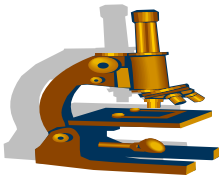
Catholic Schools

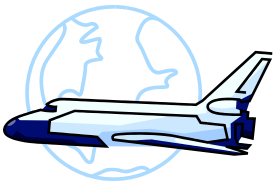
of

Fairbanks

Science Fair

Information Packet





Science Fair Project Schedule

Experiment — Date Due

1. Choose a topic that you find interesting. You may first want to visit a museum, science center or the library for ideas.		
2. Write your big question. Make sure it is a question you can investigate by yourself.		
3. Research your topic using books, magazines, encyclopedias and information from professionals, such as doctors, teachers, scientists, librarians and so on.		
4. Write a hypotheses or a good guess about what you think the outcome of your experiment will be.		
5. Write a step-by-step procedure.		
6. Collect all materials needed for your project.		
7. Conduct your experiment and collect data.		
8. Record the results of your experiment.		
9. Repeat step 7 and 8 three times.		
10. Draw a conclusion and organize the results of your experiment on easy-to-read charts or graphs		
11. Build a display using charts, graphs, photos, illustrations, neat lettering and models of your experiment.		
12. Prepare an oral presentation to explain your project to others.		

Report or Demonstration or Collection

1. Choose a topic that you find interesting. You may want to visit a museum, science center or library for ideas.		
2. Research your topic using books, magazines, encyclopedias and information from professionals, such as doctors, scientists, teachers, librarians and so on.		
3. Collect all the materials needed for your project.		
4. Write a report that includes resources used.		
5. Build a display using charts, graphs, photos, illustrations, neat lettering, and models of your project topic.		
6. Prepare an oral presentation to explain your project to others.		

Science Fair Guidelines

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Please read the Guidelines for All Projects carefully to understand the requirements for entering your project. The guidelines that follow them are for the specific types of science projects: experiments, demonstrations, collections, computer projects, scientific reports, and inventions. They reflect requirements for the District Science Fair. They can help you decide where your project belongs as well as offer suggestions on how to conduct, organize and present your project. So, please read all guidelines carefully.

Guidelines for All Projects

1. The reviewers will look for:
    - Clarity of presentation: Is the projects easily understood, logically organized, self explanatory, neat, eye-catching? Does it center on the main idea of your topic and show evidence of being constructed and written by you (list the things you had help with)?
    - Your understanding of the project
    - Creativity and originality
    - Thorough treatment of your subject

2. Project components should be short and simple (one or two sentences may suffice).

3. All project exhibits should have your names, grade, and teacher on the back.

4. All projects should be titled and clearly labeled.

5. Project exhibits should be self-supporting and may be constructed out of foam core, masonite, heavy cardboard, etc. Poster board is not recommended.

6. Make your exhibits as compact as possible. Exhibits may not exceed **30 inches front to back, 3 feet side to side, and 6 feet top to bottom**.

Project Exhibit Example

7. All resource information (books, magazines, newspapers, etc.) used should be listed, but need not be brought in as part of your project.

8. Small group projects (2 to 6 students), sibling projects, and class projects are encouraged.

9. No live vertebrate animals may be exhibited. Use photographs, illustrations, etc.

10. Hazardous materials or procedures are not allowed (disease causing organisms, open flames, dangerous chemicals. etc.)

11. Your display should include the written part of your project and things you used to work on your scientific question/statement. This could include a model, a collection, an invention, all journals and data sheets and materials used in your project Consider using a photograph or drawing of fragile items or expensive equipment in your display, or bringing it in for the interview only.

12. Bring your own extension cord if you need one.

13. All projects will receive participation awards and written comments from the reviewers.

14. Resources for ideas and background information: Internet, Noel Wien Library, UAF Rasmusson Library and the ICS/Monroe school library have science sections that have books on how to do a science project in general, books full of specific science experiments that could be adapted to an idea which you may

have, and books on specific fields of study in science. Additionally, the UAF Museum may be a good place to visit for ideas. After you have chosen a subject for your project, researching it using the library and/or the museum and/or enlisting the help of a scientist friend is your next step.

Guidelines for the Six Science Project Types

SCIENTIFIC METHOD OF INVESTIGATION – EXPERIMENT GUIDELINES

1. **Objective:** The question you wish to answer or investigate. Make it as good a question as you can. For example, how does something work? This could be something in nature, something mechanical, etc. Use it for your display title, if you wish.

2. **Hypothesis:** What you think will happen when you test the objective or question. This is a possible answer to your question. Why do you think it is the answer?

3. **List of materials used:** List the materials and equipment you used to conduct your experiment.

4. **Procedure:** Figure out a way to test your hypothesis or answer. Design an experiment procedure.

5. **Results or data:** List what you found when you conducted your experiment. Use charts, graphs, photos, drawings, etc. or a combination of two or more of these methods to show your results.

6. **Conclusion/Discussion:** What did you learn? Was your hypothesis correct? Why or why not? Can you use what you learned from this experiment explain other natural events, engineering practices, etc. in the world around us? If so, how?

7. **Bibliography:** This lists all the research and resources you used to do this project (books, articles, professionals, etc.)

8. **Helpers:** All the people who worked on this project with you should be acknowledged somewhere on your exhibit.

DEMONSTRATION OF A SCIENTIFIC PRINCIPLE – GUIDELINES

1. **Objective:** You need to clearly identify one scientific principle that you are demonstrating or duplicating when you build your model(s), such as how does a human heart beat, how do the legs of a goose stay warm in winter, or any other naturally occurring phenomenon. One sentence in the form of a statement/ question, which can also be used as your display title, is enough here. No hobby kits, please.

2. **Procedure:** Explain step-by-step what materials you used to build your model(s) as well as how you did and how it works. You can add to your demonstration with the use of other models, drawings, photos, etc. that also show how the principle that you want to duplicates operates. Document all materials and/or methods you tried, even if they do not work or do not meet your ideal model for duplicating your scientific principle. Keeping a journal of your activities is the best way to do this. Explain what, when and why you did it.

3. **Results:** A model(s) that works!

4. **Evaluation/Discussion of your model(s):** Did this model(s) duplicate the scientific principle the way you thought it would? Could you make improvements? How?

5. **Bibliography:** This lists all the research and resources you used to build this model(s) – books, articles, professionals, etc. Researching your scientific principle is important to building your model(s).

6. **Helpers:** All the people who worked on this project with you should be acknowledged somewhere on your exhibit.

Please read the guidelines to Inventions before deciding if your project belongs here or not!

Collection Guidelines

1. **Objective:** What is the main classifying idea for this collection? Is it seashells, rocks, fungi, leaves, photos of different cloud types, etc? The collection must be categorized according to some naturally occurring material or event. The objective statement or the one word identifying your collection would make a good title for the display of your collection.

2. **Research the collection:** Research can tell you how to label the items in your collection with such information as their scientific and common names and when and where they were found; suggest how to arrange your collection for display or storage; provide background information about each item in your collection; and indicate why items belong in your collection. Some important background information should appear in the display. More detailed information can be kept at the display in a notebook. Most collections consist of a number of items, not just 3 or 5. However, exceptions do exist!

3. **Procedure:** Tell how you put your collection together. List the materials you used in gathering it and putting it on display. Use various methods, such as models, drawing, photos, graphs, charts, measurement, etc. to inform others about your collection. For example, you may want to take a photo of the tree from which you picked a leaf to add to its background information. You could also draw a tree on which you could arrange your leaf collection.

4. **Bibliography:** This lists all the research and resources you used for understanding your collection.

   (books, articles, professionals, etc.)

5. **Helpers:** All the people who worked on this project with you should be acknowledges somewhere on your exhibit.

Computer Project Guidelines

1. **Objective:** Why did you write this program? What purpose did you hope to accomplish with it? Print a graphic demonstration? Work a math problem?

2. **Who can use this program:** Try to make the operation of your program as user friendly as possible. You should provide a thoroughly written explanation that identifies what needs to be done to start the program, run it, stop it, and return it to its starting conditions, so that anyone who's unfamiliar with your program can operate it. How do you know if you have accomplished this? Try it on one of your buddies.

3. **Procedure:** Explain how you wrote this program. What computer language or development environment did you use? Any difficulties? List them. You might keep a log detailing what you did as you worked on the program. Accompanying the project should be: 1) a printout of the program; 2) a printout showing that the program did what you wanted it to do; and 3) a disk labeled with your name, grade, and teacher with your program saved on it.

4. **Evaluation/Discussion of your program:** Did you like the results? Any changes that you would like to make?

5. **Bibliography:** This lists all the research and resources you used to do this project (books, articles, professionals, etc.)

6. **Helpers**: All the people who worked on this project with you should be acknowledges somewhere on your exhibit.

You will have to make your own arrangements to show how your program runs.

Scientific Report Guidelines

1. **Objective:** Find a topic that interests you. Be sure that the topic is narrow enough for you to handle thoroughly, such as the aurora, oxy-fuels, permafrost, current scientific controversies or news, or any other scientific topic that comes to mind.

2. **Research the topic:** Find as much information as possible about the topic. This includes reading books and magazines, interviewing experts, going to lectures, visiting museums, and/or viewing TV programs about it. Keep thorough notes about what you learn and where you got your information.

3. **Procedure:** Write the report in your own words. Use models **, drawings, photographs, charts, etc. to illustrate your topic. Please, include your own observations.

4. **Evaluation/Discussion:** This is a wide open area where you can include such items as how hard it was to research this topic, what was the most valuable piece of information you gained, if this sparked interest or questions about other subjects, etc.

5. **Bibliography:** List all research and resource materials that informed you about your topic. Be as thorough as you can be.

6. **Helpers:** All the people who worked on this project with you should be acknowledged somewhere on your exhibit.

** Please be aware that this category is <u>not</u> for demonstrating a scientific principle. For example, if while constructing a display for the aurora, a model is built to stimulate, duplicate, or reproduce some <u>action</u> of the aurora, such as energy output or light properties, this project becomes a demonstration of a scientific principle. However, if the model is built to show how the aurora looks, this project is a scientific report. The difference is like a model plane with an engine (demonstration of a scientific principle) and a model plane without an engine (scientific report). So please read both the “Demonstration of a Scientific Principle Guidelines” and the above guidelines to see where your project belongs.

<u>Invention Guidelines</u>

The most important part of doing an invention, which by definition must be an original (something that no one has made before you), is keeping a journal of your work. You need to record your research (books, articles, professional advice, etc.) in the journal, all your design work, and any materials you used including explanation of those tired but not used and have a “How to Use” section. Every time you work on your invention, write about it in your journal. This journal must accompany your working invention model to the Science Fair.

1. **Need:** Why did you invent this device? (Inconvenience, to improve performance, lots of complaints, etc.?)

2. **Description:** Describe what your invention does. Use as many graphs, pictures or visuals as you can. Be thorough, but concise.

3. **Procedure:** Thoroughly describe the step-by-step instructions on the operation of your invention. Before writing this down on the display board, try your instructions on a friend.

4. **List of materials:** Don't forget anything.

5. **Results:** What will be the result of your invention? Who will use your invention and how will it change their lives? How does your invention improve upon another idea or device? How does your invention solve a problem?

6. **Display:** Your display should be "flashy". Remember, you are trying to sell your invention to people. Use TV commercial techniques, slogan, jingles, pictures, eye-catching words and phrases. Make the public want to use your product.

7. **Helpers:** Don't forget to acknowledge all the people who worked on this project with you somewhere in your exhibit.

How does the ICS/Monroe Science Fair work?

The goal for the Catholic School's Science Fair is to encourage students to learn about science by doing "hands-on" science. We want the project to be exciting, enjoyable and educational – a positive experience for both students and their parents. Judging of the science fair projects is done by professional scientists from the various scientific fields. Students will be invited to discuss their project with the judge who reviewed the project. We look for judges who enjoy working with children and who will offer encouragement and positive feedback. The judges will be using the District Science Fair judging criteria, which allows the students to compete against a set of goals, not against each other. All students entering a project in the science fair will be given an ICS Science Fair ribbon (1^{st}, 2^{nd}, or 3^{rd}) and a certificate. We feel that all the students deserve a ribbon for the work they put into making the Science Fair a success.

A certain number of projects will be sent to the District Science Fair; the number of projects depends on the enrollment at our school. The judges will be asked to recommend projects for the District Fair. Then a panel of over-judges will review the recommendations and make the final selections for the District Fair.

Parent Help on Science Fair Projects

There are many ways parents can help their children with Science Fair projects. The main thing to keep in mind is that it is the child's project. It should be the child's idea to do a project. We realize that some teachers may require their students to do a project as part of their science curriculum. In these cases parents can help their children pick topics which will interest the child, but which are narrow enough to be easy to do. The idea is to expand knowledge and have fun.

Helping in the Idea Stage: Kids have good ideas for the projects all the time. They have questions that can be worked into projects. You can help them by writing those ideas and questions down, keeping them in one place and finding them when it's time to start working on the project. Books, teachers, friends, pets, trips cooking, gardening, sports, and hobbies can all be sources of ideas.

Getting Started: You can help your child narrow down the idea to a specific scientific problem to his or her appropriate level. You can help your child find out what is already known about the topic with books on the subject or by interviewing a local expert. Help your child plan a schedule with steps to check off as you go, using the guidelines for the kind of project your child has chosen. Doing a little at a time makes it more manageable. Ask your child to explain what is happening as he/she does the experiment or if the intention is doing what he/she wants it to do. Let your child make "mistakes". Some of these "mistakes" are part of learning. Some are actually the result. Help your child keep an open mind and observe what is really happening. Kids are sometimes better at these things than adults because they have no preconceived notions of what is "supposed" to happen.

Keeping up the Good Work: If your child has done the experiment or made the invention and had a great time, but is struggling to get it written down, you can help reminding him/her that the project components should be simple. Be sure to allow at least 2 weeks for the writing part of the project when you plan the project. You can help by taking photographs or encouraging the child to draw pictures to illustrate his/her project. If your child asks, you may provide spelling or editing help. Most children will need your help in making exhibit boards. It is important for the child to list who helped out and how.

At the Fair: Just having a project in the Science Fair can give your child a great sense of pride and accomplishment. The important thing to emphasize about doing a Science Fair project is the discovery and presentation of ideas, not the awards. Parents should also be aware that reviewing has its subjective as well as scientific aspects. Reviewers are human, which means each has a different response to a child and his/her project.

Demonstration of Scientific Principle

CRITERION	LEVEL OF WORK	LEVEL OF WORK	LEVEL OF WORK
THE DEMONSTRATION IS	focused on one clearly identified scientific principle	focused on unrelated or poorly identified principles	not focused, or based on unclear principles
THE DEMONSTRATION IS BASED UPON	thorough research	some research	little or no research
WRITTEN EXPLANATIONS ARE	very clear, very correct	need some clarification; mostly correct	unclear, mostly incorrect
ORAL EXPLANATIONS ARE	very clear, very correct	need some clarification; mostly correct	unclear, mostly incorrect
THE DISPLAY IS	extremely easy to understand; extremely attractive	somewhat easy to understand; somewhat attractive	not easy to understand; not attractive
THE DEMONSTRATION USES	more than one method to convey information (models, photos, drawings, etc.) all of which are excellent	more than one method to convey info, all of which is satisfactory	only one method to convey information, which is marginally satisfactory
SOURCES OF INFORMATION	numerous; cited well	a few; cited poorly	not given

Experiment or Investigation

CRITERION	LEVEL OF WORK	LEVEL OF WORK	LEVEL OF WORK
QUESTIONS THE PROJECT SEEKS TO ANSWER	very clear	somewhat clear	unclear
THE HYPOTHESIS OR PREDICTION IS	very clear	somewhat clear	unclear
PROCEDURES ARE	very clear; very complete, addresses hypothesis very clearly	somewhat clear; somewhat complete; somewhat addresses hypothesis	unclear; very incomplete; does not address hypothesis
DATA, OBSERVATION RECORDS ARE	very clear; very complete, very well illustrated; repeated several times	somewhat clear; somewhat complete; illustration satisfactory; repeated once	unclear; very incomplete; no illustrations; not repeated
CONCLUSIONS ARE	very consistent w/data; refers very clearly to initial hypotheses	somewhat consistent w/ data; little reference to initial hypothesis	not consistent with data; does not relate to initial hypothesis
WRITTEN EXPLANATIONS SHOW	excellent understanding	good understanding	some understanding
ORAL EXPLANATIONS ARE	excellent understanding; excellent ability to extend beyond project	good understanding; good ability to extend beyond project	some understanding; some ability to extend beyond project
THE DISPLAY IS	extremely easy to understand, extremely attractive	mostly easy to understand; not attractive	not easy to understand; not attractive

SOURCES OF INFORMATION ARE	numerous; cited well	not given	not given

Scientific Collections

CRITERION	**LEVEL OF WORK**	**LEVEL OF WORK**	**LEVEL OF WORK**
THE COLLECTION IS	focused on one clearly identified theme	focused on several unrelated themes	not focused, or based on unclear themes
THE COLLECTION IS BASED UPON	thorough research	some research	no research
WRITTEN EXPLANATIONS ARE	very clear, very correct	need clarification; mostly correct	unclear, mostly incorrect
ORAL EXPLANATIONS ARE	very clear, very correct	need clarification; mostly correct	unclear, mostly incorrect

THE DISPLAY IS	extremely easy to understand; extremely attractive, in very logical order; well labeled; clearly labeled	mostly easy to understand; mostly attractive; in somewhat logical order; labels somewhat understandable	not easy to understand; not attractive; not in logical order; labels hard to understand
THE DEMONSTRATION USES	more than one method to convey information (models, photos, drawings, etc.) all of which are excellent	more than one method to convey info, all of which is satisfactory	only one method to convey information, which is marginally satisfactory
SOURCES OF INFORMATION	numerous; cited well	a few; cited poorly	not given

Scientific Report

CRITERION	LEVEL OF WORK	LEVEL OF WORK	LEVEL OF WORK
THE REPORT IS	focused on one clearly identified theme	focused on several unrelated themes	not focused, or based on unclear themes
THE REPORT IS BASED UPON	thorough research	some research	little or no research
WRITTEN EXPLANATIONS ARE	very clear, very correct	need clarification; mostly correct	unclear, mostly incorrect
ORAL EXPLANATIONS ARE	very clear, very correct	need clarification; mostly correct	unclear, mostly incorrect
THE REPORT IS	extremely easy to understand; extremely neat	mostly easy to understand; mostly neat	not easy to understand; poor grammar; poor spelling
THE REPORT CONTAINS	many excellent illustrations; excellent grammar; excellent spelling	several good illustrations; satisfactory grammar; satisfactory spelling	few good illustrations; poor grammar; poor spelling
SOURCES OF INFORMATION ARE	numerous; cited well	a few; cited poorly	one or less

Original Computer Program

CRITERION	LEVEL OF WORK	LEVEL OF WORK	LEVEL OF WORK
THE PROGRAM OR DEMONSTRATION RUNS	very cleanly and without flaws	somewhat cleanly and with only a few minor flaws	with much difficulty and with several major flaws
OBJECTIVES ARE STATED	very clearly; very easily understood	somewhat clear; somewhat understandable	not stated; very hard to understand
OPERATION OF THE PROGRAM REQUIRES	no special computer expertise on the part of the user	moderate computer expertise on the part of the user	much computer expertise on the part of the user
THE DISPLAY IS	extremely easy to understand; extremely attractive	somewhat easy to understand; somewhat attractive	not easy to understand; not attractive
WRITTEN EXPLANATIONS SHOW	excellent understanding	good understanding	little understanding
ORAL EXPLANATIONS SHOW	excellent understanding; excellent ability to extend beyond project	good understanding; good ability to extend beyond project	little understanding; little ability to extend beyond project

Inventions

CRITERION	LEVEL OF WORK	LEVEL OF WORK	LEVEL OF WORK
THE PROBLEM OR NEED PRESENTED IS	very clear	somewhat clear	unclear
THE PROCEDURE (MANUFACTURE) DESCRIBED IS	very clear	somewhat clear	unclear
THE LIST OF MATERIALS PROVIDED IS	entirely complete	somewhat complete	not given
THE INVENTOR'S NOTEBOOK IS	very complete; very easy to understand	somewhat complete; somewhat understandable	very incomplete; hard to understand
THE "HOW TO USE" SECTION IS	very clear	somewhat clear	unclear

WHAT THE INVENTION IS SUPPOSED TO DO IS	very clear	somewhat clear	unclear
WRITTEN EXPLANATIONS SHOW	excellent understanding	somewhat clear	poor understanding
ORAL EXPLANATIONS SHOW	excellent understanding	somewhat clear	poor understanding
THE DISPLAY IS	extremely easy to understand; extremely attractive	easy to understand; attractive	not easy to understand; not attractive
THE NAME FOR THE INVENTION IS	extremely intriguing	somewhat intriguing	not intriguing
THE JINGLE USED TO SELL THE PRODUCT IS	extremely “catchy”	somewhat “catchy”	not “catchy”
THE MODEL OF THE PRODUCT IS	extremely well constructed	well-constructed	poorly constructed
SOURCES OF INFORMATION ARE	numerous; cited well	few; cited poorly	not given