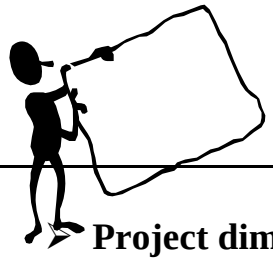


Rules and Procedures for Displaying Projects

- **Project dimensions for Grades 5-8** are 38 cm (15 in.) deep, front to back; 76 cm (30 in.) wide, side to side; 274 cm (108 in.) high, floor to top. **Project dimensions for Grades 9-12** are 76 cm (30 in.) deep, 122 cm (48 in.) wide, 274 cm (108 in.) high.

- **Items NOT allowed at Project Display**

  - While food may be used in experimentation, neither **human nor animal food** may be displayed in or at your project area. Photographs are suitable representations of food and/or procedures involving food.

  - **Bacterial cultures, yeast cultures, molds or other fungi, or other microbial cultures (live or dead)** are prohibited from display. Photographs are suitable representations of cultures and/or procedures involving cultures.

  - Bare wires or knife switches may be used on circuits of 12 volts or less; otherwise, standard enclosed switches, conforming to safety codes, are required.

  - Neither **vertebrate nor vertebrate parts** may be displayed. This includes taxidermy specimens. The only exception includes microscope slides that are properly acquired from biological supply companies. Such slides must be labeled as to their origin.

  - **All chemicals including water** (exception is water that is integral to an enclosed apparatus), **and their containers (glass and otherwise)**

  - **Dry ice** (or other sublimating solids)

  - **Flames or highly flammable materials**

- **For projects requiring electricity, a 9' grounded extension cord must be provided.** The extension cord can only be connected during the time the project is being evaluated by judges. Computers may be displayed and operational; however, the Regional Fair is not responsible for personal property.

- **Prince William County Guidelines allow students in Grades 5-8 to display plants.** Students in Grades 9-12 are subjected to ISEF guidelines, which do NOT allow plants to be displayed.

- **Personal student information** (names, school awards) on any project component (display board, research paper, etc.)

SUGGESTED PROJECT COMPONENTS

- Project Notebook (Optional)
  A project notebook contains accurate and detailed notes and information on the progress of your research. Good notes show consistency and thoroughness.

- Abstract (Required For Grades 9-12)
  An abstract is a summary (250 words, maximum) that includes the purpose of the research, an overview of the procedures followed, results of data collection, and conclusions based on the data. It may also include any possible research applications. See "Writing An Abstract" in this handbook.

- Research Paper / Simple Report
  For middle and high school students, a research paper should be displayed along with a project notebook and any necessary forms or relevant written materials. A research paper helps organize data as well as thoughts. A good research paper or simple report includes the sections on the following pages. These sections should be brief and concise. For high school students, the longest one is usually the discussion of data.

  - Grades 5 and 6
    A simple report for elementary students includes the components described on "Parts of the Simple Report: Grades 5 – 6"

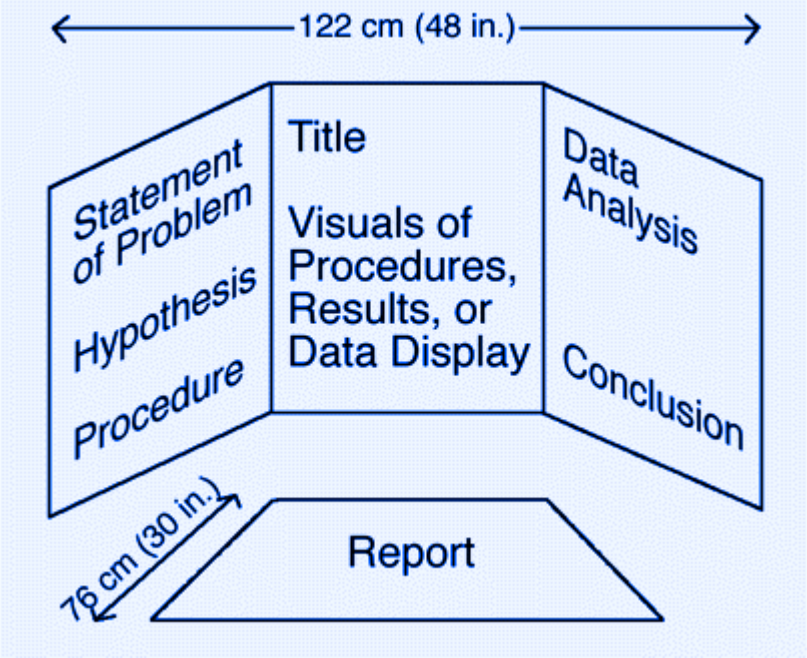
  - Grades 7 and 8
    A research paper for middle school students includes the components describe in "Parts of the Written Paper: Grades 7 and 8"

  - Grades 9 – 12
    The research paper for high school students follows the components mandated by the *International Science and Engineering Fair*:

    - Title Page and Table of Contents
    - Introduction (Background & Purpose for Research)
    - Materials and Methods (Experimental Design Diagram)
    - Results (Data Tables, Graphs, etc.)
    - Discussion of Results
    - Conclusions
    - Acknowledgments
    - References/Bibliography

- Visual Display
  Also frequently referred to as a "tri-fold" display, this board is a three-dimensional representation and summary of the steps involved in the scientific experimentation. It is an "at-a-glance" summary of the experimental design, results, and conclusion of the research.

The Visual Display



Note: Diagram indicates dimensions for Grades 9 – 12. See below for display dimensions for Grades 5 – 8.

Display Dimensions

The entire project display is limited to the following dimensions: Grades 5-8--38 cm (15 in.) deep, front to back; 76 cm (30 in.) wide, side to side; 274 cm (108 in.) high, floor to top; Grades 9-12--76 cm (30 in.) deep; 122 cm (48 in.) wide, 274 cm (108 in.) high. All projects must be self-supporting on the floor or on a flat table. If a table is used, it becomes part of the project.

Parts of the Written Paper: Grades 7 – 8

Part	Purpose
Title	Write a sentence that relates the independent and dependent variables that were investigated.
Introduction	Describe the rationale, purpose, and hypothesis for the investigation. Use three questions to guide your writing of the introduction. • Why did you conduct the experiment? (Rational) • What did you hope to learn? (Purpose) • What did you think would happen? (Hypothesis) Provide a literature review and citations.
Experimental Design Diagram	Format the experimental process.
Procedure	List the steps followed to complete the investigation. Check the list carefully for accuracy, completeness, and precision.
Results	Complete a data table and an appropriate graph for the data using the following guidelines.
Data Table	• Make a table containing vertical columns for the independent variable, dependent variable, and derived quantity. • Subdivide the column for the dependent variable to reflect the number of trials. • Order the values of the independent variable—preferably from the smallest to the largest. • Record values of the dependent variable. • Computer the derived quantity.
Graph	• Draw and label the X and Y axes of the graph. • Write data pairs for the independent and dependent variables. • Determine an appropriate scale for the X and Y axes; subdivide the axes. • Plot the data pairs on the graph. • Summarize the data trends on the graph.
Conclusion	Use six questions to guide your writing of the conclusion. • What was the purpose of the experiment? • What were the major findings? • Was the hypothesis supported by the data? • How did your findings compare with background research? • What possible explanation can you offer for the findings? • What recommendations do you have for further study and for improving the experiment?

Parts of the Simple Report: Grades 5 – 6

Part	Purpose
Title	Write a sentence that relates the independent and dependent variables that were investigated.
Introduction	Describe the rationale, purpose, and hypothesis for the investigation. Use three questions to guide your writing of the introduction. • Why did you conduct the experiment? (Rational) • What did you hope to learn? (Purpose) • What did you think would happen? (Hypothesis)
Experimental Design Diagram	Format the experimental process.
Procedure	List the steps followed to complete the investigation. Check the list carefully for accuracy, completeness, and precision.
Results	Complete a data table and an appropriate graph for the data using the following guidelines.
Data Table	• Make a table containing vertical columns for the independent variable, dependent variable, and derived quantity. • Subdivide the column for the dependent variable to reflect the number of trials. • Order the values of the independent variable—preferably from the smallest to the largest. • Record values of the dependent variable. • Compute the derived quantity.
Graph	• Draw and label the X and Y axes of the graph. • Write data pairs for the independent and dependent variables. • Determine an appropriate scale for the X and Y axes; subdivide the axes. • Plot the data pairs on the graph. • Summarize the data trends on the graph.
Conclusion	R = Recall: Describe what you did. E = Explain: Explain the purpose of your experiment. R = Results: State the results. Was the hypothesis supported by the data? U = Uncertainty: Describe any errors. N = New: Write 2 new things that you learned. Write 2 questions for further investigation.

Writing an Abstract

An abstract is a brief, written discussion of the science project. It consists of a brief statement of the essential, or most important, thoughts about the project. Abstracts should summarize, clearly and simply, the main points of the experiment and/or the main sections of the report.

What is included in an abstract:

- Project title
- Purpose of the experiment (problem and hypothesis)
- Procedures used
- Observations/data/results
- Conclusions
- Works Cited (Bibliography)

A Simple Example Abstract:

Which Chocolate Chip Cookie Do Third Graders Like Best?

The purpose of this project is to determine which type of chocolate chip cookie third grade students like best. It is hypothesized that third graders will like the homemade chocolate chip cookies best.

Cookies were bought at Publix and others were homemade. All third grade students had previously been given consent forms in order to participate. If someone was allergic to chocolate, he / she was not included in the study. Cookies were put in the same type bags marked A, B, and C. Students were asked to fill out a slip revealing their gender and telling which type of cookie they liked best.

Results showed that third grade boys liked homemade cookies best and third grade girls liked *Keebler* cookies best. The hypothesis was not correct. This study could have been repeated at different times of the day to determine if time of day has any effect on the choice of third grade students.

Information from this study may be used for mothers who give cookies to their children. If a mother is planning a happy surprise, the cookies a student likes would be the most desirable.

Works Cited:

Nelson, Jim. *Cooking is Fun*. New York: Random House, 1989, p. 95.

"Dining on Data," *Science Scope*. Vol. 17 No.3, Arlington: National Science Teachers Association, November/December 1993, pp. 26-29.

Grade 8 Sample Abstract:

Green Hair and Chlorine: Who Is the Cu-lprit?

The purpose of this experiment is to determine what makes blonde hair turn green in a swimming pool. It is hypothesized that chlorine in the pool water turns blonde hair green.

Nine milliliters (ml) of water were placed in a test tube with 1 ml of the following variables: chlorine, copper sulfate, copper sulfate/pool water, and copper sulfate/chlorine. One ml of each solution was added into another test tube of 9 ml water. This step allowed dilution by 10 percent, 6 times each. This method is called serial dilutions. In each test tube, groups of blonde hair were soaked over night. The next day the hair was removed, dried, and placed onto cardboard.

The hair in various concentrations of chlorine did not seem to cause any significant difference with either the tap water or pool water. The hair in various concentrations of copper sulfate and did turn green. There appeared to be a direct relationship between the amount of copper sulfate in the concentration and the color of the hair. The test tube containing .01 grams of copper sulfate per ml of water turned the hair very green, while there had to be .0001 milligrams of copper sulfate per ml of water to allow the hair to turn green.

It was concluded that the "culprit" that turns hair green in a swimming pool is not chlorine, as was hypothesize, but most likely copper found in the pool's piping. Chlorine probably facilitates the leaching of copper from the pipes, but further experimentation would need to be performed before this can be concluded.

Works Cited:

Johnson, Elaine. "Environmental influences on the hair follicle." In: Orfanos, Carol et. al. eds. *Hair Research*. Berlin: Springer, 1981, pp. 183-94.

Kalopesis, Gary. "Toxicology and Hair Dyes." In: Montagna, William, ed. *The Science of Hair Care*. New York: Marcel Dekker Inc., 1986.

Sample abstracts actual entries from the 2001 California State Science Fair. Some modification of bibliographic sources were made.

For sample high school abstracts, refer to the example shown in the *2007 Intel Student Handbook section of the 2007 International Science and Engineering Rules*. Students qualifying for the senior (Grades 9-12) Division of the Regional Science Fair MUST submit a 250-word maximum abstract with required ISEF protocol forms.