Science and Social Studies Fair Handbook

Catholic High, New Iberia

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An official guide to the Catholic High Science and Social Studies fair for students and parents, this handbook will aid students in developing their projects from start to finish and parents in their understanding of the fair and its purpose.

TABLE OF CONTENTS

NOTE TO PARENTS AND STUDENTS:

Dear Parent and Student:

As the United States continues to compete in a global economy that demands innovation, we at Catholic High continue to promote the development of crucial twenty-first century skills demanded by employers. The Catholic High annual Science and Social Studies fair involves students in authentic application of these skills – information, visual, and cultural literacy; personal, social, and civic responsibility; global awareness; higher-order thinking,; effective communication; and teaming and collaboration.

We hope the following suggestions will be helpful as you develop this year's project:

1. The most important ingredient in any project is the amount of work that the **student** accomplishes, how much knowledge he or she acquires, and how much initiative is displayed.
2. Practice makes permanent! Completing a science or social studies fair project is like building a model, doing a puzzle, playing a sport, or giving a musical performance. You become better at it as you stick with it.
3. Do not worry about the project's performance at the fair. Anyone who ever does a careful piece of work wins because they gain knowledge, develop careful work habits, and win personal pride.
4. Develop and stick to a schedule. Getting started right away leads to better results.
5. Although it is to be the student's effort, there is no substitute for a parent's support.
6. Areas in which a parent's assistance will be necessary include:
    a. Safety – Be sure that poisons, dangerous chemicals, and open fires are avoided. Learn a practice electrical safety if electricity is used in the project. If any aspect of the project appears to be dangerous, it is not to be included.
    b. Transportation – Help will be needed for the transportation of materials to the fair, and to any source of project information such as libraries, businesses, museums, nature centers, and universities.
7. Areas in which a parent's assistance may be welcome include:
    a. Suggesting project ideas (These may be connected with your work.)
    b. Technical work such as construction and photography
    c. Help with project expenses
    d. Being an interested listener

HOW FAR YOUR IDEA CAN TAKE YOU

Accomplishment	Rewards
• Intel International Science and Engineering Fair (High School Science Only)	• Nobel Award • International Tours and Trips • International Summer Job Opportunities • Scholarships • Cash Awards • Career Possibilities
• State Fair	• Career Ideas • Scholarships • Trips, Tours • Cash Awards • Summer Job Possibilities
• Regional Fair	• Special Recognition and Awards • Ribbons • New Friends • New Project Ideas
• School Fair	• Strengthened Skills • Knowledge • Self-satisfaRecogRibbons • Certificates

WHICH TYPE OF PROJECT WILL I DO?

Science Projects

Involve research and/or an investigation

Provide quantitative data through experimentation followed by analysis and application of that data

Categories

- ANIMAL SCIENCES
- BEHAVIORAL & SOCIAL SCIENCES
- BIOCHEMISTRY
- CELLULAR AND MOLECULAR BIOLOGY
- CHEMISTRY
- COMPUTER SCIENCE
- EARTH & PLANETARY SCIENCE
- ENGINEERING: Electrical & Mechanical
- ENGINEERING: Materials & Bioengineering
- ENERGY & TRANSPORTATION
- ENVIRONMENTAL MANAGEMENT
- ENVIRONMENTAL SCIENCES
- MATHEMATICAL SCIENCES
- MEDICINE & HEALTH SCIENCES
- MICROBIOLOGY
- PHYSICS AND ASTRONOMY
- PLANT SCIENCES

Social Studies Projects

Show application of a basic truth or generalization or show research in a study of people in their relation to physical environments

Require methods of research and inquiry, not just "show" displays or "collections of things"

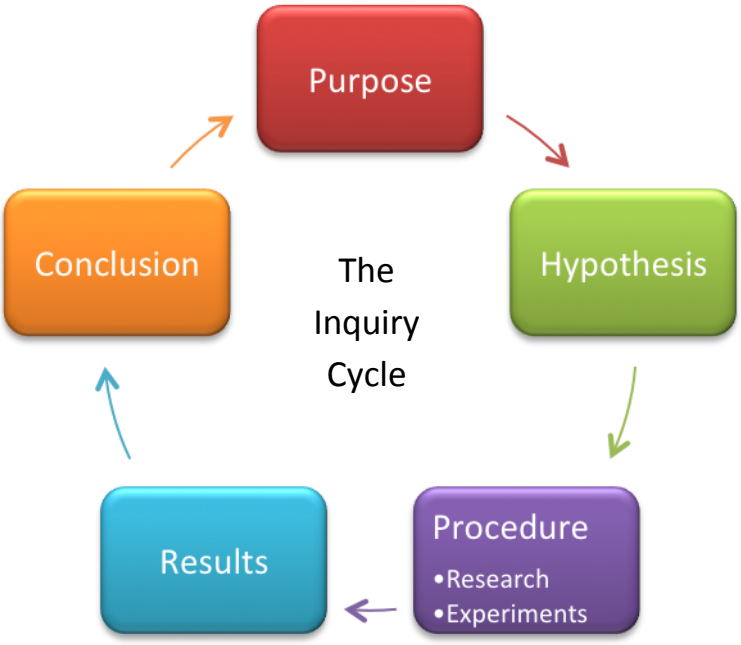
Categories:

- ANTHROPOLOGY - Culture developed by people living and thinking together
- ECONOMICS - wants and needs satisfied by people laboring
- GEOGRAPHY - people and nature interact
- HISTORY - the continuous narrative of human progress
- POLITCAL SCIENCE - group living regulated by social control
- SOCIOLOGY - people living in groups

BASIC INGREDIENTS FOR A GREAT PROJECT

"SCIENTIFIC METHOD" OR "INQUIRY CYCLE"

This is the method scientists follow. It can be applied, to a great extent, to both science and social studies projects. Often referred to as a cycle now, the method usually leads to deeper or continued questioning.



RESEARCH PAPER

This is a detailed, comprehensive description of your project. Your research paper provides a formal background for your project. It helps you put all your project experiences in order. It lets your teacher and the judges learn more about your efforts. It should include everything in your abstract as well as particulars of your experiments, research, and bibliography.

ABSTRACT

This is a brief summary of your project. An abstract should be no longer than 250 words. Use only one side of a typed, double-spaced page, with a 12-point font.

EXHIBIT

This is your project display. It must not be larger than 36 inches wide, 30 inches deep (front to back), and 9 feet tall. Keep your exhibit neat, uncluttered, and to the point. Your display must also stand by itself.

CHOOSING A TOPIC AND TITLE

In considering a topic, remember:

1) ***Value:*** The topic should be enlightening on some significant aspect of human experience.
2) ***Originality:*** If a project has been the subject of a previous investigation, the proposed new study should either furnish substantial new evidence or provide a significant new interpretation.
3) ***Practicality:*** Sources must be available to use conveniently and without fear of censorship. The scope of the subject should be neither too limited nor too broad to be given good in-depth treatment.
4) ***Unity:*** Every project must have a unifying theme or be directed to a certain question or thesis.

Begin by thinking of things you might be curious about. For example, you might be interested in **Diseases** or **Space** or **Early America.** Then, focus on one thing in particular about that topic. For example, you might want to know **how sicknesses affect people** or **why we study objects in space** or **Native Americans**.

Information has to be exact if it's going to matter. It is like telling people you ran a long distance and telling them you ran a 5K. The reaction is much stronger when you give an exact distance. So once you have narrowed things down, it is time to get really specific. Using the same examples, you could ask:

What influences the rate of recovery from the common cold?

What effect do solar storms have on the Earth's atmosphere?

What impact did early government policy toward the Chitimacha have on their lives today?

Choose a catchy title. Make it specific. It should pique curiosity, making the reader want to learn more about the topic.

Once you have a few good ideas, it is time to choose among them.

SCIENCE FAIR PROJECT TYPES: (THE THREE BASIC CHOICES)

Type 1: Investigation of a Problem

- Problem:
  - Can a machine really teach?
  - How long does it take the heart to return to normal after exercise?
  - What is the most electricity you can make using a magnet and a coil?
  - How rapidly does a plant make starch?
- Purpose
  - What exactly are you trying to figure out with your project? Make a statement, for example: To find out if a machine can really be used to teach.
- Hypothesis
  - Based on what you know, try to make an answer for your question. This is your best guess, your hypothesis. As you do your project, you will try to find out if your hypothesis is true. A hypothesis is a statement. It might sound like this: A simple machine can teach children basic science facts.
- Procedure
  - Research – Collect information to help you answer your question. Use books, magazines, interviews, and TV. Try contacting businesses, utilities, government offices, etc.
  - Experiment – Test your hypothesis. Try it out. For example, can your machine teach science facts better than another method? How can you find out?
- Results
  - List your results. Use a notebook, charts, graphs, pictures, or tapes. Be clear! Give facts, not opinions.
- Conclusion
  - What did you project teach you? Even if your experiment proved your hypothesis wasn't true, you've learned something.

Type 2: Construction of a Model

- Examples:
  - A model of a solar home
  - A telegraph system
  - Types of flowers
  - A model of a recycling plant
  - Styles of handwriting
  - Insulation materials and their uses
- You could use any of these as a project title, but it would be better if you could form a question, for instance:
  - How can a model of a solar home lead to lower energy bills?
  - How does a telegraph system work?
- Purpose
  - If your title is a question, the purpose of your project is to provide an answer, for instance: To determine that the use of solar energy can lower heating costs.
- Hypothesis
  - This is one sentence telling how your project will accomplish your purpose, for instance: A model of a solar home will show that the use of sunlight is the least expensive method to heat a home. A hypothesis must be tested.
- Procedure
  - Research – Gather information to aid your purpose.
  - Experiment – Test your hypothesis. How can you prove that solar energy is better?
- Results
  - Give measurements, not statements like "more or less."
- Conclusion
  - What might your project lead to? What is its importance?

Type 3: Demonstration of a Scientific Principle

- Examples:
  - Measuring lung capacity
  - Faraday's famous ice pail experiment
  - An oil-drop model of a splitting atom
  - An electrical smoke trap
- Any of these demonstrations could be turned into a science fair project. Think in terms of a question to help you get at the important ideas, for instance: Why should lung capacity be measured?
- Purpose
  - What is your goal? It might sound like this: To find out if a large lung capacity is an advantage during exercise.
- Hypothesis
  - One sentence: tell how you think your project can demonstrate your purpose. A hypothesis might sound like this: Students with the largest lung capacities can do the most exercise.
- Procedure
  - Research – Search for information about your project
  - Experiment – Test your hypothesis! How exactly can you prove it?
- Results
  - List the main points of what you've learned. What did your research and experiments prove?
- Conclusion
  - What does it all add up to? What is the value of your project?

RESEARCH PAPER

There are many sources of information for your research paper besides the Internet. You might check school and local libraries and high school and university libraries. Check the yellow pages of the phone book for businesses that might be helpful. Check city and parish offices such as police, fire, and public health departments. As a rule, a good research uses a variety of at least three different types of sources.

This is one good way to begin:

Notes – Your notebook contains the "raw material" for your report: a list and comments from your reading, and details from your experiments.

Outline – Copy the main ideas from your notebook into a simple outline. Organize your thoughts around the scientific method you've followed:

I. Purpose
II. Hypothesis
III. Procedure
    A. Research
    B. Experiment
IV. Results
V. Conclusion

Rough Draft – Now write out the outlined information. Think of it as a letter to your teacher or to one of the judges. Each section of your outline should be a separate paragraph.

Proofread – Look over what you've written. Pretend you are the teacher or judge! Does the report make sense? Rewrite until every thought is clear. Ask at least one other person to check your paper.

Final Copy – When you are sure that your rough draft tells the story of your project, write the final version. It should include:

I. Title Page
II. Table of Contents
III. Body – this should be the information from the outline above
IV. Bibliography

BIBLIOGRAPHY

This is an alphabetical list of books, articles, pamphlets, websites, etc. used to gather research for your project. Different fairs require different documentation styles (MLA, APA, etc.) for these items. Your teacher will provide you with detailed information on how to properly document your sources.

GUIDELINES FOR YOUR ABSTRACT

Content

Your abstract is a summary, an overview of your project. It should include:

1) Purpose – Why did you do your project? What was the question you wanted to answer? What was the problem you tried to solve?
2) Hypothesis – This is a "best guess" explanation of what you think your experiment will prove.
3) Procedure
    a. Research – Briefly explain your research plan. How did you gain information about your project?
    b. Experiment – Mention the goal and outcome of any experiments. Did they prove or disprove your hypothesis?
4) Results – What were the most important facts learned from the project?
5) Conclusion – What do your results mean? Can you compare the results to anything else you know? Do your results give you any ideas for future research?

Style

Be sure your thoughts are clear. Have someone check your spelling and grammar, even after you have used a word processor's spell-check feature.

SAMPLE ABSTRACT

NARRATIVE STYLE

Why Is There No Air in Light Bulbs?

The idea for this project came from an experiment called "Edison's Electric Light" described in *Selected Experiments and Projects* from the Edison Foundation.

Thomas Edison experimented with many types of filament wire in lamps, or bulbs, from which the air had been removed.

This project indicates the reason that air is removed from light bulbs. For a fire to burn, air (the oxygen in air) must be present: no oxygen, no fire. Electricity can cause material (even filament wire) to burn. It seemed that for a light bulb filament to glow without burning up quickly, it would have to let electricity pass through it without the oxygen in air being present.

A test was set up to determine whether or not a filament would glow longer and brighter without the oxygen in air being present.

A low resistance nichrome wire 2 cm. long was used to represent a light bulb filament. This length burned out after about two seconds of carrying electricity from a 6 Volt battery.

Electric current was applied to each of 20 filaments placed in a "bulb" that contained air. The burn out time for each trial was measured and the average time was calculated.

Electric current was then applied to each of 20 filaments place in a bulb from which air had been removed. The burnout time for each trial was measured and the average was compared to the first set of trials.

The filaments glowing without the oxygen in air being present lasted 30% longer, on the average, than the filaments glowing in the presence of the oxygen in air. These test results indicate that in order to make light bulb filaments last longer, air must be removed from light bulbs.

EXHIBIT

Material

The materials must be strong, lightweight, and self-supporting. You should be able to assemble it yourself. Be sure to make everything sturdy so it can be safely transported. Make sure you can fit it into your car. Fasten everything well. Use hardware, not tape.

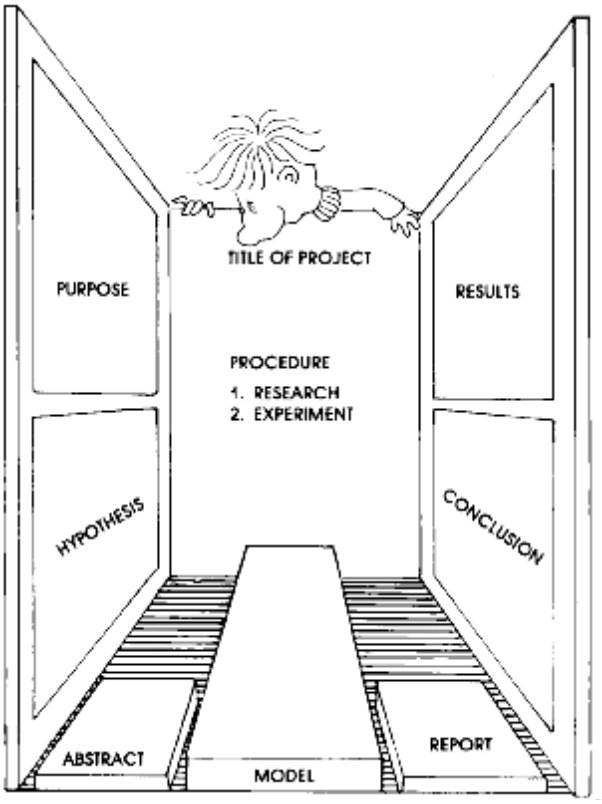
Safety

Anything which might be hazardous is prohibited. Do not use open flames, dangerous chemicals (even household cleansers can be very dangerous when mixed), unshielded light bulbs, etc. You will need to supply your own electrical cord if needed. Be sure it's in good shape and uses a three-prong (grounded) plug. Check with your teacher for complete rules. Also, if you are working with live vertebrate animals, you will need to check with your teacher for special permission.

Display

Use attractive lettering. Use one-color printing to avoid confusion. Use colors with high contrast. Spell correctly. Main points should be large and simple. Details must be clear 3-5 feet away. You may include any of the following:

- Posters – These "advertise" the main features of your project. You might use drawings, pictures, outlines, etc.
- Graphs – There are many types. Line, bar, and picture graphs all serve to illustrate some kinds of results. Check your math textbook for more information.
- Models – Be able to explain them!
- Photographs, Slides – These can display information you couldn't bring to the fair. They can also show different stages of your project's development.
- Notes – you may have journals or notebooks you kept during your experiments that you wish to display.



PRESENTATION

What to do and say

- Follow the scientific method as you describe your project.
- Practice presenting your project to your family and friends.
- Be neat in appearance and polite in manners.
- Speak to the judges as conversation partners. Look directly at them. Speak slowly. Be sure they understand you.

What judges look for

- Accuracy – Exactness. The truth that you have discovered. How closely did you follow the scientific method?
- Neatness – Attractiveness. Project appeal. Be as creative as you can be!
- Clear thoughts – Do you understand everything you've done? Have you done everything down to the last detail? Can you explain it?
- Results – Did you end up with knowledge that is important to you?