



# The 2011 Vermont State Science & Math Fair

Inspire & Reward  
High Quality Research by  
Vermont Secondary Students

# Inspiration & Reward

- Question
- Research project
- Local Science Fair
- Vermont State Science & Math Fair
- National & International Competitions
- Awards & Prizes

# Awards & Prizes

- VPA gold and silver medals
- Over \$4000 in cash plus other prizes in locally and nationally sponsored awards
- Over \$1 million in Next Generation scholarships to Vermont colleges
- Nominations to national & international competitions
- Expense paid trips for finalists & their teachers to national & international competitions

# Locally Sponsored Awards & Prizes

## **SPONSOR**

## **AWARD**

• Vermont Principals' Association	\$200
• American Chemical Society	\$200, Merck Index
• Ethical Science & Education Coalition	CD ROM & book
• Green Mountain Water Environment Association	\$300
• Northeast Branch American Society for Microbiology	\$200
• Vermont Organization of Nurse Leaders	\$50
• Vermont Chapter of Sigma Xi	\$20
• Haematologic Technologies, Inc.	\$500
• Tau Beta Pi Engineering Honor Society	\$50
• Vermont Academy of Arts and Sciences	\$200
• groSolar	Zeus System
• NRG	\$250
• Sovernet	\$250
• Society of Manufacturing Engineers	\$200
• Society of Women Engineers	\$200
• New England Institute of Food Technologists	\$480
• Nathaniel Group	\$50
• Entergy Vermont Yankee	\$500
• Women In Nuclear (WIN) at Vermont Yankee	\$300

# Vermont Next Generation Scholarships

over \$1 million in conditional multi-year scholarships

Green Mountain College

Norwich University

Saint Michael's College

Vermont Technical College

# National & International Competitions



Intel ISEF

Los Angeles, CA



Broadcom MASTERS

Washington, DC



I-SWEEP

Houston, TX



E3 Challenge

Houston, TX

Stockholm Junior Water Prize



# The 2011 Vermont State Science & Math Fair

- Saturday, April 2, 2011 8:30-3:30
- Norwich University, Northfield, VT
- Everything but lunch free. Lunch \$8.50



# Participants

All Vermont middle and high school students grades 5 through 12

An “Individual Project” must be the work of an individual student

A “Group Project” must be the work of *two or three* students only

Group projects are open to all grades, 5-12.

Independent Project Registration

School Registration – School Liaison/teacher





# Projects

Projects must be EXPERIMENTAL or INVESTIGATIVE (seek to answer a question or address a problem) in some area of science, engineering or mathematics. Projects that are demonstrations, 'library' research or informational projects, 'explanation' models or kit building are not appropriate for this fair.

Use of the SCIENTIFIC METHOD or the ENGINEERING PROCESS in answering a question or addressing a problem is expected. Adjust your hypothesis or redefine your problem if you see that the data do not agree with your original ideas, improve your experimental design or your prototype design. Don't forget to highlight all the new things learned!

The fair is a VISUAL presentation of your project. You will prepare an exhibit which illustrates your project and will be expected to answer questions concerning your project. Project displays must meet all of the display requirements.



# Selecting a Question

**The question must be testable.** The answer must be determined by the performance of an experiment using the scientific method or production and testing of a product or process using the engineering design method. Questions that rely on library research alone are not acceptable.

**The question is open to research.** This means a reasonable search should produce enough information related to the question to create a solid hypothesis. It may be difficult to find enough information, and the question will have to be adapted. Questions that only have one possible answer, or the answer is considered fact, are not open to research.

**The questions must have some objective basis for an answer.** Change "Why did the dinosaurs become extinct?" to "Could X have caused the extinction of the dinosaurs?" Value judgments don't work for similar reasons. Change "Which tastes better, Coke or Pepsi?" to "Which cola does more people prefer?"



# Selecting a Question

**The question has a clear focus.** Some **focus** is required to allow productive research. An initial *general* question can get things started, but it will also need to be revised and focused as the research continues. How the question is refined will depend on the student's interests and discoveries in their initial research. The final question should be as direct and specific as possible, or have clear sub-questions.

**Make sure you have defined all the terms in your question so you know exactly what you are asking.** If you are using subjective terms such as "latest" or "most recent", be sure to define exactly what you mean by this. For example, "most recent" as in the last century? the last decade? the last two years?



# Selecting a Question

**The answer cannot be a simple fact or yes/no.** Good questions require research, testing, interpretation of observations and data, and a degree of analysis to answer. If it is too simple, it won't hold anyone's interest...not even yours.

**The question must not have a premise.** For example: Why do we only use 3% of our brain? With this question comes the assumption that everyone only ever uses 3% of our brain. A better alternative might be: What influences the percentage of our brain that we use?

**The question cannot be *too* personal.** "What brand of food does my dog like the best?" might inspire some level of interest, but in most cases people want to know about how a breed of dog or dogs in general will behave. If students want to do behavior testing, they will need a *large* sample size to make generalizations, not just their family and friends, or their pets.



# Selecting a Question

**Most importantly...it must be about something of interest.** The questions must be about something you care about; enough to work on for 2 months or more. It should be of interest to other people as well. Questions are particularly juicy if their answer affects people or policy, or have other important consequences.

**You don't already know the answer.** Good science fair questions offer you the opportunity to learn something new, or create new knowledge. Students who postulate questions for which they already have an answer think it will be easier; but as it violates the spirit of genuine inquiry, it makes it harder to finish. **It should be something you *suspect* to be true.**

**Having the right answer matters.** This may seem an odd thing to include but it is at the foundation of inquiry. Motivation comes from needing to know the answer to a question, or researching a question where the answer has consequences. Anything short of this isn't genuine inquiry.



# Help Selecting a Question

- Past VSSMF abstract books
- Websites like Science Buddies
- Awards descriptions
- Parent/neighbor/friend's work
- Myth Busters
- In-class topic



# Dates to Remember

- |          |   |
|----------|---|
| FEB 18   | VSSMF Individual and School Applications due,<br>Abstracts for ISWEEEP eligibility due<br>slideshows for e3 Challenge due<br>ISEF Eligibility Package due |
| MAR 11   | Final Abstract due to VSSMF   |
| APR 2    | VSSMF at Norwich,<br>Original ISEF Eligibility Package due at registration  |
| MAY 5-9  | ISWEEEP in Houston, Texas   |
| MAY 8-13 | ISEF in Los Angeles, California   |



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