* Packets to give the students participating in the School Science Fair

Dear Scientist:
This letter contains a list of recommendations to help your Science Fair experience to go more smoothly. Look over the list. Ask your parents or teacher if you do not understand something.

Recommendations for a *BETTER* Science Fair presentation:

1. ***DRESS NICELY!*** You will be talking to the judges. You are judged on <u>your</u> appearance as well, so look nice.

2. ***SPEAK CLEARLY!*** The judges will be asking you questions. Be proud of the project you have completed and do not be afraid to tell the judges things you learned and/or things you wish you would have done differently.

3. ***STAND STILL!*** Do not play with your clothes or twirl your hair. Stand with confidence and be alert at all times. You never know when the next judge will ask you a question so you want to be prepared at all times. Keep your hands behind your back if you need to.

4. ***VOCABULARY USAGE!*** Use phrases such as "I learned…", "The best part of my project was…" "My experiment taught me…", "Science is always changing because…". Stay away from words such as "ya know", "uh-huh", "ummm", "I don't know", "whatever" or any slang words.

5. ***BE POSITIVE!*** Even if you were not able to prove your experiment, that doesn't mean you failed. Science is always changing and never predictable, therefore be positive and do not be afraid to tell the judge you will just have to try a different method next time.

6. ***STAY WITH YOUR PROJECT!*** Do not leave your project until you have been directed to do so. If you are not with your project when a judge comes, you will miss possible points.

7. ***SMILE!*** Judges love to see a smile on your face! This shows them you are excited to be there and excited about Science.

My Science Report

PURPOSE / QUESTION: A question I have about science is _____

_____

_____

_____

HYPOTHESIS: I predict the following will happen: _____

_____

_____

_____

_____

PROCEDURE: This is what I will do:

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

6. _____

_____

7. _____

_____

8. _____

_____

9. _____

_____

10. _____

_____

DATA / OBSERVATIONS: This is what I say: _____

_____

_____

_____

CONCLUSIONS: "From my experiment, I determined that my hypothesis was _____ (correct or incorrect) because _____

_____

_____

_____

District Science Fair Rules

The rules outlined below **must be adhered to without exception**. Please follow all rules listed so you will not experience disappointment or surprise on the day of the fair. The use of the steps in the Scientific Method is required and must be demonstrated. However, these exhibits must be based on scientific principles.

Plants, (except [c] below), molds, vertebrates, environmental pollutants and items listed below which are used in an experiment cannot be exhibited, but the project may be demonstrated through photography, illustrations, and/or diagrams.

NOTE: Photographs and illustrations are considered equal to or better than actual project or demonstration materials as long as the exhibit is accompanied by identification labels.

1. Exhibit size is **limited** to 30 inches deep, front to back; 48 inches wide, side to side, and 96 inches high, floor to top. (Tables are 30 inches high.) **There can be NO exceptions.**
2. Only ONE student per project will be permitted. NO team projects are allowed.
3. Students must complete and have already submitted the Student Information Sheet Registration Form to their individual schools science fair coordinator prior to exhibiting their projects at the fair.
4. Proper attention to safety is required of all science fair participants. **Anything which could be hazardous to the public is PROHIBITED FROM BEING DISPLAYED**. Specifics are outlined below:
   - **a. NO OPEN CONTAINERS WHATSOEVER!!!**
   - b. Live organisms pathogenic to man or live vertebrates (i.e. cultures of bacteria or fungi are prohibited; invertebrates can be displayed only in safe, enclosed containers)
   - c. Plants will be allowed if they fit within the project dimensions. Plants must be pre-watered. Poisonous or toxic plants are prohibited.
   - d. Vertebrate animals, living or dead, and their parts are prohibited.
   - e. Food, either human or animal, may only be displayed in sealed containers.
     Note: The public must NOT sample food.
   - f. **DO NOT** display syringes or any similar devices.
   - g. Any flames, open or concealed, are prohibited.
   - h. Hot plates are prohibited. Do not use any highly flammable display material.
   - i. Dangerous chemicals, including caustics and acids, are not allowed. **Safe chemicals** such as table salt, sugar, or bicarbonate of soda **may be displayed** in quantities of less than 1 tablespoon.
   - j. Highly combustible solids, liquids, or gases are prohibited.
   - k. Do not use tanks which contain combustible gases, including butane and propane, both of which are prohibited.
   - l. Bare electrical wires/exposed knife switches may be used only with circuits of 12 volts or less.
   - **m. NO electrical outlets of any kind will be provided, nor will they be available.**
   - n. **The student may not display his/her name or school on the project.** All projects will be identified only by an assigned number.
   - o. **A contestant may enter only ONE exhibit.** The exhibitor must do all work on exhibits. Teachers, sponsors, parents, etc. may participate only in an advisory capacity. Judges will give special attention to displays using children's language and drawings. Avoid using technical terms that are not understood by the student.
   - p. Scoring will be on work by students, **NOT** on the value of accessory equipment, either borrowed or purchased.

Criteria for judging will be based on creative ability, scientific thought, understanding, dramatic value and technical skill, and clarity. Decisions of the judges will be final.

*updated October 2011 – Jennifer LeBaron

Science Fair

Student and Parent Booklet

Washington County School District
*revised May 2011 - Jennifer LeBaron

PURPOSE of this booklet:

For parents, science projects are often just another intrusion into an already too hectic life. Even the simplest project consumes considerable amounts of *precious* free time. Science projects, however, are one of those school assignments where parent assistance is not only allowed, but also encouraged (maybe even expected). **The key word is HELP, not DO!** You feel obligated to help, if only to demonstrate your dedication to your child's education. And you probably wouldn't mind if you saw clear-cut objectives such as "What, specifically, is my child expected to achieve?" Instead of answering these questions, instruction that is sometimes provided may be murky and difficult to read.

Of course, parent-assisted projects often become parent-dominated projects. It's really annoying to attend the science fair and discover the projects on display are often obviously NOT the work of a school-age child. Instead, the fair may tend to become a competition among parents. This is NOT the intent of the fair.

This booklet is intended to help parents understand what they NEED to do to help their child complete a successful project. The project may not rival those achieved by an overabundance of parental assistance, but it will attain its purpose.

Rules have been defined to help reward student work with minimal parent help. We all want the same thing: your child's success and a fair learning opportunity! Not every child can win first place, but every child who participates IS successful!

WHY do science projects?

Almost daily some favored snack is identified as "cancer-causing", or some detested vegetable is labeled "cancer-fighting". Scientists make these determinations by experimentation. Scientific research is often cited in newspapers and then contradicted. Why? Because even the simplest experiment can become complex and the experiment's validity shadowed by doubt. This explains much of the controversy surrounding "scientific facts", and an important lesson to learn from our own experiments.

Although a student's science fair project is going to be far simpler than a professional scientist's, it still follows the same basic procedure called the Scientific Method or the Scientific Process. **The step process consists of:**

1. PURPOSE / QUESTION
2. HYPOTHESIS
3. PROCEDURE
4. DATA / OBSERVATIONS
5. RESULTS
6. CONCLUSIONS
7. SUMMARY
8. BIBLIOGRAPHY

These steps will be dealt with in greater detail later in the booklet. Finally, properly done, science projects provide a rare opportunity for students to combine a number of academic skills to produce an end product.

WHAT science projects are NOT:

Too often, science projects are equated with science demonstrations. It's cute to see that vinegar and baking soda together cause a reaction and if the reaction occurs in a mock-up volcano, it's a rather distinctive demonstration. But that's all it is; a demonstration! No new information was discovered.

Science fair demonstrations ARE NOT acceptable at any School Science Fair or at the District Science Fair. It isn't a science *experiment* and if your child chooses to do a demonstration, it will harm your child's score.

Some popular science demonstrations include: showing how clouds form, showing how electricity is conducted, showing how caterpillars become butterflies, showing how a volcano erupts, etc. *These are not acceptable for the purpose of the science fair.* Models and collections also hurt a child's chances of winning. They do NOT follow the Scientific Method. They cannot be experimented upon. They involve much money, time, and research if they are done well. Quite frankly, they stand NO chance of winning.

WHAT science projects ARE:

Science projects should involve students in an experiment where the result can be guessed at but isn't known for sure. This is actually an advantage over the demonstration projects: *if something unexpected occurs with an experiment, the project doesn't need to be trashed.* It is *acceptable* in an experiment for the conclusion to contradict the hypothesis.

KEEP IT SIMPLE!

Science projects can become complex, so keep the experiment simple! This is actually very important to the Scientific Method. **Remember this: The simpler the experiment, the less likely that some unknown variable caused the result.** It's like starting a homeowner's project: you replace the drapes and the carpet suddenly looks awful; you replace the carpet and the tiling looks out of place; you replace the tiling…. Etc. So, if you start simple, hopefully the experiment will stay manageable.

What is simple? Using a battery example, choose two types of batteries – not every battery on the market. Which lasts longer, Duracell or Eveready? For detergent, the same thing applies: Which cleans better, Tide or Bold? If the experiment involves plants, choose two types of plants. What grows better in damp soil, marigolds or periwinkles?

Experiment Ideas

Commercials are a gold mine for ideas for simple experiments. Does Joy dishwashing liquid last longer than the leading bargain brand? Does Tide really clean better than its competitors? You can use these commercials for inspiration. For example, does the battery that propels silly bunnies across endless commercials really last longer? If you're a cynic, you say no. If you're taken by the ads, you say yes. If you're a budding scientist, you say, "Let's do an experiment!"

Ideas are all over, but the near at hand are the best. After all, **science is expected to improve our daily lives.** By applying science to problems in our lives, it can do just that. ***Remember:*** Choose a topic that you are familiar with, one you may be studying this year or have studied in previous years… OR… choose a topic that you are highly interested in.

Other Ideas:

- *Have a spot in the garden where nothing grows? Try a couple of different plants.*
- *Do you think you may be over-watering the lawn? Take a patch of out-of-the-way grass. Water it carefully with different amounts of water. What are the results?*
- *Which type of house plant will do better under a skylight? In a kitchen window? In a dark corner?*
- *Does an aluminum bat hit a ball farther than a wooden bat?*
- *Does saccharine attract ants like sugar does?*
- *Which diaper is really more absorbent?*

Before you decide on a science experiment, brainstorm a long list. Get silly about it! Write them down. Discuss these with your child. Then decide.

The Steps in the Scientific Method

To conduct a proper experiment, you **MUST** follow the Scientific Method. The Scientific Method requires:

1. PURPOSE / QUESTION
2. HYPOTHESIS
3. PROCEDURE
4. DATA / OBSERVATIONS
5. RESULTS
6. CONCLUSIONS
7. SUMMARY
8. BIBLIOGRAPHY

1. PURPOSE / QUESTION

The question should be very simply stated. What is the scientific experiment all about? What are you trying to prove or disprove? What is the reason you are doing the experiment? With the battery-operated bunny, the question is "Which battery lasts longer, Duracell or Eveready?" If you choose diapers for the experiment, the question is "Which diaper lasts longer, Luvs or Pampers?"

2. HYPOTHESIS

The hypothesis is also very simply stated. This is your "educated guess". It is YOUR expected outcome of the experiment. Example: You've always liked the Luvs brand of diapers and you've always encouraged everybody to use them. Now you are going to prove to any doubters out there that Luvs are better than Pampers. Your hypothesis is "Luvs diapers absorb more liquid than Pampers."

3. PROCEDURE

This procedure is the instruction process to complete the experiment. You may write this out in step-by-step instruction format or in paragraph form. Make sure to be as detailed as possible as your experiment needs to "stand alone", which means somebody who has never heard of your experiment should be able to do it themselves because of your description. This would be a great place to include supplies used to perform your experiment.

4. DATA / OBSERVATIONS

Data and observations can include notes, errors found while experimenting, or **anything** that you watched and observed while doing the experiment.

5. RESULTS

Results are the specific results of the experiment. This is a GREAT place to include charts and graphs. If Duracell batteries lasted longer than the Eveready batteries, the results of the experiment would be: "The Duracell batteries continued to power the toy 22 minutes longer than the Eveready batteries."

6. CONCLUSION

The conclusion relates back to your hypothesis. You will make reference to your hypothesis. Were you wrong or right? Why do you think you were wrong or right? To go along with the battery results, the conclusion example would be: "From my experiment, I determined that my hypothesis was correct (or incorrect). Duracell batteries last longer than Eveready."

7. SUMMARY

Each project is required to have a summary. The summary is the final bit of exhausting work, and yet it is among the most important tasks your child undertakes. Your child has to write the most important information accumulated during the entire science project. It's important because this is about all the judges have time to read. They will look at the display, interview the child and read the summary. Make sure the summary includes: the question/purpose, the hypothesis, why you chose this experiment, the data/observations, the results and conclusion, and what you learned. Keep it short and simple.

8. BIBLIOGRAPHY

This provides a "thank you list" to books you used as references or people and stores that helped you with supplies.

A FEW FINAL WORDS

Please make sure you have read the rules very carefully!!! Many have changed and it is important that you know of the changes before starting. You will be *judged by grade level*. Remember that you **MUST** have a project that follows the Scientific Method.

A Successful Science Project:

- Represents YOUR work, not that of an expert, a teacher, or your parents
- Indicates an understanding of the experiment
- Has a notebook showing a complete record of all your work. Shows careful planning that would eliminate a "rushed" project
- Has a simple, well-stated title and neat lettering
- Includes photographs, charts, pictures, graphs, etc. that might be necessary to explain your work
- Has accurate, valid and correct data and observations
- Tells a complete story – problem and solution
- Is original in approach and presentation
- Is self-explanatory
- Is attractive and organized
- Does not have to cost much money
- Follows the scientific method and includes some kind of experiment
- Is one that gives credit to those who helped (bibliography)

A Successful Science Project is NOT:

- Only a report
- Necessarily a new discovery or an original piece of research
- Constructing a plastic model from a hobby kit
- An enlarged model or drawing
- A weekend chore or a project completed in one or several hours.
- Something done by your parents and/or teacher

Name _____

Student Science Fair Time Line

DATE	Check when completed	Activity
		1. Choose a topic that you are interested in doing. (one that is not too hard nor too easy)
		2. Read books or information about your topic to learn as much as you can.
		3. Fill out the project entry form and turn it into your teacher.
		4. Once you've received approval from your teacher, you can begin work on your project.
		5. Organize everything you plan to do.
		6. Write out your purpose or your question.
		7. Write your hypothesis (your guess as to the outcome of your experiment)
		8. Write out your procedure.
		9. Decide what supplies you may need.
		10. Perform your experiment.
		11. Record your observations and collect your data.
		12. See if your hypothesis was correct.
		13. Begin work on your display. Present the information you collected in easy-to-read graphs and tables.
		14. Make a place on your board for: Purpose/Question, Hypothesis, Procedure, Results, Conclusion, and Bibliography.
		15. Practice answering questions the judges might ask.
		16. Make a written report to include with your display.
		17. Bring your project to school and HAVE FUN!

CREATIVE ABILITY Rubric (30 pts.)

Uniqueness
Project is truly unique and well thought out. This has not been seen at other fairs.
Project is completely appropriate for age of the student.
Thinking
Project shows the student's thinking and process. The student has adapted and molded the project to make it his/her own.
Student Work
Project depicts the student's own work.

SCIENTIFIC THOUGHT / METHOD Rubric (30 pts.)

Purpose / Problem is clearly addressing a valid scientific or mathematical concept. It is obvious that the idea is the student's own.
Hypothesis is complete, testable, and uses precise wording. It is directly addressing the stated problem and reflects prior knowledge.
Procedure is well-constructed and tests the problem. Steps are outlined in a step-by-step fashion that anyone could follow. All materials are listed.
Observations / Results are clear. Data is summarized in a way that describes what was discovered. Project discusses connections/similarities or differences between data found. Charts, graphs, and/or other visuals are used.
Conclusion completely answers the problem and states if the hypothesis was successful or rejected. If rejected, there is evidence or reasoning to explain why.

UNDERSTANDING Rubric (15 pts.)

Information
Project is very explicit, indicating what the student has learned throughout the experiment.
Research
Student has used research and literature appropriately, with lists available of who helped, bibliography, books or articles used, etc.
Tell a Story
Student has a precise understanding of the project. Student is able to relate the experiment in an appropriate manner when talking to the judges.

DRAMATIC VALUE / TECHNICAL SKILL Rubric (10 pts.)

Construction
Project is neatly done. Project is creative and organized. Attention has been paid to detail.
Project is well written and easy to follow. Grammar is used correctly with no mistakes.
Spelling and punctuation are correct.
Sentences are structured, concise and detailed.
Charts, graphs and/or other visuals are neatly organized, used, and arranged.
Work is definitely thoughts and ideas of the student.
Appearance
Project holds attention of the viewer at all times.
Project uses color appropriately and is exciting.
Headings are used consistently throughout the project.

CLARITY Rubric (15 pts.)

Communication
Student distinctively communicates the purpose of the experiment, how the experiment was handled, and how it concluded.
Information
Project information is explicit and in the appropriate logical order.
Student's work is accurately displayed.
Understanding
Project is easy to follow and understand. Another person could follow the experiment.