



BONNEVILLE POWER ADMINISTRATION

Science and Energy Education Grants 2013-14 Final Report



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Executive Summary

BPA Science and Energy Education grants are awarded to schools, non-profit organizations and government agencies to support projects that advance energy education in the Northwest. The program increases student awareness and understanding of how the energy system works, and sparks student interest in science, technology, engineering and math — skills that will be essential for the energy workforce of the future.

Since 2012, BPA has awarded more than \$60,000 in grants to teachers, schools and non-profits to support the bright ideas and energy of local educators. These grants have helped to bring their creative ideas to life for students throughout the Northwest.

ORGANIZATION	PROJECT	AUDIENCE	GRANT
Clackamas County Friends of Extension	Renewable Energy Education Program	Middle school students Clackamas County, Oregon	\$5,000
Springfield School District	The Power of Water: The Water Turbine Project	High school students Springfield, Oregon	\$3,120
Central Klickitat Conservation District	Electric Energy Production and Conservation in the Northwest	Middle and high school students Klickitat County, Washington	\$2,314
Polson Middle School	Sparking Energy Stewardship	Sixth grade students Polson, Montana	\$2,134
Benton Conservation District	Salmon Power!	Middle and elementary school students Benton County, Washington	\$3,700
Martin Sortun Elementary School	Energy and Renewable Energy Exploration via Robotics	Elementary school students Kent, Washington	\$1,400
Yakima Basin Environmental Education Program	The Sockeye Return with Energy and Power	Middle and high school students Yakima and Kittitas Counties, Washington	\$2,500

Clackamas County Friends of Extension

Clackamas County, Oregon

Renewable Energy Education Program



Gardiner Middle School sixth grade students learn about renewable energy sources.

Clackamas County Friends of Extension is a non-profit organization that used BPA grant funds to launch the state's first accredited renewable energy curriculum, developed by OSU Extension Service faculty. The curriculum strengthens STEM (science, technology, engineering and math) education, develops energy literacy, and builds teacher capacity to teach science and engineering.

Instructors trained classroom teachers as they delivered the 13 hour hands-on energy curriculum to classrooms, reaching kids and mentoring teachers at the same time. After one or two years of mentoring, teachers will take over the delivery of the curriculum lessons.

Students learned science inquiry, problem-solving, and critical thinking skills through hands-on experiments and activities around energy, electricity, and conservation. They also learned about different careers in the energy field from guest speakers.

This free Renewable Energy Education Program reached 993 middle school students and 22 teachers from seven Clackamas County school districts.

REPORT PREPARED BY JANET NAGELE
OSU EXTENSION SERVICE

Springfield School District

Springfield, Oregon

The Power of Water: The Water Turbine Project



Gateway High School students test the power of water on their prototype turbine designs.

This project challenged students to assemble and test the power output of a working water turbine.

A team of teachers met throughout the school year to develop a prototype water turbine for students. They tested the design with two classes from Gateway High School. Using information from this pilot program they will modify and develop "The Power of Water" before rolling it out to classrooms in the Springfield School District next year.

On the first day of testing, students achieved electrical output ranging from 6.1 to 20.3 volts. Using this baseline data students could modify their turbine design. During a second day of testing power output improved significantly with some turbines producing over 38 volts of power, demonstrating to the students the potential of putting water to work. The water turbine project was a successful hands-on science activity that maintained student interest and prompted their scientific inquiry into the power of water.

REPORT PREPARED BY STUART PERLMETER
SPRINGFIELD SCHOOL DISTRICT

Central Klickitat Conservation District

Goldendale, Washington

Electric Energy Production and Conservation in the Northwest



Students learned about energy production from dams like the John Day Dam on the Columbia River.

Students learned about electricity and why it's critical to our everyday lives. They learned how it's produced and supplied in the Northwest, particularly in Klickitat County, and why planning and conservation are essential.

Classroom presentations included descriptions of water power from Columbia River dams, local wind farms, a methane gas power plant, and a natural gas generating plant. Students learned how the energy grid collects and distributes electricity from the source to the customer. The presentations concluded with a quiz and take home handout for parents.

Quote from participant:

"The presentation was a great addition to the study of Physical Science at Goldendale High School... Students were able to see what types of jobs are available in the electrical industry and hopefully some will pursue these opportunities for future employment. Students also saw the variety of electrical production in our area, opening their eyes to what's behind the wall socket..."

—Jennifer Holycross, Physical Science Teacher
Goldendale High School

REPORT PREPARED BY KERRY D. BODILY
CENTRAL KLICKITAT CONSERVATION DISTRICT

Polson Middle School

Polson, Montana

Sparking Energy Stewardship



Sixth graders collect data from a model solar energy collector.

Polson Middle School sixth grade students learned about alternative forms of energy and their potential impacts on individuals, industries, and communities.

Students solved energy problems through hands-on investigations with wind power, hydroelectric power, and solar energy. They gained new understanding and insight about using nonrenewable resources over those that are renewable. Students learned that they could make a difference in their individual lives and in their communities.

Sixth graders used engineering design principles to draw conclusions about these alternative energy sources. They learned about the advantages and disadvantages of using renewable resources including habitat impacts, cost, and pollution. By partnering with local engineers and tribal scientists and gathering information from Mission Valley Power Company, students were able to research each of these alternative energy forms.

All the sixth grade students showcased their work at an all school Creativity Showcase event for fifth — eighth grade students, their families and the local community. Students were excited to share their learning with other students, their families and community members.

REPORT PREPARED BY TAMI MORRISON
SIXTH GRADE TEACHER

Benton Conservation District

Kennewick, Washington

Salmon Power!



At the Salmon Summit kids learned about safe fish passage and multiple benefits of dams.

Benton Conservation District used BPA funding to expand its “Salmon in the Classroom” program to help students explore how rivers provide fish habitat and electricity.

A teacher workshop provided educators with a science-based perspective on the historical decline and modern recovery of Columbia River Basin salmon populations.

During classroom presentations to more than 6,000 students, kids brainstormed about how they use electricity and learned their electricity is generated in the Columbia River hydro system. Multimedia and physical model demonstrations showed students the parts of a dam and how hydroelectricity is generated. Students learned five safe routes around dams for both juvenile and adult salmon. Students demonstrated their new knowledge by moving ‘fish’ through a model of a hydroelectric dam.

At the end of the year, students attended Salmon Summit, a two day educational event on the many uses of the river. There students released their classroom-raised salmon into the Columbia River. Many of the salmon were implanted with PIT tags prior to their release. Tag detections were emailed to schools and posted on Facebook so everyone could follow the salmon migration down stream. Almost all of the tag detections occurred at juvenile bypass facilities, reinforcing the message of Salmon Power classroom presentations that described a safe route around dams.

REPORT PREPARED BY RACHEL LITTLE
BENTON CONSERVATION DISTRICT

Martin Sortun Elementary School

Kent, Washington

Energy and Renewable Energy Exploration via Robotics



Students explore their new renewable energy robotics turbines.

Funds were used to purchase energy robotics kits, and to conduct teacher training to use them to engage students in energy transfer, generation, operation of the electric grid and renewable energy concepts.

Initially, students utilized the sets to explore different ways to generate electricity by simulating power plants. The energy robotics kits allowed students to record and analyze graphs of electrical output from their simulated power plants. The energy meters measured volts, watts, amps, and joules while the data logging software created a real-time graph. This allowed students to learn about different ways to measure and observe electricity.

Students also learned about kinesthetic energy, light energy, sound energy, thermal energy, potential energy, and chemical energy.

The program was very successful and is expanding to include an additional 100 students during the 2014–2015 school year. The renewable energy sets proved to be an important facet of our STEM (science, technology, engineering and math) academy development project at Martin Sortun, and will be a central component of a school-wide program.

REPORT PREPARED BY DOUG FERGUSON
CLASSROOM TEACHER

Yakima Basin Environmental Education Program

Yakima, Washington

The Sockeye Return with Energy and Power



Students from East Valley Central School in Yakima, Washington on a field trip to the Cle Elum River.

More than 1,000 students learned basic principles of extirpation, rehabilitation, and coordination through guided field trips and in-class sessions that explored the history of the sockeye salmon in the Yakima Basin.

The program started in the fall, when students were able to see the sockeye spawn above Cle Elum Lake, learn the life history of the salmon, and the significance of their return after 100 years of extirpation. Classes toured the Cle Elum Dam facility, learning the role of hydroelectric power in today's society, and the modifications made to dams to allow for adult migration upstream and juvenile migration downstream. Throughout the winter, classroom sessions investigated alternative forms of energy generation, and compared and contrasted the advantages and disadvantages of the different options. Projects focused on landscape, wildlife, and cultural impacts. Upon completion, students reported their findings to their fellow classmates.

REPORT PREPARED BY TIFFANY BISHOP, EXECUTIVE DIRECTOR
YAKIMA BASIN ENVIRONMENTAL EDUCATION PROGRAM

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