

Science Fair 2014

Student Information Packet

St. John de la Salle Catholic Academy

Experiment Project

Science Fair 2014 – Student Information Packet – Experiment Project

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INTRODUCTION

You are surrounded by science. Everything uses some form of science to make it work. The chair you sit on was made by some person. All the tools used to build it are because of knowledge from science and technology. Someone had to know what shape to make the saw and how sharp the teeth are to cut wood, right? How did they know to make one saw for wood and a different one for metal? Why does the wood saw have big teeth and the metal saw have small teeth?

Science is asking questions and finding answers. A science project, simply put, is the process of asking a question you have about something you are interested in, hypothesizing (best-guessing) what the answer might be, researching for information on that topic, experimenting, inventing, collecting or doing in-depth research, analyzing your results, and coming to a conclusion!

What your accomplishment will mean for you:

- ☆ Gaining self confidence
- ☆ Proving you can do it
- ☆ Learning new things
- ☆ Being recognized by your school and community
- ☆ Knowing what the scientific method is and how it can help you.

Everything you need to know about doing a great science project is inside this packet. You'll be discussing the contents with your teacher and also your parents. Approximately every two weeks between now and your school science fair, your teacher will give you a Student Timeline for Science Fair Project sheet to check your project's progress. The timeline sheet is designed to keep you, your parents and your teacher on target.

You should keep this packet, timeline sheets, letters home to parents, and all other information in a separate "Science Fair" folder. Your science fair folder should be kept at home unless your teacher asks you to bring it to school.

You will find the science fair to be an exciting and rewarding experience. Let's make this year's fair the best ever!

HELPFUL TIPS FOR PARENTS

This should be a fun project! Success is when your child asks their own question, completes their project with a smile, and knows more than when they started. Enjoy this time of discovery and fun for you and your child!

- ❖ The science fair project reinforces reading, writing, logic and math skills, and creativity.
- ❖ The goal is that your child learns “the scientific method” or “the engineering design process” through direct experience.
- ❖ For their daily reading, recommend they choose a science book that can be a research resource for their project.
- ❖ A **Report** is part of the process.
 - o Both the rough draft and final draft of the report must be typed.
 - o Type the report *as your child wrote it or dictated it to you*. If the sentence structure is off, ask them if it needs correction. **Guide** them to the correction.
 - o Use their words; children say things in unique and fun ways.
- ❖ It is best to guide and answer their questions with questions. You may know the answer, but help them discover it themselves. For example, you may want to show them which paragraph in the book to re-read rather than giving them the answer.
- ❖ Although neatness is good, it’s not the main focus. A 6-year-old can make the data chart with a little help. They should do that part while you operate the hot glue gun.
- ❖ The project does not have to look store bought. It needs to be made by them, so that they truly get better every year they participate.
- ❖ Encourage your child’s artistic side with the display. For example, you can show how the use of color and shapes can be used to show the importance of a part of the display.
- ❖ If you allow your child to use web sites for research; verify the site is “correct” and then let them use the research found there. *Remember:*
 - o Anyone can create a web site; this does not mean its information is correct!
 - o Make sure the web site is run by a large, recognized group such as a college or organization.
 - o DOT “org”, “gov” or “edu” are generally trustworthy for accuracy of content.

Where to Purchase Science Fair Materials

HOME DEPOT

www.homedepot.com

LOWE'S

www.lowes.com

MICHAEL'S CRAFTS

www.michaels.com

OFFICE DEPOT

www.officedepot.com

RADIO SHACK

www.radioshack.com

STAPLES

www.staples.com

JOANN'S FABRICS

www.joann.com

WALMART

www.walmart.com

LAKESHORE LEARNING

www.lakeshorelearning.com

DEVELOPING A SCIENCE FAIR EXPERIMENTAL PROJECT USING THE SCIENTIFIC METHOD

Conduct an experiment using **The Scientific Method**. It includes asking a question, doing some preliminary research, making a hypothesis, planning and conducting your experiment, and analyzing your results.

I. PROBLEM

State the problem – one sentence in the form of a question. Choose a topic in which you are interested in learning more about.

II. PRELIMINARY RESEARCH

Research, read, watch science videos, and contact resource people who may help. Incorporate prior knowledge.

III. HYPOTHESIS

Form a hypothesis as a one-sentence statement. The hypothesis is an educated guess (your best guess) based on your preliminary research.

IV. EXPERIMENT

- Materials: Plan and collect the materials you will need for your experiment. It is best to borrow, make, or use inexpensive materials.
- Procedure: Plan the steps of your experiment including independent, dependent, and controlled variables. Conduct your experiment.
- Observe and Record Data: Plan how you will record your data. Record what happens during your experiment.
- Results: Summarize findings in the form of data tables, graphs, and drawings. Write an explanation of your findings.

V. CONCLUSION

The conclusion answers the hypothesis. What did you learn from your experiment? Was your hypothesis proven? Why or why not?

WRITTEN REPORT CONTENT

TITLE PAGE

See Written Report Format on next page.

PURPOSE

In three sentences or less, tell why you did your science project on the topic you chose.

ACKNOWLEDGEMENTS

In one or more sentences, say “Thank You” to those who have helped you with your project. You should include those who gave you guidance, materials and the use of facilities or equipment.

TABLE OF CONTENTS

List each of the following sections and the page numbers for each. Type the page number at the bottom of each page after you have finished the final copy of your report.

☆ **PROBLEM**

State the problem in the form of a question. The problem is one sentence long and specific.

☆ **PRELIMINARY RESEARCH**

This part of your report has information that was found by other scientists and relates to your topic.

☆ **HYPOTHESIS**

State your best guess for answering the question before you have performed an experiment. The hypothesis is one sentence long.

☆ **EXPERIMENT**

The experiment is used to test your hypothesis.

Materials: List the materials you used.

Procedure: List the steps of your experiment. Diagrams are helpful in this section. Do not use the words “I” or “you”.

Data: Show what you observed during the experiment. Include measurements you made. You may also use drawings to help show what you observed.

Results: The results are a summary of your data. The results section of your paper is organized into graphs and charts. This is where you tell about your data and what you observed. Remember, even if your data shows that your hypothesis was incorrect, your project is still good.

☆ **CONCLUSION**

Look over your report, graphs, charts and tables. Use two or three sentences to tell what you learned from your experiment. Was your hypothesis valid? Why or why not?

APPLICATION

Now that you have finished your project, use this section to share with others your thoughts about this experience. Did you have any problems? What would you do differently next time? Explain how what you learned from your project applies to the real world.

SOURCES / BIBLIOGRAPHY

List all sources that you used for researching your topic and writing your paper. You must have at least two sources, and only one may be a website. All encyclopedia sources will be counted as one source. Interviews with experts in your field of study are encouraged.

STARRED (☆) topics are part of the rubric criteria for judging. The other parts are used only for grading the written report by the teacher.

WRITTEN REPORT FORMAT

- Each line with a box (☐) in front of it begins a new page in the report.
- **Items with a star (☆)** must be included in reports for **Pre-K – 2nd grade** projects. Other sections are optional for Pre-K – 2nd grades.
- **ALL** of the items listed below must be included in reports for **3rd–8th grade** project.
- **ALL** reports must be **typed** – both rough draft and final draft.

☐ ☆ TITLE PAGE

- Title in the *middle of the page*.
- In lower right-hand corner:
 - Last Name, First Name
 - Grade ____
 - Teacher Name
 - School Name
 - Date (include year)

☐ PURPOSE

☐ ACKNOWLEDGEMENTS

☐ TABLE OF CONTENTS (with page numbers)

☐ ☆ PROBLEM

☐ PRELIMINARY RESEARCH

☐ ☆ HYPOTHESIS

☐ ☆ EXPERIMENT

- Materials
- Procedure
- Data
- Results

☐ ☆ CONCLUSION

☐ APPLICATION

☐ ☆ SOURCES / BIBLIOGRAPHY (Go to www.easybib.com for correct formatting in MLA style.)

- 1. The original report is in a report cover with 3-hole fasteners and goes inside the report pocket on the display board.**
- 2. A COPY should be turned in to your teacher for grading.**
- 3. ANOTHER COPY should be kept at home or on the computer.**

DISPLAY INFORMATION

BACKBOARD MATERIALS

The backboard must be sturdy and stand by itself on a table. Foam core-board and cardboard are the best materials. If you need to cut through the sides of your core-board to make “wings”, do not cut all the way through.

COLORS

If you need to paint your backboard, enamel paint works best. Do not use water-based paint. Contact paper may also be used. Use a minimum of three contrasting colors on your board.

LETTERING

Your title and subtitles may be computer generated or cut from construction paper. Do not freehand the letters. The title letters should be 3-4 inches high. The subtitle letters should be 1-2 inches high. The subtitles, which are mandatory on the display board, are: Problem, Hypothesis, Procedure, Results and Conclusion. All items on the display must be glued to the board. Do not use pins, tacks, staples, or tape.

DRAWINGS, PHOTOS AND GRAPHS

Drawings and photos are most useful on the display. Drawings should be drawn in pencil first and then retraced. Drawings should be in color and outlined in thin black felt tip pen. Graphs and charts must be used in the results section. They may be computer-generated. All graphs and charts must have explanatory titles. Graph axes must be labeled.

If you have a camera, you should photograph your experiment’s progress. A photo of you with your experimental set up is encouraged. All photos must be titled.

DISPLAY DIMENSIONS

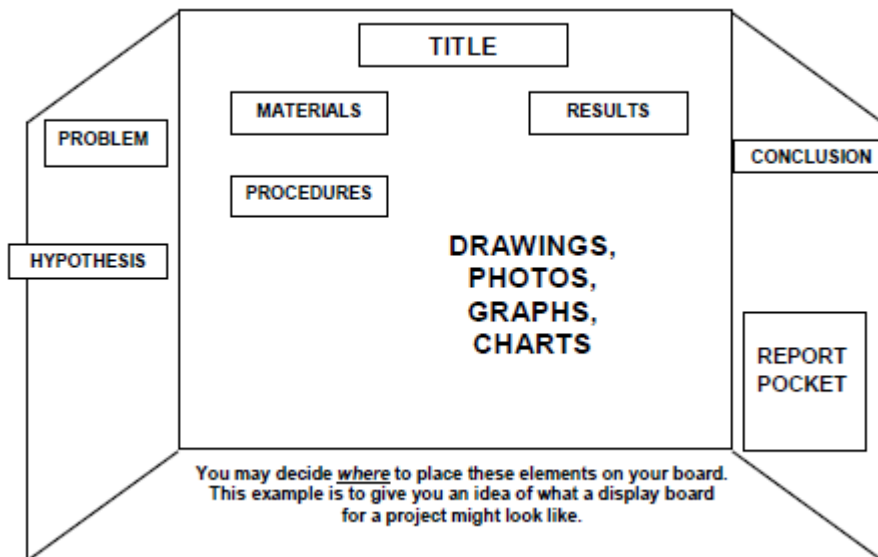
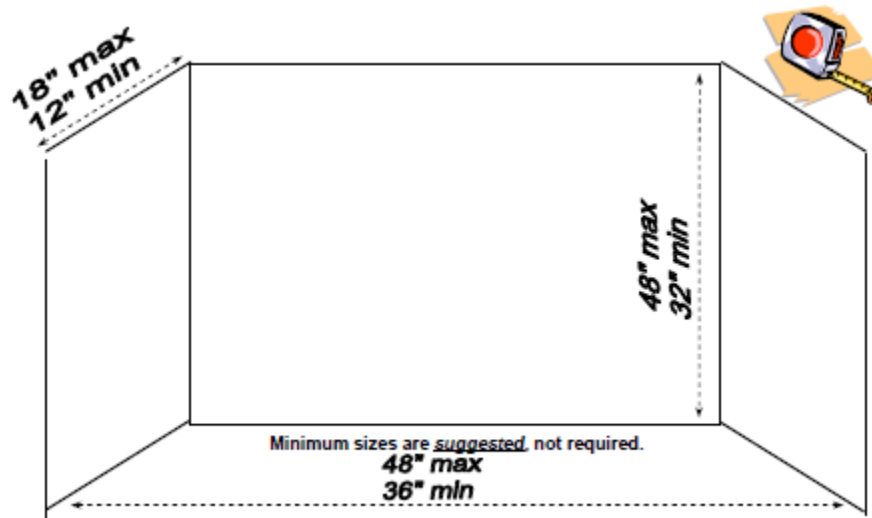
1. When backboard (display portion) is flat, it should be 48 inches wide.
2. Side panels (“wings”) should be 12 to 18 inches.
3. Height should be no more than 48 inches.

REPORT POCKET

There must be a “pocket” on the display to hold your report.

When you have decided what you are going to put on the backboard (display), lay the unglued display on the floor and look at it carefully. Have family and friends look at it and ask their opinions. Then, you should glue everything into place.

DISPLAY SIZE & SET-UP



DISPLAY ITEMS

Part of your display should include something that represents the project and should be placed in front of or on the display board. Depending on the type of project you do the display items may or may not be the focus of the display.

If you cannot decide what to use to represent your project, brainstorm with family, friends, and classmates. Keep in mind that the items you choose will set the tone for your display and must be approved.

No part of your display may pose a safety hazard. Do not include harmful chemicals, bacterial cultures, sharp objects, or any source of heat or flames. No live or preserved animals are allowed.

Some examples of display items are listed below:

- Equipment or materials you have built or used as part of your project or experiment (i.e., an incubator, variously shaped kites, a solar oven, a microscope with slides, etc.)
- Models
- Artistic representations of your topic (i.e., a large paper maché nose for an odor project, toothpick bridges for a physics project, or a collage of leaves for a plant project)
- Samples or specimens
- Simulated items such as photos, video, and audio taken while working on your project or during your experiment. (Keep in mind that use of an extension cords requires special permission.)

There are endless possibilities. Be creative! Put on your thinking cap!

Rubric for Grades Pre-K – 2nd

	“TRANSLATED”	Advanced Proficient 5 points	Proficient 3 points	Attempted 1 point
Problem (Double Points) (x2)	Ask a real question where you don't know the answer.	States problem as a question, provides evidence that it comes from the student's personal interests or experiences, and represents a genuine learning opportunity for the student.	States problem as a question, and while there is no evidence of connection to a specific interest or experience of the student, it appears to represent a genuine learning opportunity for the student.	States the problem as a question that is vague, or as a statement, or addresses an issue to which the student already knows the answer.
Preliminary Research	Find good information. Use what you find to help with your question.	Cites two or more sources. Different types of sources are cited. The student clearly connects the research to their problem in their own words.	Cites two or more sources from one or more types of resources (e.g., text, encyclopedia, business, magazines, catalogs, internet, or interview/s). The student generally connects the research to their problem in their own words.	Cites only one source. Or, the description of the research is incomplete, or has little or no connection to the problem, or is not written in the student's own words.
Hypothesis (Double Points) (x2)	Guess the answer to your question using the information you found.	Hypothesis is complete (in one sentence), testable, and clearly addresses the stated problem. Student shows a direct connection to their research.	Hypothesis is complete (in one sentence), testable, addresses the stated problem, and shows some connection to the research.	Hypothesis is either not testable or does not connect to the stated problem, or shows no connection to the research.
Procedure & Materials	Plan an experiment to answer your question. List all the steps and materials needed. Plan to repeat the experiment to be sure the results are good.	Experimental design is a well-constructed test of the stated hypothesis. Procedures are outlined in a step-by-step fashion that could be followed by anyone without additional explanations. All relevant materials are listed.	Experimental design is adequate to test the hypothesis, but may leave some unanswered questions. Procedures are outlined in a step-by-step fashion, but there may be 1 or 2 gaps that require explanation. Major materials are listed.	Experimental design is not relevant to the hypothesis or the procedures outlined are seriously incomplete or not sequential, or materials list is missing or incomplete.
Results (Double Points) (x2)	Show what happened in your experiment. Use pictures, graphs, and words to make it really clear.	Performed experiment several times. Summarizes the data in a way that describes what was discovered using accurate graphs and charts.	Performed experiment one or more times. Summarizes the data in a way that describes what was discovered using graphs and charts with few errors or omissions.	Performed experiment only once and data are not summarized clearly.
Conclusions	Use your data to answer your original question. Explain why your guess was right or wrong.	Conclusion completely answers all aspects of the problem, states if the hypothesis was supported or rejected, and clearly cites evidence to explain why.	Conclusion addresses the problem, states if the hypothesis was supported or rejected, and attempts to explain why.	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the results.
Visual Quality of Display	Make your project fun to look at with pictures and colors. Use large, clear lettering. Check grammar and spelling.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.

Rubric for Grades 3rd – 8th

	“TRANSLATED”	Advanced Proficient 5 points	Proficient 3 points	Attempted 1point
Problem (Double Points) (x2)	Ask a real question where you don't know the answer.	States problem as a question, provides evidence that it comes from the student's personal interests or experiences, and represents a genuine learning opportunity for the student.	States problem as a question, and while there is no evidence of connection to a specific interest or experience of the student, it appears to represent a genuine learning opportunity for the student.	States the problem as a question that is vague, or as a statement, or addresses an issue to which the student already knows the answer.
Preliminary Research	Research thoroughly. Connect the research to your question.	Cites two or more sources. Different types of sources are cited. The student clearly connects the research to their problem in their own words.	Cites two or more sources from one or more types of resources (e.g., text, encyclopedia, business, magazines, catalogs, internet, or interviews). The student generally connects the research to their problem in their own words.	Cites only one source. Or, the description of the research is incomplete, or has little or no connection to the problem, or is not written in the student's own words.
Hypothesis (Double Points) (x2)	Try to answer your question using your research.	Hypothesis is brief and complete, testable, and clearly addresses the stated problem. Student shows a direct connection to their research.	Hypothesis is brief and complete, testable, addresses the stated problem, and shows some connection to the research.	Hypothesis is either not testable or does not connect to the stated problem, or shows no connection to the research.
Procedure & Materials	Plan an experiment to answer your question. List all the steps and materials needed. Plan to repeat the experiment to be sure the results are good.	Experimental design is a well-constructed test of the stated hypothesis. Procedures are outlined in a step-by-step fashion that could be followed by anyone without additional explanations. All relevant materials are listed.	Experimental design is adequate to test the hypothesis, but may leave some unanswered questions. Procedures are outlined in a step-by-step fashion, but there may be 1 or 2 gaps that require explanation. Major materials are listed.	Experimental design is not relevant to the hypothesis or the procedure outlined are seriously incomplete or not sequential, or materials list is missing or incomplete.
Results (Double Points) (x2)	Show what happened in your experiment. Use pictures, graphs, and words to make it really clear. Explain what made a difference and what didn't.	Performed experiment several times. Summarizes the data in a way that describes what was discovered using graphs and charts with no errors or omissions. Discusses connections between variables or points out any patterns.	Performed experiment one or more times. Summarizes the data in a way that describes what was discovered using graphs and charts with few errors or omissions. Mentions at least on relationship between variables or points out a pattern.	Performed experiment only once and data are not summarized clearly. Or, does not discuss any relationship between variables or note any pattern or trend.
Conclusions	Use your data to answer your original question. Explain why your hypothesis was right or wrong.	Conclusion completely answers all aspects of the problem, states if the hypothesis was supported or rejected, and clearly cites evidence to explain why.	Conclusion answers the problem, states if the hypothesis was supported or rejected, and attempts to explain why.	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the evidence collected.
Visual Quality of Display	Make your project fun to look at with pictures and colors. Use large, clear lettering. Check grammar and spelling.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.

Rubric for Written Report

<i>COMPONENTS</i>	<i>POSSIBLE POINTS</i>	<i>SCORE</i>
TITLE PAGE: See Written Report Format on page 6 of Student Information Packet.	2	
PURPOSE: In three sentences or less, tell why you did your science project on the topic you chose.	3	
ACKNOWLEDGEMENTS: In one or more sentences, say “Thank You” to those who have helped you with your project. You should include those who gave you guidance, materials and the use of facilities or equipment.	2	
TABLE OF CONTENTS: List each of the following sections and the page numbers for each. Type the page number at the bottom of each page after you have finished the final copy of your report.	3	
PROBLEM: State the problem in the form of a question. The problem is one sentence long and specific.	5	
PRELIMINARY RESEARCH: This part of your report has information that was found by other scientists and relates to your topic.	10	
HYPOTHESIS: State your best guess for answering the question before you have performed an experiment. The hypothesis is one sentence long.	5	
MATERIALS: List the materials you used.	5	
PROCEDURE: List the steps of your experiment. Diagrams are helpful in this section. Do not use the words “I” or “you”.	10	
DATA: Show what you observed during the experiment. Include measurements you made. You may also use drawings to help show what you observed.	10	
RESULTS: The results are a summary of your data. The results section of your paper is organized into graphs and charts. This is where you tell about your data and what you observed. Remember, even if your data shows that your hypothesis was incorrect, your project is still good.	5	
CONCLUSION: Look over you report, graphs, charts and tables. Use two or three sentences to tell what you learned from your experiment. Was your hypothesis valid? Why or why not?	10	
APPLICATION: Now that you have finished your project, use this section to share with others your thoughts about this experience. Did you have any problems? What would you do differently next time? Explain how what you learned from your project applies to the real world.	5	
SOURCES / BIBLIOGRAPHY: List all sources that you used for researching your topic and writing your paper. You must have at least two sources, and only one may be a website. All encyclopedia sources will be counted as one source. Interviews with experts in your field of study are encouraged. Bibliography is correctly formatted.	5	
PRESENTATION: Entire report is typed (12 pt. font, Arial or Times New Roman), double-spaced, and original copy is placed in a report cover with 3-hole fasteners and goes inside the report pocket on the display board. A COPY should be turned in to your teacher for grading.	10	
CONVENTIONS: Proper grammar and mechanics are used throughout report.	10	
TOTAL	100	