Connecticut Science Fair

www.ctsciencefair.org

CSF Website

WHERE DO GOOD IDEAS COME FROM? TECHNIQUES FOR DEVELOPING CREATIVE POTENTIAL AND IDEA GENERATION

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Center for 21st Century Skills

at EDUCATION CONNECTION

Dr. LaBanca's Blog

Agenda

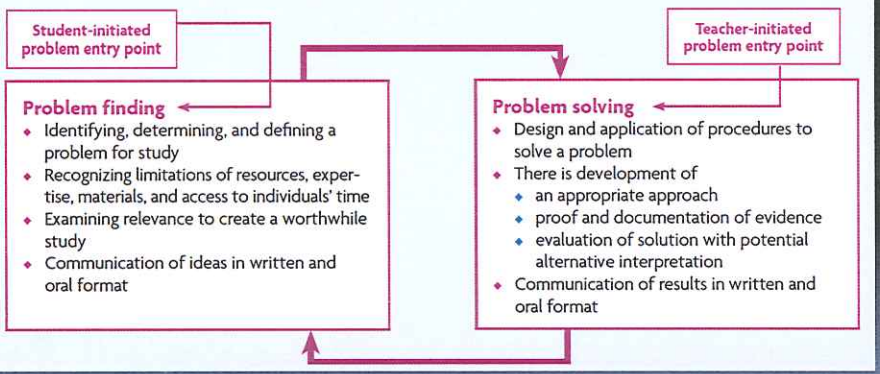
- Continental Breakfast and Welcome
- Intro to the CT Science Fair
- What's new in science and engineering?
- Brainstorming Activity
- Article Activity
- Use the rules to guide you
- Project Title Activity

Goal of Today's Workshop

Improve the quality of projects that students present at the Connecticut Science Fair by empowering teachers and students to become more aware problem ***finders***.

FIGURE 1

The relationship of problem finding and problem solving in science research.



Connecticut Science Fair

March 13-17, 2012
Quinnipiac University
Hamden, CT

Deadlines

- Oct 30 School Registration
- Dec 1 High school student registration
- Feb 15 Middle school student registration
- Mar 1 Project Abstracts Due
- Mar 13 Project set up by 7:30 p.m. in full compliance of the rules

Mission Statement

- Provide a forum for the science, mathematics, and engineering skills of 7th through 12th grade students.
- Encourage young people to develop self-inquiry and critical thinking skills .
- Provide recognition through awards and opportunities to compete in national and international awards programs.

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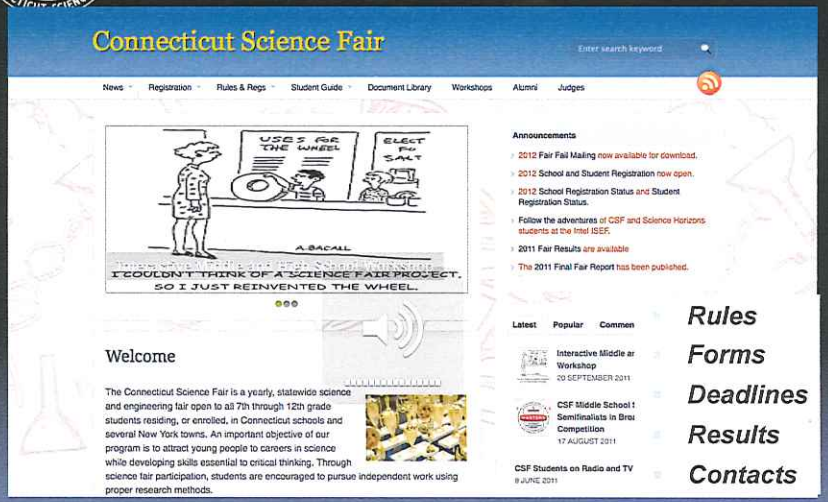

Evaluate

- ***Fluency.*** The total number of interpretable, meaningful, and relevant ideas generated in response to the stimulus.
- ***Flexibility.*** The number of different categories of relevant responses.
- ***Originality.*** The statistical rarity of the responses.
- ***Elaboration.*** The amount of detail in the responses.

Judging Criteria for Regular Awards

Percent Weighting

	Indiv.	Team
Scientific Thought/Engineering Goals	30	25
Creative Ability	30	25
Thoroughness	15	12
Skill	15	12
Clarity	10	10
Teamwork (if team)	–	16

Cleaning clothes dirties oceans

It's easy to pollute coastal areas, even for people who live far from the beach. All it takes are a washing machine and polyester clothes.

Polyester is everywhere: The plastic fabric can be used to make fleeces, shirts, pants, furniture and blankets. It's synthetic, which means it's created from chemicals in a lab to resemble something natural. Scientists recently found that polyester clothes shed plastic fibers while in the washing machine. During the rinse cycle, these microscopic threads wash down the drain, zip through water treatment plants and end up on the coasts.

This variety of plastic pollution is emerging all over the world, according to Mark Browne, an environmental scientist at University College Dublin in Ireland. In a recent study, he and his team collected samples from the shores of six continents. The samples taken from coasts near big cities had the most pollution from plastic fibers, but the scientists found the contamination in every habitat.

You can't see it, but plastic pollution mixes with the sand on coasts around the world. The tiny, human-made threads come from polyester clothing that's been through the wash. Credit: Bryan Bell, National Park Service

After finding the plastic threads, Browne and his colleagues went looking for the source. Previous studies had shown that wee bits of plastic show up near where water exits treatment plants. With that in mind, Browne went further back in the water-treatment process and took a close look at laundry.

The researchers got to work, repeatedly cleaning synthetic clothes and blankets in washing machines. After each cycle, they rinsed thoroughly and studied the outflow of water for plastic threads. They found that "a single garment can produce greater than 1,900 fibres per wash," according to a study published on September 6. Fleece was the biggest source of the threads.

Polyester fibers aren't the only tiny polluters. In a study published in November 2010, Portuguese researchers reported finding tiny plastic pellets in every sample of sand taken from two beaches. These kinds of small plastic balls give a rough texture to products like skin cleaners and paint removers.

Even though they're very small, the bits can cause trouble in a watery habitat. "In the ocean, plastics act like a sponge" that can absorb other toxic pollutants, Anthony Andrady told *Science News.* Andrady, who did not work on the new studies, is an expert on polymers at North Carolina State University in Raleigh. Polymers are materials, including plastic, made from long chains of molecules bonded to each other.

The scientific evidence for plastic pollution could point to big problems down the road. "I think these findings are a big deal," Henry Carson, a marine ecologist at the University of Hawaii at Hilo, told *Science News.* Marine ecologists study the sea and how the life forms that live there interact with each other and their environment.

"These tiny pieces have the potential not only to get inside tissues of mussels and other animals," he said, "but to actually move into their cells. That's pretty frightening."

polyester A synthetic material used chiefly to make fabrics.

habitat The natural home or environment of an animal.

cell The smallest structural and functional unit of an organism.

ecology A branch of biology that deals with the relations of organisms to one another and to their physical surroundings.

materials science An area of science that studies the relationship between a material's structure and properties. Chemists who work in the field study how different combinations of molecules and materials result in different properties.

Connecticut Science Fair Research Pathways

Middle School and (possibly) High School students have a choice of the EZ Path or the Unrestricted Research Path.
Prior to the start of research, the Student and Teacher choose the desired path route and informs the teacher prior to start of research

EZ PATH

*Projects **MUST NOT** involve the following items:*

Biological

- Blood products, fresh tissue, teeth & bodily fluids
- Human Subjects[§]
- Nonhuman vertebrate animals or their parts
- Potentially pathogenic agents, including all bacteria
- Recombinant DNA

Chemical

- Controlled substances
- Carcinogenic, mutagenic & toxic chemicals
- Explosive chemicals
- Radioactive materials
- Compressed gases

Energy

- Hazardous substances or devices
- High voltage equipment
- Class 3 and 4 Lasers
- Ionization radiation (X-rays/nuclear energy)

FORMS REQUIRED

- Checklist for adult sponsor (online)
- Registration Form (online)
- Research Plan (online)
- Release Form (1D)(signed by parent)

Note: CSF may determine your project does not qualify for EZ Path. See exclusions above and contact us if there are questions.

UNRESTRICTED RESEARCH PATH

*Projects **MUST** conform with all ISEF and CSF rules and regulations.*

FORMS REQUIRED

- Checklist for adult sponsor (online)
- Registration Form (online)
- Research Plan (online)
- Release Form (1D)(signed by parent)

AND THE FOLLOWING, AS APPROPRIATE:

	Form Title	Purpose
1C	Research Institution	For student research conducted in a regulated research institution or industrial setting
2	Qualified Scientist	For projects involving human subjects, vertebrate animals, potentially hazardous biological agents. Submit prior to work
3	Risk Assessment	For projects using hazardous chemicals & biological substances, and hazardous activities or devices
4	Human Subject Form	For projects involving humans). Submit prior to work
5A/ 5B	Vertebrate Animals	For animal projects. Submit prior to work
6A/ 6B	Potentially Hazardous Biological Agents, Animal Tissue	Submit prior to work
7	Continuation Projects	

[§]Very few human subject projects qualify for EZ Path. See 'Exempt Studies' on page 13 of the ISEF Rules at: http://www.societyforscience.org/isef/rules/rules7.pdf . Other human projects can be approved by your school IRB but do not qualify for EZ Path and a form 4 (at least) will be required by the IRB.

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- Human Subjects§
- Nonhuman vertebrate animals or their parts
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- Recombinant DNA

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*Projects **MUST NOT** involve the following items:*

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- Radioactive materials
- Compressed gas

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Energy

- Hazardous substances or devices
- High voltage equipment
- Class 3 and 4 Lasers
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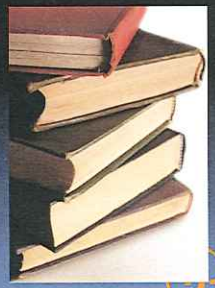
LITERATURE REVIEW PROJECT

- Use source information for all aspects of project
- Organize primary and secondary sources into a report
- No inquiry



TECHNICAL PROJECT

- Inquiry-based
- Well known question
- Well known outcome

- Predetermined procedures
- Predictable results

TECHNICAL PROJECT WITH VALUE

- Inquiry-based
- Technical data
- Unique data set – unique niche
- Value to an authentic audience

NOVEL APPROACH PROJECT

- Novel question
- Novel method to solve a preexisting question

- Ill-defined question
- Ill-defined outcome

Project Titles Speak Volumes

2002 Connecticut Science Fair

High School Physical Sciences

Honors	Project Number	Title
		The Most Effective Substance For Melting Ice
		Motion Response Deterrents Of Deer
		The Diaper
		The Relationship Between The Number Of Times A Baseball Is Hit And The Distance It Goes
		Geriatric Assist Robotic System (G.A.R.S.)
		Solar Heating Efficiency And Design
		The Design And Construction Of A Semi-Autonomous, Omni-Directional Wheelchair
		Nanoconstruction With Self-Assembling DNA-PNA Complexes
		Comparision Of Packing Media For The Biofiltration Of Hydrogen Sulfide
		Effects Of Thermal Noise And Positional Uncertainty On Nano-Scale Machines
		Which Water Rates the Best
		Sunspots
		Thermal Conduction
		Designing A Laser Jamin Interference Refractometer To Measure Gas Refractive Index
		Wax Your Ride: The Best Snowboard Wax
		Peanut Power

YOUR TASK: Pick 3 1st Honors and 3rd Honors Projects.

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