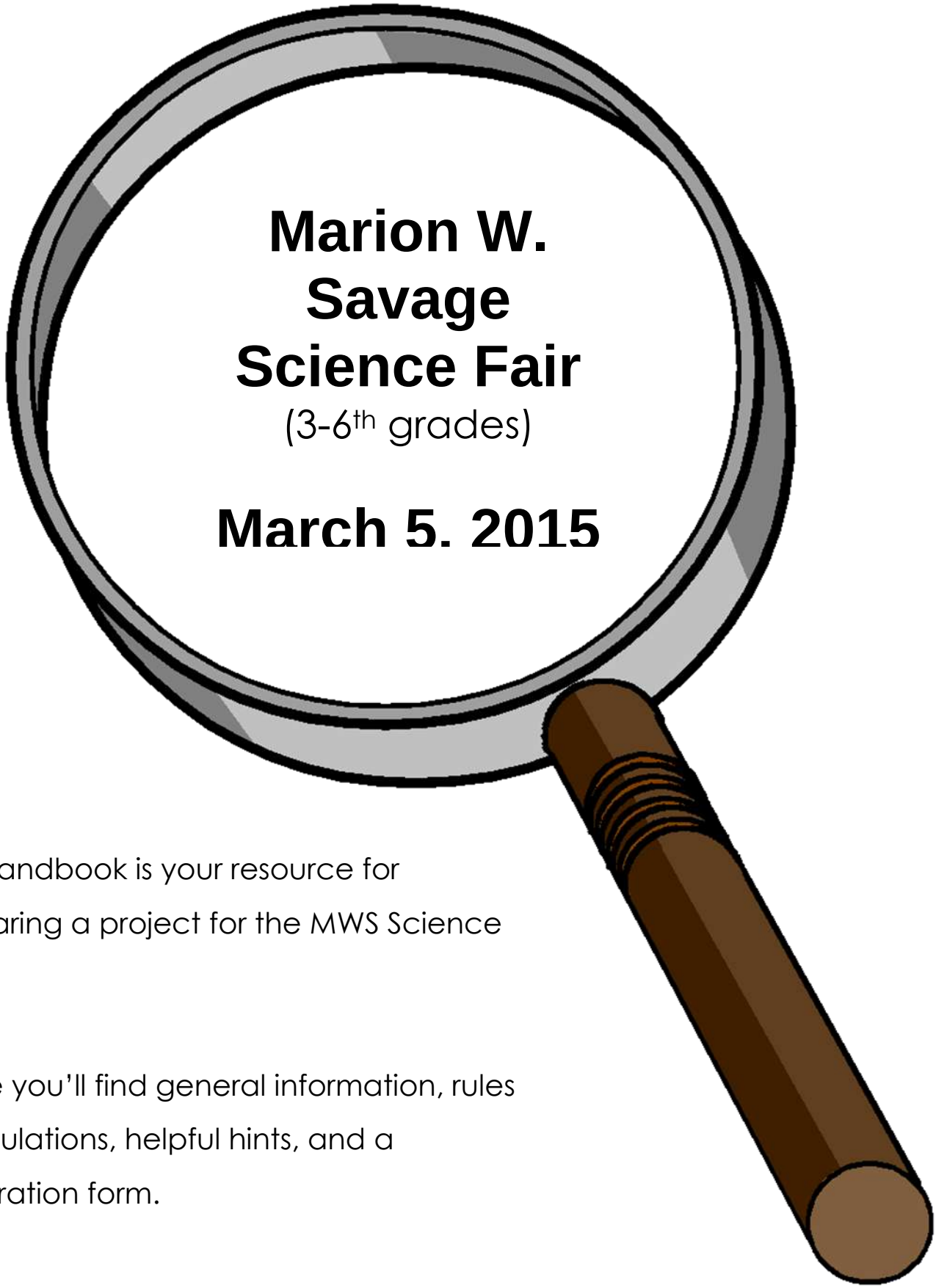


Marion W. Savage Science Fair

(3-6th grades)

March 5. 2015

This handbook is your resource for preparing a project for the MWS Science Fair.

Inside you'll find general information, rules & regulations, helpful hints, and a registration form.

Registration deadline:
Friday, January 30, 2015

A Message to Students & Families

Dear Science Enthusiasts,

Thank you for your interest in participating in Marion W. Savage's Science Fair. This handbook has been written to help you prepare your project. It is very important that the Registration Form at the end of this handbook be completed, signed, and returned to your student's classroom teacher by Friday, January 30, 2015.

Participation in a science fair gives children the opportunity to develop the skills, attitudes, and knowledge that will help them become successful in a rapidly-changing world. The ability to solve present and future problems depends on the ability to question the world in new and creative ways. The thinking skills developed while doing a project are the same basic skills that will be used daily throughout life. What better opportunity for your student to develop such skills than participate in our schools Science Fair!

Students in **Grades 3-6** have the opportunity to prepare a **Science Fair Project**. A Science Fair project asks a question and tries to answer that question by performing an experiment using the Scientific Method. Science Fair projects are judged and have the option of being considered for advancement to the Regional Science Fair in Mankato.

While classroom teachers are very supportive of the Science Fair, there is not sufficient class time for them to address projects during the teaching day. The role of the adult in the home is a critical one. It is important for families to provide guidance and support, without completing the project for the child.

Many students will become involved as participants; all others will have the opportunity to view the displays and learn from them. All students who submit projects will also get to celebrate with a pizza party lunch on the day of the fair. ☺ In addition, all Marion W. Savage families will be invited to tour the displays during Explore Night. I am pleased and excited that you have expressed an interest in being a part of it all.

I sincerely hope you find great enjoyment in participating in the Science and Discovery Fair. Please remember to call or email with any questions or concerns.

Sincerely,
Sara Strahota
Science Specialist
707-3234

DATES TO REMEMBER

Registration Deadline ..... Friday, January 30

Marion W. Savage Science & Discovery Fair ..... Thursday, March 5

Minnesota State University Regional Science Fair ..... Saturday, April 25

What is a Science Fair Project?

The purpose of a Science Fair project is to answer a question through experimentation. You will need to choose a topic and then narrow it down to a specific question you can investigate. There are many possible ways or experiments to answer that question. A few basic steps need to be followed when preparing a Science Fair project. These steps are outlined on the following pages.

Almost any science topic can be the basis for a Science Fair project. However, in order for your project to be considered for the Mankato Regional Science Fair, it must fall into one of the categories listed here:

*Zoology & Humans
*Medicine & Health
*Physical Science
*Consumer Product Testing
*Environmental Science
* Botany
*Earth & Space Science
*Engineering, Computers, & Math

Can two students work on one project?
Yes. If two students work on one project, they should turn in one registration form with signatures from the parents/guardians of both students.

The following pages in this packet outline the many rules and regulations surrounding a science fair project. These are put in place to ensure safety and fair competition. Failure to follow these rules will result in disqualification from the Science Fair.

Students in grades 3-6 who complete a Science Fair project will have their project evaluated by a special team of judges. The best projects will be selected to represent Marion W. Savage at the Mankato Regional Science Fair, where they will complete against students from other schools in our region. Attending the Regional Science Fair is optional!!

The regional science fair is on Saturday, April 25, 2015 from 7:45am-3:30pm. It is located on the Minnesota State University Mankato campus. There is a $20 registration fee for students who advance to regionals- this fee is covered by the school. More information regarding registration will be sent home to students who are chosen to advance.

For more information, visit the Mankato Regional Science Fair at the following website: http://www.mnsu.edu/sciencefair/

Fill out the registration form. Return it to your classroom teacher by Friday, January 30th.

Science Categories

Many projects can fall into multiple categories, therefore it is necessary to identify the primary emphasis of the project and place it in that category.

The following is a list of category descriptions. <u>All elementary projects are registered into one of the following categories:</u>

Botany: Agriculture, plant growth, plant anatomy, plant diseases, plant behavior, plant cells, plant genetics, microbiology including bacteria, fungi and viruses, etc.

Consumer Product Testing: Testing of products, i.e. soaps, paper toweling, batteries, bubble gum.

Earth & Space Science: Geology, geography, meteorology, astronomy, rocks, minerals, soils, volcanoes, weather, fossils, gravity, atmosphere, petroleum, comets, stars, planets, solar system, etc.

Engineering, Computers & Math: Application of scientific principles to practical ends as design, construction, and operation of efficient and economical structures equipment and systems, including civil, mechanical, aeronautical, chemical, electrical, automotive, heating and refrigerating, transportation, power transmission and generation communications, architecture, lasers, rockets, computer systems and design, probability, mathematics, etc.

Environmental Science: Pollution (air, water, land), pollution sources, waste disposal, environmental change (heat, light, irrigation, erosion), ecology, etc.

Medicine & Health: Medicine, dentistry, pathology, ophthalmology, nutrition, sanitation, disease, pediatrics, dermatology, allergies, speech and hearing, biochemistry, food additives, human genetics, cells, etc.

Physical Science: Optics, acoustics, electricity, magnets, simple machines, plastics, fuels, crystals, chemistry, etc.

Zoology & Humans: Animal genetics, mammals, birds, reptiles, amphibians, fish, insects and other invertebrates, animal cells, anatomy, physiology, behavior, animal husbandry, veterinary medicine, psychology, sociology, anthropology, learning, public opinion, surveys, educational testing, etc.

Scier  **uired Items**

1. **Project Notebook:** This is a notebook or 3-ring binder where ALL of your notes, measurements, observations, tables, graphs, etc. are recorded.

2. **Project Title**

3. **Statement of the Problem:** This has to be written as a question. Make sure the question is easy to understand and fits your project exactly. What are you trying to discover? Define your variable (the part of your experiment that will change) that will help you find your answer. You should have control over the other variables or your experiment could be flawed, meaning you can't trust the data.

4. **Hypothesis:** This is your prediction- what do you think will happen? This should be written before you start your experiment. For example, "I think that water is necessary for plants to grow and I will do an experiment to see if my idea is correct."

5. **Materials:** List the materials you used in your experiments.

6. **Procedure:** How did you carry out your experiment? Select only one element to change in each experiment. Things that can be changed are called variables. Change one thing that will help you answer your question and keep the others fixed. You must be able to explain the variable changes and measure them. Then you run the experiment without these changes. This is called the control experiment and allows measurement of change.

7. **Results:** This is your data and measurements. Explain in detail what actually happened. You should use tables, charts, or graphs to explain your results.

8. **Conclusion:** What did you find out by doing this experiment? Are there patterns? Why did the results happen the way they did? Your conclusion should answer your Statement of the Problem. Was the hypothesis correct or incorrect? You may have surprised yourself and disproved your hypothesis. This is still good science and valuable information. Your experiment is still valid. Don't be disappointed if you proved your idea incorrect: be happy you ran a successful experiment and gained knowledge.

9. **Bibliography:** This is a formatted list of at least three resources you used. Make sure you use different types of sources (book, internet, etc.). A sheet giving bibliography entries is included in this handbook.

10. **Elementary Project Approval Form:** This form should be laid on the table in front of your project during judging. This form can be found at the end of this packet.

A Controlled Experiment

When you are conducting a scientific investigation, you must carefully follow experimental procedures. You must design an experiment to test your hypothesis. When planning your experiment, remember to keep everything the same except for the single variable being tested. A variable is something that can be changed in the experiment. It is what you are testing. Everything else must be the same – only one variable or condition is altered or changed.

A Control Group should be used when conducting an experiment. This group receives the same attention as the test groups; however, it will not be influenced by the variable the other groups are testing.

Example:

Question: How does the amount of fertilizer used affect plant growth?

Hypothesis: If I increase the amount of fertilizer, it will then cause greater growth in tomato plants.

The **test variable** will be the amount of fertilizer used, so all other variables and conditions must stay the same. That means:

1. Multiple plants should be used in each test group.
2. The seeds must come from the same package and should be randomly selected.
3. All seeds must be planted in the same sized pots at the same time with similar soil.
4. All plants must receive exactly the same things with the exception of the test variable (amount of fertilizer).
5. The temperature and light conditions must be the same for all test plants.
6. Designate one group as the Control Group. This group is not given any fertilizer.
7. Set up at least two other groups that will receive different amounts of fertilizer.
8. Apply the selected amount of fertilizer to each group at the same time for each application.

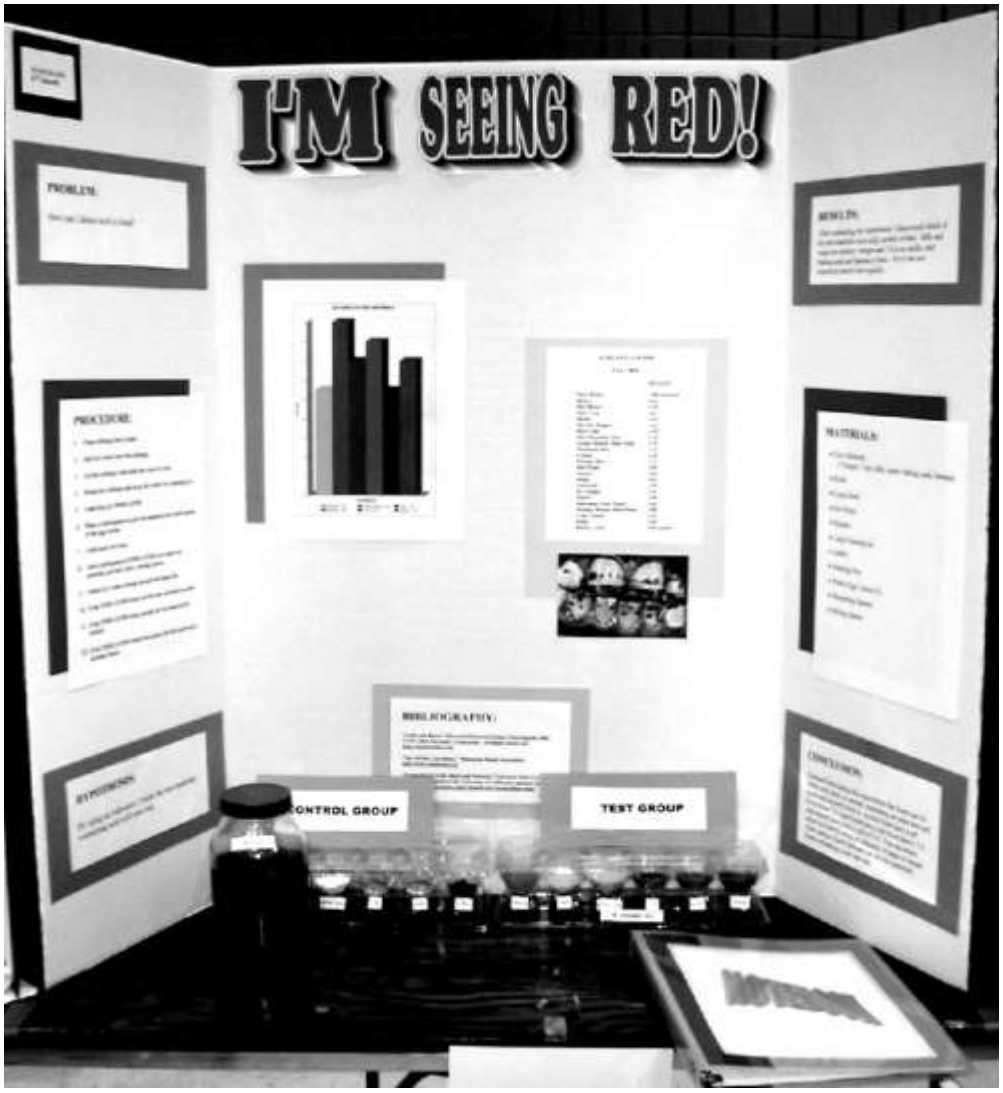
Some other examples of science fair projects that use appropriate scientific questions:
- Does the temperature of water affect how fast sugar dissolves?
- Does the type of bread affect how fast it molds?
- Do the size of its wheels impact how fast a car travels downhill?

Some examples of science fair projects that do not use appropriate scientific questions:
- Which TV weather forecaster is the most accurate?
- Which laundry detergent cleans the best?
- What is a volcano?

Project Display

Please consider these suggestions when making your display:

1. This is your exhibit; you should do most of the work yourself. It is very tempting to have someone bigger than you do the printing, coloring, pasting, and word processing, etc. You will be able to show your exhibit with great pride if you have done as much of the work as possible yourself.
2. Make large, simple and clear explanations. A picture or diagram is worth many words.
3. Make the title large, clear, and neat.
4. Use attractive, bright colors if your project is to be noticed and remembered.
5. Along with your notebook, display objects or materials used in your experiment.
6. **Make sure you have included all Required Items.**



What battery lasts the longest?

What paper towel is the most absorbent?

How does the pH of a liquid affect the growth of a plant?
How do colored lights affect a bean plant's growth?
What liquids freeze the fastest?
What popcorn brand pops the best?
What things will biodegrade?
How does temperature affect the growth of yeast?
How does color affect temperature?
What determines how fast a piece of candy dissolves?
Which plastic trash bag is the strongest?
What type of soap solution makes the biggest or strongest bubble?
Which brand of disposable diaper absorbs the most liquid?
Which laundry detergent works the best?
How does the number of wire wrappings affect the strength of the electromagnet?
How can you slow the browning of the apple?
Which flavor of gum lasts the longest?
How long does it take for mold to grow on cheese?
What vitamin dissolves the quickest?
What font if the easiest to remember?
What type of cloth is the best insulator?
What type of cereal is the least soggy after one minute?
Which soft drink keeps its fizz the longest?
What material causes the most static electricity?
Which brand of lipstick lasts the longest?
What environment is best for storing bread to keep it from molding?
Which gets warmer- sand or humus?
Which way does the wind blow most often?
What can be used to clean oil from water?
Which metal conducts heat best?
What type of dog food does my dog prefer?
Which brand of hockey tape lasts longest?

**** Notice that most questions start with <u>why</u>, <u>what</u> or <u>how</u>. Avoid questions that can be answered with a simple "yes" or "no." ****

Adult Assistant Do & Don't List

DO ENCOURAGE participation in the Science and Discovery Fair.
DO READ any project-related notes your student brings home. Help your student fill out

any forms.
DO OFFER to take your student to libraries, museums, or other places for information during the research phase of the investigation. You can also help your student contact people who may be able to provide information about the topic.
DO HELP your student acquire the materials needed for the project.
DO LISTEN if your student wants to talk through some ideas. Communicate to your student the message, "I'm interested in what you are doing." Give honest feedback, but do so in a positive way.
DO HAVE your student take necessary safety precautions. Do not him/her do anything dangerous.
DO HELP your student construct a realistic time frame for completion.
DO OFFER assistance in transporting project materials to and from school.
DO CONTACT Mrs. Strahota if you have any questions regarding procedures.
DO SUPERVISE students when using the Internet. Encourage appropriate Internet use including paraphrasing information and citing sources rather than copying and pasting.

DON'T DO the work for your student. Remember this is his/her project. Doing your student's project sends the message, "I don't want you to think for yourself." Give your student room to make mistakes. That's the only way he/she will learn. If the project seems too hard, then the student should select one that can be handled.
DON'T MAKE the focus of the project a competition. It's nice to get recognition, but the purpose of the fair is for the student to exercise thinking skills and to expand his/her knowledge of a topic area. This means EVERY student a winner!

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Safety

1. Anything that is hazardous is PROHIBITED. This includes but is not limited to:
    - Syringes similar devices
    - Any flames, open or concealed
    - Highly flammable/combustible gases, liquids, or solids

- Dangerous chemicals including caustics and acids
- Poisons, toxic and hazardous chemicals, drugs, and other controlled substances
- Dry ice or other sublimating solids
- Projects with unshielded belts, pulleys, chains and moving parts with tension or pinch points that pose a potential hazard to observers

2. There can be NO "hands-on" chemistry for observers, only for participants to use for demonstrating purposes.
3. Liquids may be exhibited, as long as they are in sealed plastic containers and are properly labeled. This liquid may not be harmful in any way, should it be accidently opened.
4. Electronic apparatus must be properly insulated. This rule is essential to prevent serious electric shock.
5. If batteries are used, they must be sufficient to maintain operation throughout the time of the fair.
6. Mrs. Strahota reserves the right to refuse any exhibit that is unsafe or inappropriate.

Live Organisms (Plant and Animal)

1. The use of live animals is permitted provided the animals are not harmed in any matter. A special "animal use" form must be completed and returned with your registration form. Forms are available from Mrs. Strahota. Live animals cannot be displayed. (Photographs and videos are acceptable alternatives.)
2. No actual parts of vertebrate animals can be displayed except teeth, nails, and animal bones. Sealed insect collections will be permitted.
3. Exhibiting spoiled foods, molds bacteria, microorganisms or any other type of cultured growth is not permitted, unless they are in a sealed plastic container.
4. Plants may be exhibited, except poisonous or dangerous ones.

Set-Up and Display

1. You will have the opportunity to sit with your project during part of the day while students tour the fair. However, each exhibit should be arranged so the viewer can understand it without requiring a lecture or demonstration.
2. Normal wear and tear on exhibits is to be expected during the time the fair is open to the public. For this reason, each participant is advised to protect his or her exhibit as completely as possible. Valuable instruments, objects, etc. should be securely fastened or covered. Expensive or fragile items should not be displayed.
3. Each exhibit will be displayed on a pre-assigned table space measuring 3'x2'x4'. Exhibits should also be free-standing (do not expect to be able to tape things to a wall.) Tables are provided for you.
4. Display boards are provided for FREE.
5. The Science Fair is held in the gym. **Bring your project to the gym on Thursday, March 5 before school.** You may NOT bring your project earlier than 8AM.

Science Fair Project Research

You should be able to find various books on science topics at the public library or our school's library. Science books, including books about science fair projects, are generally found in the 500's and 600's in the non-fiction section.

Some examples:

J502.8-J507-8	How to do a science fair project
J500.507, J520-523	Space, Universe, Astronomy
J530, J533, J538	Physics, Sound, Color, Electricity, Magnets
J542	Chemistry
J550-J552	Earth Science, Rocks, Fossils
J582.16-J612.3	Human Body, Food, Nutrition
J621	Machines and Electronics
J635.986	Gardening Experiments

Scott County Library (Savage)	952-707-1770
Hours: Monday-Tuesday	10am-8pm
Wednesday	1pm-8pm
Thursday	10am-8pm
Friday	10am-5pm
Saturday	10am-4pm
Sunday	1pm-5pm

Burnhaven Library (Burnsville)	952-891-0300
Hours: Monday-Thursday	10am-8:30pm
Friday-Saturday	10am-5:30pm
Saturday	1pm-5pm

Please take a peek at our own library display and resource area

B nats

BOOKS

Author (last name first). Title (underlined). City where the book is published: Publisher, copyright date.

Athenton, Pike. <u>Fish with Wings</u>. Miami: Marine Press, 1999.

MAGAZINES
Author (last name first). *Article title*. Title of the magazine (underlined) date (day month year): Page numbers of the article.

Bolton, Mary. *Fish in the Air*. Marine Life 7 June 2005: 34-35.

ENCYCLOPEDIAS
Article title. Title of the encyclopedia (underlined). Edition or version. Other type (CD-ROM). Date published.

***Flying Fish*. The World Book Encyclopedia. 1998 ed.**

MOVIES
Title (underlined). Media (film, videocassette). Production company, date. Time length.

Flying Fish and Flightless Birds-Nature's Mistakes? Videocassette. Classroom Science Productions, 2006. 30 min.

INTERVIEWS
Person interviewed (last name first). Type of interview. Date (day month year).

Short, Abe. Personal interview. 15 Jan. 2007.

INTERNET
Author<e-mail address>. *Post title*. Site title. Post date, or last update. Site sponsor. Date accessed. <Electronic address>.

***Barbados: Flying Fish*. Barbados Tourism Encyclopedia. Barbados Tourism Authority. 28 July 2006. <http://www .barbados.de/flyfish.htm>.**
Note: No author, e-mail address, or postdate were available.

Helpful Websites

South Central/South West Minnesota Regional Science & Engineering Fair
http://www.mnsu.edu/sciencefair/

Scott County Library (Savage)
http://www.scott.lib.mn.us/

Burnhaven Library (Burnsville)

http://www.co.dakota.mn.us/libraries/Pages/default.aspx

Agricultural Research Service: Science, Agriculture, and You
http://www.ars.usda.gov/is/kids/

Science Bob
http://www.sciencebob.com/index.php

Energy Quest: Science Projects
http://www.energyquest.ca.gov/projects/index.html#chemical

Exploratorium: The Science Explorer
http://www.exploratorium.edu/science_explorer/

Discovery Education: Science Fair Central
http://school.discoveryeducation.com/sciencefaircentral/

Science Made Simple
http://www.sciencemadesimple.com/science.html

ZOOM
http://pbskids.org/zoom/activities/sci/

Science Project Lab: 1st Grade Science Fair Projects
http://www.scienceprojectlab.com/1st-grade-science-fair-projects.html

Science Fair 911- Display Boards
http://www.stevespanglerscience.com/blog/science-fair-secrets/science-fair-911-display-boards/

Seven Weeks to a Great Science Fair Project

Week #1
____ Choose your topic
____ Organize your notebook
____ Ask questions
____ Research your chosen topic

Week #2
____ Finish your research

____ Define your problem
____ Develop your hypothesis
____ Design your experiment

Week #3
____ Gather all needed materials for your experiment
____ Start your experiment
____ Turn in your registration form! (Due January 30th)

Week #4
____ Set-up an outline for your project report
____ Continue your experiment
____ Begin collecting materials for your display

Week #5
____ Continue your experiment
____ Write the first draft of your project report
____ Sketch some designs for your display

Week #6
____ Finish your experiment
____ Revise list of materials needed and the steps of the procedure if necessary
____ Analyze your data and draw conclusions
____ Revise the project report

Week #7
____ Complete your display
____ Edit and type the final draft of the project report
____ Practice how you will present your project to the judges

Presentation to Judges

This is an important part of your project so take the time to plan and practice the presentation you will make to the judges. Plan in advance what you want to say.

Here is an approach you may wish to use for making your oral presentation:

1. Greet the judges and introduce yourself.
2. Tell them the title of your project, your grade, your school, and your teacher.
3. Tell how you became interested in this project.

4. Tell them some background information about your topic. What research did you do?
5. State the purpose of your investigation.
6. Describe in a step-by-step fashion the procedure you followed for conducting the investigation. Point to sections of your display and refer to charts, graphs, and photographs. If you have equipment on display allow the judges to examine it.
7. Explain the results of your experiment and be sure to discuss controls and variables.
8. Identify the conclusions that you drew from the experiment.
9. Ask the judges if they have any questions. Remember, if you don't know an answer say so and indicate you will look into it.
10. Thank the judges for their time and any suggestions they have offered to improve your project.

Good manners, nice clothes, and enthusiasm for what you are doing will help to impress the judges. Here are some tips:

1. Wear nice clothes.
2. Be polite and practice good manners.
3. Make eye contact with your judges and make sure to give each judge your attention.
4. Stand up straight and to the side of your exhibit.
5. Speak with confidence.
6. Don't do anything to distract the judges, like shuffle your feet, chew gum, or look at the ground.
7. Relax, smile, and have fun!

Marion W. Savage Sc

Student Name: _____ Phone: (_____)_____

Grade: _____ Teacher: _____

Title of Project: _____

Testable Question: _____

Prediction: _____

_____

Category (Check One):

____ Botany
____ Consumer Product Testing
____ Earth & Space Science
____ Engineering, Computers & Math
____ Environmental Science
____ Medicine & Health
____ Physical Science
____ Zoology & Humans

Display Boards: Each project will receive a FREE display board courtesy of Cargill ☺

Electricity: Does your project need electricity? (circle one) Yes No
If yes, bring your own extension cord (8-12 ft is best). Your exhibit will be placed near an outlet.

Permission to Participate
I give permission for my student to participate in the Marion W. Savage Science Fair on Thursday, March 5, 2015.

_____
(Parent/Guardian Signature)

Registration forms are due by <u>Friday, January 30, 2015</u>