Los Alamos County Department of Public Utilities
Outreach Service Agreement AGR16-033

2017 Calendar Year Report
February 22, 2018

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LOS ALAMOS
Department of Public Utilities
Electric, Gas, Water, and Wastewater Services

PEEC
Pajarito Environmental
Education Center

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Program Summary

In February 2016, Pajarito Environmental Education Center ("PEEC") entered into a contractual agreement with the Los Alamos County Department of Public Utilities ("DPU") to provide educational services to DPU customers about water and energy conservation in Los Alamos County.

This contract continues the work started under a previous contract between DPU and PEEC, carried out between 2012 and 2015.

The period covered by this report is calendar year 2017. During this time, PEEC engaged in outreach efforts through Los Alamos Public Schools ("LAPS") and at public venues, including at the Los Alamos Nature Center, which is operated by PEEC.

This report contains a summary of outreach efforts and results, budget summaries for 2017, and overviews of each of the task orders, including a brief summary of work completed and plans for continuation of each project. A summary of lesson plans is provided. Finally, the report includes a list of teacher contacts, publicity materials and teacher evaluations.

Complete curricula, outfitted trunks, activities, exhibits, giveaways and other materials are stored at the Los Alamos Nature Center and may be viewed there. If you would like to observe a lesson, please contact Siobhan Niklasson at educator@peecnature.org.

Cover photo: Los Alamos High School students pose with DPU employees Matt Duggan and Adam Cooper after a tour of the Abiquiu Lake Hydroelectric Facility. Students went home with a thorough understanding of how hydroelectric power is generated, and how it fits into Los Alamos County's power grid.

Year at a Glance

2017 Outreach Summary

• ***4335 connections*** *made with community members about energy and water conservation through interpretive lessons, workshops and events*

• ***3170 visitors*** *went home with ideas for conserving water in their gardens through our new waterwise gardening exhibit*

• ***2865 student contacts*** *allowed Los Alamos Public School students to engage with water and energy in hands-on lessons*

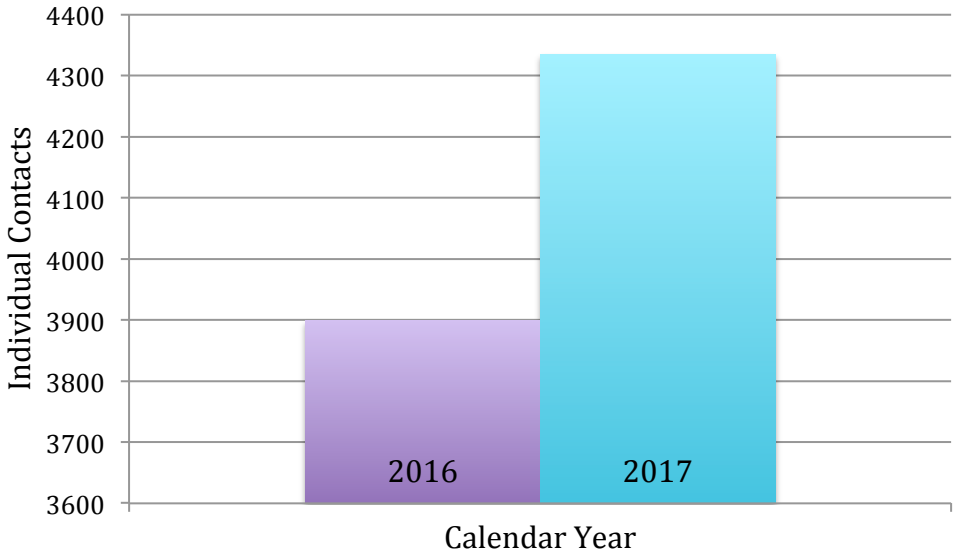
• ***1470 people*** *participated in water and energy conservation activities at the Los Alamos Nature Center, the Los Alamos Science Fest, and other community venues*

• ***287 4th graders*** *took part in interactive demos about water at the 3rd annual Los Alamos Water Festival*

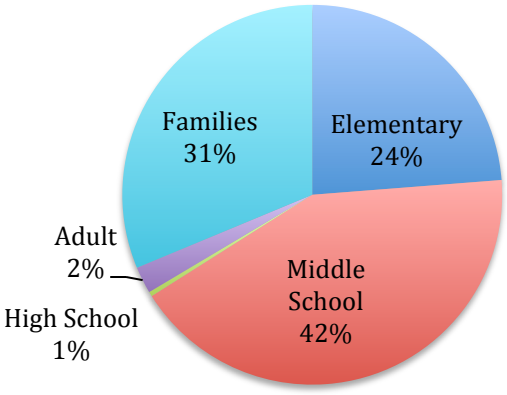
• ***1 new exhibit*** *spotlighting outdoor water conservation was unveiled at the Los Alamos Nature Center*

Above: PEEC staff and students from the Los Alamos High School Eco-Club collaborated to make this sculpture, displayed at PEEC's Earth Day event, showing the number of disposable water bottles used *each second* in the US.

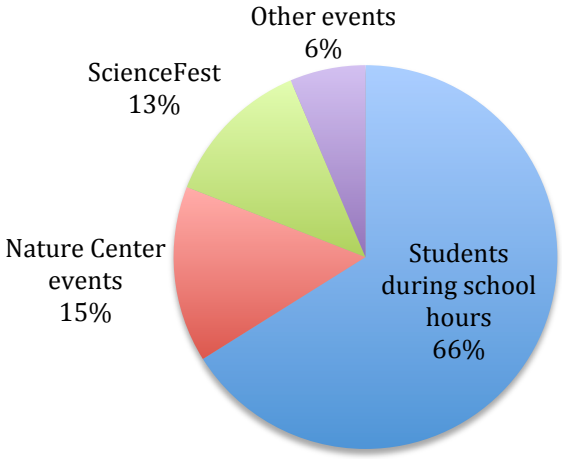
People Reached by Contract Year, Interpretive Lessons & Events



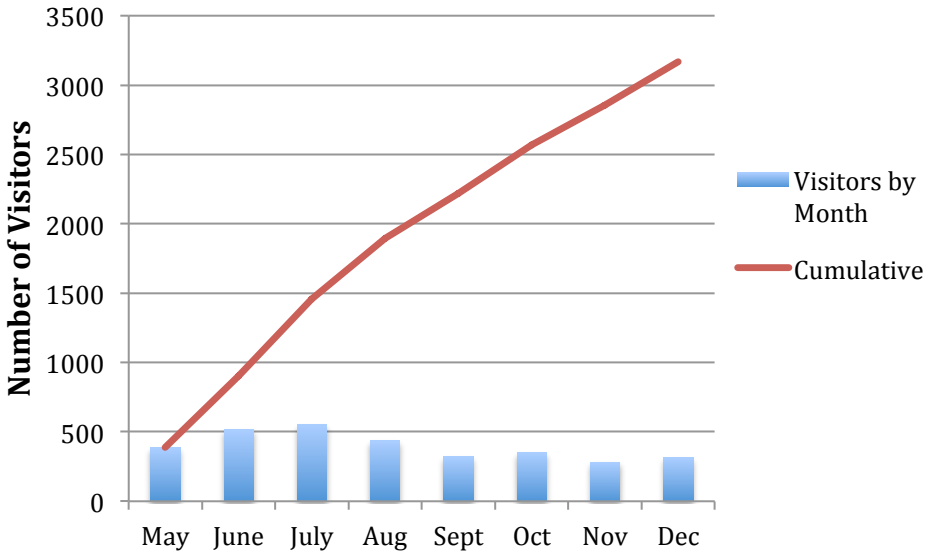
2017 Audience Reached by Age



2017 Outreach by Venue



People Reached May – Dec 2017, Waterwise Gardening Exhibit



Calculated as 25% of nature center visitors since exhibit installation.

Above: DPU's Jack Richardson looks on as PEEC gardeners cut the ribbon on the waterwise gardening exhibit. The exhibit gives home gardeners ways to conserve water in our dry climate. Photo by Thomas Graves.

Above: Students at Piñon Elementary in White Rock explore factors affecting passive solar energy uptake by designing and building model houses.

Right: A Girl Scout from Troop 10074 in Los Alamos teaches a visitor at PEEC's Earth Day celebration how to make a water-conserving olla to take home.

Left: Through hands-on activities at the Los Alamos Science Fest, students discover how water conservation has been a way of life on the Pajarito Plateau from Ancestral Puebloan time through the present. Photo by Bonnie J. Gordon/Los Alamos Daily Post.

Participant Feedback:

"Groups engaged in strategies and discussion while building their houses. This was a very illustrative, hands-on activity that had real-world applications to homes."

– 5th-grade teacher

The fact that there was so much discussion lets us know the kids were really getting a lot out of the lesson. Great thinking involved. You asked many thought-provoking questions for fourth graders.

– 4th-grade teacher

This field trip had something for everyone: from big machinery, to computers, to the river!

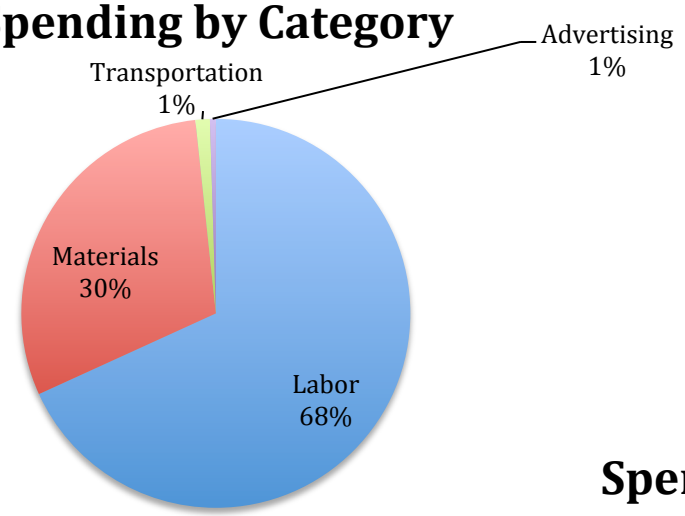
– High school environmental science teacher

Budget Summary

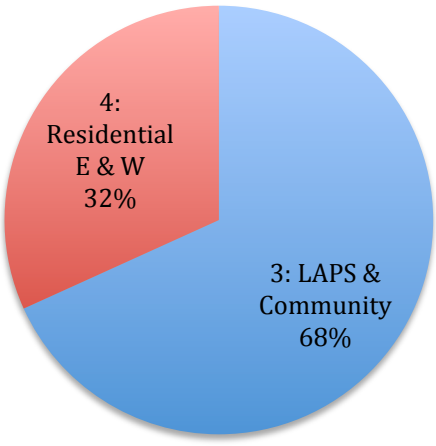
Budget Overview
January – December 2017

Task Order	Visitor Contacts	Hours	Category	Budgeted	Spent
3: LAPS & Community	4091	461.75	Advertising	$500	$197
			Labor	$24,000	$18,653
			Materials	$11,500	$8,132
			Transportation	$2,000	$482
			Total	**$38,000**	**$27,463**
4: Residential E & W	3414	214	Advertising	$1,200	$0
			Labor	$7,200	$8,796
			Materials	$3,600	$3,997
			Transportation	$0	$0
			Total	**$12,000**	**$12,794**
All Task Orders	**7505**	**675.75**	**Total**	**$50,000**	**$40,257**

Spending by Category



Spending by Task Order



Invoice Summary
January – December 2017

Month	Student/Visitor Contacts*	Hours	Amount
January	267	89.75	$4,194.21
February	1327	118.25	$5,048.50
March	100	78.75	$8,461.21
April	884	92.75	$5,183.54
May	412	6.25	$2,362.88
June	517	4.50	$235.40
July	1153	37.50	$1,603.98
August	437	27.50	$1,183.00
September	432	57.00	$2,740.36
October	785	54.00	$2,296.94
November	582	49.25	$2,231.73
December	609	60.25	$4,715.21
2017 TOTAL	**7505**	**675.75**	**$40,256.96**

* Includes waterwise gardening exhibit visitors, calculated as a percentage of nature center visitors during the months of May to December, 2017.

2017 Task Order Overviews

Los Alamos County Public Schools and Community Outreach

Task Order 3

Goal:
Educate Los Alamos students about energy and water and the importance of conservation through hands-on instruction in K-12 classrooms and at community events.

Scope:
Modify and implement classroom curricula that include hands-on in-class activities and field trips that meet New Mexico State curriculum and Common Core standards. The instruction should focus on energy and water especially as they relate to Los Alamos County; understanding energy conservation; and/or other topics deemed appropriate by agreement between PEEC and DPU staff. A PEEC representative will present the curricula, on invitation from the classroom teachers, in Los Alamos schools. Organize a water festival for 4th-grade students including water-themed activities and giveaways. Bring energy and water themed exhibits to community events.

Year-End Comments:

1) Accomplishments:
We created a rubric for revising all of our energy and water lessons for grades 3 – 6 and have written four new lessons to date. Our 8th-grade energy unit continues to be one of our most-demanded programs. This year, middle school outreach accounted for nearly two-thirds of our in-class student contacts. We hosted the third annual 4th-grade water festival. The festival featured presenters from around the community, and received soundly positive feedback from participating teachers. We worked with student groups including the Los Alamos High School Eco-Club and the Girl Scouts to bring water-conservation-themed activities and exhibits to community events, including PEEC's Earth Day and Los Alamos Science Fest.

2) Plans for future work:
In the coming year, we plan to complete our revision of lessons for grades 3 – 6, incorporating the new New Mexico STEM Ready science standards as well as social studies standards about resource management. Teachers are excited about the 4th annual water festival, scheduled for April 6 and 13, 2018. We plan to continue bringing energy and water-conservation activities to school science nights and community events.

Los Alamos/White Rock Residential Energy and Water Efficiency Outreach

Task Order 4

Goal:
Educate Los Alamos County residents and homeowners about energy and water conservation at home.

Scope:
Organize a home efficiency expo and home efficiency house tours to demonstrate energy and water efficient solutions to Los Alamos residents and homeowners. Create signage to be displayed at the Los Alamos Nature Center highlighting energy and water conserving features such as photovoltaics, water harvesting and waterwise gardening. Offer four public programs a year about energy and water conservation.

Year-End Comments:

1) Accomplishments:
Our major accomplishment this year was the installation of a new waterwise gardening exhibit outside the Los Alamos Nature Center. The exhibit details ways home gardeners can use native and drought-tolerant plants, as well as soil cover and sensible irrigation methods, to conserve water in their gardens and landscapes. In addition, we organized public events, including a standing-room-only screening of the documentary film *Beyond the Mirage: The Future of Water in the West* and discussion about water in the American West.

2) Plans for future work:
We are excited about a new exhibit, opening soon inside the Los Alamos Nature Center, that will highlight solar energy generation. We are also busy planning an electric vehicle show at the nature center that will coincide with the Los Alamos Science Fest on July 14, featuring electric vehicles of all types and information about Los Alamos County's electric grid and solar projects.

Curriculum Overview

2017 Lesson Summaries

Complete lesson plans are stored at PEEC.
Contact educator@peecnature.org to see them.

Elementary

Grade/Topic	Academic Standards	Lesson Overview
3/Energy	Electricity & Magnetism	Students explore electricity and magnetism, and find out how electromagnetic generators are used to produce our electricity.
3/Water	Weather & Climate	Students learn how specific traits allow plants to survive in our arid climate, and design a garden with plants selected for our climate.
4/Energy	Energy conversion, fuels	Students observe how energy changes form, and role-play the energy transformations in a coal-fired power plant.
4/Water	Human-natural environment interaction	Students demonstrate human impacts on the water cycle through an active game.
5-6/Energy	Science can be used to protect resources	Students discover factors affecting passive solar energy by building and testing a model house.
5-6/Water	Locations of water on Earth	Students build a model aquifer and design and test solutions to extract the water.

Middle School

Grade/Topic	Academic Standards	Lesson Overview
7	Water & carbon cycles	Students do experiments and play games to explore the water and carbon cycles.
8	Energy sources and transformations	Students perform laboratory experiments to discover how energy changes form, and how energy transformations are used to produce electricity.

2017 Teacher Contact List

(some teachers organize lessons for others at their school)

Teacher	School	Email
Allison Washburn	Aspen	al.washburn@laschools.net
Amy Gilbert	Aspen	a.gilbert@laschools.net
Ronda Harmon	Aspen	r.harmon@laschools.net
Tammy Moore	Aspen	t.moore@laschools.net
Andrea Determan	Barranca	a.determan@laschools.net
Angela Lopez	Barranca	an.lopez@laschools.net
Annemarie Brown	Barranca	an.brown@laschools.net
Kareen Reyer	Barranca	k.reyer@laschools.net
Samantha Waidler	Barranca	s.waidler@laschools.net
David Parsons	Chamisa	d.parsons@laschools.net
Mitzi Mann	Chamisa	m.mann@laschools.net
Barbara Musgrave	LAHS	b.musgrave@laschools.net
Katie Tauxe	LAHS	k.tauxe@laschools.net
Angie Chipera	LAMS	a.chipera@laschools.net
Curtis Terrill	LAMS	c.terrill@laschools.net
Eva Abeyta	LAMS	e.abeyta@laschools.net
Lindsey Fullop	LAMS	l.fullop@laschools.net
Megan Rains	LAMS	m.rains@laschools.net
Sarah Blom	LAMS	s.blom@laschools.net
Barbara Kerley	Mountain	b.kerley@laschools.net
Donna Schaefer	Mountain	d.schaefer@laschools.net
Kim Clayton	Mountain	k.clayton@laschools.net
Lorraine Whalen	Mountain	l.whalen@laschools.net
Barbara Kress	Piñon	b.kress@laschools.net
Herb Siegel	Piñon	h.siegel@laschools.net
Kati Steinberg	Piñon	k.steinberg@laschools.net
Kristen Martines	Piñon	k.martines@laschools.net
Whitney Holland	Piñon	w.holland@laschools.net

Water Festival Information

2017 Los Alamos Water Festival

LOS ALAMOS

Department of Public Utilities

Conservation

Additional Support From:

Bandelier National Monument Fire Management
Bradbury Science Museum
Fuller Lodge Art Center
Los Alamos National Laboratory Earth & Environmental Sciences Division
New Mexico Environment Department
New Mexico State University
Pajarito Environmental Education Center
And our wonderful volunteers!

Water Festival Summary

Date: April 7 & 21, 2017
Location: UNM-LA
Time: 9 AM – 2 PM

Description

We hosted Los Alamos 4th-grade students at our third annual Los Alamos Water Festival at UNM-LA. During the day, students participated in several mini-lessons about water presented by community experts, and then created a water-themed art project to help them summarize their learning.

Giveaways (all items with DPU logo)

- String backpacks for all students
- Zippered totes for all teachers
- Water-conservation-themed water bottles for all participants
- Water conservation ruler for all participants
- Color-changing pencil for all participants

Attendance

All 4th-grade classes in the district took part, and our homeschool session was fully booked with a wait list. Altogether, we served 287 students.

Post-Event Comments

- We heard positive feedback about every single one of our presentations.
- Almost all the presenters came back from previous years, and we had more presenters than we needed on both days.
- Students knew about the giveaways from previous years, and were excited to get their own.
- Lunch was a little expensive and could have been better organized, so we will consider another option for next year.
- A few teachers were confused about procedures, so we will make these clearer for next year.
- Teachers prefer the activities that are most hands-on. We will assist presenters with hands-on options for their activities.
- Several teachers told us they thought this water festival was the best one ever.

Community Presenters

Organization	Name	Contact Information	Presentation Title
Bandelier National Monument Fire Management	Hanna Davis	hanna_davis@nps.gov	Precipitation, Humidity and Wildland Fire & Engine 91
Bradbury Science Museum & Fuller Lodge Art Center	Liz Martineau, Gordon McDonough & Ken Nebel	liz4_always@yahoo.com	Watercolor Prints
Department of Public Utilities	Jennifer Baca	jennifer.baca@lacnm.us	Water and Wastewater Cycles
Department of Public Utilities	Clay Moseley	clay.moseley@lacnm.us	Pump Power: How We Move Your Water
Los Alamos National Lab — Earth & Environmental Sciences	Michelle Bourret	bourret@lanl.gov	Exploring Groundwater in NM & Beyond
NM Environment Department	Megan Green	megan.green@state.nm.us	Living Stream
NMSU	Rossana Sallenave	rsallena@ad.nmsu.edu	How Do We Measure Water Quality?
PEEC	Jennifer Macke, Annika Olsen & Sara Fyke	jpmacke@comcast.net	Aquatic Wildlife
PEEC	Denise Matthews	denise@peecnature.org	Fun With Surface Tension
UNM-LA	Jane Clements	janec181@unm.edu	What's in the Water?

Community Events Overview

2017 Public Event Summaries

Date	Title	Description	Attendees
3/11/17	Los Alamos Co+op Anniversary	Participants discover how their food choices affect their water footprint.	100
4/4/17	Water is Life	Screening of the documentary film *Beyond the Mirage: The Future of Water in the West*, followed by a series of four speakers specializing in New Mexico water issues. Refreshments and discussion follow.	86
4/22/17	Earth Day Festival	Girl Scouts from Troop 10074 teach visitors to make water-conserving ollas for their gardens.	500
5/13/17	Ribbon Cutting	Waterwise gardening exhibit ribbon cutting	25
7/10/17	Nature Playtime: Garden Water Conservation	Families learn techniques for conserving water in their home gardens, including mulching soil and using water-conserving plant nannies.	33
7/15/17	Science Fest	Visitors of all ages do hands-on activities to see how people have conserved water on the Pajarito Plateau throughout history.	550
7/25/17	History Adventures: Water	Kids do hands-on activities to see how people have conserved water on the Pajarito Plateau throughout history.	15

Waterwise gardening exhibit ready for unveiling. Photo: Thomas Graves

TALKS AND A FILM AT THE NATURE CENTER

PEEC
Pajarito Environmental Education Center

ELENA GIORGI

Water is Life Discussion and Film

TUESDAY, APRIL 4, 6:30 – 8:30 PM

What water issues are New Mexicans facing now?

Join us for an evening of learning and discussion at the Los Alamos Nature Center. The program will start with a discussion about our rivers and local water issues by four speakers, Jack Richardson, Steve Harris, Jen Pelz, and Norm Gaume, followed by a break with refreshments and a chance to meet the speakers. Afterward, watch the documentary *Beyond the Mirage: The Future of Water in the West*.

More information online at www.peecnature.org/events

This FREE program is sponsored by the Los Alamos County Department of Public Utilities.

LOS ALAMOS
Department of Public Utilities
Electric, Gas, Water, and Wastewater Services

PEEC 2600 Canyon Road, Los Alamos, New Mexico 87544 505.662.0460 www.peecnature.org programs@peecnature.org

Evaluations

Teacher/Parent Evaluation Summary

(original evaluations are stored at PEEC;
contact educator@peecnature.org to see them)

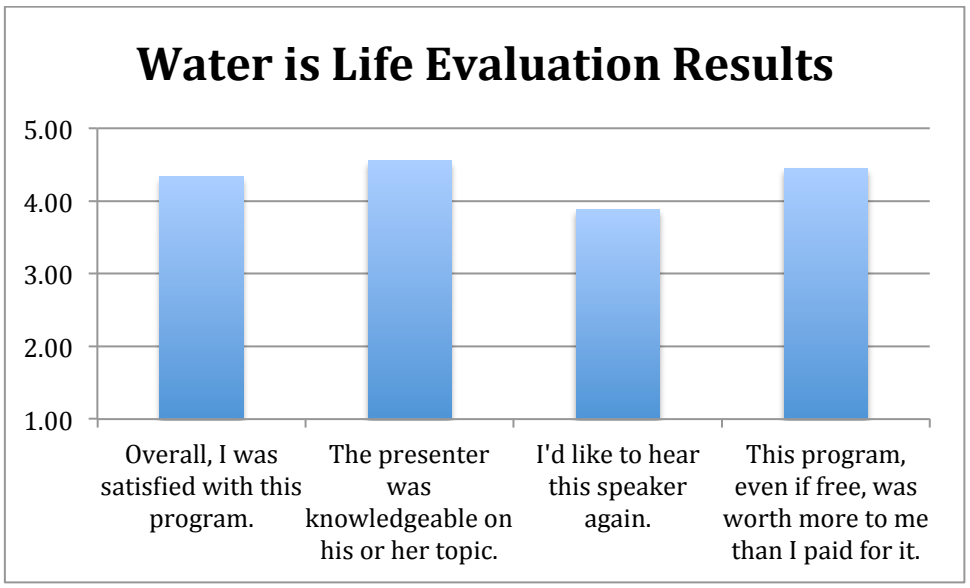
Date	Grade	How satisfied (1-4)	Comments
1/17/17	3	4	My students were engaged and using higher-level thinking skills to ask higher-order questions. They also were making observations, predicting and writing down a hypothesis. The units we cover in 3rd grade: Physical changes, the life cycle, butterflies, weather.
1/18/17	3	3	Overheard: "It might be evaporation…No, there is no water? [Light shown] Ohhh!!! It is like a microwave … Like a house. Power windows." Thank you for all that you do to coordinate with the public schools. It is great for them to have other teachers and approaches.
1/18/17	5	4	Students were engaged in problem solving. They were working cooperatively using their imaginations. Our classroom lesson on groundwater was good preparation for this lesson. Vocab, teacher demo. Kids really enjoyed activity and were very engaged.
1/23/17	5	4	Hands-on problem solving was great, as was building an aquifer. Have kids use clipboards to keep notes out of the "wet."
1/23/17	5	4	Working well in groups, assigned jobs, using vocabulary from last week, realized needed a filter/net, very engaged writing and drawing. Open to all suggestions. Science is not my strength. Awesome job of extending what Pat Roberts taught Friday.
1/30/17	5	4	Really liked all the different designs. Great to have kids explain each group's ideas. Good pictorial reinforcing of ideas.

1/30/17	5	4	My class was especially chatty. Not due to your lesson. They did participate in discussion, very interesting and good discussion of variables. Groups engaged in strategies and discussion while building house. Good discussion of differences. Compare and contrast. Different houses and results. Glad you discussed that it was hard to compare houses. Question of multiple variables. This was a very illustrative, hands-on activity and had real-world applications to homes, etc.
1/30/17	5	4	Vocabulary, insulation, Fahrenheit, Celsius (converting), predictions, note-taking, problem-solving, working together, listening and contributing to group. When can you come back? Glad there was sun. They like going outside.
2/15/17	4	4	The fact that there was much discussion lets us know the kids were really getting a lot out of the lesson. I like the worksheet. Great thinking involved. You asked many thought-provoking questions for 4th graders. They were able to engage in thought processes at grade level. Lesson aligns with Common Core standards as well as NM standards. If time is sufficient, maybe pull in a little about nonrenewable, renewable energy (or maybe this is another lesson). Weather lesson?
4/7/17	4	4	The kids used such advanced vocabulary. They liked seeing the fire crew and equipment and the water pump. They asked such interesting questions.
4/7/17	4	3	Interactive demos seem to work best. Presenters that were more involved kept student attention better.
4/7/17	4	4	I liked the timing and the variety of activities. I felt bad that certain groups missed certain activities.
4/7/17	4	4	I wish I could take my preschoolers to activites like this.
4/7/17	4	4	The kids talked about all the activities and how to save water. The small rooms were kind of stuffy, and you should include a general introduction to conservation.
4/7/17	4	4	I loved seeing the shaving cream art, and the kids liked the salamanders. You should talk more about WHY clean water is so important.

4/7/17	4	4	Students had so much fun. They liked learning about surface tension, and I liked having smaller groups for some of the demonstrations.
4/7/17	4	4	
4/7/17	4	3.5	Students had lots to keep them busy.
4/7/17	4	4	There were a lot of good hands-on activities this year.
4/7/17	4	4	Good presenters and information. ALL PEEC activites and lessons are wonderful.
4/7/17	4	4	This activity was well planned. There should be other relevant activities on pollution, extinction, etc.
4/7/17	4	4	The students enjoyed the sessions, but they were sad they didn't get to do the outside activity with the water since we ran out of time.
4/7/17	4	4	They liked the hands-on stations, but were sad they didn't get to do them all. Water is often overlooked, so I liked this program.
4/21/17	4	4	
4/21/17	4	4	When they were putting together the raindrops, they incorporated what they had learned.
4/21/17	4	4	The students were interested in the salamanders and the microscope. The pump demonstration was very interesting for them. You should tell the kids how much water a family uses per day, month, or year. Then talk about how much they could save with adjustments to their lifestyle.
4/21/17	4	4	The students liked talking about fighting wildfires and the wastewater reclamation facility. The art was fantastic. We just wish we had more time.
4/21/17	4	3.5	The students liked the idea about the wastewater reclamation plant and the hands-on activities. We loved the locality of the field trip, and the everyday information. As a homeschooling parent, I appreciated this trip a lot. We will definitely come back.
4/21/17	3-5	4	We wish there were more events like this, and that they were longer.
4/21/17	Age 10-12	4	Homeschool parents love these kind of age-inclusive events.
4/21/17	4	3	I would love to do a program about local wildlife.

4/21/17	4	4	There was a lot of interest in the microscopes. Splitting the groups worked very well as well. Thank you for providing lunch.
10/24/17	3	4	The students did a good job on the scavenger hunt using science vocabulary on the bingo board and from our lessons. We heard students engaged, pointing out signs of erosion throughout the hike. Great observations and examples. Students also really enjoyed the model of the canyon and aquifer! The bingo board was great but with all the pencils, papers, and clipboards we were constantly losing things; maybe we can have one per group and count the signs of erosion? This would save on paper and time also. Thank you, as always!
10/24/17	3	3	They enjoyed the papers to look at but many said they found them all in 5 min. so to keep them engaged you could maybe have them count how many they can find so they are looking the whole time. The like hearing about the settlers and roads.
10/24/17	3	4	The kids had extra questions about water; it would be great to have a field trip to learn more about the water aspect. Possible field trips about water conservation and waste management.
11/2/17	7	4	Conversations were flowing! Siobhan had students in groups working together and kids were on task talking about how water was evaporating from their tubs. Always great to have Siobhan Niklasson in my class. Great program/supplies/ideas/conversations/ activities and she runs a good tight ship.
12/5/17	11,12	4	"This is cool!" Let them read directions—water work. Good learning experience for students. Something for everyone (machinery, river, outdoors).

Water is Life Evaluation Summary



All categories scored by audience members on a scale of 1 (lowest) to 5 (highest).

Total Attendees: 86