K-5 STEM Fair Handbook

A Note to Parents:

The STUDENT is the PRIMARY RESEARCHER. His/her role is to:

- Choose the topic
- Do research
- Plan and conduct experiments/demonstrations
- Record data
- Prepare the report and do artwork or the display

The PARENT has three LESSER roles:

- LAB ASSISTANT-help gather materials, assist with construction, and supervise "dangerous" activities.
- CONSULTANT-ask questions, give advice, ask questions, make suggestions, and ask questions. Ask student to explain his/her reasoning. Do not make decisions, encourage the student to work it out.
- CHAIRMAN OF THE BOARD-may reject projects on the basis of high cost, lack of proper research facilities, and so on. Rule on safety issues.

Choosing Your Project

Choose any topic you are interested in. Then, decide what type of projects to do:

- Research
- Demonstration
- Collection
- Experiment

Present Research: For a research project, you ask a question, do plenty of reading, conduct interviews and use what you learn to discover a pattern or a trend. One example of a good research project might be to find out if a manufacturer's claims are true. For example, ask the question, "Which cereal really stays crispy in milk?" Then do the research to answer your question and display your findings at the science fair.

Do a Demonstration: Would you like to demonstrate a scientific principle or fact, or show how a tool or a device works? Start by thinking of an interesting question, such as "How does rain form?" or "How does a microscope work?" Then find a

way to show the process. If you're demonstrating an apparatus, it's also fun to uncover the history of the equipment, how it is used and why it is important. Models and cross-sections (objects cut in half to see the inside) also make good demonstrations. For instance, you could show a model of the human eye, or a cross-section of a roller blade.

Show a Collection: If you are collector, this is your chance to shine! A display of well-organized collection of rocks, shells fossils, pressed leaves of flowers, insects or anything else can be a great science fair project. To make your collections spectacular, show plenty of variety and label everything clearly. Interesting pictures and maps of your discovery sites will jazz up your display. Also, if you've kept a log book detailing your discoveries, show that too.

Perform an Experiment: This is the type of project most often presented at a science fair. An experiment is a test that's designed to find the answer to a problem

Exploring the universe through science is exciting, but there are rules to the game. To gather and present information in an orderly manner, scientists use the *scientific method*, a step-by-step approach to discovering answers and solving problems. The steps are:

1. **Find a problem** (Ask a scientific question you are *able to test*.)
2. **Do the research on the topic.** (Gather as much information as possible.)
3. **Make a hypothesis – that is, a guess**. Predict what the answer to the question will be. Write your hypothesis in the form of a statement, not "I think…"
4. **Experiment!** Think of a way to test your hypothesis.
5. **Record the results**. Collect the data from the experiment.
6. **Draw a conclusion**. What did the data tell you?
    1. How did the results support or not support your hypothesis?
    2. Is it possible to repeat the experiment? Can you change it in any way?
    3. What new questions did this experiment make you think of?
    4. How is the information useful? How does it relate to the world in which you live?

If you are having trouble choosing an idea, ask a parent, teacher or librarian to help you select one. Once you have chosen the topic you'd like, decide how you will show it. Remember that for any science fair project you do, you need to explain the point, or purpose of your project.

Think it Through

- Discuss your ideas.
- Talk about what you want your project to look like.
- Make a rough sketch and use it as a guide.
- What is the best part of your idea?
- What will make your project different?
- Are your ideas clearly expressed?
- Can your exhibit be easily understood?
- What might go wrong and what can you do about it?

The Project Display

- Be neat
- Take time to make clear, simple and neat drawings, graphs and diagrams
- Avoid cluttering the display
- Add extra touches like lines of color, borders and so on, to make the display attractive