your board **FIRST**
- Does your conclusion state if it proves or disproves your hypothesis?
- Paper attachments **MUST** be **NEATLY** attached
- **SPELLING ERRORS ARE UNACCEPTABLE!**
- **SPELL CHECK** your work before attaching to board
- Lettering should be **neat and easy to read**
- Use brightly colored paper behind your headings
- Use photos, drawings, tables and graphs when possible
- Do not write directly on board
- **YOU MUST** include on the board your title, purpose, hypothesis, materials, procedure, results, conclusion and research.
- **YOU MUST** practice and memorize your presentation if you are chosen to present to a science judge.

The Completed Project

When complete, the science fair project should be neat and thorough. It should be displayed in an organized way so that judges can find needed information quickly and easily.

The example below is a completed project set up for viewing by judges and others at the science fair. Most important, enjoy the science fair!



Science Fair Procedures

1. Read the science fair informational packet with your parents or guardian.
2. Choose a topic. You may select a topic that is not on the suggested list. Begin to get information about your topic from the public library and other resources, such as the school library or the Internet (with parental consent).
3. Complete the science fair application and turn in to your teacher by the due date.
4. Once your application is approved by your teacher, you may begin your science fair project.
5. Make notes as you complete each step of your project.
6. Take photographs, make diagrams, and/or collect pictures or illustrations for your display.
7. Draw a rough sketch of what your display board will look like.
8. 4th grade written reports are optional...**however; an outstanding category cannot be achieved without a written report!** Write your rough draft.
9. 5th through 8th grade written reports are **mandatory!** Write your rough draft.
10. Finalize your science fair project. Complete your display board. Have adults proofread your project for errors. Correct the errors!
11. Practice giving your presentation to family members or in front of a mirror.

Science Fair Procedures Cont'd.

12. Write your final copy of your written report and have your project judged.
13. **Bring your display board, materials and written report to school.
Dress professionally for the judging!**
14. Explain your project to the judges. Memorize your speech.
(Minimal note cards allowed).

Science Fair Application For Scientific Method Experiments

All participants must fill out an application. Once your project is approved you will receive a science display board.

Applications are due by: _____

Name _____ Grade _____

Teacher _____

A. Question: What do you want to find out by doing your experiment? It cannot be answered by yes or no!

B. Hypothesis: What do you predict will happen? (Begin with: I predict that....)

C. Purpose: Rewrite your question. (Begin with: The purpose of my project is to find out....)

D. Materials:

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

My Independent Variable: The one thing that you change on purpose in your experiment is: _____

My Controlled Variables: The things in your experiment that you keep the same are: _____

E. Research: List your sources... include Book titles, Websites, Magazines or Journals. (You need at least three).

1. _____
2. _____
3. _____
4. _____
5. _____

F. Procedure: Write a detailed explanation of the steps you will take to complete your experiment.

Hint: (It's like writing down a cake recipe so that others can follow it step by step to get the same results).

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

Your final step will begin with: (Last, I will repeat my experiment 2 more times).

_____ Approved

_____ Please make noted changes

Comments:

School District 163 Science Fair Judging Form

Project Number _____ Student Name _____ Grade _____

Teachers Name _____

Project Title _____

Oral Presentation (5 points)

- The student can give the presentation from memory using note cards for minimal help.
- The student demonstrates understanding of the topic.
- The talk is well organized and relates to the topic.
- The student provides answers in complete sentences.
- The student makes good eye contact and is easy to understand.

Written (5 points)

- There is a purpose and hypothesis.
- The Review of Literature is clear, organized and grammatically correct.
- The paper includes: materials, procedure, results, conclusion, and research.
- Graphs and tables are included to support the data.
- Include at least 3 references.

Project Board (5 points)

- The display demonstrates organization.
- The display is colorful, eye-catching, and easy to read and is not in pencil.
- The display is neat, grammatically correct and grade appropriate.
- The display includes the steps of the scientific method: Purpose, Hypothesis, Procedure, Results, Conclusion and Research. (Does your conclusion state if it proves or disproves your hypothesis)?
- The independent and controlled variables are stated on the board.

Experimentation (4 points)

- The experiment shows originality.
- The project demonstrates the use of the scientific method: Purpose, Hypothesis, Procedure, Results and Conclusion. (Does the conclusion state if it proves or disproves the planned hypothesis)?
- The experiment is well planned and thought out.
- There is only one independent variable.

Knowledge Acquired (5 points)

- The student demonstrates that they have gained knowledge from the project.
- The student has used a minimum of 3 sources.
- The project demonstrates creativity and critical thinking.
- The conclusion is correct based on the student's results.
- The student can tell if their conclusion proved or disproved their hypothesis.

School District 163 Science Fair Judging Form

_____ Total Points Judges Signature _____

___ Outstanding: 24 pts.

___ 1st Place: 19-23 pts.

___ 2nd Place: 14-18 pts.

___ 3rd Place: 9-13pts.

School District 163 Digital Science Fair Judging Form

Project Number: _____ Student Name: _____

Teachers Name: _____ Grade: _____

Project Title: _____

Oral Presentation (5 points)

- The student can give the presentation from memory using note cards for minimal help. (Does not read the PowerPoint slides verbatim.)
- The student demonstrates understanding of the topic.
- The talk is well organized and relates to the topic.
- The student provides answers in complete sentences.
- The student makes good eye contact and is easy to understand.

Written (5 points)

- There is a purpose and hypothesis.
- The Review of Literature is clear, organized and grammatically correct.
- The paper includes: materials, procedure, results, conclusion, and research.
- Graphs and tables are included to support the data.
- Include at least 3 references.

Digital Presentation (5 points)

- The presentation demonstrates organization.
- The presentation is colorful, eye-catching, visually appealing and easy to read.
- The presentation has consistent formatting, is grammatically correct and grade appropriate.
- The presentation includes the steps of the scientific method: Purpose, Hypothesis, Procedure, Results, Conclusion and Research. (Does your conclusion state if it proves or disproves your hypothesis)?
- The independent and controlled variables are stated in the digital presentation.

Experimentation (4 points)

- The experiment shows originality.
- The project demonstrates the use of the scientific method: Purpose, Hypothesis, Procedure, Results and Conclusion. (Does the conclusion state if it proves or disproves the planed hypothesis)?
- The experiment is well planned and thought out.
- There is only one independent variable.

School District 163 Digital Science Fair Judging Form Cont'd.

_____ **Knowledge Acquired (5 points)**

- The student demonstrates that they have gained knowledge from the project.
- The student has used a minimum of 3 sources.
- The project demonstrates creativity and critical thinking.
- The conclusion is correct based on the student's results.
- The student can tell if their conclusion proved or disproved their hypothesis.

_____ **Total Points**

Judges Signature _____

___ **Outstanding: 24 pts.**

___ **1st Place: 19-23 pts.**

___ **2nd Place: 14-18 pts.**

___ **3rd Place: 9-13pts**

Written Report Requirements/Guidelines

- Page 1: Title Page: Your project title, your name, your school name, your teacher's name and your grade.
- Page 2: Table of Contents: List the parts of your report by page number.
- Page 3: Acknowledgements: Give credit to family members and teacher who have helped you with this project.
- Page 4: Introduction: The introduction is a brief summary of your project.
- Page 5: Research: Summarize the information you learned about your topic. Cite sources within body of paragraph describing research.
- Page 6: Purpose and Hypothesis: State your purpose and hypothesis in detail and include why you picked this project.
- Page 7: Materials and Procedure: List your materials and state all steps in your experiment.
- Page 8: Results/Data: Describe what happened or what you observed in your experiment. Show data in charts or graphs if appropriate.
- Page 9: Conclusion: Describe what happened. Did you prove or disprove your hypothesis? What did you learn from this experiment? Do not be afraid to say that you made any mistakes along the way. Great discoveries can come from mistakes.
- Page 10: Bibliography: Make a list of books, magazines, websites, etc. (no search engines i.e. Google, Bing, etc.) that you used to get information for your Science Fair Project.

****Important note:** NOTHING should ever be printed off the Internet or copied out of a book, cut out and added to a Science Project. Students always need to read the information and rewrite it IN THEIR OWN WORDS!!!

Results and Graphing help:

<http://nces.ed.gov/nceskids/createagraph/default.aspx>

Sample Written Report

Table of Contents

Acknowledgements	Page 1
Purpose and Hypothesis	Page 2
Introduction and Review Literature	Page 3-5
Materials & Procedures	Page 6
Results	Page 7
Conclusions	Page 8
Reference List	Page 9

Acknowledgments

I want to thank my mom for buying all the popcorn for my project. I want to thank Ms. Peebles for helping us with questions we had. Most important, I want to thank my family who had to eat all the popcorn I made.

Purpose

The purpose of this study is to see which brand of popcorn pops the most kernels. This study will help us understand why the kernels may not pop in the microwave.

Hypothesis

It is hypothesized that the space in the bag is too small. Therefore, there is not enough room for all the kernels to pop.

Introduction

Popcorn was first grown in Mexico and somehow made it to India and China before it came to North America. In 1950, ears of popcorn were found in a cave in New Mexico. The sizes of the ears ranged from ½ inch to 2 inches long and are the oldest ears ever found. Popcorn was popped in the old days by throwing it on a hot stone in a fire. Like a game, the popcorn would pop and fly out of the fire and the people try to catch it (Gibbons, 1993).

Review of Literature

Within the last five years, grains of corn were found from 1,000 years ago. The corn in good condition still popped after all these years. The natives wore popcorn as head dressing and necklaces. They used it as decoration as we use jewelry (Smith, 1990).

In 1885, the first popcorn cart was invented. Popcorn was sold in the streets. It was not until 1925 when the home poppers were invented did families enjoy popcorn in their homes. Now, microwave popcorn is responsible for \$250 billion dollars in sales. Today Americans eat over one billion pounds of popcorn a year (seventeen and ½ billion quarts). Each person eats about 70 quarts per year (U.S. popcorn, 2002).

The average kernel measures about 10 grams. The higher number of kernels per 10 grams means the smaller the kernels. The moisture level is critical for the kernel to pop. Moisture content should be between 14% to 15%, which is measured with the Dickey-John GAC II moisture tester. Kernels come in different shapes and sizes. These shapes and sizes affect the way the kernel pops (Woods, 1980).

Inside a grain of unpopped corn are small drops of water. You cannot see the drops, but they are there. Each drop is wrapped in a tight white jacket inside the hard shell. When the corn gets hot, the water inside does too. The water turns to steam. The steam expands out of the white jacket blowing up. The white jacket is the popcorn you eat (Frank, 1979).

Materials

Three different brands of popcorn

Five bags of each brand

Microwave

Fire extinguisher

Scale

Timer

Procedures

After buying the popcorn from the store, I weighed the first bag I was going to pop and recorded the weight and the name of the brand of popcorn. I set the microwave on high for four minutes. After the popcorn popped, I weighed the bag again to see if the mass changed. I separated the popped kernels from the non-popped kernels. I counted the non-popped kernels and recorded the data. I repeated these steps every day until I popped five bags from each of the three brands of popcorn.

Results

	1 st Attempt	2 nd Attempt	3 rd Attempt	4 th Attempt	5 th Attempt
#1 Brand	21	24	19	23	21
Weight before	16oz.	Weight after	14oz.		
#2 Brand	18	35	25	20	28
Weight before	16.5oz.	Weight after	15.5oz.		
#3 Brand	23	25	23	20	26
Weight before	15oz.	Weight after	14oz.		

Brand one had an average of 21.6 unpopped kernels.

Brand two had an average of 25.2 unpopped kernels.

Brand three had an average of 23.4 unpopped kernels.

The weight of the first bag was 2 oz's less after cooking it.

The weight of the second bag was 1 oz. less after cooking it.

The weight of the third bag was 1 oz. less after cooking it.

Conclusions

In conclusion, the popcorn was popped at the same time and at the same temperature, and there was a difference between the brands. Brand one had an average less than the other two brands. Brand one also lost a total of 2 oz. after popping was completed. The 2 oz's can allow the extra room needed for the seeds to pop. Therefore, one can assume if there was more space, more kernels would pop.

Reference List

Frank, Asch. (1979). Popcorn. Holiday House, New York.

Gibbons, Gail. (1993). From seed to plant. Parents magazine, press.

Smith, Andrew. (1999). Popped culture: A social history of popcorn in America.

United States Popcorn Board. (2002). Fun facts about popcorn.
www.nal.usda.gov/speccoll/images1/popcorn.html

Woods, Dave. (1980). What makes popcorn pop? Atheneum Publications, MI.

2nd Grade
Science
Demonstration
or
Model

How to Choose a Topic

2nd graders who participate in the Science Exposition must do a demonstration or model project

Demonstration or Model Project

A demonstration or model illustrates a known scientific concept or phenomenon. The student will complete research in order to show how a science topic “works.” Some samples are listed below.

- ❖ Explain the water cycle
- ❖ Explain how Earth experiences the seasons
- ❖ Why do oceans have low and high tides?
- ❖ Explain various space phenomena: phases of the moon, black holes, galaxies, or Solar System.
- ❖ Classify living vs. non-living things
- ❖ Classify different types of rocks
- ❖ What happens when you leave liquids in sunshine?
- ❖ Classify butterflies and moths
- ❖ Classify different trees in your neighborhood
- ❖ Show how the Fibonacci sequence is found in nature
- ❖ Explain why the acid in soda pop is harmful to teeth
- ❖ Model or diagram the ocean floor
- ❖ Diagram one of the body systems
- ❖ Label the layers of a rainforest
- ❖ Make a mini greenhouse to grow plants
- ❖ Classify clouds
- ❖ Identify ways to attract butterflies to a garden
- ❖ Create models of molecules
- ❖ Classify liquids as acid or base
- ❖ Diagram layers of the Earth
- ❖ Discover everyday magnetic objects
- ❖ Demonstrate how the acid in soda pop cleans dirty coins
- ❖ Classify living things into groups
- ❖ Make a fruit battery
- ❖ Investigate Global Warming
- ❖ Identify uses of solar power
- ❖ How are differently pitched sounds made?
- ❖ Demonstrate the way scientists use weather instruments such as anemometers, barometers, thermometers
- ❖ Make a model or diagram of the International space station or Space Shuttle
- ❖ Diagram the night sky, showing constellations
- ❖ Classify birds as carnivores or herbivores

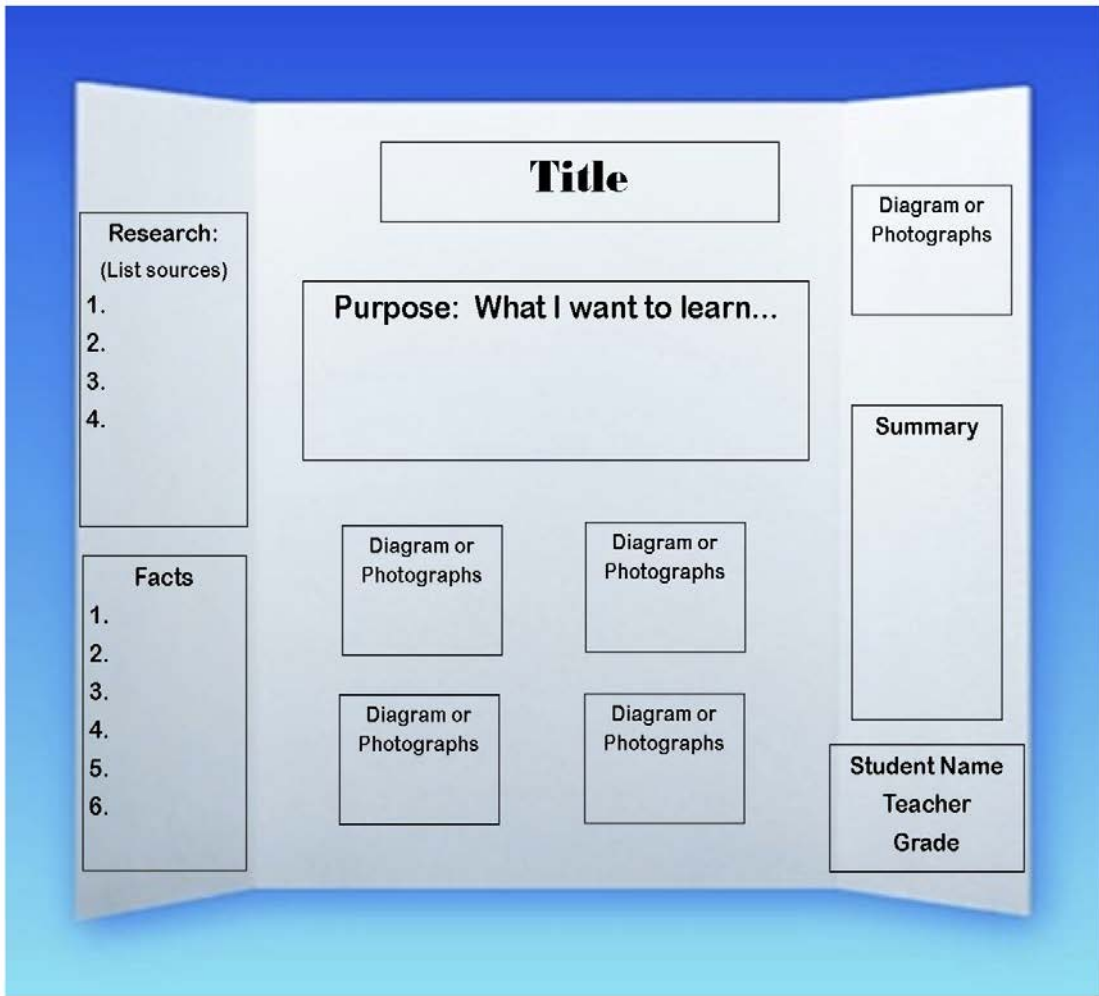
Demonstration/Model Project Directions

1. Read to learn about your topic. Look up your topic on the Internet with help from an adult. Read books about your topic. You may even ask a librarian for ideas on where to learn more about your topic. You must have at least 5 facts and a summary on your display board!
2. Complete the Science Fair Application **have it signed by your parent or guardian, and turn it in to your teacher.** Once your application is approved by your teacher, you may begin your science fair project.
3. Now that you know more about your topic, decide how you will present your new knowledge at the Science Fair: you could do a demonstration, make a model or draw a diagram. Talk to your parents or guardians about finding or buying materials for your project. Figure out what you will put on display on Science Fair day.
4. A written report is optional. If you decide to write a report, you will write a summary of what you have learned about your topic. Turning in a copy from the Internet or an encyclopedia IS NOT the same as writing a report. Your report must be in your own words. Judges can tell if something is just copied from another source!!
5. You now need to create a display board for the science fair. Draw a rough sketch of what your display board will look like. Everything you put on your display board must be your own work. **NOTHING** should ever be printed off the Internet or copied out of a book, cut out, and glued on a display board. Students always need to read the information and rewrite it IN THEIR OWN WORDS!!!

** The following information **must** be written on your display board: project title, student's name, school, teacher, and grade.

Science Fair Display Layout

Your board doesn't have to look exactly like this sample. Please create an attractive and informative board that shows what you have learned about your topic.



Science Fair Procedures

Demonstration Projects

1. Read the Science Fair informational packet with your parents or guardian.
2. Choose a topic; you may select a topic that is not on the suggested list. Begin to get information about your topic from the Public Library and other resources, such as the school library or the internet (with parental consent).
3. Complete the Science Fair Application **have it signed by your parent or guardian, and turn it in to your teacher.**
4. Once your application is approved by your teacher, you may begin your science fair project.
5. Make notes as you complete each step of your project.
6. Take photographs, make diagrams, and/or collect pictures or illustrations for your display.
7. Draw a rough sketch of what your display board will look like.
8. If you choose to do a written report (optional), write your rough draft.
9. Finalize your science fair project. Complete your display board. Have adults proofread your project for errors. Correct the errors!
10. Write your final copy of your written report (optional) and have your project judged.

Science Fair Application For Demonstration or Model Projects

All participants must fill out an application. Once your project is approved you will receive a science display board.

Applications are due by: _____

Name _____ Grade _____

Teacher _____

A. Purpose: _____

B. Research: List your sources, (ie. books, website etc.)

1. _____
2. _____
3. _____
4. _____
5. _____

C. Materials (List the materials you will need to do the demonstration or model project...i.e.: diagrams, science board) (You may or may not need all lines).

1. _____
2. _____
3. _____
4. _____
5. _____

Parents/Guardians Signature _____

School District 163 Science Exposition Judging Form

2nd Grade Demonstration Projects

Project Number _____ Student Name _____ Grade _____
Teachers Name _____
Project Title _____

_____ **Oral Presentation (4 points)**

- The student demonstrates understanding of the topic.
- The talk is well organized and relates to the topic.
- The student provides answers in complete sentences.
- The student makes good eye contact and is easy to understand.

_____ **Project Board (5 points)**

- The display demonstrates organization.
- The display is colorful and eye-catching.
- The display is easy to read and contains 5 facts and a summary.
- The display is neat and grammatically correct.
- The information is grade appropriate.

_____ **Knowledge Acquired (2 points)**

- The student has used a minimum of 3 sources.
- The project demonstrates creativity and critical thinking.

_____ **Total Points**

Judges Signature _____

___ **Outstanding: 11 pts.**

___ **1st Place: 8-10pts.**

___ **2nd Place: 5-7 pts.**

___ **3rd Place: 2-4 pts.**