Salem Elementary Science Fair Guidelines

PART I - OVERVIEW

WHAT IS A SCIENCE FAIR PROJECT?

A Science Fair is an opportunity for students to get hands-on with the scientific method. Students will come up with a question and develop a way to find an answer or solution. Students are also tasked with reporting on their findings, writing a report on their project and developing a presentation showing all aspects of their project. The results of the entire project are exhibited at the Science Fair where students have the opportunity to present their work to fellow students, teachers and parents.

A Science Fair project provides a unique opportunity to reach into all aspects of the student's academic training and requires that the student draw on things learned both within and outside of the classroom. Participation in a Science Fair is generally optional but some teachers may choose to incorporate it into their lessons plans.

A Science Fair provides students with the opportunity to apply the science skills and concepts learned in class and dig more deeply to more thoroughly understand those concepts. It is also an opportunity to work independently outside of the classroom. Students that participate in science fairs increase their problems solving skills and independent thinking when they apply those skills to an independent project, a project that is done at the student's own pace and skill level.

WHAT IS EXPECTED?

Each project should include a report at a level appropriate for that student's grade level (see section IV for details). Participants are also encouraged to provide a display with highlights from the report such as one of the tri-fold project display boards available from office supply stores. The display should include the title, purpose of the project (the question), your hypothesis, the procedure used and a summary of results, and a conclusion. The report and any appropriate materials demonstrating the project should accompany the display. See the State Science Fair Rules for restrictions.

Judging will be done by community and parent volunteers who will ask questions about the project. Students are also encouraged to ask questions of the judges, about their professional involvement in science. The top 2 projects in the K-2nd grades and also in the 3rd - 5th grades will receive awards. 3 overall winners will have the option of moving on to the North Carolina Science Teachers Association Central Regional Science Fair in February 2010 (see http://www.nc-crsf.org/ and http://www.ncsta.org/sciencefair) winners from that regional fair go on to the North Carolina State Science Fair. The Salem Elementary Science Fair will

observe the rules of the North Carolina State Science Fair (see attached). Please pay particular attention to the section on items unacceptable for display.

There is no entry fee but donations from parents or the community to fund the cost of awards is appreciated. Contact rtphokie@gmail.com for more information.

GENERAL GUIDELINES FOR PARENTS

It is very important that parents let students do the work on their own. While all work must be performed by the student and all ideas must ultimately be generated by the student, parents are encouraged to work with their children to find resources and to supervise work. The best way to encourage children to develop independent thinking and problem solving skills is to provide guidance rather than answers. Questions should be answered with questions.

All students will be required to disclose outside assistance. It is usually pretty obvious whether or not a student has done the work, don't put your child in that position. Salem strongly encourages students and parents to set a good example by working independently and encouraging other students to perform in the same manner. Help your student understand that a successful science fair project is not necessarily one where everything goes as planned, but rather one where the student has learned something new and has gained insights into their ability to think independently and solve problems. A failed experiment doesn't mean a failed project.

MORE RESOURCES

- There are numerous books with science experiments for kids that can spark project ideas, many are available at Wake County Public Libraries
- Your student's teacher may incorporate the Science Fair (at their option) into their lesson plan.
- Science Fair ideas: http://www.sciencebuddies.org/
- North Carolina Central Region Science Fair: http://www.nc-crsf.org
- North Carolina State Science Fair: http://www.ncsta.org/sciencefair

Questions about the Salem 2010 Science Fair: Tony Rice, rtphokie@gmail.com

PART II – SELECTING A TOPIC

ITS TIME TO THINK

The best way to pick a topic is to observe the world around you. The best ideas are developed over time.
Students should set aside several weeks to think about potential project ideas and should talk with their teacher about their ideas.

It may be helpful for students use a notebook to keep ideas for potential project concepts. Even kindergartners can carry such a notebook and draw or sketch potential ideas for later recollections. Having the notebook available on family outings will give your student a way to record any ideas that come up.

It is recommended that each student come up with three potential project ideas before beginning any work. This gives students a choice of back up plans in the event that a project does not work

out for one reason or another. Then pick one idea and run with it!

ITS ALL STARTS WITH A QUESTION

Each project idea should be based around a question that can be answered through experimentation.

What if ……
What would happen if ……..
Is there a difference between ……
Would it be possible to ……..
Is there a way to …….
Is ___ better than _____

Ideas can come from such things as (i) outside activities, (ii) clubs, (iii) hobbies, (iv) school work, and (v) everyday problems. A science project based on an existing interest or hobby is a great way to tie science into their everyday lives and keep the process fun for students and parents.

There are a lots of books available on science fair projects which can spark ideas, many are available at the Wake County Public Libraries. While these can be great for brainstorming ideas with your child, remember that the each student should work to come up with independent ideas. Remember this isn't just about showing off "cool science stuff", it's about students putting the scientific method to use.

The project should be based attempting to answering a specific question. The more specific the question, the easier the experimentation part of the project will be. Think ahead to how the experiment is going to measure results. Will you be counting something? Measuring pH, temperature, length, distance, etc.? Comparing colors?

Once you have your 3 questions and have picked one to run with....

MAKE A PREDICTION

Write a sentence that predicts what will happen when you do your experiment. This is your "hypothesis." You will be testing this with experimentation.

PART III – THE EXPERIMENTAL PROCESS

A successful project requires use of the "scientific method." This requires that the student: observe, plan, experiment, and explain what happens in the project. A good science fair project will pose a question and then design an experiment to determine an answer to the question. It is ok if the answer to the question is different than the expected answer. The important aspect is the process, not necessarily the end result.

EXPERIMENT

Design and do a series of experiments. Design each experiment so you can observe results if one and only one variable is changed. By changing one variable, you can determine that variable's effect on your chosen event. For example, if you are studying the best way to remove stains, you would treat the same materials with the same stains changing only the type of cleaning solution. In this way, you would know that it is the cleaning solution that is resulting in the change of effect and not any other variable. You should also have a control. For example, with the cleaning experiment, you might have a test material with stains that is not cleaned at all and another test material that is cleaned only with water. In this way, you know both what happens to the solutions with no treatment and with only water as a treatment. Again, this will help to show the impact of the cleaning solution. Keep in mind that there may be other things outside of your control that may change such as temperature or humidity. While you cannot change these things, you should record them if you think they might have an impact on your experiment.

Remember that an important part of the experiment is documentation. Take pictures of your experiment both before the experiment, during the experiment and after the experiment. This will help to document the results. You should also record the data you generate from your experiment. This information should be kept in a bound notebook and should be included as a part of your project display.

EXAMINE YOUR RESULTS

Did your experiment go as planned? Why or why not? Were your results what you expected? Why or why not? Consider if you should do additional experiments to prove your results. Were there variables that need to be further examined? If so, maybe you want to redo the experiment. It is always ok to do additional work. Just make sure you document all of your experiments so that you can compare and analyze the results. If you redo your experiment, did you get the same results? If not, why not? It is ok to get different results to the same experiment, so long as you analyze the possible reasons for the differences.

DRAW CONCLUSIONS

Was your hypothesis correct? What variables were important? Did you collect enough data? Did you collect the data in the best way? Should more work be done to complete the experiment? Remember it is ok if your experiment did not prove your hypothesis. The important thing is that you learned something new and had fun in the process.

PART IV - PROJECT REPORT

The report provides an overview of your work and insight into your chosen topic of interest. A report can be very simple or quite detailed. At a minimum it should outline the question asked, the hypothesis, a description of the methods used to test that hypothesis, the results obtained.

A kindergartner may have a "report" consisting primarily of sketches of his or her project. While a 5th graders would be expected to have a more detailed report with all sections . Other grades expected to produce something in between. Some students may go into great detail and others will cover only the basics. The important thing is that you make an effort to report on your findings in the best way that you can and that its clear that the focus of the project was putting the scientific method to work..

The report should include

- Title Page
- Table of Contents
- Summary
- Introduction
- Experiment
- Variables
- Discussion
- Conclusion
- Credits
- References

THE TITLE

The title of your report is the same as the title for your project. Once you have selected your project title, your report title is done. The title should be centered in the middle of the first page. Your name, your teacher's name and your grade should appear in the lower right hand corner of the title page.

TABLE OF CONTENTS

The Table of Contents should list all sections of your report and page numbers.

THE SUMMARY

Although this section appears at the front of the report, it will likely be the last section that you write and should be a single paragraph.. The summary should include information about (i) the problem or questions you are studying, (ii) the hypothesis, (iii) the action you took in your investigation, (iv) the results of your experiments, and (v) the most important conclusions based on the results of your work. Remember, your conclusions should be what you have reached through your own efforts and experimentation.

THE INTRODUCTION

The introduction should help readers understand how you came up with the idea for your project and why you were interested in the topic. You will want to tell your readers what you hoped to

prove or disprove through your experiments. You will also want to describe some of the things you learned as you worked on your project. The introduction should include (i) the question you are asking, (ii) what your experiment is intended to prove or disprove, (iii) why the experiment should be done and (iv) what information you need to learn from your experiment in order to answer you question. Since you do not need to include the results in the introduction, this section can actually be written *before* you begin you experiment. This section should be bigger than

THE EXPERMENTAL PROCEDURE

This section should prove all of the details of your experiment. Information should include how you conducted the experiment and what materials or equipment were used. This section may include photographs of the experiment. It may also include sketches and graphs or the results and outcomes of the experiment. This section should include enough detail that another student could read the description and perform the same experiment with the same results. Details are critical in this section and it will

THE DISCUSSION

This section will be the longest section of your report. In this section you will describe the results of your experiment and what those results might mean or show. It includes all of your observations and data. Data should include raw data (data in the form collected) as well as processed data (data in charts and graphs). You will also want to discuss possible errors in your experiment and ideas of what you might have done differently to achieve a different result.

THE CONCLUSION

The conclusion is a brief restatement of the results included in your discussion. The conclusions are the results from your experiment and not results that you have found from your research.

CREDITS

All scientists rely on the assistance and input of others. While it is ok to seek the advice and assistance of others, you need to credit each of these individuals with the help that was provided. Whether it was your teacher or a parent that helped you to access equipments, locate materials or facilitate your experiment, you will want to list each of these people and the assistance they provided.

REFERENCES

Your report may include references to information that you have found in books, magazines or on the internet. All such information should be credited to the original source and should be cited in your report. Don't worry about correct citations. The important thing is that you include the names of any authors, the name of the publication and where you found that information. Anyone reading your report should be able to locate that same reference based on the reference information that you provide.

PART V - Registering for the Fair

The fair is generally held on a Thursday evening, mid to late January. This schedule is chosen to allow students time to complete projects after the winter holidays and ensure that winners can participate in the regional competition, generally held in North Raleigh.

Online

With so many students working on projects covering "green" topics such as renewable energy and recycling, it only makes sense for the fair to go as green as possible. This year you can register for the fair online at:

http://salemscience.utprosim.com

Parents please enter your email address and you'll receive an email with a registration number an instructions to continue. You'll need the following information to complete the registration process. Student's name, teacher's name, grade, project title and summary (please allow your child to write this section), and whether or not the project requires electricity.

If you don't have access to the internet, Wake County Public Libraries have public internet access you can use or you may ask your child's teacher if they are available to help them register.

Paper form

If you are unable to register online, paper registration forms can be obtained from and returned to your child's teacher.