



Educators Summit Workshops March 9, 2011

A1: Systems thinking - Linking people and nature through design: Green Architecture & Design Activities for Grades 3-8

Presenter: Polly Carpenter AIA, Program Director, Learning By Design in Massachusetts

Description

Our Built Environment consumes 70% of the United States' energy. If we are to create a sustainable world, it is crucial that the next generation be active participants in shaping it. The Design Process gives students the tools they need to make critical choices about how we build in the future. In this project-based workshop, participants will come to see sustainability through the "lens" of architecture, considering the interconnectivity between buildings, the natural environment, energy resources and people, as well as connecting across the disciplines of Mathematics, Science/Technology, Social Sciences, Language Arts and the Visual Arts.

Using Sustainable Massachusetts buildings as case studies, we will explore Sustainable Design and the Design Process. We will then go through a hands-on design project to create our own sustainable places and spaces. Using the resources and handouts provided educators will be able to create programs at their own sites and classrooms to engage students in sustainable design projects.

Learning Outcomes

- Participants will analyze the relationship of humans and nature through an exploration of sustainable design and through this analysis, recognize that building design is essential to the concept of meeting present needs without compromising the ability of future generations to meet their own needs.
- Through discussion and hands-on activities, participants will demonstrate their understanding of how design can protect and benefit ecosystems, watersheds and wild habitats.
- Participants will demonstrate their understanding of how design conserves energy and resources by creating three dimensional models to test the impact of the sun on passive and solar concepts.
- Participants will be able to apply this knowledge to create content to engage their own students in sustainable design activities.

Type of workshop

Hands-on; Demonstration; Roundtable discussion

Audience

Elementary School Educators; Middle School Educators; Administrators; Environmental Educators



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A2. Green School Solutions for the Northeast

Presenters: Carolyn Sarno, Senior Program Manager, High Performance Buildings & Susy Jones, High Performance Buildings Associative, Northeast Energy Efficiency Partnerships (NEEP)

Description

CHPS and NEEP have provided high performance building resources and technology to schools in the northeast for almost a decade. Resources provided by the two non-profit organizations can help schools achieve energy efficiency and utilities savings, heighten student performance, and improve student, staff and faculty health. Join us as we provide training on how to create the schools that provide these benefits!

The workshop will provide an introduction to both programs, a review of the CHPS Verified program for northeast schools, and an overview of the CHPS prerequisites and credits for each state's criteria. In addition, the workshop will provide examples and lessons learned from recent projects around the country such as Nathan Bishop Middle School, a historic renovation (Rhode Island) and Hampton Bays Middle School (New York).

Participants will learn how CHPS and NEEP resources can assist schools not only in the design, construction and maintenance process, but also how high performance schools benefit the community as a whole.

Learning Outcomes

- Participants will learn about the benefits of safe, healthy, energy-efficient facilities that provide the amenities for a quality education.
- Participants will learn about the assessment tools and resources currently available to schools in Massachusetts, New York, New Hampshire, Rhode Island, Connecticut, Maine and Vermont.
- Through a demonstration of the CHPS Scorecard and through regional studies of recent projects, participants will learn how CHPS and NEEP resources can benefit schools not only in the construction phase, but how the schools can become centers of the community.

Type of workshop

Demonstration; Roundtable discussion

Audience

Administrators; Superintendents and Facility Managers



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A3. Wind Wise

Presenter: Michael Arquin, Director, Kid Wind

Description

The purpose of this workshop is to introduce teachers to the science and engineering behind wind energy and to share ideas and lesson plans on how to teach about wind energy concepts in K-12 classrooms using our new WindWise Curriculum.

This session will cover valuable topics in wind energy science, such as:

- Why teach wind power in K-12 classrooms?
- History of Wind Power
- Modern wind turbines – How do they work?
- Current state of the U.S. Wind Industry
- Key issues facing wind power
- Holding a classroom or regional wind turbine challenge competition
- Hands-on wind energy science activities
 - Variables in wind turbine design
- What standards can be addressed with wind energy lessons?

This session will include a hands-on wind energy experiment time in which teachers will design turbine blades and measure power output of a wind turbine. Variables such as blade shape, blade size, blade pitch (angle), number of blades, and blade material will be explored.

All attendees will leave the workshop with basic materials to build a classroom wind turbine.

The KidWind Project is a team of teachers, engineers and scientists committed to innovative energy education. Our goal is to promote the beauty of wind power through affordable tools and training programs that challenge, engage and inspire students of all ages. Over the past four years we have held over 200 workshops in 37 states training over 4,000 teachers.

Learning Outcomes

- Learn the history of Wind Power and the current issues facing wind power
- Learn how modern wind turbines function
- Explore variables in wind turbine design

Type of workshop

Hands-on

Audience

Middle School Educators; High School Educators



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A4. Imagining Our Future: Mainstreaming Sustainable Energy Education for STEM Students

Presenter: Ken Wells, Teacher, St. Mark's School

Description

Walt Disney coined the term “imagineering” in 1952 to describe the process of envisioning and creating an appealing vision of a fantasy “Tomorrowland” future. Today, society needs to imagineer an appealing sustainable energy future, and it must happen within our current students’ lifetimes.

Learning is most successful and most enjoyable when it engages imagination. Students may be exposed to lots and lots of facts, concepts and words in the classroom, but sometimes they don't internalize or understand new ideas until they can get hands-on experience. Through the first-person experience, they learn to manipulate a new idea and begin to imagine all the things they could do with it. Through this process they begin to understand why complex relationships exist between our first-world lifestyle choices, environmental degradation and global crises.

What is energy? A satisfying elementary definition: "Energy is what you need into order to change anything." As students study more science, they learn a useful, more detailed definition that involves motion, position and arrangement of particles, and engages the concepts of kinetic and potential energies.

Students need to first understand separately what "energy" is, then what "renewable" means, and then what "sustainable" means. Then they can begin to imagine why developing a reasonable appetite for sustainable, renewable energy is the only way civilization will enjoy a long future. Students need to be equipped to know and understand the objective, scientific truth of our global situation. I have great faith that kids will imagineer themselves a better future!

Learning Outcomes

- Learn how to teach Implications of energy choices
- Learn a laboratory exercise that simulates sequential steps of natural water purification
- Learn the process of making biodiesel
- Be informed on ways in which to incorporate the workshop's activities, labs and demonstrations into current scholastic work with students.

Type of workshop

Hands-on; Demonstration

Audience

Elementary School Educators; Middle School Educators; High School Educators; Administrators; Environmental Educators



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B1. Building as a Teaching Tool

Presenter: Indigo Raffel, Education Coordinator, Conservation Consultants Inc.

Description

Twenty percent of America goes to school every day. Too many of these students and teachers attend schools in buildings that are inefficient and where opportunities are missed to reduce operational costs, foster learning and protect student health and the environment. Conservation Consultants Inc has created a green building education program, “Building as a Teaching Tool” (BATT), which will allow the students to make a difference in their schools. Schools are intended to prepare students for the future. Green building and sustainable practices are the future. It is only fitting that schools be provided with a curriculum geared toward sustainability.

Green building is a holistic approach to the built environment. Not only do we look at the physical systems of the building but we also look at the behaviors of the occupants and how the building fits into the greater environment.

Conservation Consultants, Inc. (CCI) has developed an exciting innovative Green Building Education program to share with educators. BATT will expose students to sustainable practices by combining the Green Building and Environmental Education expertise of CCI. BATT will help further develop the critical thinking and leadership skills of the students while they put into practice their newly acquired knowledge base.

Learning Outcomes

- Participants will be able to recognize and define a Green Building.
- Participants will be able to correlate LEED (Leadership in Energy, Environment and Design) to the four natural systems:
 - Earth, Air, Energy (Fire), Water
- Participants will be able to facilitate a primary green building audit in their class room and other
 - sites in their school.
- 4. Participants will be able identify environmentally friendly behavior in a building.

Type of workshop

Hands-on

Audience

Middle School Educators; Environmental Educators



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B2: Building in Nature's Image

Presenter: Kevin Stack, BaDT, Builder in Nature's Image, Northeast Green Building Consulting, LLC

Description

"After 3.8 billion years of research and development, failures are fossils, and what surrounds us is the secret to survival." Janine Benyus.

This presentation describes how Biomimicry and the sciences of Life form an Ecoliteracy for buildings and communities. The focus is on the Biomimicry methodology and case studies in the human-built environment. Kevin will survey varying formulations of “bio-inspired” design, including Biomimicry and Biophilia. Using case studies from his built projects, he will discuss how the Biomimicry methodology translates advanced scientific ecological knowledge and traditional ecological wisdom into Ecological Performance Standards (EPS). Ecological Performance Standards are functional and practical metrics for the design and construction of our homes and communities based on Life’s design/building standards. By setting EPS as the standard for projects to achieve, our homes and communities become functionally regenerative and preserving elements of the Biosphere--by mimicking how the surrounding ecosystem designs and builds. In this way, our homes can sequester more carbon than emitted, manage and purify water as a marsh or northern forest, or create an inherently local deconstruction infrastructure that mimics the ecosystem service of Decomposition.

Learning Outcomes

This session will enable participants to:

- Begin to apply the Biomimicry methodology and educate students about the Biomimicry methodology.
- Develop an understanding of how to apply the Biomimicry methodology to solve human design challenges in the human-built environment.
- Appreciate how Biomimicry “consciously emulates Nature's genius” and reveals “Nature as Mentor, Model, and Measure.”

Type of workshop

Presentation

Audience

Elementary School Educators; Middle School Educators; High School Educators; Administrators; Environmental Educators



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B3 Solar Sense

Presenter: Steve Kurkoski, Master Electrician, Stephen M. Kurkoski Electric & NESEA Educator

Description

Formal and non-formal educators receive an overview of basic concepts around electrical circuits, energy transfer and use of photovoltaic energy. Teachers learn how to use and care for educational mini solar panels along with motors, LEDs and other associated materials. Teachers will have a choice to explore from a variety of hands-on explorations suited to their interest and grade level and background. The station activities reflect a sampling of the types of activities teachers can find on-line in the “The Solar Kit” lessons at SchoolPowerNaturally.org

Examples of activities include:

- 1) Comparing batteries and photovoltaic cells
- 2) Testing for voltage and current, and calculating power
- 3) Exploring how parallel and series circuitry affects output
- 4) Exploring solar cells with a magnifying glass.
- 5) Modeling the path of the sun
- 6) Measuring solar irradiance
- 7) Exploring reflection, transmission and absorption
- 8) Experimenting with variables affecting output from a solar panel
- 9) Calculating Power Max from a solar panel
- 10) Optimizing output from several solar panels.

Learning Outcomes

There are a wide variety of options an individual teacher might pursue within this workshop, and this will determine their learning outcome. Some potential outcomes:

- Compare similarities and differences between solar cells and batteries.
- Explain the relationship of voltage, current and power in a direct current system
- Arrange an electrical circuit in parallel and in series with mini solar panels.
- Test current and voltage output from solar panels under a variety of conditions.
- Calculate Power Max from various solar panels.
- Hypothesize effects of shading, added reflective material or other variables on a solar panel's output.

Type of workshop

Hands-on

Audience

Elementary School Educators; Middle School Educators; High School Educators



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B4: Energy Intelligence: How Do We Get It? How Do We Teach It?

Presenter: Craig F. Stead, PE, CEM, Stead Consulting

Description

What is energy and why is it important to understand energy? How can we become energy intelligent and maximize benefits from energy while minimizing our energy use?

This workshop will explain the principles of energy efficiency and conservation with simple classroom demonstrations. A brief history of energy development will be given. An energy audit of a school will show where energy savings are found using simple energy monitoring instruments.

Learning Objectives

- Gain a deeper understanding on how to teach energy principles
- Learn an overview of energy development in the U.S.
- Learn the overview of how an energy audit is conducted in a school

Type of workshop

Hands-on; Demonstration

Audience

Elementary School Educators; Middle School Educators; High School Educators; Environmental Educators