

From: NESEA K-12 Education Department [agrindrod@nesea.org]
Sent: Thursday, April 08, 2010 9:57 AM
To: agrindrod@nesea.org
Subject: NESEA K-12 Spring 2010 - Solar Energy Education



NORTHEAST SUSTAINABLE ENERGY ASSOCIATION

Inquiry-based, science and engineering education provides students with the tools necessary to assess and make healthy choices for themselves, their families, and their communities. The work of the K-12 Education Department is to provide opportunities that nurture the development of informed and pro-active citizens, infused with a team-spirit approach to face the challenges that lie ahead with dignity and resourcefulness.



NESEA K-12 SPRING 2010 E-NEWS

Spring has marched into our lives and is showering its warming rays upon us. Time to get out those model solar panels and get your students outside exploring the science and applications of solar energy!

Sample Experiment:

PARTS OF A SOLAR PANEL

Relates to [School Power...NaturallySM](#) Solar Kit Lesson #4

Materials: multi-testers (multi-meters); magnifying lens; a 3 V, 1.2A Junior Solar Sprint (JSS) solar panel from Pitsco or Solar World; 1 V 400mA mini-panels; small solar cells (request pieces from a solar installer - visit NESEA.org Sustainable Green Pages for a listing of PV installers near you).

Basic Explanation:

A solar panel and solar cells are examined and the solar panel is mentally “reverse engineered” to gain a deeper understanding of the way it works.

SOLAR PANEL SAFETY: Don’t bend solar panels, and don’t drop them. The cells are like thin pieces of glass. Be careful not to cut yourself on them. If doing experiment indoors with a lamp, keep solar panels at least 10 cm from lamp & don’t leave them unattended or sitting there. Remove them before they feel too hot to the touch. The plastic covering can easily warp, shrink, or melt.

Tasks for students:

___ Using a magnifying lens, carefully examine the cells on both sides and make note of observations.

Upcoming Educator Workshops:

Visit <http://www.nesea.org/k-12/events/> for a full description and to register.

4/15 Wind Wisdom for School Power Naturally, Manhattan, NY, 4:00 - 6:30 pm

4/17 Wind Wisdom for School Power Naturally, Staten Island, NY 1:00 - 4:00 pm

Junior Solar Sprint!

SAVE THE DATE:

Northeast JSS Championship, **Sunday, June 13**

To qualify for participation in the Championship, student teams must be invited by winning at their area or state race.



Contact NESEA if you are interested in volunteering or

One side of cell:

Other side of cell:

Which side do you think should face the light? If you didn't already know the answer, what led you to choose a particular side?

___ Set up your multi-tester. Set the dial on 20V DC. Lay the red lead flat against the most solid area of the white grid of one of the small cells & touch one of the center strips on the top of the blue-black side. Measure other cells if time permits.

Cell #1 _____ V Cell #2 _____ V Cell #3 _____ V

___ Compare the results for the different cells. What did you notice?

___ Move the red banana plug to the top of the three holes on the multi-tester and measure the current: _____ Amps

___ Examine a solar panel under a magnifier. Imagine you are deconstructing the panel. Describe all the parts and details you can, and try to figure out a function and/or explanation for the observed detail.

___ Diagram the inside and outside wiring of the solar cells in a mini panel.

Note where each connection is coming from and where it is going to. Note which lead is + and which is - and how it is attached to the panel.

___ Diagram the cell-to-cell and lead wiring of solar cells in a JSS panel: Note which lead is + and which is - and how it is attached to the panel

___ What do you think accounts for the difference in voltage & current between the JSS & mini panels? Hint: Each cell is 0.5V regardless of size, which you might have discovered in the cell exploration.

cells in each:

JSS- Mini-

Note series connections - bottom of one to top of another:

JSS- Mini-

Note parallel connections

JSS- Mini-

___ What is the difference between a solar cell, a solar panel and a solar array?

Have students complete activity in pairs or small groups and regroup to discuss findings.

A special notice to New York educators:

Solar Sails New York Program

Through a service contract with the New York State Energy Research

exhibiting a renewable energy project at the Northeast Championship.

The JSS Process:

Through hands-on experimentation, students learn how to design, build, and race model solar cars and tackle issues in the engineering process, properties of materials, forces and motion, electricity and magnetism, ratios and geometry. These young engineers deepen their understanding about solar energy, math, physical science and craftsmanship.

Meet your JSS Area & State Event Coordinators

Area Events:

Connecticut

Connecticut State Race
Date: Saturday, June 5
Contact: Jeff Bechard, Slade Middle School
jkbechard@aol.com

Fairfield County Date:

Date: TBA

Contact: Amar Gada
amar_gada@hotmail.com

Delaware

Delaware State Race
Date: Wednesday, May 12
Contact: Suzanne Sebastian,
Delaware Energy Office
suzanne.sebastian@state.de.us

Maine

Maine State Race
Date: Saturday, June 5, 2010
Site: Owls Head Transportation Museum, Rockland, ME
Contact: Peter Zack, Maine Energy Education Program
meep@psouth.net

and Development Authority (NYSERDA), NESEA is offering free workshops: *A Solar Kit for the Classroom*; created for grades 3 -12 with a strong focus at the middle school level; and *Wind Wisdom for School Power...Naturally*, appropriate for grades K-6.

At the workshop teachers and non-formal educators will receive:

- engaging, hands-on science and engineering activities that support New York State Learning Standards and Core Curriculum, addressing specific performance indicators; and
- a free energy education kit and support materials for your classroom, center, or institution.

Take a look at the deluxe solar kit that compliments the Solar Kit lessons:



For more information on the *Solar Sails New York* program and a workshop schedule visit <http://www.nesea.org/k-12/solarsailsnewyork/>

NOW AVAILABLE FOR FREE DOWNLOAD

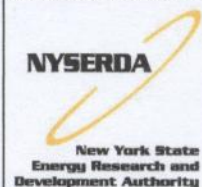
Wind Wisdom for School Power Naturally

Two curricular units: K-4 and 5-6

<http://www.nesea.org/k-12/solarsailsnewyork/>

or at SchoolPowerNaturally.org

The Solar Sails New York program is sponsored by NYSERDA & the *School Power...Naturally* program.



JSS Rules and Regulations Updates

Junior Solar Sprint Rules and Regulations Northeast Championship rules have been updated for 2010, mostly for clarification. Updates arose from feedback of teachers and participants and were discussed among area coordinators at the coordinator conference last November and were carefully considered. Particular attention was given to the compartment and payload rules, which are now addressed separately. A simple way for kids to think about the payload is that it can represent

Massachusetts

Berkshire-Hudson Area

Date: Saturday, June 5

Contact: Cynthia Grippaldi,
Center for Ecological Technology
cynthiag@cetonline.org

Cape and Islands

Date: Saturday, June 5

Contact: Megan Amsler
Cape and Islands Self-Reliance
megan@reliance.org

Eastern Massachusetts

Date: TBA

Contact: Henry Vandermark,
Boston Area Solar Energy
Association,
hkv@solarwave.com

West Central Massachusetts

Date: Saturday, March 5

Contact: MaryAnn Berselli,
Western New England College
mberselli@wnc.edu

New Hampshire

Upper Connecticut River Valley

Date: TBA

Contact: Jen Tate, Thayer School
of Engineering at Dartmouth
College
Jennifer.A.Tate@dartmouth.edu

Keene - Monadnock Area

Date: Wednesday, June 2

Contact: Susie Spikol,
Harris Center for Conservation
spikol@harriscenter.org

New Jersey

Bergen County

Date: Friday, June 4

Contact: Craig Messmer, Teaneck
Community Charter School
solarcar@tccsnj.org

Middlesex County

Date: TBA

Contact: Ed Ronk, Edgar Middle

either a person or cargo. As such, the car should not be required to hold up or hold together any part of the car including the solar panel. The payload (person or cargo) shouldn't be altered in any way (eg crushed or cut up), shouldn't be held in place with a stick (skewered) and should be removable and re-insertable in the same condition at any time. As for the compartment, it is intended to be a 3D structure of the vehicle, remaining the same shape with or without the payload. Get the specific language in the JSS Rules and Regulations document found on our web site.

It is important to note that the rules for the Northeast Championship may be varied at area events, allowing for experimentation and a dynamic program. Please be sure to check with your area coordinator about specifics for each area event. Download your Junior Solar Sprint Rules and Regulations at our web site at www.nesea.org/k-12/juniorsolarsprint

Check out a winning model solar car: This team won First Place in Technical Merit at the 2008 Northeast Championship.



The CECE Experience: "Outside the Box" Exhibits

Have you, your students or someone you know created a renewable energy project that is "outside the box," meaning that it doesn't fit the criteria for a Junior Solar Sprint model solar electric car, and maybe it isn't even a car at all, but would be great to showcase at the Championship? If it is a light, small model vehicle similar to JSS cars, we may be able to offer an exhibition run on the track at lunchtime. Here is a starter list for potential exhibit items:

- Did you make a model solar car where you used a different panel arrangement or soldered your own solar cells to make a panel?
- Do you have an alternative fuel or electric powered model, ride-in or real car, cart or bike or other machinery?
- Did you have a human powered device?
- Have you crafted a wind powered kinetic sculpture or vehicle?
- Have you tinkered around with solar ovens or solar concentrators?

Send a description, a photo and your contact information by May 20, 2010 to sreyes@nesea.org and we will consider including it at the Northeast Championship on June 13.

The Clean Energy for a Clean Environment (CECE) Program empowers youth and educators to explore topics in energy efficiency and

School
eronk@metboe.k12.nj.us

Inter-County Final
Date: Wednesday, June 2
Contact: Cindy Reuther,
TransOptions, Inc.
creuther@transoptions.org

Buffalo Area
Date: Saturday, May 8
Contact: Carl Berger, Buffalo JSS
jssbuffalo@yahoo.com

Southern Finger Lakes
Date: Saturday, May 22
Contact: Bob Walters, DeWitt
Middle School
bwalters@icsd.k12.ny.us

Pennsylvania
Philadelphia Area
Date: Saturday, May 22, 2010
Contact: Joe Bruno, Philadelphia
Solar Energy Association
joegbruno@comcast.net

Rhode Island
Rhode Island State Race
Date: Saturday, June 5
Contact: Elisabeth Bux, Apeiron
Institute for Sustainable Living,
401-397-3430 or
elisabeth@apeiron.org

Vermont
Northern Vermont
Date: TBA
Contact: Mike Thomas, Williston
Central School, Williston, VT
THOMASM@wsdvt.org

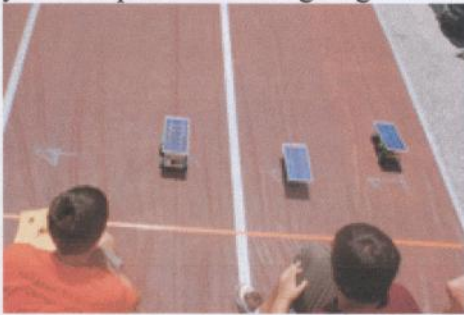
Washington D.C. & Maryland
Date: Friday, May 21
Contact: Charlie Garlow, Electric
Vehicle Association of Greater
Washington, D.C.
Garlow.Charlie@epamail.epa.gov

renewable energy resources. Students explore the science and applications of renewable energy and can earn a Clean Green Power Champion Patch by completing hands-on projects that they then share with their school and/or community. Consider the JSS Northeast Championship as your place to showcase!



What age can participate in area events and the Northeast Championship?

The official Northeast Junior Solar Sprint competition network is for middle school students up to 8th grade or equivalent ages of middle schoolers. There has been some flexibility at different area events for younger students. A guiding rule should be that parents and adults, while they may teach about engineering process; applicable principles of physical science; solar photovoltaics and other components, as well as various crafting techniques and successful features of a well designed car, should not have built any part of the car or told the child how to design their vehicle. At the Championship, teams are expected to handle all aspects of managing their vehicles from problem solving to soldering repairs, without adult hands involved. Within limits of safety, youth should be allowed to experience their own successes and failures with good sportsmanship. That said, kids of all ages benefit from making model solar cars, so teachers are encouraged to build their own programs and classroom and school competitions. We love to hear how your unique events are going and encourage creativity.



[NESEA K-12 is now on Facebook.](#)



Become a fan! Let's start some discussions. What are your interests in renewable energy education? What are your needs? Let's help one another. Share lessons that really work. Post your challenges and accomplishments.



JSS in the northeast is coordinated by NESEA and sponsored by the [U.S. Army Educational Outreach Program](#).



Energy Thinking

Energy—where we get it and how we use it—can be expected to change radically during the lifetimes of our children. Through activities in [this unit](#), students will implement an easy-to-use structure—the Energy Thinker's Diagram—to analyze and evaluate energy use in their lives and propose changes that could reduce unwanted consequences of energy use that students consider important. Students examine the scientific concepts of energy sources, forms, transformations, efficiency, and heat transfer. (Curricular units currently available in MA & PA)

NESEA videos on YouTube

Watch the JSS promos from footage of the 2009 Northeast Championship. [10 min.](#) & [4min](#) The [original video is also available on YouTube](#) or you can purchase a DVD through [NESEA](#).

The NESEA K-12 Education Department offers professional development opportunities and resources for teachers and non-formal educators, and curriculum and programs on energy efficiency and energy conservation, and on forms and applications of renewable energy. NESEA employs best practices in creating grade-specific and age-appropriate curriculum that meet state and federal academic *Learning Standards*.

Contact the K-12 Education Department!


413-774-6051 x 21 or x 27

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