

2015-16 PROGRAMS

IN-CLASS WORKSHOPS

- Solar & Wind FUNdamentals (K-3)
- Magnetism & Electricity (3)
- Electricity & the Environment (4-12)
- Renewables By Design (4-12)
- Button Up! (4-12)
- Modeling Climate Science (6-8)
- Smart Technology & Climate Change (9-12)

CURRICULA

- Solar & Wind FUNdamentals (K-3)
- PVs Clean and Green (5-12)
- WindWorks (5-12)
- Solar Challenge (6-12)
- Climate Change: Understanding & Engagement (6-8)

GREEN SCHOOL ENERGY CHALLENGE

Green School Energy Challenge is an academics-to-action program for grades 5-12 that bridges science and engineering with social aspects of addressing climate change, saves money for school communities, and empowers youth.



Moretown GSEC students ponder the best ways to save energy.



Eighth-graders at Rivendell Academy test their collectors.

Solar Challenge Heats Up

More schools than ever before took on VEEP's Solar Challenge curriculum this year, a hands-on, cross-disciplinary project where students design and build solar collectors out of cardboard and aluminized or reflective Mylar with the goal of heating water to a boil.

The challenge is a real-world engineering problem in action. There is no one right way to build a collector, and students are challenged to be self-directed, experiment, analyze and learn from mistakes.

The eighth-grade physical science classes at Woodstock Elementary School did the challenge for the first time this spring, led by teachers Ryan Becker and Barbara Drufovka. Becker had taught lessons on heat transfer earlier that year, and was covering light in the spring, and the Solar Challenge brought those pieces together.

"One thing that feels successful is when you can turn students loose and they have direction and purpose, and I'm guiding instead of mandating conformity," Becker says. "When you're self-directed, you can take it in different ways. It's an opportunity to fail at design, and retackle it differently."

VEEP 2014/15

By the Numbers

We reached

120
SCHOOLS

and **8** HOMESCHOOL
GROUPS



We led

438

IN-CLASS
WORKSHOPS

& presentations

with **10,000+**

student and teacher
PARTICIPANTS

reaching all
14 COUNTIES



17 schools
took on the
**WHOLE SCHOOL
ENERGY CHALLENGE**



27 SETS of
6 LESSONS

on solar and wind
energy were taught by
teens to K-3 students
through the TRY for the
Environment program.

◀ continued from cover

Failure, in fact, can still mean success when it comes to engineering. “Even if [their collector] didn’t work, they could still get a good grade,” says Jess Angell, VEEP’s director of curriculum and education, who led the program with her 11th grade physics class at Lyndon Institute before joining VEEP. “It wasn’t about how effectively it worked, it was about the process you went through, designing and engineering. The learning didn’t stop with ‘We did it and it didn’t work.’”

Becker notes that science is a class where students are most often mixed levels. “A kid taking geometry can be sitting next to a kid several years behind,” he says. “I like that there’s opportunities for extensions for those students who need that extra math, who need that challenge.”

The challenge can go in the other direction, as well. “The kids who were really strong at textbook reading, tests, and memorizing really struggled on the building part,” Angell says. “They couldn’t figure out how to translate that knowledge. The kids who had that hands-on, practical skill, who weren’t so good at the books — they were really good at this.”

Needing many different skill sets to tackle one problem is a key — and very real-world — part of the Solar Challenge. “It crosses into other subjects so easily, like math and language skills,” says VEEP educator Erin Malloy, who has led the challenge or trained teachers to lead it since 2001.

Rich Steckler, who teaches at Rivendell Academy in Orford, NH, learned about the challenge several years ago, got “really jazzed on it,” and has incorporated it into his seventh and eighth grade science classes ever since.



If you’re interested in bringing any of VEEP’s curricula to your students, take a training, where teachers get to practice the hands-on units themselves. VEEP offers custom trainings held onsite at your school with any number of teachers. For more info, call **802-552-8450** or e-mail info@veep.org.

“It’s a wonderful thing for kids from an engineering perspective,” he says.

“It’s an avenue to teach them some other stuff: mirrors, angle of reflection; I integrate math and the Pythagorean theorem.”

Other teachers have used the challenge to bring in calculus problems, talk about social studies and the use of collectors around the world, or work on language skills by having students write reflections on their experience. Culinary arts have even made an appearance: some students have tried to use their collectors to make hot cocoa, cook hot dogs, or pop popcorn and melt butter (with varying degrees of success!).

That kind of experimentation is a testament to the enthusiasm this program generates. “[The students] love the excitement of the challenge itself,” says Steckler, who describes the final outdoor testing day as a “festival environment.”

“You can just see the students come alive in that process of making something,” says Malloy. “When some of them can boil water, it’s an amazing moment of surprise” — a moment that both students and teachers feel proud of.

VEEP offers trainings (see sidebar) and provides kits of all materials needed. Pyranometers are a new tool available this year, allowing students to measure solar radiant intensity and collect and analyze data on a high school quantitative level.

However, sophisticated tools are no substitute for simple exploration and questioning, says Andy Shapiro, VEEP’s director of science and engineering education who co-created the program more than 20 years ago, and that’s a fundamental principle of VEEP’s work.

“Science is not something that’s done in labs with big elaborate machinery,” he says. “It’s people observing what’s around them and making sense of the observations.”

The Solar Challenge “brings the practices of science and engineering to life,” says Angell. “It allows every kid to have an opportunity to learn science in a different way, and an engaging way.”

PROGRAM UPDATES

NEW! Climate change curriculum and workshop for middle school students

VEEP has developed an in-class workshop and curriculum that guide middle-school students to explore and adapt models to gain evidence-based understandings of different aspects of our climate system. Contact VEEP for more information about bringing a workshop to your class or being trained to run the NGSS-aligned curriculum (including borrowing of a kit of all necessary supplies). [Thanks to Acorn Fund and EPA for funding.](#)

NEW! Energy careers workshop for high-school & CTE students

VEEP is developing an in-class workshop on Renewable Energy Careers that will be ready to pilot in fall 2015 and bring to classrooms in spring 2016. This workshop will give high school and career and technical education center (CTE) students the opportunity to interact with equipment and critical thinking challenges relevant to these careers, highlighting the science and skills needed by workers in the field. Contact VEEP if you are interested in piloting or hosting the workshop in your classroom. [Thanks to the J. Warren and Lois McClure Foundation, a supporting organization of the Vermont Community Foundation, for funding.](#)

TRY program receives statewide honor

The Teens Reaching Youth for the Environment (TRY) program received the Governor's Award for Environmental Excellence in June 2015. The program, a partnership between VEEP and UVM Extension's 4-H Teen Leadership program, trains and supports teens in teaching a six-lesson solar and wind energy curriculum to K-3 students. The lessons use engineering design tasks and fun activities to deliver science concepts in a powerful experience for both teens and young students. The program has engaged almost 100 teens and reached more than 900 K-3 students. Contact VEEP if you are interested in forming a teen teaching team. [Thanks to State Farm for funding.](#)

Renewables workshop updated

What can students do with solar electric panels, wind generators, a water turbine and 90 minutes in the classroom? Renewables by Design: An Introduction to Energy Engineering is a hands-on workshop for students in grades 4-12 to explore energy engineering at age-appropriate levels. This redesign of our old Renewables are Ready presentation can be followed up with a VEEP curriculum on solar or wind energy. [Thanks to Green Mountain Power for funding.](#)



Solar cars with VEEP educator Laura MacLachlan get a big thumbs up.

NEW! Infrared and solar tools available

VEEP has two new tools to put in students' hands for the 2015/16 school year. Visual **IR thermometers** are very simple infrared cameras that blend a visual image with a thermal (or heat) image to show areas of thermal differential, helping students learn about thermal energy and heat transfer. VEEP will be using these in several of our programs over the coming year. VEEP also has four **pyranometer** kits for use by high schools, which include a readout and instructions. Pyranometers are a tool used to quantify the intensity of incoming solar energy. High school teachers can request the kits to use with the Solar Challenge or PVs Clean and Green curricula or any activity where measuring solar energy is important. [Thanks to FLUKE Corporation and LI-COR for donating these tools.](#)

NEW! Teacher course on energy literacy, engineering, and NGSS

Starting in 2015/16, VEEP will offer Three Dimensional Learning in Energy Literacy, a 15-hour course (1 graduate credit pending) that integrates energy literacy, engineering design, and the Next Generation Science Standards (NGSS). Shifts in curriculum and instruction will need to happen with the adoption of NGSS, and this program will help teachers create three-dimensional learning opportunities using energy as the core disciplinary idea. The course will be dynamic and responsive to teachers' classroom needs and will include deep exploration of the three dimensions of NGSS, co-teaching of several VEEP in-class energy workshops with VEEP educators, individualized classroom support, and follow-up training on planning and assessing energy lessons/units using the EQUiP Rubric. [Thanks to Efficiency VT for funding.](#)

WindWorks workshop with fifth-grade students at Champlain Elementary School.





Promoting energy literacy
in schools and communities
throughout Vermont: **VEEP.ORG**

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THANK YOU!

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Free workshops for all VT classrooms!

VEEP will bring one free in-class workshop into any class in Vermont that requests one during the 2015/16 school year as long as funding lasts. Additional workshops will cost \$175, or less if we are visiting more than one class at the school that day. Additional grants may be available if needed. More info at veep.org. Thanks to Efficiency Vermont for statewide funding, with additional support in Burlington from Burlington Electric Department and in southern Vermont from VLITE Foundation.



Northfield Middle/High School students explore wind.

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