Green Schools News

EmPOWERing Maine Students to Know Their SOURCE

Fall 2005 **Volume 6, Issue 1**

New for Classroom: Teen Driver Car Maintenance 101

MEEP's newest partner, Sarah Cushman. Photo Courtesy Anne Cardale of Women, Work, and Community.

The real cost of driving our cars is often hidden. If you'd like a way to expose the financial and environmental expense of car ownership to an audience of teen drivers, you need to meet our new partner, Sarah Cushman. A Master-Certified auto mechanic and Portland Adult Education automotive instructor, Cushman will be teaming with MEEP to offer several presentation options this year.

"Why didn't I learn this years ago when I first started driving?"

"I've seen far too many young people come into the shop with a car that will be going to the junkyard long before its time. They were never taught the important basics – how to recognize serious warning signs, and how much it actually costs to keep a car on the road," Cushman says. "This turns cars into one more disposable item in our society, at great financial and environmental cost to all of us."

(Continued on page two)

Green Schools Year in Review

Saving money, fostering environmental stewardship, and conducting real life science research: These are all things that dozens of Maine schools have in common. They have stepped up to the challenge and have participated in a MEEP Green Schools activity.

Currently, there are four Green School activities in which a school can participate:

- The Energy Patrol
- The Vending Mi$er Challenge
- Student Energy Audit
- The CFL Fundraiser

The ***Energy Patrol*** is aimed at elementary and middle school students as they become involved in helping their school reduce its electricity use. With approximately 60 percent of a school's electricity bill going toward lighting, classes certainly could use a reminder to turn off the lights. Students simply tour the school during lunch or recess to make sure lights and computer monitors are not left on while not in use.

Classes who do the best job saving electricity are awarded with a week's care of a soft, stuffed polar bear (a visual reminder that climate change is real) until the following week's winner is determined.

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High School Service Learning Project opportunity—Operation Keep ME Warm. Check out "Watts on the Web" on page 6 for more info.

Green Schools News is a Publication of:

Maine Energy Education Program (MEEP) and the

Maine Department of Environmental Protection, Air Bureau (MDEP).

Otisfield's Energy Fashion Expo Struts its Stuff

Natural gas strutting down the runway.

Picture all the glitz and glam, music, and strutting runway models. Mix in a few energy sources such as wind power or natural gas and you have an "Energy Fashion Expo."

Ruth Wilson wanted a way to "energize" her sixth grade class at Otisfield Community School after taking two district MAP assessments. Inspired by author and workshop presenter Barry Lane, Wilson discovered a fun and interactive solution by turning the school's gymnasium into a runway for her energy models (students). With much of the school present, their new knowledge was shared with the audience.

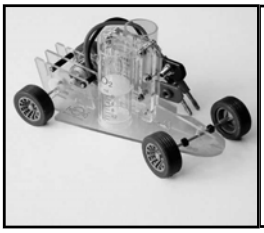
"I knew that the sixth graders knowledge was shared because a third grader wanted to debate coal being called non-renewable…in his mind, it was renewable because things continually die and even though it will take millions of years more, there would be more formed someday," commented Wilson whose fashion show also highlighted solar energy, wind energy, uranium, hydropower, natural gas, petroleum, biomass, and geothermal energy.

The student challenge: First, groups of two to three students picked energy topics from a hat. Students then had to research their topic and create a spiel that incorporated key criteria with voice and puns and their own original costumes, while Wilson provided the appropriate and energizing music for her models.

Imagine a catchy, beat filled tune in the background with a key introduction to the model: "Here we have a flashy, flammable fossil fuel. His name is Nelson Natural Gas…He used to be dull, odorless and colorless! But then he met Marie Mercaptan." This was followed by many facts and details on the energy source.

With such a creative, entertaining, and imaginative follow up to uninspiring assessment tests, both the students in Wilson's class and the rest of the school will not soon forget their energy sources. The fashion show certainly forced attendees to ♪ *Think*♪ about all the energy sources presented and why some may receive a little more ♪ *Respect*♪ than others. Let's hope the use of fossil fuels won't keep us ♪ *Under Pressure*♪ for too long as the world further develops and turns to alternative energy sources that are ♪ *Simply Irresistible*♪ .

"It was something to 'energize' students after facing two district MAP assessments that did little to inspire them."



MEEP is still offering its Hydrogen Fuel Cell and Hybrid Car Activity. Contact us today to schedule your classroom presentation.

Driving Workshop *(continued from page one)*

In her work teaching car maintenance classes through Portland Adult Ed, Cushman offers students a chance to look at everything from basic automotive theory and hands-on familiarity with car parts, to what maintenance their cars actually need and how to budget realistically for car costs. She also covers environmentally-conscious car ownership: the ways cars affect our environment from cradle to grave, how to drive a cleaner car, and ways to consider owning no car, one car, or one less car. Throughout her Adult Ed class experiences she has heard students say over and over, "Why didn't I learn this years ago when I first started driving?"

Great news! MEEP has contracted with Cushman to offer a menu of presentation options free of charge to high school classes, public and private driving schools, church youth groups, and other interested organizations. The presentations can be tailored to fit the needs of any particular group – and high school classroom sessions can be directly tied to specific Maine Learning Results.

"Think about when you were growing up," Cushman comments. "The average family with teen drivers had one or two cars – now you see families with three to four. Car ownership has grown to such an extent that we view it almost as a right, and certainly as a necessity. We aren't always able to take a second, hard look at those assumptions – and at our responsibilities."

For more information or to schedule a presentation for your class, please contact MEEP at 625-7833. Cushman's presentations are funded through a one year grant from the DEP Bureau of Air Quality. The Kids and Transportation Programs of York and Cumberland Counties are collaborating with MEEP and DEP to support this initiative.

Speed vs. "Looks": Gender Issues at the Junior Solar Sprints

When it comes to building and racing model solar cars, guys are into speed, girls are into appearance. OK, that's a gross generalization. Still, in the eleven years that MEEP has coordinated the Junior Solar Sprint model solar car competition for middle schoolers, it's usually the guys ("Hood Rat", "The Flying Flame") duking it out for the title of fastest vehicle. The girls ("The Barbie Mobile", "The Jollie Ollie (Ice Cream) Truck") have often put their energies into works of art on wheels instead.

Final Three race for speed, left to right: Margaux LeBlanc, Neil Pomerleau, and John Harrison.

Last year's (2004) state finals complicated this thinking. S.P.I.R.I.T., a creation of Tiana Turner and Desi Clark from James F. Doughty Middle School in Bangor zipped home ahead of the pack. That result set the stage for the 2005 race on June 4, and what was arguably our most exciting finish to date.

After a wet May, event participants reveled under the blue skies at the Owls Head Transportation Museum. By afternoon the 41 teams, competing in a double elimination format, had been reduced to three: "Velocity", a 6th grade entry from Middle School of the Kennebunks (Margaux LeBlanc, Beth Whitmore and Rachel Magalski); "Solar Speed", a 7th grade creation from Auburn Middle School (Neil Pomerleau, Stephen McDonough and Jeremy Daigle); and "Harleb Rocket", built by two MSK 8th graders (John Harrison and (yikes!) Margaux's brother Cam LeBlanc).

Herein lies a tale related by Margaux's dad. It seems that after her team's first meeting last spring, Margaux came home saying her mates wanted to focus on design. She wanted to build for speed, a heritage, no doubt, from two older brothers who had won state speed titles. "This is going to take all of my skills of persuasion," she forecast. Apparently Margaux was persuasive enough and "Velocity" more than lived up to its name. Still, when the checkered flag dropped for the last time, it was "Harleb Rocket" in First Place, with "Solar Speed" second and "Velocity" third---a terrific finale.

While the crowd focused on the speedsters, the judges routed three First Place medals to Devin Littlefield's "Blue Man" in the categories of Craftsmanship, Technical Merit and Innovation. The Stratton Elementary 7th grader had garnered First Place in Craftsmanship the previous year with "Yellow Man", then had gone on to duplicate that award at the Northeastern Championship in Springfield, MA.

The detail oriented and award winning "The Phish" from MSK

The most popular car (Kids' Choice) was "The Phish" (Chloe Little-Simpson, Katharine Feldman and Katie Fitzpatrick) from MSK. Of the Maine teams---eleven in all---invited to compete in Springfield the next weekend, only "The Phish" came back with an award. A crowd favorite for its engaging artistry (see photo), 'The Phish" won Second Place for Craftsmanship.

MEEP salutes this year's cosponsors of the Sprint, the Maine State Energy Program (Department of Energy funding) and the Maine Department of Environmental Protection, Bureau of Air Quality.

Announcing MEEP's upcoming fall workshops

Call now for more info: 625-7833

Grades 4-8, Energy Education Leadership Workshops:

October 13, Bethel Inn Conference Center, Bethel
October 18, Kingfield Town Hall, Kingfield
October 21, South Berwick Town Hall, South Berwick
October 28, Woodfords Congregational Church, Portland
November 1, Cohen Center, Hallowell
November 4, Penobscot Job Corps Center, Bangor
November 9, Penquis Higher Education Center, Dover-Foxcroft
November 15, Chewonki Foundation, Wiscasset

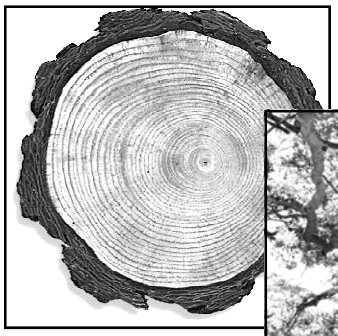
Grades 6-12, Transportation and the Environment Workshops:

November 18: Owls Head Transportation Museum, Owls Head
November 29: Woodfords Congregational Church, Portland

Using "Tree Cookies" to Study Climate Change

Activity compiled courtesy of: "The Wright Center for Science Education"

When trees grow, they add new material around the outside layer. Trees that experience distinct winter and summer seasons, like those in Maine, only grow in the summer season and lie dormant in the winter. As each new growth layer/ring is added, its size is determined by how much growth takes place during the growing season. The amount of growth is dependent on the amount of water the tree receives. Longer or wetter summers produce larger growth rings on trees. The measurement of rings on a tree is an excellent means of determining the amount of growth that took place in any growing season. From that, the length of summer and amount of precipitation (weather) can be interpreted. Any tree, then, can be used to interpret long-term weather or climate. Though some trees generally do not live to be very old (relative to the geological time record), there are trees that live thousands of years and provide longer climate records. Records from young trees, old trees, house and ship timbers and fossil trees can be tied together by identifying sections with the same sequence of climatic events-the records overlap in time where the climatic patterns match up. Through correlating different wood samples, scientists have been able to derive a record of climate change that is 16,000+years long.



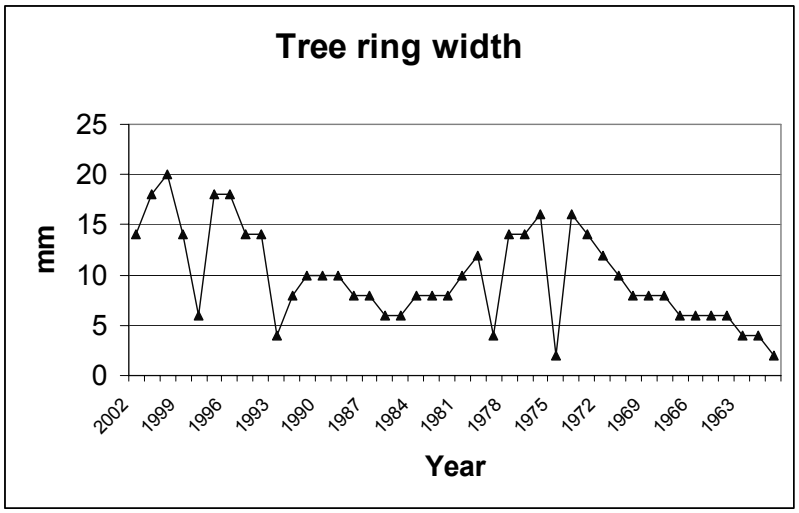
Different tree species are also better indicators of climate change (long term weather) because each species is adapted to specific climatic regions. As climate changes, tree species repopulate different regions. The "migration" of many trees towards the poles and higher elevations has been observed as the Earth's average temperature increases.

In this activity, students will understand how tree rings are indicators of weather, and quantify the size of tree rings and interpret weather and climate change. Students will then use simulated tree cores to replicate how scientists used tree rings to study how climate has changed over time. Check out <*www.sonic.net/bristlecone/dendro.html*> for more background information.

Part A

Procedure:

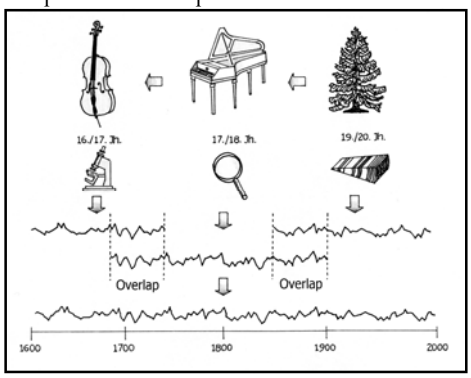
1. Obtain as many "tree cookies", or cross sections of trees as possible. You can call your local forester who will be happy to supply you with cookies. You may also be able to borrow or rent a boring device to take actual samples from living trees. However, boring devices can be sharp and dangerous without proper instruction. DO NOT cut down trees just for this exercise.
2. Divide students into groups and give each group a tree cookie, a small metric ruler, a magnifying lens, paper, and pencil.
3. Using a magnifying lens, observe the tree rings. Are all tree rings uniform and the same color? What could account for the differences in color and width of the rings?



Graphic credits: www.chemsoc.org/networks/learnet/jesei/treering/index.htm

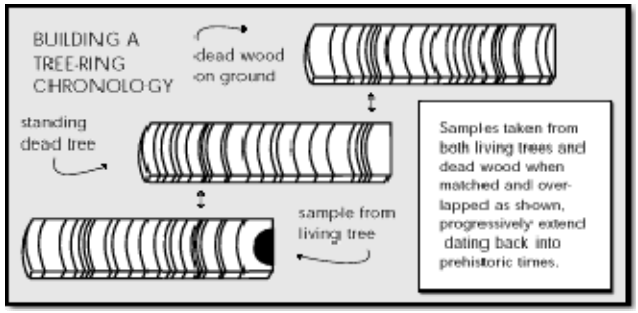
4. Place one corner of one end of a piece of paper at the center of the tree cookie and use the long edge of the paper as a straight edge to the outside of the tree cookie.
5. Starting at the center of the tree cookie, students should count the number of rings to the outside/last layer, marking the location of each ring on the paper.
6. Identify and record the locations of the thickest and thinnest rings.
7. Measure the thickness of each ring (between each of the marks made on the paper).
8. Draw measurements as a bar or line graph (thickness versus year).

Graphic credits: http://www.mdw.ac.at/I105/orpheon/Seiten/education/DendroBeutingText.htm



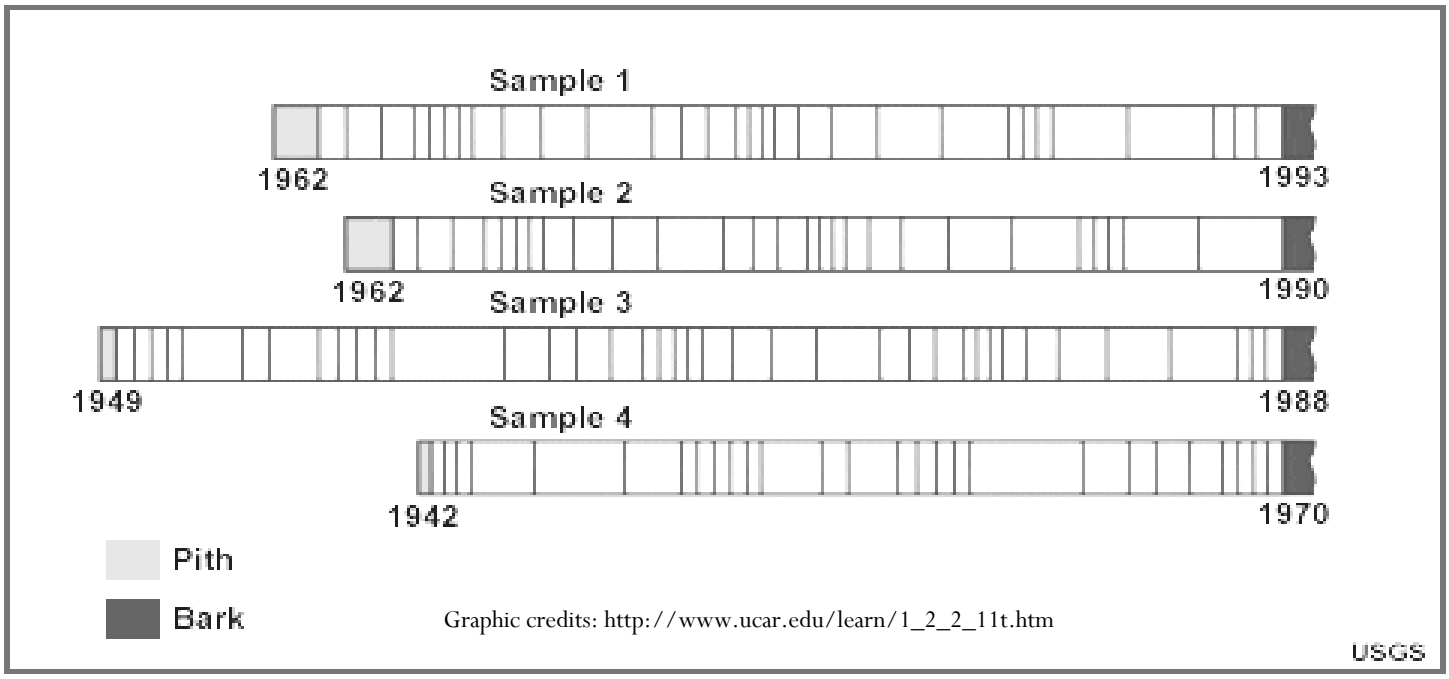
Part B.

Now that students have seen how tree rings can be used to determine yearly weather change, they are ready to sample techniques involved in reconstructing climate history. It is best to use cut outs of the strips below. The second website listed at the bottom of this page also has cuts outs which can be used. It is encouraged not to use real tree cookies unless you know the exact year and locations they were taken.



Graphic credits: http://www.sonic.net/bristlecone/dendro.html

1. Using the sample tree cores below, cut out one set for each group of students, leaving only the year 1993 on sample one.
2. Use the ring patterns to match up the tree samples. When two trees were alive at the same time and in the same geographical area, they experienced the same growing conditions so should show the same pattern of tree rings. Once lined up, tape the three cores together.
3. How much time do the lives of the three trees span together? Label the years on the paper strips as you count the rings.
4. Measure the width of all the tree rings and record them in a table along with their year. Remember, only count the overlapping sections once and draw a graph of the width of the tree versus the year, as in number eight of part A.



Graphic credits: http://www.ucar.edu/learn/1_2_2_11t.htm

Questions

1. What do the graphs of tree-ring width versus time represent?
2. Give a brief and general description of how the climate (and growing conditions) might have changed during the period that your tree samples represent.
3. How could we get climatic information further back in time than tree rings can provide?
4. If carbon dioxide levels are rising, and global warming continues, what difference would you expect to see in the tree rings between modern ones and those laid down over 100 years?

Resources

http://www.tufts.edu/as/wright_center/iecws/materials/dendrochronology.pdf
http://www.chemsoc.org/networks/learnnet/jesei/treering/index.htm

Solar panels on a school in Voorheesville, NY

Maine Schools Can Take Advantage of Solar Rebates

Starting Sept. 17, 2005 certain solar electric, hot water or hot air systems installed by qualified installers, and installed after July 1, 2005, will be eligible for rebates to help reduce system cost. The Public Utilities Commission is developing program details to clarify how consumers, including schools, can take advantage of the rebates. You can view the full text of the program on the PUC's State Energy Program website at *www.maine.gov/msep.* Consumers interested in purchasing systems should read the legislation carefully to ensure the systems they purchase meet all the requirements of the law, and should save all documentation necessary to demonstrate that the system purchased meets established criteria.

"Watts" on the Web?

- *www.volunteermaine.org*
  Here's a great service project. Assist those who most need help staying warm this winter by forming an Operation Keep ME Warm team. Participants will help weatherize 3,000 homes across the state. Go to the Volunteer Maine website and click on the Operation Keep ME Warm logo for more information and to register your team.

- *www.dlese.org*
  The Digital Library For Earth Science Education hosts an immense number of curriculum activities. The library is easy to search by grade level, activity type, and content which is aligned to the national science education standards

- *www.tufts.edu/as/wright_center/iecws/materials.html*
  Here, fine a list of curricula created by teachers as a result of their participation in the Wright Center for Science Education's International Environmental Change Workshop Series (now in its third year.) Check out the centerfold for a sample activity.

Green Schools (continued from page one)

The ***Vending Mi$er Challenge*** is a MEEP activity offered to middle school and high school students to help a school become green. Since vending machines consume a ton of energy, many being on 24 hours a day, seven days a week, this is a great way to save a school money and prevent needless pollution.

What exactly is a Vending Miser and how does the challenge work? MEEP and MDEP ask students to measure the amount of electricity used by their vending machine for three days without the Vending Miser and then three days with the Vending Miser. The device simply cycles down the compressor when no one is present near the vending machine. What is usually discovered is a savings of around 50 percent with the Vending Miser.

Helen Hurgin's seventh grade class at Windham Middle School determined an energy savings of about $175 per year, per machine. Students are encouraged to present their findings to folks in administration or facilities in hopes they will see the sense in purchasing this energy saving technology. MEEP donates a Vending Miser to the school if the vending miser challenge results are presented. Marshwood High School in South Berwick purchased seven Vending Misers after students in Jeff Gardner's physics class presented their results to the school board.

A ***Student Energy Audit Workshop*** is available to classes who successfully complete the Vending Miser Challenge. A state energy engineer will mentor students in auditing their building.

MEEP's ***CFL Fundraiser*** takes energy savings into the community. Students sell these energy efficient light bulbs as a fundraiser, thereby encouraging monetary and environmental savings. CFLs are a bit more expensive than conventional incandescent light bulbs; however, they last much longer and use only 30 percent of the electricity compared to their counterparts. Over its life span a CFL can actually save $40 to $50 on an electric bill as well as prevent over 600 pounds of CO_2 from being emitted. Any interested organization can also participate in the CFL fundraiser.

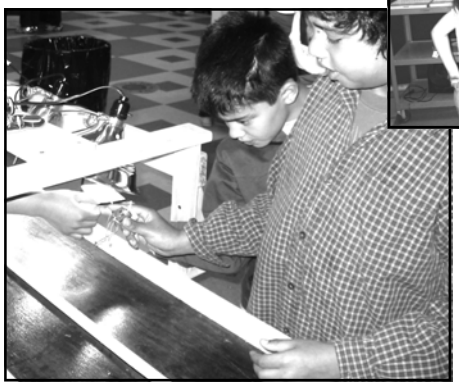
Congratulations to all the schools who participated in the Green Schools project this year. Please feel free to contact MEEP for more information on these programs and to get your school involved in saving money and the environment.

Wow...Science Exhibits at Lincoln Middle School!

"Wow, today I learned…!" Students at Lincoln Middle School in Portland were delighted to hear visitors complete the statement by saying that wind and solar energy can be used to produce energy after passing through their exhibits.

Eighth graders in the Androscoggin House at Lincoln MS worked since November 2004 on interactive museum exhibits designed mainly for kindergarten through fifth grade students. Funded by the Maine Community Foundation, Lincoln Middle School received $3,000 to develop a student created, 11 exhibit **Androscoggin House Museum of Science and Technology**. Each group worked with a community mentor that assisted the students with research and provided guidance during the design and construction of its interactive exhibit.

All exhibits were exceptional with designs that demonstrated electric motors, magnetism, pulleys, and water power as well as MEEP mentored solar energy and wind energy. Along with a physical, hands on demonstration of their energy sources, the groups produced laptop computer slideshows that gave a brief introduction to their energy source. A poster was also produced as part of their display.



Powering race cars with energy from light.

Team Wind group members Macy Brown, Jessica Pinkerton, Amy Currie, and Kara Amabile determined that: "Wind is cheap, reliable, and doesn't pollute." In fact, Maine will soon be receiving energy from the wind as developers have planned a wind farm for the top of Mars Hill Mountain in Aroostook County that will provide electricity to power 24,000 to 25,000 homes in Maine.

Team Wind's exhibit featured a self constructed, five foot tall wind turbine model to attract visitors. They asked attendees to hold and test mini wind turbines with blades of various lengths and shapes to see which blade design would produce the most amount of electricity.

Team Solar's Hongchuan Wang, Angela Balsano, Ashlee Quigley, and Charlie Bellarfoire all agreed: "It was really cool and nerve racking watching everything come together." Featuring a solar race track with powerful incandescent lights (representing the sun) hanging above, students watched solar cars generate electrical energy as they raced to the finish line. The students' exhibit also featured a photovoltaic (PV) or solar cell connected to a fan which would spin when placed under a light. Visiting students' faces lit from excitement watching the fans spin and cars race instantly when placed under the light.

Exhibit attendees learn about wind power.

"It's like magic," replied one student from Longfellow Elementary School regarding the use of a solar panel to cause a fan to spin. What seems like magic is a clean way to produce electricity without the use of pollution causing, nonrenewable resources such as coal. One group member summed up the point of the exhibits perfectly: "We need to use it (solar energy) more, otherwise the fossil fuel supply will be used up."

Available for FREE Loan...

The Climate Change Backpack is full of curriculum ideas, games, and activities for use in the classroom. Upon request, we can even come into your classroom to do a few activities to help teach your students about this important topic. Contact Peter Zack at (207) 287-4855 or Deb Avalone-King at (207) 287-7028 to borrow a backpack or schedule a visit.

The Climate Time Machine Biomonitoring Activity Kit

How do scientists study climate change? In this activity, students jump on the climate time machine and with a hands-on experience, simulate an actual climate change study (using pollen) to track how the climate has changed over the past 20,000 years. New this year, MEEP has several sets for loan. Please contact Deb Avalone-King at (207) 287-7028 to borrow these materials.

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Fall 2005 Issue

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Maine Energy Education Program - Energy Activities in an Ecological Context

Phone: 207.625.7833 Email: meep@psouth.net Web: http://www.meepnews.org

Students challenge their knowledge about energy with MEEP's free curriculum activities. Check inside for great ideas and happenings right here in Maine!

It's not too early to plan *Jeepers Peepers* into your curricula...DEP's Springwatch Project and Earth Day essay contest are a great way to introduce your students to collecting and using ecological data.

For more information, please visit
<www.state.me.us/dep/blwq/doceducation/jeepers/>

The Maine Energy Education Program Thanks Our Generous Sponsors:

Friends of MEEP

This issue of Green Schools News created by Jeremy Dubois
(SERVEMaine Volunteer, Maine DEP Bureau of Air Quality)

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