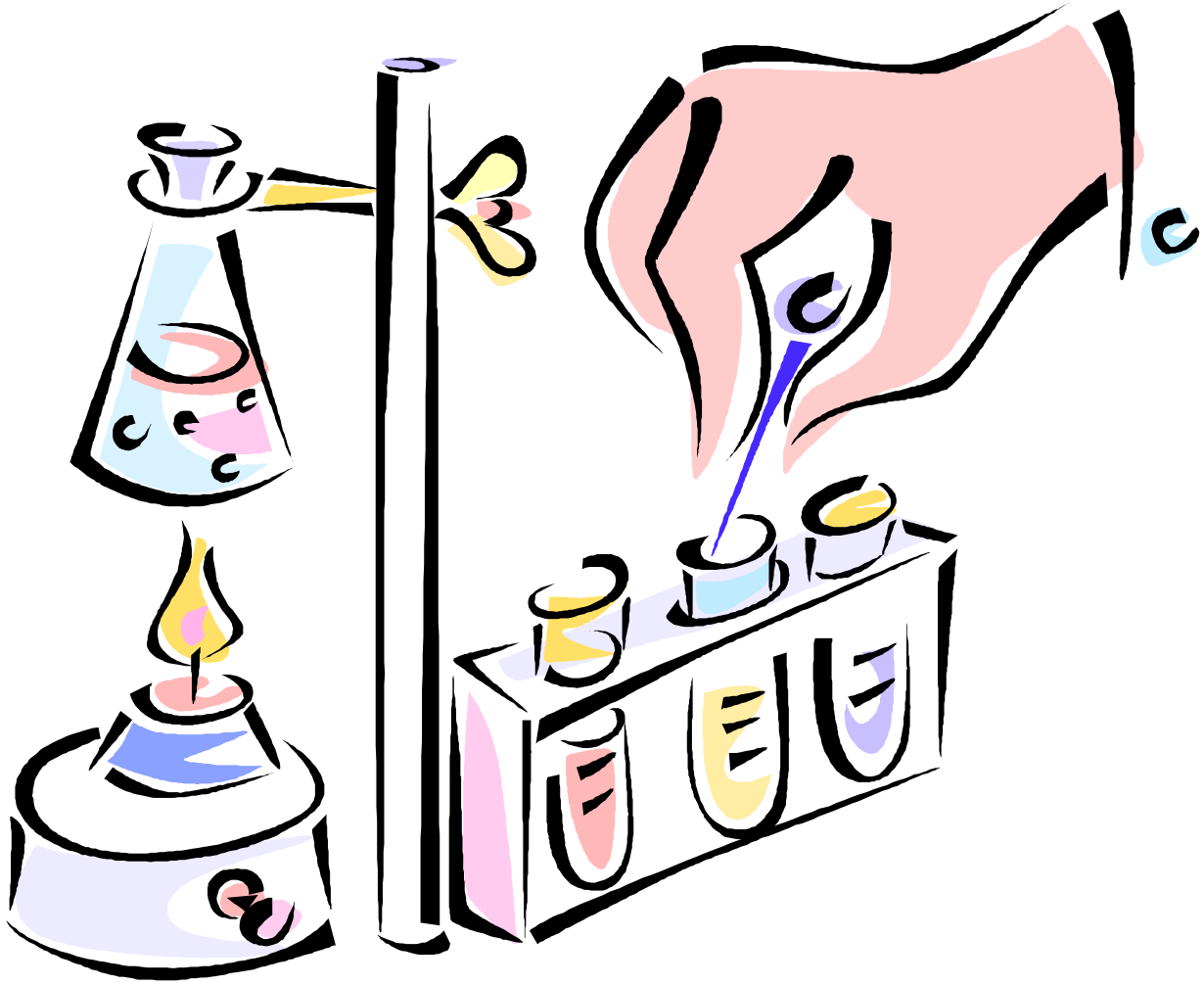

Science Fair

Student and Parent Booklet

Washington County School District
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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
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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.