CIESE Professional Development
2007/2008 Workshops

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Elementary Science & Engineering Connections Series

These workshops feature lessons that integrate applied science content within an engineering context relevant to the lives of youth. Some of the workshops will utilize real time data available from the Internet, and telecollaborative projects that utilize the Internet's potential to reach peers and experts around the world.

Each workshop will include science lessons to teach key science concepts as well as engineering lessons from the *Engineering is Elementary* (EiE) curriculum developed by the Museum of Science, Boston where the science concepts are applied though an engineering design challenge. Teacher Guides for the EiE units will be given out to all participants. It includes: Lesson Plan, Story Book, and Evaluations.

● Elementary S&E Connections: Weather

Science Topics: **Weather**
NJCCC Science Standards: **5.1, 5.4, 5.8B**

Science Exploration
Participants will review the types and sources of weather information necessary for forecasting the weather and examine the instruments that are used to gather weather data. They will explore how weather information is displayed on weather maps and as real time data. Participants will consider and discuss how information from a variety of meteorology Internet sites, including CIESE online science project *Wonderful World of Weather*, can be used to reinforce concepts and enhance classroom instruction.

Catching the Wind: Designing Wind Mills
(Mechanical Engineering)
This unit guides students to learn about wind and the ways engineers design machines to capture wind energy. Students explore different materials and shapes conducive to catching the wind. For the design activity, students create their own windmills that can lift a small weight.

Date	Grade Level	Fee	Location	Time
11/28/07	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Electricity

Science Topics: **Series Circuit, Parallel Circuit, Insulators, Conductors**
NJCCC Science Standards: **5.1, 5.4, 5.7B**

Science Exploration
Participants will engage in hands-on activities that will enhance the study of electricity in the classroom.

An Alarming Idea: Designing Alarm Circuits
(Electrical Engineering)
This unit helps students to apply their knowledge of electricity, circuits, conductors, and insulators as they design and construct their own alarm circuits. The science concepts of electricity/energy transfer, conductors and insulators, and complete and incomplete circuits are reinforced; students are also introduced to schematic diagrams.

Date	Grade Level	Fee	Location	Time
11/14/07	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Water

Science Topics: **Properties of Water, Separation Techniques, Water Cycle, and Environmental Topics**
NJCCC Science Standards: **5.1, 5.4, 5.6, 5.8B**

Science Exploration
Participants will engage in hands-on activities and Internet-based activities that will enhance the study of water properties and related environmental topics in the classroom. The CIESE telecollaborative science project, *Down the Drain*, will be explored.

Water, Water, Everywhere: Designing Water Filters
(Environmental Engineering)
This unit addresses the increasingly important issue of water quality through lessons that teach students about water contamination and the ways that people ensure the quality of their drinking water. Students plan, construct, test, and improve their own water filters.

Date	Grade Level	Fee	Location	Time
3/31/08	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Life Cycles

Science Topics: **Animal Classification, Introduction to Taxonomy, and Life Cycles of Animals and Plants**
NJCCC Science Standards: **5.1, 5.4, 5.5**

Science Exploration
Participants will engage in hands-on and internet-based activities that will enhance the study of animals and life cycles in the classroom.

The Best of Bugs: Designing Hand Pollinators
(Agricultural Engineering)
This unit helps students connect their knowledge of insects and plants to a broader understanding of the natural system of pollination. Science concepts about insects, life cycles, pollination, and natural systems are introduced and reinforced, and different aspects of agricultural engineering are explored. For the design challenge, students design and improve hand pollinators to work with different model flowers.

Date	Grade Level	Fee	Location	Time
2/13/08	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Forces

Science Topics: **Forces (Pushes and Pulls), Balancing Forces, and Different Bridge Types**
NJCCC Science Standards: **5.1, 5.4, 5.7A**

Science Exploration
Participants will engage in hands-on and internet-based activities that will reinforce concepts

and enhance the study of forces in the classroom.

To Get to the Other Side: Designing Bridges
(Civil Engineering)
In this unit, students explore why bridges are shaped differently. Students distinguish between beam, arch, and suspension bridges and learn how bridge designs counteract and redirect forces and motion. In the culminating design challenge, students design, construct, and test their own bridges.

Date	Grade Level	Fee	Location	Time
3/7/08	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Simple Machines

Science Topics: **Simple Machines, Work, and Forces**
NJCCC Science Standards: **5.1, 5.4, 5.7A**

Science Exploration
Participants will engage in hands-on and internet-based activities that will reinforce concepts and enhance the study of simple machines in the classroom.

Marvelous Machines: Making Work Easier
(Industrial Engineering)
This unit guides students to learn about how factories use processes, systems, and machines to help make work easier and safer for workers. During the culminating design challenge, students will combine a series of simple machines to complete the various tasks of a model potato chip factory and make work easier.

Date	Grade Level	Fee	Location	Time
2/28/08	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Sound

Science Topics: **Waves, Frequency, Vibration, and Energy Transformations**
NJCCC Science Standards: **5.1, 5.4, 5.7B**

Science Exploration
Participants will engage in hands-on and internet-based activities that will reinforce concepts and enhance the study of sound in the classroom.

Sounds Like Fun: Seeing Animal Sounds
(Acoustical Engineering)
This unit brings new levels of excitement and depth to traditional sound units, reinforcing basic concepts while introducing students to the field of acoustical engineering. Students will investigate ways to damp sound, and then will focus on developing a visualization of sound in a way that captures its key elements and communicates the sound clearly to others.

Date	Grade Level	Fee	Location	Time
4/9/08	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Elementary S&E Connections: Animal Adaptations

Science Topics: **Animal Adaptations, Animal Life Stages, and Habitats**
NJCCC Science Standards: **5.1, 5.4, 5.5, 5.10**

Science Exploration
Participants will engage in hands-on activities from *Bucket Buddies*, a CIESE telecollaborative project, in which participants identify macro invertebrates in pond water samples and analyze the data that has been submitted by other students from around the world

Just Passing Through: Designing Model Membranes
(Bioengineering)
This unit provides students with the opportunity to apply their knowledge of organisms and their basic needs through a series of activities related to the diverse field of bioengineering. Students are challenged be bioengineers and design a model membrane that can deliver water to an imaginary pet frog in a controlled manner, helping the frog to meet one of its basic needs.

Date	Grade Level	Fee	Location	Time
5/30/08	K-5	$60	Stevens	9:00 a.m. – 3:00 p.m.

● Design Your Own Science & Engineering Lessons

Learn how easy it can be to incorporate engineering lessons into your science class. Bring some of your favorite science lessons and leave the workshop with exciting new engineering lessons.

Date	Grade Level	Fee	Location	Time
1/25/08	K-5	$25	Stevens	9:00 a.m. – 3:00 p.m.

Engineering is Elementary Series (EiE)

Each Engineering is Elementary Series workshop will include engineering lessons from the Engineering is Elementary (EiE: http://www.mos.org/eie/) curriculum developed by the Museum of Science, Boston. Each EiE module integrates an elementary-level science topic with a specific field of engineering, introduces the engineering design process, and has participants apply science concepts through an engineering design challenge. EiE is standards-based, research-based, classroom-tested curriculum that aligns with many national science curricula, including FOSS, STC, GEMS, and Insights. Preliminary research from a study conducted by the Museum of Science, Boston shows increased student achievement in science when students participate in EiE curricula. Teacher Guides for both EiE units will be given out to all participants. They include: Lesson Plan, Story Book, and Evaluations.

● EiE Life Science I

Science Topics: **Animal Adaptations, Life Cycles, and Habitats**
NJCCC Science Standards: **5.1, 5.4, 5.5, 5.10**

The Best of Bugs: Designing Hand Pollinators
(Agricultural Engineering)
This unit helps students connect their knowledge of insects and plants to a broader understanding of the natural system of pollination. Science concepts about insects, life cycles, pollination, and natural systems are introduced and reinforced, and different aspects of agricultural engineering are explored. For the design challenge, students design and improve hand pollinators to work with different model flowers.

Just Passing Through: Designing Model Membranes
(Bioengineering)
This unit provides students with the opportunity to apply their knowledge of organisms and their basic needs through a series of activities related to the diverse field of bioengineering. Students are challenged be bioengineers and design a model membrane that can deliver water to an imaginary pet frog in a controlled manner, helping the frog to meet one of its basic needs.

Date	Grade Level	Fee	Location	Time
10/29/07	K-5	$95	Stevens	9:00 a.m. – 3:00 p.m.

● EiE Physical Science 1

Science Topics: **Simple Machines, Balance and Force**
NJCCC Science Standards: **5.1, 5.4, 5.7A**

To Get to the Other Side: Designing Bridges
(Civil Engineering)
In this unit, students explore why bridges are shaped differently. Students distinguish between beam, arch, and suspension bridges and learn how bridge designs counteract and redirect forces and motion. In the culminating design challenge, students design, construct, and test their own bridges.

Marvelous Machines: Making Work Easier
(Industrial Engineering)
This unit guides students to learn about how factories use processes, systems, and machines to help make work easier and safer for workers. During the culminating design challenge, students will combine a series of simple machines to complete the various tasks of a model potato chip factory and make work easier.

Date	Grade Level	Fee	Location	Time
1/9/08	K-5	$95	Liberty Science Center	9:00 a.m. – 3:00 p.m.

● EiE Physical Science 2

Science Topics: **Sound and Electricity**
NJCCC Science Standards: **5.1, 5.4, 5.7**

Sounds Like Fun: Seeing Animal Sounds
(Acoustical Engineering)
Students will investigate ways to damp sound, and then will focus on developing a visualization of sound in a way that captures its key elements and communicates the sound clearly to others.

An Alarming Idea: Designing Alarm Circuits
(Electrical Engineering)
This unit helps students to apply their knowledge of electricity, circuits, conductors, and insulators as they design and construct their own alarm circuits. The science concepts of electricity/energy transfer, conductors and insulators, and complete and incomplete circuits are reinforced and students are also introduced to schematic diagrams, a symbol "language" that electrical engineers use to plan and design circuits.

Date	Grade Level	Fee	Location	Time
12/7/07	K-5	$95	Stevens	9:00 a.m. – 3:00 p.m.

● EiE Earth Science 1

Science Topics: **Water, Water Cycle, Wind and Weather**
NJCCC Science Standards: **5.1, 5.4, 5.6, 5.7, 5.8B**

Water, Water, Everywhere: Designing Water Filters
(Environmental Engineering)
This unit addresses the increasingly important issue of water quality through lessons that teach students about water contamination and the ways that people ensure the quality of their drinking water. Students plan, construct, test, and improve their own water filters.

Catching the Wind: Designing Wind Mills
(Mechanical Engineering)
This unit guides students to learn about wind and the ways engineers design machines to capture wind energy. Students explore different materials and shapes conducive to catching the wind. For the design activity, students create their own windmills that can lift a small weight.

Date	Grade Level	Fee	Location	Time
4/18/08	K-5	$95	Stevens	9:00 a.m. – 3:00 p.m.

● EiE Life Science 2

Science Topics: **Plants, Life Cycles**
NJCCC Science Standards: **5.1, 5.4, 5.5, 5.7, 5.10**

Thinking Inside the Box: Designing Plant Packages
(Packaging Engineering)
Students investigate the functions of packages, they discover the relationship between the needs of the product (in this unit, a plant) and the functions that must be considered in package design. Ultimately, students design, test, and improve their own packages to solve a tricky challenge: carry a plant and keep it safe for several days--while also ensuring it has the light, air, and moisture it needs.

The Best of Bugs: Designing Hand Pollinators
(Agricultural Engineering)
This unit helps students connect their knowledge of insects and plants to a broader understanding of the natural system of pollination. Science concepts about insects, life cycles, pollination, and natural systems are introduced and reinforced, and different aspects of agricultural engineering are explored. For the design challenge students, design and improve hand pollinators to work with different model flowers.

Date	Grade Level	Fee	Location	Time
4/11/08	K-5	$95	Stevens	9:00 a.m. – 3:00 p.m.

● EiE Physical Science 3

Science Topics: **Solids, Liquids, Magnetism**
NJCCC Science Standards: **5.1, 5.4, 5.7**

A Work in Progress: Improving the Play Dough Process
(Chemical Engineering)
In this unit, students shape their understandings of sequenced processes, the properties of solids and liquids, and some possible outcomes of mixing the two, as they get serious about play dough. Students tackle the challenge of creating the way to improve an "okay" play dough recipe. On the way, they explore the properties of a good dough and compare their own sample to it. Then they improve a standard process for mixing the ingredients--to ensure that it creates a just-right dough.

The Attraction is Obvious: Designing Maglev Systems
(Transportation Engineering)
In this unit, students explore the science behind the magic-seeming effect of Maglev. Students send magnets "sailing," help magnets hover, and poke around magnetic poles. Students design, test, and improve their own tabletop Maglev transportation systems— a levitating vehicle system that will carry packages without them touching the ground.

Date	Grade Level	Fee	Location	Time
6/6/08	K-5	$95	Stevens	9:00 a.m. – 3:00 p.m.

Science & Technology Connections Series

CIESE sponsors and designs interdisciplinary projects that teachers throughout the world can use to enhance their curriculum through unique and compelling use of the Internet. We focus on projects that utilize real time data available from the Internet, and telecollaborative projects that utilize the Internet's potential to reach peers and experts around the world.

● Multidisciplinary Projects in Science and Literacy: Internet-Based Lessons Using Telecollaboration and Real-Time Data

Science Topics: **Life Science, Earth Science and Environmental Science**
NJCCC Science Standards: **5.1, 5.5, 5.8, 5.10**

Learn about free Internet-based projects that can be used to enhance the K-5 science curriculum. Explore CIESE sponsored and designed interdisciplinary projects such as *Square of Life* and *Bucket Buddies*. In addition, other projects and resources will be recommended. All CIESE

projects are standards based and have a language arts/literacy component, including suggestions for using children's literature to introduce or reinforce science concepts.

Date	Grade Level	Fee	Location	Time
11/29/07	K-5	$25	Stevens	9:00 a.m. – 3:00 p.m.

Middle School Teacher Workshops (Grades 6-8)

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A World In Motion (AWIM) Series

A World In Motion, developed by the Society of Automotive Engineers Foundation, brings math and science principles to life for middle school students through highly interactive and innovative learning experiences that incorporate the laws of physics, motion, flight, and electronics. Each of the AWIM Challenges is designed around current math, science, and technology standards. Teacher Guides will be given out to all participants.

● AWIM Physical Science I- Designing Toys

Science Topics: **Forces, friction, gears and simple machines**
Math Topics: **Fractions, proportions and ratios**
NJCCC Science & Math Standards: **5.1, 5.3AD, 5.4, 5.7A, 4.1AB, 4.3C, 4.5ABC**

This workshop engages students in problem-solving activities for which they must design, build and test a toy based on a request from a toy company. Attendees qualify for one free classroom set of materials. Participants will engage in a hands-on exploration of an engineering design experience that will challenge students to:

- Apply their understanding of science concepts such as forces, friction, gears and simple machines
- Practice their understanding of math concepts such as fractions, proportions and ratios
- Design, build and test a prototype toy based on a Request-for-Proposal (RFP)
- Learn team building and problem solving skills

Date	Grade Level	Fee	Location	Time
2/25/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● AWIM Physical Science 2- Designing Gliders, Skimmers & Jet Toys

Science Topics: **Forces, center of gravity and thrust**
Math Topics: **Mean, area, and ratios**
NJCCC Science & Math Standards: **5.1, 5.3AD, 5.4, 5.7A, 4.1AB, 4.3C, 4.4A, 4.5ABC**

This workshop engages participants in 3 problem-solving activities for which they must design, build and test a toy and supplementary materials on a request from a toy company. Attendees qualify for one free classroom set of materials. Participants will engage in a hands-on exploration of an engineering design experience that will challenge students to:

- Apply their understanding of science concepts such as forces, center of gravity and thrust
- Practice their understanding of math concepts such as mean, area and ratios
- Design, build and test a prototype toy glider based on a Request-for-Proposal (RFP)
- Learn team building and problem solving skills

Date	Grade Level	Fee	Location	Time
1/30/08	6-8	$25	Liberty Science Center	9:00 a.m. – 3:00 p.m.

Building Math

Building Math is a modular curriculum for grades 6-8 mathematics studies that integrates math concepts, algebraic reasoning and engineering through an engineering design challenge in a realistic story context. Teacher Guides will be given out to all participants.

● Building Math: Overview

Math Topics: **Numbers and Operations, Measurement, Algebra, Geometry, Data Analysis, Problem Solving, Communication**
NJCCC Math Standards: **4.1AB, 4.2ADE, 4.3AC, 4.4A, 4.5ABC**

Learn about the *Building Math* modular curriculum for grades 6-8 mathematics studies. It integrates math concepts, algebraic reasoning and engineering through an engineering design challenge in a realistic story context.

Date	Grade Level	Fee	Location	Time
10/30/07	6-8	$65	Stevens	9:00 a.m. – 3:00 p.m.

● Building Math: Stranded

Math Topics: **Numbers and Operations, Measurement, Algebra, Geometry, Data Analysis, Problem Solving, Communication**
NJCCC Math Standards: **4.1AB, 4.2ADE, 4.3AC, 4.4A, 4.5ABC**

Participants will take a journey of a lifetime battling to survive on a deserted island after a plane crash. This workshop will cover one of the three design challenges:

- **A Storm is Approaching**: Design a shelter to protect you and your team from a storm.
- **We Need Water**: Design a water collector with enough capacity for you and your team.
- **Balancing Act**: Designing a loading plan that can keep people and objects balancing in a canoe.

Date	Grade Level	Fee	Location	Time
1/28/08	6-8	$65	Stevens	9:00 a.m. – 3:00 p.m.

● Building Math: Everest

Math Topics: **Numbers and Operations, Measurement, Algebra, Data Analysis, Connections, Communication**
NJCCC Math Standards: **4.1AB, 4.2DE, 4.3BC, 4.4A, 4.5CDEF**

Participants will join a project adventure team on the trek of a lifetime, battling extreme climate conditions, as they journey to the top of the world. This workshop will cover one of the three design challenges:

- **Gearing Up:** Design a coat to protect your team from Everest's year-round harsh, frigid weather conditions.
- **Crevasse Crisis:** Design a light-weight bridge to safely cross a dangerous ice crevasse.
- **Sliding Down:** Design an emergency zip-line transportation system to safely and quickly bring your sick teammates down the mountain.

Date	Grade Level	Fee	Location	Time
2/26/08	6-8	$65	Stevens	9:00 a.m. – 3:00 p.m.

● Building Math: Jungle

Math Topics: **Numbers and Operations, Measurement, Geometry, Algebra, Probability, Data Analysis, Connections, Communication**
NJCCC Math Standards: **4.1AB, 4.2ADE, 4.3ABC, 4.4AB, 4.5BCE**

Participants will join a community service team on a mission to the Amazon Rainforest to investigate, and hopefully solve, the problems of the indigenous people group known as the Yanomami. This workshop will cover one of the three design challenges:

- **Malaria Meltdown:** Design a medicine carrier that can safely transport malaria medicine while keep it cool in a tropical climate.
- **Mercury Rising:** Design a water filter system to remove mercury from a river.
- **Outbreak:** Design a virus intervention plan to contain the spread of the flu.

Date	Grade Level	Fee	Location	Time
12/14/07	6-8	$65	Stevens	9:00 a.m. – 3:00 p.m.

ProENGINEER Workshops

Pro/ENGINEER Schools Edition software is an engineering computer-aided design (CAD) tool with fully associative capabilities spanning modeling, assemblies, drawings, animations, kinematic analysis and design optimization, renderings and more.

Each teacher trained in ProENGINEER will receive a free perpetual license enabling them to install the software on 300 computers (school and home computers).

● ProENGINEER Introductory Workshop

PTC's Schools Program is developed specifically to introduce middle and high school students to design technology and help them to become better problem solvers, critical thinkers and collaborators. Participants will learn ProENGINEER thorough multimedia tutorials and project-based activities. After completing the 2-day training workshop, PTC will donate 300 licenses of Pro/ENGINEER Schools Edition 3D design software to each teacher.

Date	Grade Level	Fee	Location	Time
10/18/07 & 10/19/07	6-12	$25	Stevens	9:00 a.m. – 3:00 p.m.
11/15/07 & 11/16/07	6-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

Science and Engineering Connections Series

New engineering lessons were designed as companions to CIESE's award-winning science collaborative-based and real time data unique and compelling internet projects.

Each workshop will include an in-depth exploration of a specific Internet-based project in the morning to teach key science concepts and then the afternoon will be dedicated to engineering lessons where the science concepts are then applied though an engineering design challenge.

● Earth Science & Engineering Connections I- Earthquakes

Science Topics: **Earthquakes, Volcanoes, Latitude & longitude, Plate tectonics**
NJCCC Science Standards: **5.1, 5.4BC, 5.8**

Musical Plates: A Study of Earthquakes and Plate Tectonics has four core activities that will teach students how to access and interpret real-time earthquake and volcano data and how to use the information to solve a real-world problem. Participants will engage in a guided exploration of this project and then investigate how to build a structure to withstand liquefaction. They will also design an earthquake resistant structure.

Date	Grade Level	Fee	Location	Time
2/29/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Physical Science & Engineering Connections I- Properties of Water

Science Topics: **Properties of Water, Water Quality**
NJCCC Science Standards: **5.1, 5.4BC, 5.6, 5.8B**

In the ***International Boiling Point Project***, students discover which factor in the experiment (room temperature, elevation, volume of water, or heating device) has the greatest influence on boiling point. After conducting the boiling point experiment, students submit their results to a world-wide online database. Then, students analyze all of the data to reach an answer to the question: What causes a pot of water to boil? Participants in this workshop will participate in a hands-on exploration of this experiment and practice analyzing archived data. In addition, participants will design a mechanism to collect the steam from boiling "polluted" water and then let it condense in a new container to create pure, clean water.

Date	Grade Level	Fee	Location	Time
1/11/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Physical Science & Engineering Connections II- Distance, Rate, Time

Science Topics: **Measurements (Time, Distance, and Speed), Longitude, Latitude, and Weather**
NJCCC Science Standards: **5.1, 5.3A, 5.4BC, 5.7A, 5.8BCD**

In this project, ***The Stowaway Adventure***, participants use real time data from the Internet to track a real ship at sea, determine its destination and predict when it will arrive. They monitor the weather conditions at sea and predict when rough weather might impact on the ship's arrival time. In addition, participants will design, construct and test a travel bag for their stowaway adventure.

Date	Grade Level	Fee	Location	Time
4/2/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Physical Science & Engineering Connections III- Wave Propagation

Science Topics: **Weather, Waves**
NJCCC Science Standards: **5.1, 5.4BC, 5.8BCD**

What causes tsunamis? How dangerous is it? How do we find one? Can we predict when and where one will form? Who is most at risk from its effects? What defenses are there against its destructive power? ***Tsunami Surge*** uses real-time data sources from the Internet to help students answer the above questions. It challenges students to think critically and creatively in their efforts to understand, predict, and guard against this powerful force of nature. In addition, students design, construct, and test a simple hand pump to remove water from an area flooded by a Tsunami.

Date	Grade Level	Fee	Location	Time
3/12/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Design Your Own Science & Engineering Lessons

Learn how easy it can be to incorporate engineering lessons into your science class. Bring some of your favorite science lessons and leave the workshop with exciting new engineering lessons.

Date	Grade Level	Fee	Location	Time
1/4/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

Science & Technology Connections Series

CIESE sponsors and designs interdisciplinary projects that teachers throughout the world can use to enhance their curriculum through compelling use of the Internet. We focus on projects that utilize *real time data* available from the Internet, and *telecollaborative projects* that utilize the Internet's potential to reach peers and experts around the world.

● Real World Problems in Earth Science

Science Topics: **Weather, Earth's Motion, Measurement, Earthquakes, Plate Tectonics, Engineering Design**
NJCCC Science Standards: **5.1, 5.3A, 5.4BC, 5.8BCD**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***Weather Scope*** - Study factors that affect weather and climate.
- ***Musical Plates*** **-** Explore the relationship between earthquakes and plate tectonics using real time earthquake data.
- ***The Noonday Project*** - Measure the circumference of the earth using a method that was first used by Eratosthenes over 2000 years ago.

Date	Grade Level	Fee	Location	Time
6/9/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Real World Problems in Life Science

Science Topics: **Genetics, Water Quality, Experimentation and Measurement**
NJCCC Science Standards: **5.1, 5.3BD, 5.4C, 5.5**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***Genetics Project*** - Let's ask a lot of people all over the world which traits they have. Then we can analyze the collected data to see if the dominant trait occurs more frequently than

the recessive trait.

- ***Take a Dip*** - Compare the water quality of your local river, stream, lake or pond with other fresh water sources around the world.
- ***Global Sun Temperature*** – Determine how geographic location affects average daily temperature and hours of sunlight.

Date	Grade Level	Fee	Location	Time
1/10/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Real World Problems in Physical Science

Science Topics: **Properties of Water, Weather, Longitude, Latitude, Measurements (Time, Distance, and Speed)**
NJCCC Science Standards: **5.1, 5.3, 5.4BC, 5.6, 5.7A, 5.8BCD**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***The International Boiling Point Project*** - Discover which factor in the experiment (room temperature, elevation, volume of water, or heating device) has the greatest influence on boiling point.
- ***The Stowaway Adventure*** - Use real time data from the Internet to track a real ship at sea, determine its destination and predict when it will arrive.
- ***The Noonday Project*** - Measure the circumference of the earth using a method that was first used by Eratosthenes over 2000 years ago.

Date	Grade Level	Fee	Location	Time
3/10/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Real World Problems in Environmental Science

Science Topics: **Experimentation and Measurement, Water resources, Air Quality, Pollution**
NJCCC Science Standards: **5.1, 5.3BD, 5.5AB, 5.8, 5.10**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***Down the Drain*** - Collect data on water usage and determine what you might do to use less water.
- ***Air Pollution: What's the Solution?*** - Use data and animated maps from the internet and monitor for the presence of ground level ozone.
- ***Take a Dip: The Water in our Lives*** - Compare the water quality of your local river, stream, lake or pond with other fresh water sources around the world.

Date	Grade Level	Fee	Location	Time
1/16/08	6-8	$25	Stevens	9:00 a.m. – 3:00 p.m.

High School Teacher Workshops (Grades 9-12)

High School Calendar-At-A-Glance		
10/18-19/07	ProENGINEER	p. 22
10/24/07	ETF Designing the Worlds Best Organizer	p. 20
10/26/07	Real World Problems in Chemistry & Physics	p. 25
11/2/07	Real World Problems in Biology	p. 24
11/15-16/07	ProENGINEER	p. 22
12/3/07	ETF Designing a Building of the Future	p. 21
2/4/08	ETF Improve a Patented Toy Boat Design	p. 21
2/29/08	Earth Science & Engineering 1- Earthquakes	p. 22
3/4/08	Real World Problems in Environmental Science	p. 25
5/5/08	Design Your Own Science & Engineering Lessons	p. 23
5/7/08	Chemistry & Engineering- Properties of Water	p. 23
5/12/08	Real World Problems in Earth Science	p. 24
5/15/08	Physics & Engineering- Wave Propagation	p. 23
5/19/08	ETF Power to Innovate	p. 21

Engineering The Future: Designing the World of the 21st Century

Engineering The Future (ETF), developed by the Museum of Science Boston's National Center for Technological Literacy, is a full-year engineering and technology education course designed for students at approximately the 9th grade level. However, it may also be successfully implemented with students in higher grades, depending on their level of experience with engineering and science concepts. The course provides a strong foundation in physics and prepares students to explore the social, historical, and environmental contexts of emerging technologies. Through four projects, students learn about engineering design; manufacturing; cost/benefit analysis; communication and energy systems (fluid, thermal, and electrical). The four projects may be implemented sequentially as in the full-year course or may be implemented as stand-alone units. The course is intended for all students, not solely those pursuing engineering or technical disciplines. Teacher Guide, Engineering Notebook, and Text Book will be given to all participants.

● Design the World's Best Organizer

Science Topics: **Engineering Design Process**
NJCCC Science Standards: **5.4**

Participants learn how to make engineering drawings of their cell phone designs, conduct marketing surveys to find out what kinds of organizers people would like to purchase, construct

models of their organizer concepts, redesign, and build a prototype for testing.

Date	Grade Level	Fee	Location	Time
10/24/07	9-12	$95	Stevens	9:00 a.m. – 3:00 p.m.

● Design a Building of the Future

Science Topics: **Forces, Balance, Energy**
NJCCC Science Standards: **5.1, 5.4, 5.7A**

Participants learn about the "new urbanization" movements in which city planners, architects, and engineers work together to design structures that serve a variety of functions. Tools of science and mathematics are applied to solving such problems as improving the structural integrity and thermal efficiency of the designed structures.

Date	Grade Level	Fee	Location	Time
12/3/07	9-12	$95	Stevens	9:00 a.m. – 3:00 p.m.

● Improve a Patented Toy Boat Design

Science Topics: **Energy Transfer, Behavior of Compressible Gasses and Non-compressible Fluids, Conduction of Thermal Energy**
NJCCC Science Standards: **5.1, 5.4, 5.6A, 5.7**

Participants build a "putt-putt boat" that is powered by a fluid/thermal engine. The design challenge is to apply fundamental concepts of matter and energy to understand how the boat works and then redesign it.

Date	Grade Level	Fee	Location	Time
2/4/08	9-12	$95	Stevens	9:00 a.m. – 3:00 p.m.

● Power to Innovate

Science Topics: **Electricity, Generators, Alternative Energy Sources, Communication Systems**
NJCCC Science Standards: **5.1, 5.4, 5.7**

Participants find out how ammeters and voltmeters work and how to generate an electrical current. The design challenges are to create a scoreboard code, design a mouse detector, a communications system, and a fan control system.

Date	Grade Level	Fee	Location	Time
5/19/08	9-12	$95	Stevens	9:00 a.m. – 3:00 p.m.

ProENGINEER Workshops

Pro/ENGINEER Schools Edition software is an engineering computer-aided design (CAD) tool with fully associative capabilities spanning modeling, assemblies, drawings, animations, kinematic analysis and design optimization, renderings and more.

Each teacher trained in ProENGINEER will receive a free perpetual license enabling them to install the software on 300 computers (school and home computers).

● ProENGINEER Introductory Workshops

PTC's Schools Program is developed specifically to introduce middle and high school students to design technology and help them to become better problem solvers, critical thinkers and collaborators. Participants will learn ProENGINEER thorough multimedia tutorials and project-based activities. After completing the 2-day training workshop, PTC will donate 300 licenses of Pro/ENGINEER Schools Edition 3D design software to each teacher.

Date	Grade Level	Fee	Location	Time
10/18/07 & 10/19/07	6-12	$25	Stevens	9:00 a.m. – 3:00 p.m.
11/15/07 & 11/16/07	6-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

Science and Engineering Connections Series

New engineering lessons were designed as companions to CIESE's award-winning science collaborative-based and real time data unique and compelling internet projects.

Each workshop will include an in-depth exploration of a specific Internet-based project in the morning to teach key science concepts and then the afternoon will be dedicated to engineering lessons where the science concepts are then applied though an engineering design challenge.

● Earth Science and Engineering Connections I- Earthquakes

Science Topics: **Earthquakes, Volcanoes, Latitude & longitude, Plate tectonics**
NJCCC Science Standards: **5.1, 5.4BC, 5.8**

Musical Plates: A Study of Earthquakes and Plate Tectonics has four core activities that will teach students how to access and interpret real-time earthquake and volcano data and how to use the information to solve a real-world problem. Participants will engage in a guided exploration of this project and then investigate how to build a structure to withstand

liquefaction. They will also design an earthquake resistant structure.

Date	Grade Level	Fee	Location	Time
2/29/08	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Chemistry and Engineering Connections- Properties of Water

Science Topics: **Properties of Water, Water Quality**
NJCCC Science Standards: **5.1, 5.4BC, 5.6, 5.8B**

In the ***International Boiling Point Project***, students discover which factor in the experiment (room temperature, elevation, volume of water, or heating device) has the greatest influence on boiling point. After conducting the boiling point experiment, students submit their results to a world-wide online database. Then, students analyze all of the data to reach an answer to the question: What causes a pot of water to boil? Participants in this workshop will participate in a hands-on exploration of this experiment and practice analyzing archived data. In addition, participants will design a mechanism to collect the steam from boiling "polluted" water and then let it condense in a new container to create pure, clean water.

Date	Grade Level	Fee	Location	Time
5/7/08	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Physics & Engineering Connections- Wave Propagation

Science Topics: **Weather, Waves**
NJCCC Science Standards: **5.1, 5.4BC, 5.8BCD**

What causes tsunamis? How dangerous is it? How do we find one? Can we predict when and where one will form? Who is most at risk from its effects? What defenses are there against its destructive power? ***Tsunami Surge*** uses real-time data sources from the Internet to help students answer the above questions. It challenges students to think critically and creatively in their efforts to understand, predict, and guard against this powerful force of nature. In addition, students design, construct, and test a simple hand pump to remove water from an area flooded by a Tsunami.

Date	Grade Level	Fee	Location	Time
5/15/08	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Design Your Own Science & Engineering Lessons

Learn how easy it can be to incorporate engineering lessons into your science class. Bring some

of your favorite science lessons and leave the workshop with exciting new engineering lessons.

Date	Grade Level	Fee	Location	Time
5/5/08	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

Science & Technology Connections Series

CIESE sponsors and designs interdisciplinary projects that teachers throughout the world can use to enhance their curriculum through compelling use of the Internet. We focus on projects that utilize real time data available from the Internet, and telecollaborative projects that utilize the Internet's potential to reach peers and experts around the world.

● Real World Problems in Earth Science

Science Topics: **Earthquakes, Volcanoes, Plate Tectonics, Weather, Earth's Motion, Engineering Design**
NJCCC Science Standards: **5.1, 5.3A, 5.4BC, 5.8BCD**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***Weather Scope*** - Study factors that affect weather and climate.
- ***Musical Plates*** - Explore the relationship between earthquakes and plate tectonics using real time earthquake data.
- ***The Noonday Project*** – Measure the circumference of the earth using a method that was first used by Eratosthenes over 2000 years ago.
- ***Gulf Stream Voyage*** - Investigate ocean current, how it affects the Atlantic Ocean and some of mankind's experiences dealing with it.

Date	Grade Level	Fee	Location	Time
5/12/08	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Real World Problems in Biology

Science Topics: **Genetics, Water Quality, Experimentation and Design**
NJCCC Science Standards: **5.1, 5.3BD, 5.4B, 5.5**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***Human Genetics*** - Let's ask a lot of people all over the world which traits they have. Then we can analyze the collected data to see if the dominant trait occurs more frequently than the recessive trait.

- ***The Global Water Sampling Project*** - Compare the water quality of local rivers, streams, lakes or ponds with other fresh water sources around the world.

Date	Grade Level	Fee	Location	Time
11/2/07	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Real World Problems in Chemistry & Physics

Science Topics: **Properties of Water, Vectors**
NJCCC Science Standards: **5.1, 5.3, 5.4B, 5.6, 5.7A, 5.8BCD**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***The International Boiling Point Project*** - Discover which factor in the experiment (room temperature, elevation, volume of water, or heating device) has the greatest influence on boiling point.
- ***Navigational Vectors*** - Track a real airplane in flight and learn how vectors and trigonometry are used for aviation navigation.

Date	Grade Level	Fee	Location	Time
10/26/07	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

● Real World Problems in Environmental Science

Science Topics: **Water Quality, Air Pollution, Population Growth**
NJCCC Science Standards: **5.1, 5.8B, 5.10**

The real time data and collaborative projects that will be introduced in this workshop include:

- ***The Global Water Sampling Project*** - Compare the water quality of local rivers, streams, lakes or ponds with other fresh water sources around the world.
- ***Air Pollution: What's the Solution?*** - Use data and animated maps from the Internet and monitor for the presence of ground level ozone.
- ***Population Growth*** - Explores the mathematical and environmental aspects of population growth. Use archived census and demographic data as well as up-to-the-minute population estimates from the U.S. Census Bureau to model population growth and study the implications of a changing population.

Date	Grade Level	Fee	Location	Time
3/4/08	9-12	$25	Stevens	9:00 a.m. – 3:00 p.m.

Workshop Registration Form

Name: _____

Preferred E-mail Address: _____

SCHOOL INFORMATION

School Name: _____

School District: _____

School Address: _____

School City/State/Zip: _____

School Phone Number: _____ **School Fax:** _____

HOME INFORMATION

Home Address: _____

Home City/State/Zip: _____

Home Phone Number: _____ **Cellular** *(optional)*: _____

Workshop Date	Workshop Title	Fee
		$
		$
		$
		$
	Total:	$

Payment Method: ☐ Check ☐ Purchase Order

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Rosemary Cully
Stevens Institute of Technology CIESE
Castle Point on Hudson
Hoboken, NJ 07030
Rosemary.Cully@stevens.edu

(201) 216-8061 PHONE | (201) 216-8069 FAX

Once we receive your registration form and payment, we will forward confirmation information including directions and parking information.