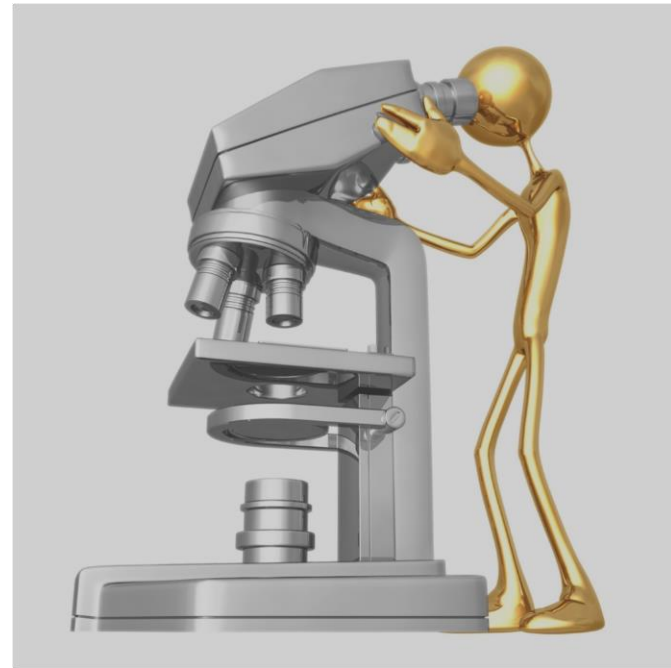


How To Do A Science Fair Project

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A good science fair project involves the student in a journey of discovery, driven by curiosity.



From —What Makes a Good Science Fair Project?

by Anita Gale with assistance from the California State Science Fair Judging Policy Advisory Committee

http://cssf.usc.edu/Resources/Good_Project.html

SCIENTIFIC METHOD

The Scientific Method is a set of procedures that is recognized by scientists worldwide as the best process for conducting research in order to reach objective, verifiable conclusions. It should be the basis for conducting a science fair project.



SCIENTIFIC METHOD

PURPOSE

What question do you want to answer with your project?

RESEARCH

Find information About your topic

HYPOTHESIS

Based on your research, What you think the outcome of your experiment will be

RESULTS

Organize and analyze the results of your experiment

CONDUCT YOUR EXPERIMENT

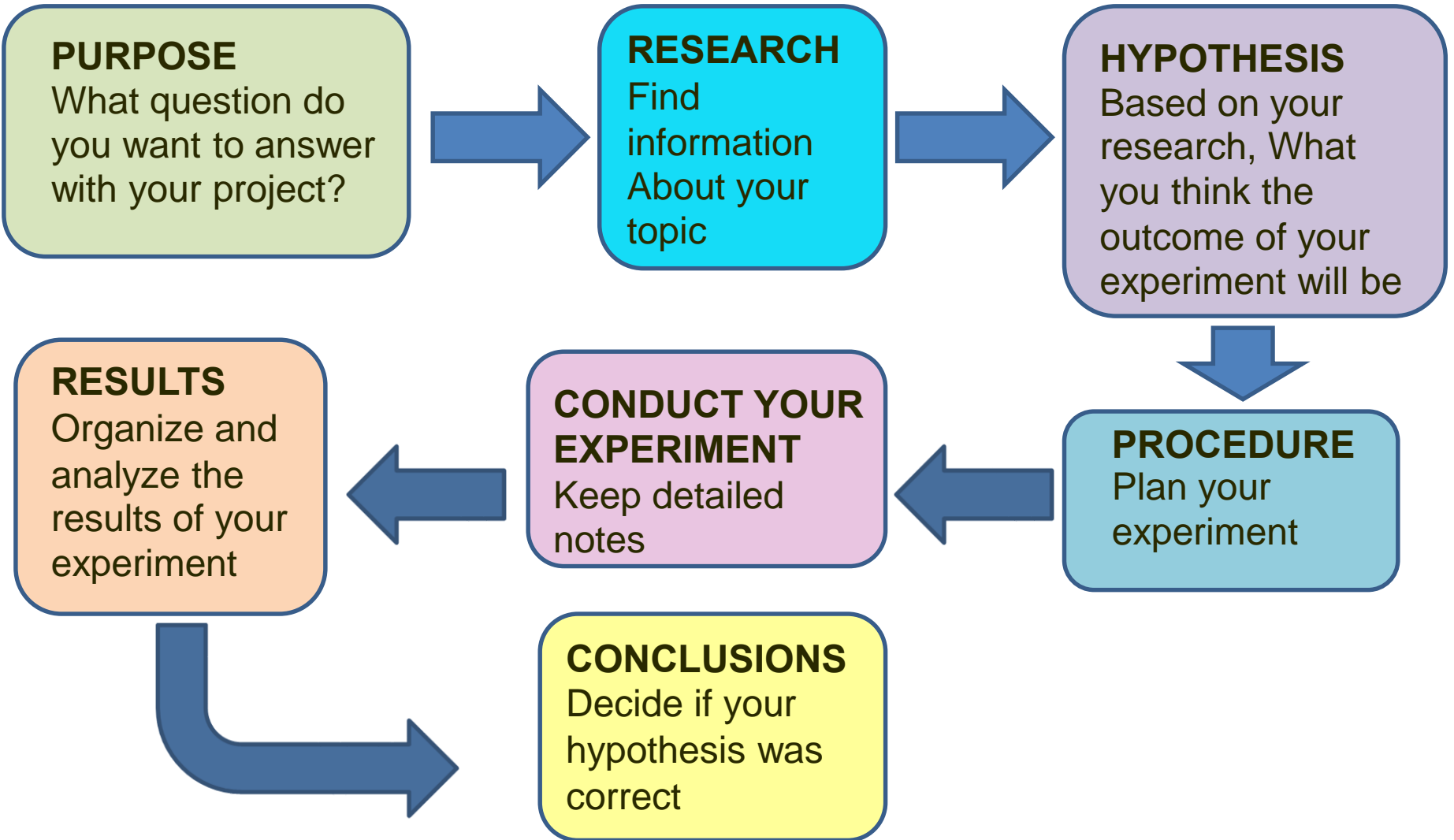
Keep detailed notes

PROCEDURE

Plan your experiment

CONCLUSIONS

Decide if your hypothesis was correct



KEEP A NOTEBOOK

Obtain a notebook in which you will keep a detailed record of everything that you do, and everything that happens during the course of your project. It should include notes on your research, the resources used, the outline of your procedure, lists of equipment, how you performed your project, what the actual results were, problems that occurred, and changes you made. Date all of your entries.



SELECT YOUR TOPIC



- Look everywhere for ideas including:
 - Your personal interests or hobbies
 - Current events and news
 - TV shows and commercials
 - Websites
 - Classes at school
 - Friends and family
 - Science Project Index



<https://www.akronlibrary.org/scifair>



NARROW YOUR TOPIC

Start asking questions, for example:

Who does the polluting?

What kind of pollution?

Where is it most notable?

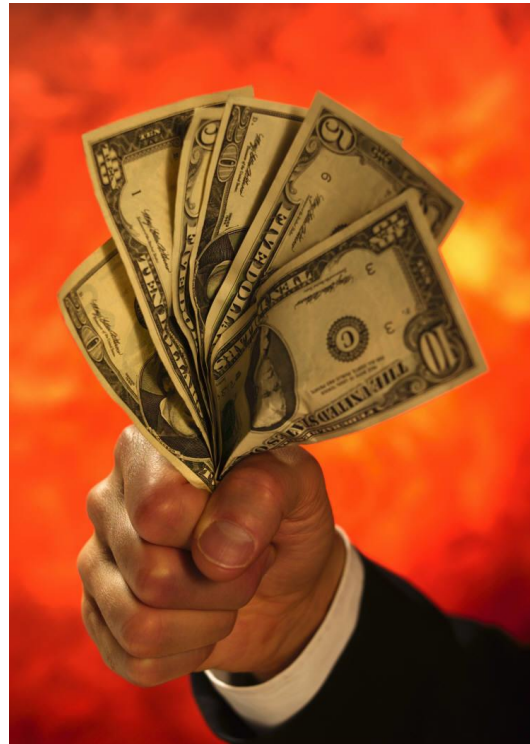
When does it occur?

Why is it a problem?

How can it be stopped?



EQUIPMENT, COST, TIME...



RESEARCH YOUR TOPIC

- Books
- Encyclopedias
- Magazines, Newspapers, and Journals

Use the resources available through the Library's website:

<https://www.akronlibrary.org/research/databases-by-subject>

- Internet

Be sure websites are authoritative and unbiased

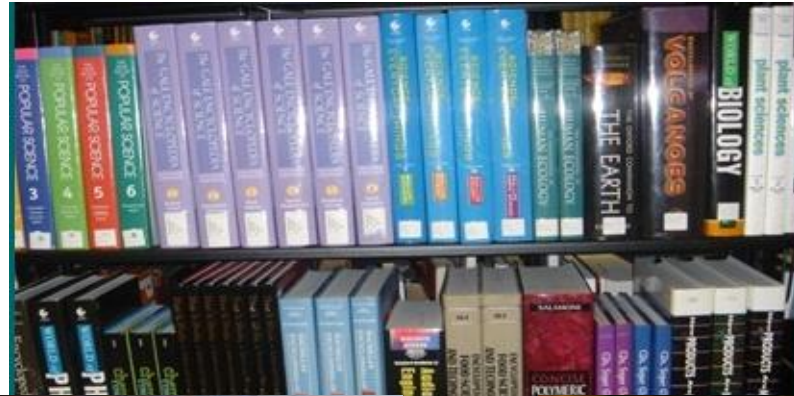
- Experts or Specialists

Check local schools, companies, museums, parks, zoos



Be sure to keep a record of all of your sources for your bibliography!

BOOKS, ENCYCLOPEDIAS, MAGAZINES, JOURNALS...



PLAN YOUR PROJECT

Keep in mind the Scientific Method as you develop your plan.



- Based on your research, define the **purpose** of your project. It should be in the form of a question:
Do preservatives delay the growth of bread mold?
- Formulate your **hypothesis** -- a one sentence summary stating the subject of the project, the variables being tested and the result you expect:
Bread without preservatives will develop mold sooner than bread with preservatives.

CONTROLS & VARIABLES



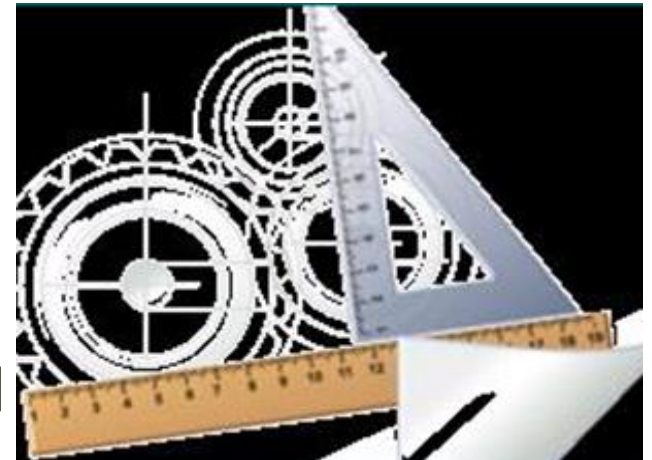
- **Controls** - The conditions and factors that remain constant throughout your experiment.
- **Variables** - The one thing that is changed.

The **independent variable** is the factor that is being tested and is changed by the person doing the experiment.

The **dependent variable** is the factor that changes as a result of the changes in the independent variable

DESIGN YOUR PROCEDURE

- Develop a detailed outline of the steps you will follow.
- Gather the equipment and materials you will need.
- Test your setup before you begin.
- Set a timetable for completing your project.



CONDUCT YOUR EXPERIMENT



- Follow safety guidelines.
- Consistently make qualitative and quantitative observations
- Record your results immediately in the notebook.
- Be precise and objective in your measurements.
- Collect as much data as possible.
- Repeat your experiment to verify your results if time allows



RECORD EVERYTHING THAT HAPPENS IN YOUR NOTES



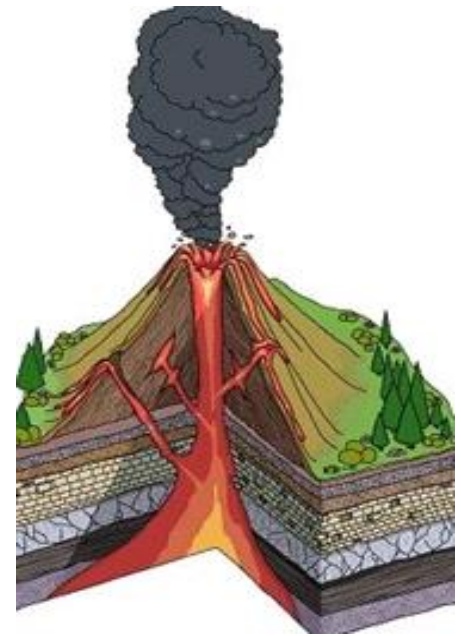
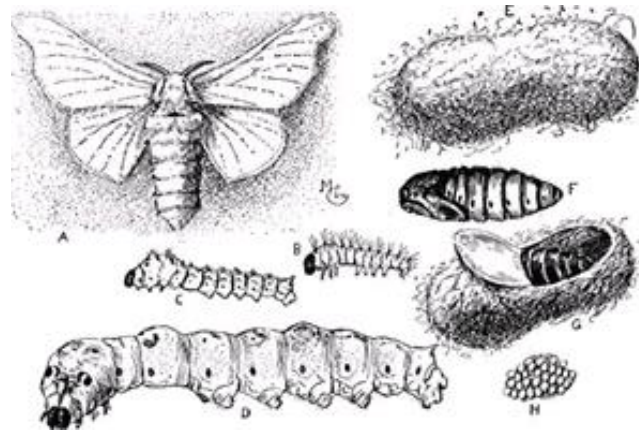
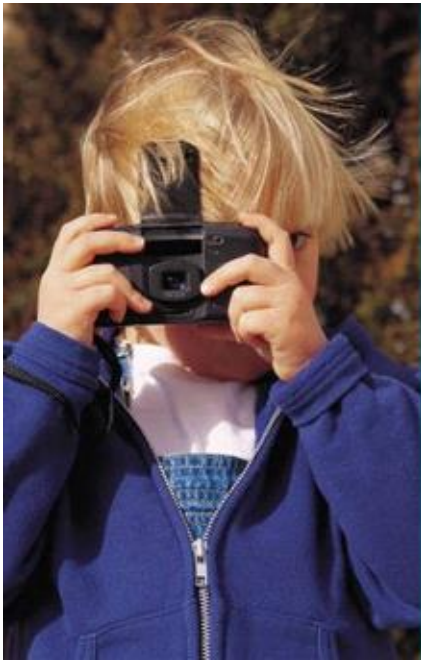
IF PROBLEMS DEVELOP...

- Be persistent. Don't get discouraged if things don't go as planned. Adjust and try again.
- Keep accurate records of what went wrong and report the problems as well as your attempts at solutions in your notebook and in your final presentation.
- Learn from your problems. Study why your experiment didn't turn out the way you expected. Understanding unexpected results is just as important as achieving the expected result.



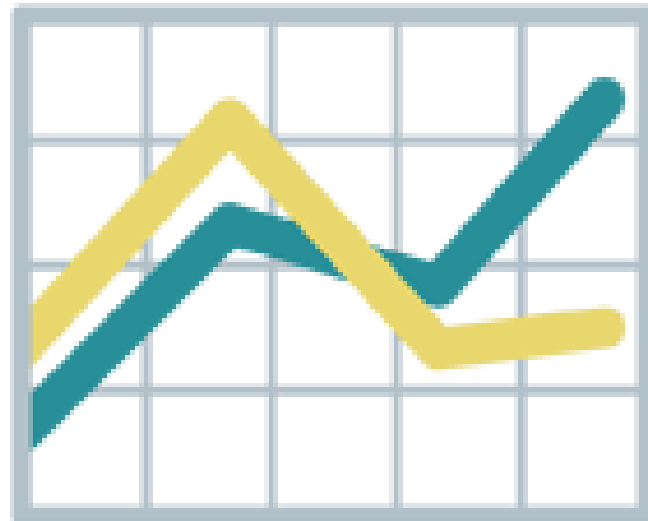
PHOTOGRAPHS OR DRAWINGS

Consider making a visual record of your project.

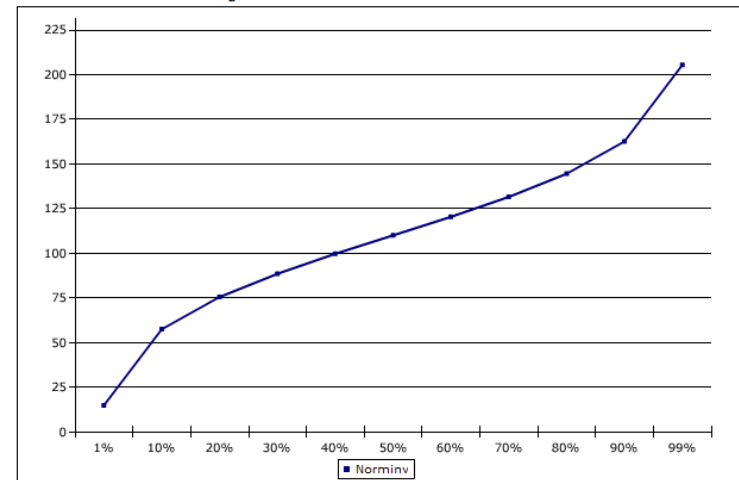
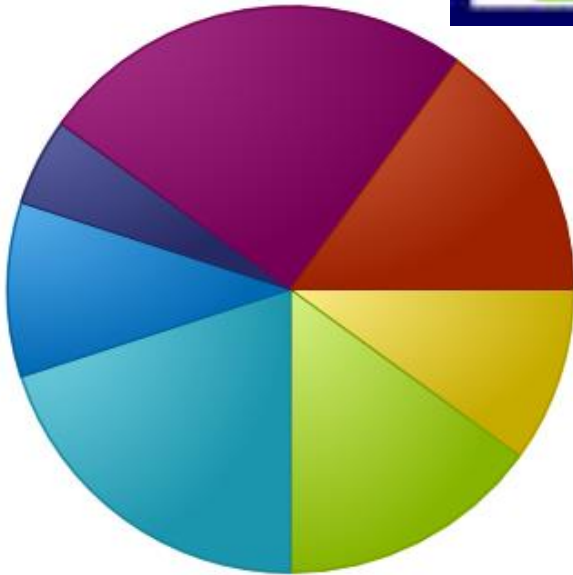


ANALYZE YOUR RESULTS

- Analyze the raw data collected as well as the comments in your notebook.
- Organize the data so you can recognize patterns or important details
- Create charts and graphs to organize this data.
- Critique your project techniques and decide if they affected the outcome.



GRAPHS & CHARTS



DRAW YOUR CONCLUSIONS

- Determine whether the results of your project support or contradict your hypothesis.
- Summarize how this conclusion is supported by your data
- Do not change or manipulate your results to agree with your hypothesis. Learning why a project does not work is just as important as one that does work.
- If your results contradict your hypothesis try to explain why you think this happened

WRITE YOUR RESEARCH PAPER



Your paper will be a record of your entire project including your original research, how you developed your hypothesis, how your project was conducted, and the results and conclusions you arrived at. It will come primarily from your notebook and should include all of the tables, graphs, and diagrams you have developed.

RESEARCH PAPER

- Determine the format required by your local science fair.
- Outline your ideas.
- Make your paper clear, well organized, and accurate.
- Don't plagiarize.
- Include a bibliography in the required style.
- Proofread the final draft. Check for grammar, spelling and punctuation mistakes.
- Create an effective title.
- Don't do a handwritten report unless permitted.



CREATE YOUR DISPLAY

- Your display will be a visual summary of your entire project.
- Typically the display consists of a three-sided backboard with space in front for items from your project.
- Organization of information on the backboard may vary, but a typical layout has the title across the top center, the outline of your project in the form of the Scientific Method down the two side panels, and your data, charts, pictures and conclusions in the center.

SAMPLE DISPLAY BOARD LAYOUT

from: www.sciencestuff.com

<p>INTRODUCTION</p> <p></p>	<p>TITLE</p> <p>(OR RESEARCH QUESTION)</p>	<p>PROCEDURE</p> <p></p>
<p>PROBLEM</p> <p></p>	<p>PHOTOGRAPHS</p> <p></p>	
<p>HYPOTHESIS</p> <p></p>	<p>DATA</p> <p></p>	<p>CONCLUSION</p> <p></p>
<p>MATERIALS</p> <p></p>	<p>RESULTS</p> <p></p>	<p>APPLICATION</p> <p></p>

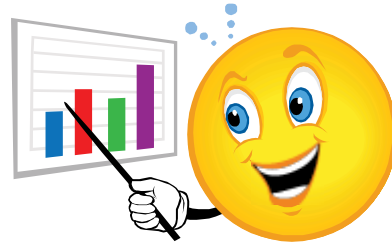
TIPS FOR YOUR DISPLAY

- Determine the guidelines for display format and dimensions.
- Find out if any materials or equipment are prohibited.
- Make a sketch or a mockup before building the actual display.
- Be sure the display is sturdy and portable.
- Use charts, graphs, drawings, and photographs but avoid a cluttered look.
- Make your display attractive, neat, and eye-catching.
- If permitted, use the area in front of the backboards to arrange important equipment or models and a copy of your research paper.

DISPLAY EXAMPLES



PREPARE YOUR ORAL PRESENTATION



- Find out how many minutes you will have to speak.
- Your presentation should consist of an introduction of yourself, your topic, the hypothesis, your procedure, highlights of the research, and an explanation of your results and conclusion.
- Keep your presentation concise but be prepared to answer any detailed questions the judges may ask.
- Rehearse your presentation before the fair. Practice it using a mirror, tape recorder, video camera, or a friend or relative until you feel comfortable.
- Write the key points on note cards to refer to but don't read your presentation.

WHAT THE JUDGES ARE LOOKING FOR

- Scientific method- How well is your project designed, and how well did you follow the scientific method?
- Understanding--Do you have a thorough knowledge of your project both in terms of background research and interpreting your process and results?
- Clarity--How well do you express yourself when explaining your project both in the oral presentation and in your written paper?
- Creativity—Did the subject of your project or the methods you used demonstrate originality?

TALKING TO THE JUDGES



- Be neat and well groomed.
- Make eye contact with the judges.
- Speak slowly and clearly.
Be enthusiastic about your project.
- Don't argue with the judges.
- Be courteous and polite when answering the judges' questions.
- Keep your answers simple. Don't fake answers. Instead offer to find out the information and get back to the judge.
- Thank the judges at the conclusion of your presentation.
- It's normal to feel stressed but try to relax and keep your sense of humor.

Finally...

- Take time to enjoy this unique and exciting experience!
- Check out the other projects.
- Congratulate yourself on a job well done.
- Discover that **SCIENCE IS FUN!**

