WATER EDUCATION PROGRAM
SCHOOL YEAR 21-22 ANNUAL REPORT

22

Post Oak Savannah Groundwater Conservation District
Water Education Program
Designed and implemented by Tinker LLC

WATER EDUCATION PROGRAM

MESSAGE FROM **TINKER LLC**

Joseph Thrasher

Dear Doug,

We wanted to take a moment to express our gratitude for selecting Tinker to deliver your Water Education Program. We thoroughly enjoyed working with the teachers, students, and parents within the jurisdiction of the District. We truly appreciate your support and would love to continue as your preferred vendor for years to come.

For your reference, enclosed is our school year 2021-2022 report regarding your program. We hope you are pleased with the outcomes.

Thanks again!

Joseph Thrasher

TABLE OF CONTENTS

WATER EDUCATION PROGRAM
EXECUTIVE SUMMARY

School Year 2021-2022

EXECUTIVE SUMMARY

Tinker LLC is pleased to submit this annual report describing the implementation and outcomes of the Water Conservation Education Program. From August 2021 through June 2022, Tinker LLC supported the water conservation education efforts in Milam and Burleson counties through a partnership with Post Oak Savannah Groundwater Conservation District (the District).

The program was developed to educate future rate payers (fourth-grade students) and current rate payers (their teachers and parents) about water through the implementation of a locally based water conservation education program within schools.

Program goals included the following:

- Provide teachers with locally based lesson content that supports Texas Essential Knowledge and Skills (TEKS) education standards and enriches current classroom curriculum
- Educate students about the importance of water
- Encourage families to practice water-saving habits
- Provide families the opportunity to save water and money through a take-home Water Conservation Kit

Tinker LLC developed a curriculum that included locally based lessons, STEM activities, digital program resources, student contests, teacher grants, and a Water Conservation Kit containing water-saving devices for each student. Through the lessons and activities, students learned about water in the community, the importance of water conservation, and how to use water responsibility.

Tinker LLC managed all aspects of the program design and implementation, including school recruitment, lesson development, day-to-day program management, and reporting.

By the Numbers

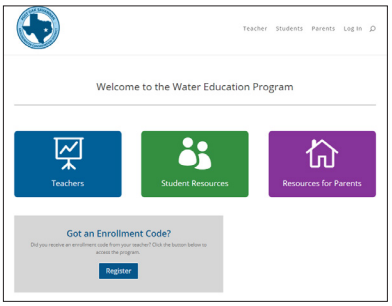
4
schools participated

6
teachers participated

400
students participated

Below are the program outcomes:

1. **Curriculum.** The curriculum included lessons that were designed to support TEKS, featured engaging digital content, and hands-on activities. Each lesson included resources such as video streaming content, online assessments, and more. Participating teachers, students, and parents accessed the curriculum through Tinker's online platform or web application.



Web Application

2. **School Participation.** During the school year 2021-2022, 4 schools, representing 6 teachers and 400 fourth-grade students participated in the program. Each of these students received a Water Conservation Kit and access to digital learning resources.

3. **Knowledge Retention.** Students completed a pre-program assessment prior to beginning to determine baseline knowledge. On the average students correctly answered 58.3% out of ten (10) questions. At the conclusion of the program a post-assessment was administered to determine knowledge gain. On the average students correctly answered 74.5% out of ten (10) questions. A 28% increase!

4. **Water Conservation Kits.** A take-home Water Conservation Kit was provided to 400 fourth-grade students. Each contained products that can be used at home to conserve water. Students work with their parents to use the products and report on their actions. Based on the reported data projected savings can be found below.

Water Conservation Kit

Projected Water Savings

5,470 gallons
Annual Household Savings

2,188,187 gallons
Annual Program-wide Savings

47,495 gallons
Lifetime Household Savings

18,998,001 gallons
Lifetime Program-wide Savings

WATER EDUCATION PROGRAM
DESCRIPTION

School Year 2021-2022

The Water Conservation Education Program education program is a locally based curriculum designed to teach fourth-grade school students about water and how to use it wisely. Offered as a completely turnkey program, Tinker managed all aspects of the program implementation.

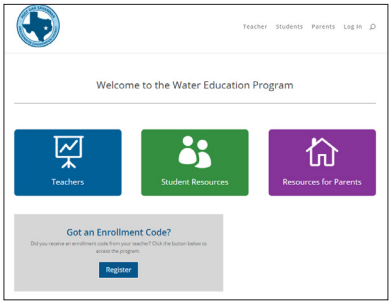
Tinker designed and customized lessons appropriate for fourth-grade students attending schools in Milam and Burleson counties. Next, Tinker contacted fourth-grade teachers using a variety of communication tools to introduce the program and collect enrollment commitments. Participating teachers, students, and parents were then provided access to Tinker's online platform or web application.

Program Delivery

Delivered by classroom teachers, the curriculum fit seamlessly within the current classroom setting. The curriculum included lessons that were designed to support TEKS, featured engaging digital content, and included hands-on activities. Moreover, each lesson included resources such as video streaming content, online assessments, and more.

Using resources from our web application, teachers delivered the curriculum to their students. Students and parents were also provided access to the web application, which included portals designed specifically for each participating segment.

Post Oak Savannah Groundwater Conservation District was provided with its own customized version of the web application that displayed its logo at the top of each page and referenced it throughout the pages.



Web Application

The digital delivery of the program through the web application allowed for:

- **Program Tracking.** All program actions were tracked and recorded in real-time. The data was analyzed and used to inform unique actions by program staff and published within an on-line dashboard. District staff was supplied credentials to access the dashboard and encouraged to follow program progress.
- **Additional Engagement Opportunities.** Other District related programs were promoted within each relevant portal.

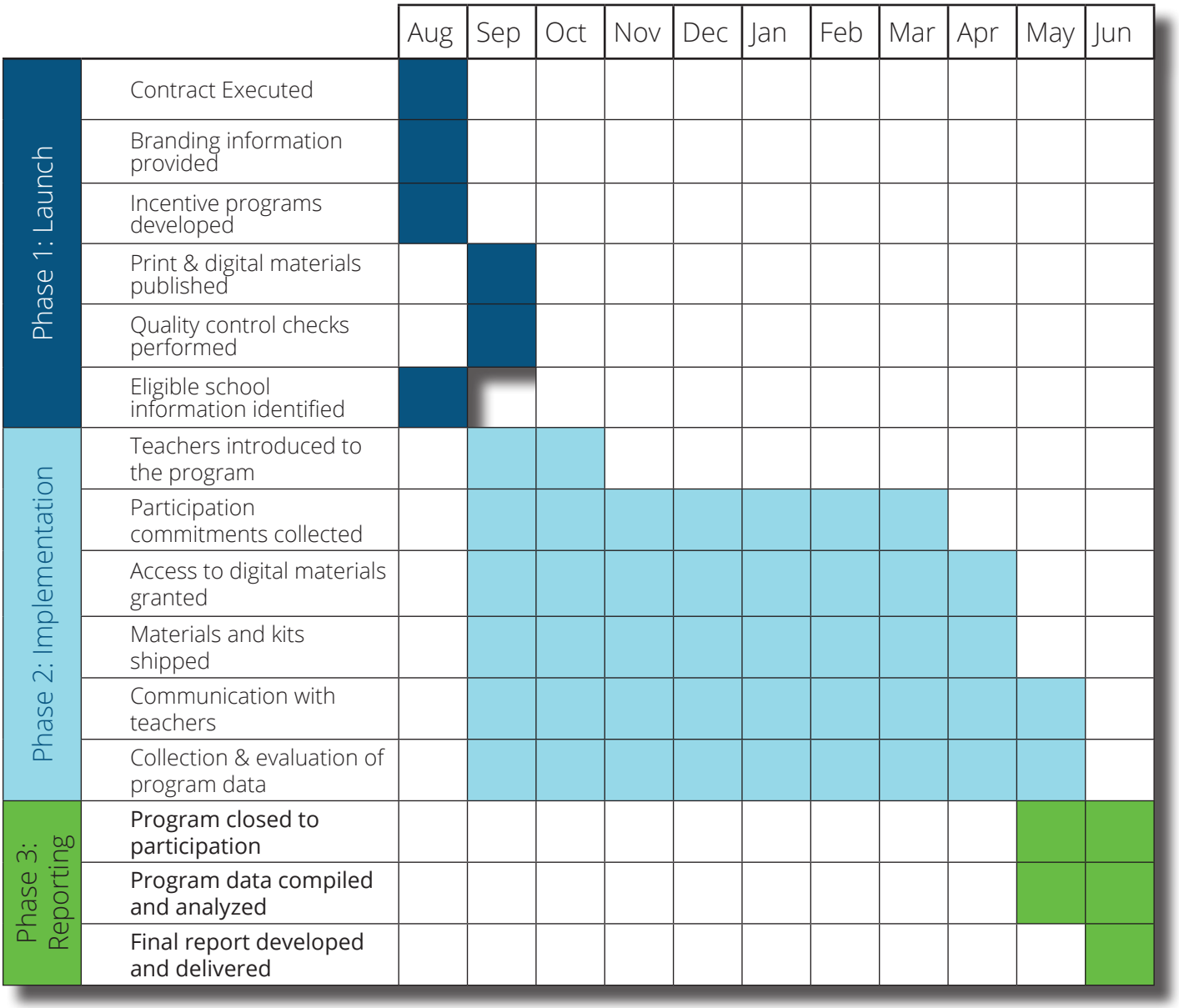
Upon completion of the lessons, students acquired new knowledge of water conservation and each student was provided a Water Conservation Kit containing water-saving devices. During the final lesson, students completed exercises using the devices included in the kit, giving their families an opportunity to immediately and consistently conserve water.

Throughout the program, students completed simple surveys and assessments. This data was collected, analyzed, and summarized to gauge the curriculum's impact on students. At the close of the unit, students and parents completed a pledge to continue to conserve water.

At the end of the school year, all data generated from the lessons and any predefined success metrics were collected to present in this Annual Report.

WATER EDUCATION PROGRAM
TIMELINE

Phase 1: Launch

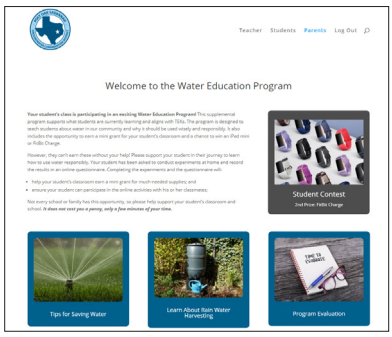


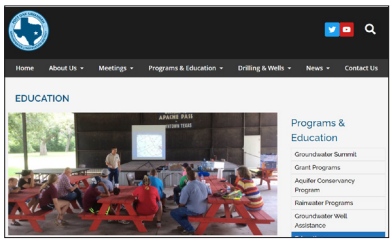
Phase 1: Launch

During the program, teachers, students, and parents were provided with a variety of resources expertly designed to educate them about water conservation and encourage water conservation behaviors via the web application. These resources, including a printed teacher guide, parent letter, and online lesson materials, were customized to feature the district logo.

These resources were designed to facilitate successful instruction, stimulate engagement, and build relationships with the partner cities. The resources provided are described below.

PARENT PROGRAM RESOURCES



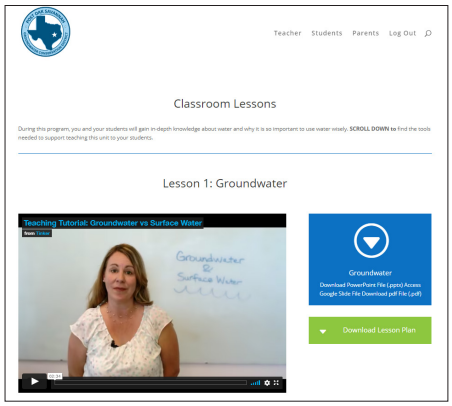


DIGITAL MATERIALS

Parents of participating students are provided access to the parent portal within the web application. Resources available include:

- Parent letter describing the program, the program goals, and the water conservation opportunities available
- Access to additional water conservation resources offered by the District
- Program Evaluation

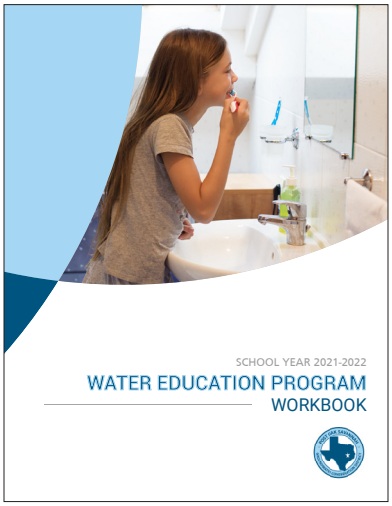
TEACHER PROGRAM RESOURCES



DIGITAL MATERIALS

Teachers are provided access to the teacher portal within the web application. Resources available include:

- Instructions to guide teachers through administration of the program.
- TEKS Education Standards
- Letter to Parents in English and Spanish
- Access to each lesson within the curriculum which contain
  - Lesson plans
  - Classroom presentation resources
  - Online resources
  - Video content
  - Individual Student Activities
  - Assessments
- Post-program Evaluation
- Student progress reporting

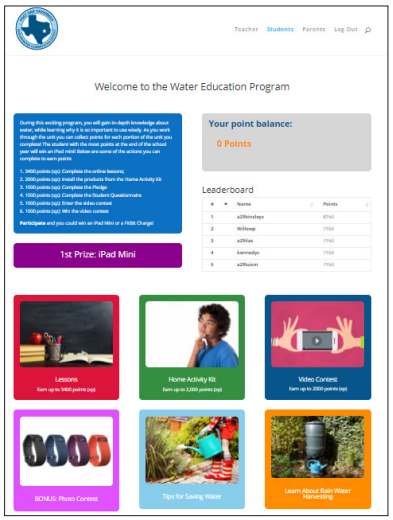


SUPPORTING PHYSICAL MATERIALS

Participating teachers are provided a Teacher Guide to support the digital resources. The Teacher Guide includes:

- Program goals
- Instructions to administer the program
- Unit plan
- Lesson plans
- Contest and mini-grant information
- Answer keys

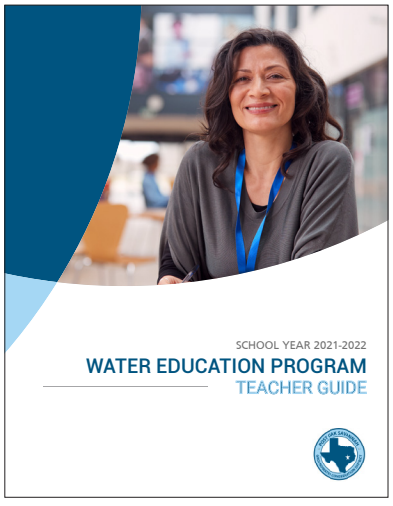
STUDENT PROGRAM RESOURCES



DIGITAL MATERIALS

Students are provided access to the student portal within the web application. Resources available include:

- Instructions guiding participants through the installation of the products inside the kit
- Access to digital lessons and assessments
- Video contest general and entry information
- Student leaderboard



SUPPORTING PHYSICAL MATERIALS

Participating students are provided a student Workbook to support the digital resources. The Student Workbook included:

- Classroom activity worksheets
- Classroom assessments
- Water Conservation Kit product installation guide and data collection forms.

WATER EDUCATION PROGRAM
CONSERVATION KITS

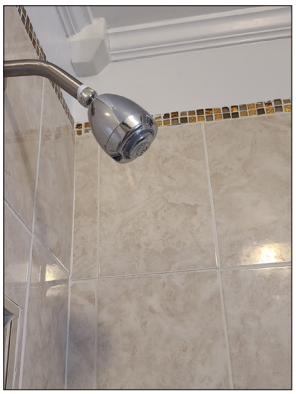
Phase 2: Implementation

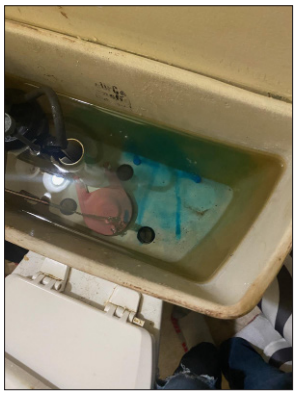
A take-home Water Conservation Kit was provided to 400 fourth-grade students and 6 teachers. Each contained products that can be used at home to conserve water. Students work with their parents to use the products and report on their actions.

Water Conservation Kit

Each kit contained the following items:

- Showerhead
  1.5 GPM / Watersense
- Kitchen Faucet Aerator
  1.5 GPM / Watersense
- Bathroom Faucet Aerator
  1.0 GPM
- Water Flow Rate Bag
- Toilet Leak Detector Tablets
- Outdoor Watering Gauge





WATER EDUCATION PROGRAM
PROGRAM CONTENT

Phase 2: Implementation

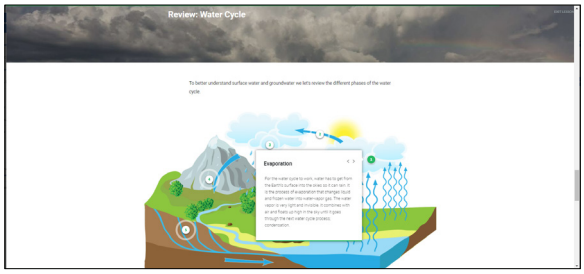
The Water Education Program curriculum was designed to build upon and supplement current classroom science, math, and language arts curriculum.

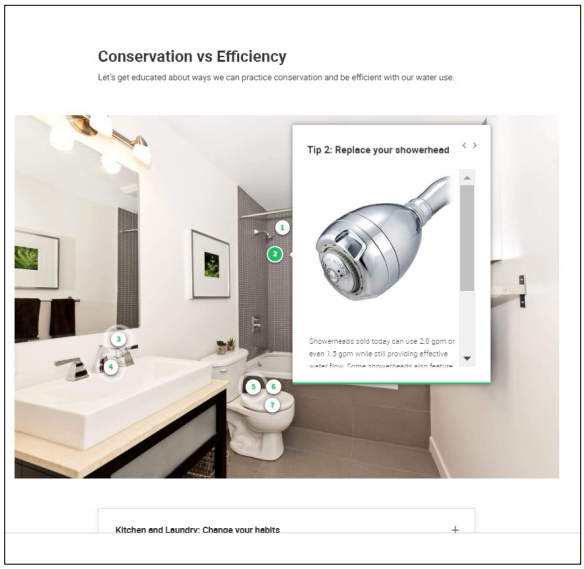
To support educational goals, Tinker worked with district staff to develop lessons specifically for students. Each lesson included locally based information and supported TEKS. Below is the list of lessons we developed:

- Groundwater and Surface Water
- Drought
- Water Energy Nexus
- Non-point Source Pollution
- Efficiency & Conservation
- At Home
- Course Review

To support each lesson, Tinker worked with district staff to include teaching resources, video resources, hands-on activities, and homework exercises in the lessons.

At the conclusion of each classroom lesson, teachers had the option of assigning online homework exercises that reviewed the content taught in the classroom. Tinker worked with district staff to develop each homework exercise. These exercises included locally based video content, interactive activities, labeled graphics, flash card grids, and more. The extensive information in each exercise was designed to be engaging and to maximize the knowledge retention of the student.





Custom Lessons

WATER EDUCATION PROGRAM
STUDENT COMPETITION

Phase 2: Implementation

A fun component of the Water Education Program was the two student competitions; Student Challenge and Video Contest.

Student Challenge

As students progress through the online portion of the program, they earn points for each action completed. Located within the web application is the student leaderboard which allows students to follow their point progress and compete with classmates. Below is a sample of those actions:

Action	Points Earned
Complete the online homework exercises	3,500
Install the products from your kit	2,500
Complete the student questionnaire	2,500
Submit a video contest entry	1,000
Submit a photo contest entry	500
Complete the online pledge	500

Video Contest

As part of the program students were given the opportunity to participate in a video contest. Students can create a short 2 to 3 minute video about water conservation for a chance to win. Videos can be uploaded through the web application.

WATER EDUCATION PROGRAM
PARTICIPATION

Phase 2: Implementation

During the 2021-2022 school year, elementary school teachers at schools served by the District were introduced to the program and asked to participate. Commitments were received from 4 schools representing 400 fourth-grade students and 6 teachers.

School	Teachers	Students	Total
Caldwell Intermediate	1	130	131
Cameron Elementary School	3	105	108
Rockdale Intermediate School	1	120	121
Thorndale Elementary	1	45	46

WATER EDUCATION PROGRAM
STUDENT ASSESSMENTS

Phase 3: Reporting

To determine the effectiveness of the program, we collected pre- and post-program data to assess changes in students' knowledge, attitude, and behavior with respect to water conservation. The outcome is provided below.

PRE-ASSESSMENT

ON THE AVERAGE STUDENTS CORRECTLY ANSWERED 5.83 OUT OF 10 QUESTIONS IN THE BASELINE STUDENT ASSESSMENT **PRIOR** TO BEGINNING THE PROGRAM

National Average: 6.73

POST-ASSESSMENT

ON THE AVERAGE STUDENTS CORRECTLY ANSWERED 7.45 OUT OF 10 QUESTIONS IN THE POST STUDENT ASSESSMENT **AFTER** COMPLETING THE PROGRAM

National Average: 8.22

28%

AFTER PARTICIPATING IN THE PROGRAM, STUDENTS INCREASED THEIR WATER KNOWLEDGE BY CORRECTLY ANSWERING 1.62 MORE QUESTIONS OVER THE BASELINE. THIS IS A 28% INCREASE IN WATER KNOWLEDGE!

National Average: 22%

STUDENT ASSESSMENTS

Phase 3: Reporting

At the conclusion of each lesson, students were ask to complete a lesson assessment. The assessment was designed to measure knowledge growth within the topic as well as the re-enforce the education. The results are used to determine the effectiveness of each lesson. The table below contains the average student score within each lesson assessment.

Lesson	Assessment	National Average
Surface Water	85%	88%
Drought	91%	87%
Water Energy Nexus	89%	86%
Non-Point Source Pollution	86%	91%
Conservation & Efficiency	90%	94%
Course Review	90%	93%

WATER EDUCATION PROGRAM
STUDENT EVALUATIONS

Phase 3: Reporting

At the conclusion of the unit students were asked to complete a post-program evaluation. Responses are found below:

STUDENT PROGRAM EVALUATION

1. Did you enjoy the Program?	
2. Was the on-line content easy to use?	YES: 91%
3. Would you like to see this program continue?	YES: 94%
4. Did you and your family change the way you use water?	YES: 94%

WATER EDUCATION PROGRAM
STUDENT PLEDGES

Phase 3: Reporting

As part of the program students are asked to pledge four different ways they will save water at home. Below is a sampling of the pledges collected:

"I pledge to save water by not flushing random stuff down the toilet."

Caroline C., Student

"I pledge to save water by taking 5 minutes showers."

Avery M., Student

"I pledge to save water by installing all of the products from my kit."

Juan G., Student

"I pledge to save water by turning off the water off while brushing teeth."

Ian A., Student

"I pledge to save water by not running the faucet to bathe my barbies."

Jaylin H., Student

"I pledge to save water by only running the dishwasher when it is full."

Paul J., Student

"I pledge to save water I pledge to save water by checking for leaks."

Clayton N., Student

"I pledge to save water by telling my parents to turn off the irrigation system when it's raining."

Averie E., Student

"I pledge to save water by putting on my new showerhead.."

Lily O., Student

WATER EDUCATION PROGRAM
TEACHER EVALUATIONS

Phase 3: Reporting

At the conclusion of the program, teachers were asked to complete a post-program evaluation. The outcome is below.

TEACHER PROGRAM EVALUATION

1. Overall how satisfied were you with the program:	
2. Did this program support education standards in your grade level?	YES: 100%
3. Was the on-line content and lessons easy to use?	YES: 80%
4. Was the program staff knowledgeable and courteous?	YES: 100%
5. Did the program staff effectively answer all of your questions?	YES: 100%
6. How satisfied were your students with this program?	
7. In your opinion, were parents effectively engaged?	YES: 70%
8. Would you conduct the program again if given the opportunity?	YES: 100%
9. Would you recommend this program to your colleagues?	YES: 100%

WATER EDUCATION PROGRAM
PROJECTED WATER SAVINGS

Phase 3: Reporting

Through the program 400 Water Conservation Kits were distributed to participants. The kits were packed with high efficiency products that when installed help to curb household water usage. Students work with their parents to install the products and report their actions. The outcomes are found below.

Number of Kits: 543

61% of students reported installing the showerhead

37% of students reported installing the kitchen aerator

65% of students reported installing the bathroom aerator

72% of students reported using the toilet leak detector tablets

- 17% of students reported the toilet was leaking
- Of those students with leaky toilets, 45% reported their parents fixed the leak.

63% of students reported using the rain gauge

Using the data collected, we calculated the projected resource savings. Projections are found below:

Projected Water Savings

5,470 gallons
Annual Household Savings

2,188,187 gallons
Annual Program-wide Savings

47,495 gallons
Lifetime Household Savings

18,998,001 gallons
Lifetime Program-wide Savings

WATER EDUCATION PROGRAM
APPENDIX A

Projected Savings

SHOWERHEAD RETROFIT

Projected Savings

Reported Inputs		
Average household size:	4.94	people
Full bathrooms per home:	2.10	bathrooms
Previous showerhead flow rate:	2.81	gallons
Retrofit showerhead flow rate:	1.41	gallons
Percent of homes with electric water heat:	85%	
Percent of homes with natural gas water heat:	15%	
Retrofit showerhead installation rate:	61%	
Participants using kits:	400	students
Assumed Inputs		
Showers per day per person:	0.67	showers[1]
Average length of use:	8.2	minutes[1]
Percent of showerhead water that is heated:	73%	hot water[1]
Temperature of incoming cold water:	55°	[1]
Temperature of outgoing hot water:	120°	[1]
Product life:	10	years[2]
Outcomes		
Projected cumulative annual water savings for all households:	1,611,413.64	gallons[1]
Projected cumulative annual electric savings for all households:	179,978.79	kWh[1]
Projected cumulative lifetime water savings for all households:	16,114,136.41	gallons[1]
Projected cumulative lifetime electric savings for all households:	1,799,787.90	kWh[1]

[1] *(March 2010). EPA WaterSense Specification for Showerheads Supporting Statement*

[2] *Manufacturer*

KITCHEN AERATOR RETROFIT

Projected Savings

Reported Inputs		
Average household size:	4.94	people
Percent of homes with electric water heat:	85%	
Percent of homes with natural gas water heat:	15%	
Retrofit kitchen aerator installation rate:	37%	
Participants using kits:	400	students
Assumed Inputs		
Average length of use:	3.0	minutes per day[1]
Additional length of use for each family member:	0.5	minutes per day[1]
Previous kitchen faucet aerator flow rate:	2.5	G.P.M.[2]
Retrofit kitchen faucet aerator flow rate:	1.5	G.P.M.[3]
Percent of faucet water used in a household is hot water:	70%	[4]
Temperature of incoming cold water:	55°	[4]
Temperature of outgoing hot water:	120°	[4]
Electric hot water heater efficiency:	90%	Efficient[4]
Natural Gas hot water heater efficiency:	60%	Efficient[4]
Product life:	5	years[2]
Outcomes		
Projected cumulative annual water savings for all households:	295,489.40	gallons[4]
Projected cumulative annual electric savings for all households:	31,037.50	kWh[4]
Projected cumulative lifetime water savings for all households:	1,477,447.00	gallons[4]
Projected cumulative lifetime electric savings for all households:	155,187.51	kWh[4]

[1] *Quantec, LLC. (2008). Impact of Flipping the Switch: Evaluating the Effectiveness of Low Income Residential Energy Education Programs. Portland: Drakos, Jamie et al.*

[2] *Vickers, Amy (2002). Water Use and Conservation. Amherst, MA: WaterPlow Press.*

[3] *Manufacturer*

[4] *(October 2007). EPA WaterSense High-Efficiency Lavatory Faucet Specification Supporting Statement*

BATHROOM AERATOR RETROFIT

Projected Savings

Reported Inputs		
Average household size:	4.94	people
Percent of homes with electric water heat:	85%	
Percent of homes with natural gas water heat:	15%	
Retrofit bathroom aerator installation rate:	65%	
Participants using kits:	400	students
Assumed Inputs		
Weighted average daily per capita reduction in water consumption:	0.6	gallons per day[1]
Percent of faucet water used in a household is hot water:	70%	[1]
Temperature of incoming cold water:	55°	[1]
Temperature of outgoing hot water:	120°	[1]
Electric hot water heater efficiency:	90%	Efficient[1]
Natural Gas hot water heater efficiency:	60%	Efficient[1]
Product life:	5	years[2]
Outcomes		
Projected cumulative annual water savings for all households:	281,283.60	gallons[1]
Projected cumulative annual electric savings for all households:	29,545.36	kWh[1]
Projected cumulative lifetime water savings for all households:	1,406,418.00	gallons[1]
Projected cumulative lifetime electric savings for all households:	147,726.79	kWh[1]

[1] *(October 2007). EPA WaterSense High-Efficiency Lavatory Faucet Specification Supporting Statement*

[2] *Manufacturer*