PARENTS, GET INVOLVED!

Encourage and Assist Your Kids

MOTIVATING YOUR YOUNG SCIENTIST

Deciding on a topic is often the hardest part of the process. Students should come up with their own original ideas, but parents can help in a number of ways.

- Pick up a variety of reading materials at the library and set the pile on the coffee table.
- Take a family trip to a science museum.
- Take a nature walk and bring small notebooks and pencils for everyone in the family (parents included). Wherever you go, sketch and jot down observations just like real explorers do.
- Encourage your child to draw on his or her personal interests. Sometimes a hobby or favorite sport will spark an idea.
- Once a decision has been made, make sure the topic can be explored and the experiment conducted in the amount of time given, and that your child will have access to the materials and equipment required.
- As the deadline approaches, relieve some of the stress. Remind your young scientist—and yourself—that the purpose of the project is to learn about science, not to win the competition.

USING THE SCIENTIFIC METHOD

The Scientific Method is a set of general guidelines for conducting science experiments in a systematic way to ensure objectivity and consistency. Professional scientists around the world and middle school students at science fairs across the country all apply the same basic methodology and speak the same universal language when they use the scientific method.

Different books and teachers may use slightly different terms, and more or less of them, to identify the steps of the Scientific Method. But all share these three: hypothesis, procedure (usually called the "experiment"), and conclusion.

Here's the general outline:

- Scientific problem (Pose a question.)
- Hypothesis (Make an educated guess.)
- Materials and equipment (Figure out what is needed. Are materials affordable? Easy to obtain? Safe? Do they abide by classroom and science fair regulations? Do they require electricity?)
- Procedure (Create a detailed, step-by-step process for conducting the experiment.)
- Number each step and include a control and a variable.
- Observations (Conduct the experiment and make notes about what happens.)
- Conclusion (Answer the question. Did the results prove or disprove the hypothesis?)

COMPILING THE PROJECT REPORT

Science is complicated, but a project report should be clear and concise. It should present highly detailed information as simply as possible while conveying a solid understanding of the underlying scientific principles explored in your child's procedure. It should include the following sections:

- Title Page
- Table of Contents
- Introduction (or "Abstract")—a short summary that includes the hypothesis, procedure, materials, results, and conclusion; how your child came up with the idea; and why it's important
- Question and Hypothesis
- Experiment (include materials)—Each step should be numbered and written like a set of instructions.
- Data and Results
- Conclusion
- Bibliography and Sources
- May also include: Review of Literature, Tables and Figures, and Acknowledgements

Important reminders for your child:

- Don't plagiarize
- Explain complicated scientific principles and terminology in your own words
- Proofread, proofread, proofread

WINNER! DISCOVERY CHANNEL YOUNG SCIENTIST CHALLENGE

Nolan with John Hendricks, founder and Chairman of Discovery Communications, Inc.

Sometimes it's your daily routine that inspires a cool scientific exploration. In the case of Nolan Kamitaki, winner of the 2007 Discovery Channel Young Scientist Challenge, it happened walking to school.

The very soil beneath Nolan's feet was laden with arsenic. Environmental arsenic contamination was on his mind, having heard about it while reading newspaper articles from his home in Hilo, Hawaii. This became the inspiration for his grand prize winning project. "Arsenic in the Schools and the Students?" is a compelling look at what is happening in the soil concentrations on the campus of Waiakea Intermediate School, Nolan's middle school. He questioned whether or not his fellow students were similarly affected.

Nolan discovered that: While there is a naturally occurring amount of arsenic in the ground, higher than normal amounts can be dangerous and potentially lethal. He then found that the soil within the school campus and the surrounding area had a high level of arsenic. Nolan then proceeded to test the hair of students attending Waiakea Intermediate School to determine whether the arsenic had managed to enter their bodies. However, there was no indication of high arsenic levels in the students' hair, and the students are most likely in no danger of arsenic poisoning.

"First, I was not too surprised at the outcome (of my experiments) because upon further research I learned that the type of arsenic in the soil was relatively not water-soluble and was bound to the soil. The most interesting development was that the state Department of Health was conducting very similar studies at the same time as I was conducting my science project. While the state of Hawaii is continuing to study this issue, my results were very similar to their current data."

Asked what it was like to attend and win a national science competition, Nolan said "The experience at DCYSC was more than the honor of winning the competition. Besides meeting many other students with similar drive and passion, I gained a lot of confidence in myself. This experience also sparked and increased my interest in science and math. My heightened interest in science as a result of the competitions has led me towards a desire for a career in science. "

But what about having fun? After all, when he won, Nolan was just 14 years old. He says "The most fun part of DCYSC was the time spent with his team, working together to solve the challenges." Further, Nolan says "The single greatest impression on me was being able to work at the National Institutes of Health (NIH) and see how many Nobel laureates walked through the same building."

For more news about the 2007 Discovery Channel Young Scientist Challenge please visit: ***www.dcysc.com***

Big Ideas & Small Miracles

Clocky: The alarm clock for people who have trouble waking up

When the alarm clock goes off and the snooze button is pressed, Clocky will fall off of the bedside table and wheel away, bumping mindlessly into objects on the floor until he eventually finds a place to rest. Minutes later, when the alarm sounds again, you must get out of bed and search for Clocky. Because you employ multiple senses to find the clock, you are sure to wake up before disabling the alarm. Small wheels enable Clocky to move and reposition himself, and an internal computer helps him find a new hiding spot every day.
Clocky is an academic research project and is not commercially available at this time.
www.media.mit.edu/press/clocky

Water-soluble golf balls: They dissolve into fish food

Newfangled Eco Golf Balls dissolve into fish food within hours of hitting the water. The U. S. Navy first used them as part of the Golf at Sea Program during Operation Enduring Freedom. The company also makes biodegradable Eco Golf Tees from corn.
www.ecogolf.com

Totally absurd inventions

A Web site devoted to "totally absurd" inventions, such as the diaper alarm, motorized ice-cream cone, ski fan, lip clip, and zero-gravity squeeze box.
www.totallyabsurd.com

Totally eccentric inventors

Beginning in the 1960s, British inventor Arthur Paul Pedrick patented a total of 161 inventions, but never sold any of them. High points included a horse-powered car, a revolving restaurant television tower, and a device to fling giant snowballs from Antarctica to irrigate the world's deserts.
www.inventors.about.com

Cool inventions by kids

Learn about ingenious devices like the Cast Cooler, invented by disabled teenager Krysta Morlan to alleviate the discomfort of wearing a cast in the summer heat. The Cast Cooler pipes cool air into the cast through a plastic tube, using a contraption built out of an aquarium pump, a nine-volt battery and a small electric motor. Krysta later invented the semi-submersible, fin-propelled Water Bike.
www.inventors.about.com/od/kidinventions

THE LONG and the SHORT OF IT...

(The six-week schedule to success)

Instead of one long, involved process, think of your science fair project as a series of shorter steps. That way, you won't feel overwhelmed at the beginning, and you'll be able to think through each step and keep track of your progress. You can do it!

DATE OF THE SCIENCE FAIR _____ DATE TO BEGIN WORKING ON PROJECT _____

SCHEDULED WEEKLY EVENTS	SCHEDULED COMPLETION	ACTUAL COMPLETION
WEEK 1: Start Up! • Choose a topic or problem to investigate. • Start a journal to keep all your notes and research along the way. • Begin primary research: Write for information from experts, such as scientists, businesses and government agencies. Set up interviews when necessary. • Begin secondary research: Search printed sources (books, journals, magazines, and newspapers) and electronic sources (Internet and software).		
WEEK 2: Research & Revise • Change your topic or problem if necessary. • Decide how to set up your investigation or experiment, including the procedure and necessary materials. • From your initial research, write your hypothesis. • Continue your research using the best resources you found. • Interview experts for more information.		
WEEK 3: Outline & Investigate • Complete initial research. Set up outline for written report. • Start your experiment or demonstration collection. • Record observations in your journal. • Begin collecting or buying materials for your display.		
WEEK 4: Record & Report • Work on first draft of written report. • Continue to record observations from your experiment in your journal. • Write down or sketch preliminary designs for your display.		
WEEK 5: Design & Refine • Write second draft of your report. • Start assembling display unit. • Begin designing signs, labels, charts, graphs, or other visual aids for display. • Write text for background of display and plan its layout. • Continue to record observations from experiment. • Take any photographs you need.		
WEEK 6: Finish up! • Complete your experiment or collection. • Analyze observations and write up your results. • Write, type, and proofread final version of written report. • Have photographs developed and enlarged. • Type explanations or background information and mount them to your display. • Finish constructing your display, including graphs, charts and visual aids.		

ROLL WITH YOUR LOGBOOK

The first thing you should do, even before you begin brainstorming, is to get a notebook to serve as your dedicated science project "logbook." Every professional scientist keeps a notebook with him/her at all times, and you'll be expected to do the same.

Things to Do & Things to AVOID

Please **DO**…

- Complete all paperwork before you begin with appropriate signatures, as required. Human or animal subjects require prior approval from your child's teacher, principal, **and** school nurse/psychologist.

- Use the Scientific Method:
  - Step 1 Ask a question
  - Step 2 Form a hypothesis
  - Step 3 Design and conduct an experiment
  - Step 4 Analyze the results of the experiment
  - Step 5 Draw a conclusion

- Use a Biosafety Level 1 laboratory to grow petri dish experiments.
  For more information read "Potentially Hazardous Biological Agents" on the Science Fair Project Rules sheet. Bacteria and mold cultures must be grown in laboratory with proper supervision. (All finalists will be required to attach proper paperwork.)

- Remember your display **cannot** contain:
  - Plant or animal matter (living or dead)
  - Microbes
  - Food (human or animal)
  - Soil or waste
  - Poisons
  - Drugs
  - Water or chemicals
  - Highly flammable materials
  - Sharp or dangerous material

  (If you feel you need any of these items, consider taking pictures of them and include the pictures on your display)

Please **DON'T**…

- wait to start until January 29, 2009!
- include pictures of people or animals in inhumane conditions.
- use recognizable pictures of people (other than immediate family) unless written permission is obtained.
- hesitate to ask if you have any questions or concerns.