POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT WATERWISE PROGRAM SUMMARY REPORT

2010-2011

SUBMITTED BY:
RESOURCE ACTION PROGRAMS®

Post Oak Savannah Groundwater Conservation District WaterWise Program

Sponsored by:

Program Summary Report 2010 - 2011

Submitted By:

Resource Action Programs®

July 2011

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EXECUTIVE **SUMMARY**

This report summarizes the 2010-2011 Post Oak Savannah Groundwater Conservation District WaterWise Program which was implemented by five-hundred fifty-seven (557) fifth-grade students, teachers, and their families. Funding was provided by Post Oak Savannah Groundwater Conservation District.

The program delivered a proven blend of teacher-designed classroom activities with hands-on home projects to install high-efficiency devices .

The program is a fully implemented, multi-resource efficiency-education program designed to facilitate installation of efficiency measures in homes and build knowledge about water and energy. The design yields a variety of measurable water and energy savings results using the best messengers – students. A proven blend of teacher-designed classroom activities with hands-on home projects to install high-efficiency devices introduces resource-conscious behavior to students and their families. Both educational studies and utility evaluations prove the importance of addressing various learning styles to maximize learning and the adoption of new behaviors. A critical element of this approach is the actual use of the new knowledge through reporting.

> *"I really think there needs to be more projects like this one. It's more of an opportunity for a dad and son to do school work together."*
>
> Michael Rader Sr., Parent
> Milano Elementary School

The reporting function provides reinforcement of new concepts while increasing participation and persistence. An overview of the results from the program appears below, with greater detail in the appendices.

Participant Satisfaction: Successful programs excite and engage participants. Students, teachers, and parents/guardians are all asked to evaluate the program and provide personal comments. A sample of the feedback is below:

- **80% of participating teachers indicated that parents supported the Program.**
- **100% of participating teachers indicated they would recommend this Program to other colleagues.**
- **100% of participating teachers indicated they would conduct this Program again.**

(A summary of responses can be found in Appendix C)

Knowledge Gained: Identical tests were taken by students prior to the program and again upon program completion to measure knowledge gained. Scores and subject knowledge improved from **72% to 87%.**

Data Obtained: A home survey was performed by students and their families, collecting household demographic and consumption data along with program participation information. A sample of that data is below:

- **77% reported that their family homes were owned.**
- **57% reported that their water was heated by electricity.**
- **14% reported that their homes had an automatic sprinkler system.**

(A summary of responses can be found in Appendix B)

Measures Installed: Students completed retrofit activities as part of the program, and reported the measures they installed in their own homes. A sample is below:

- **69% reported they installed the High-Efficiency Showerhead.**
- **67% reported they installed the Bathroom Aerator.**

(A summary of responses can be found in Appendix B)

Water and Energy Savings Results: In addition to educating students and their parents/guardians, the primary program goal for utility sponsors is to generate cost effective water and energy savings. Student home surveys not only provided the data used in Projected Resource Savings, but also reinforced the learning benefits.

Projected Resource Savings

(A list of assumptions and formulas used for these calculations can be found in Appendix A)

Projected Annual Savings		***Projected Ten Year Savings***	
4,235,861	**gallons of water saved**	**28,451,603**	**gallons of water saved**
9,921	**therms of gas saved**	**70,148**	**therms of gas saved**
259,414	**kWh of electricity saved**	**1,841,751**	**kWh of electricity saved**
4,235,861	**gallons of wastewater saved**	**28,451,603**	**gallons of wastewater saved**

Projected Average Annual Savings per Home		***Projected Average Ten Year Savings per Home***	
7,605	**gallons of water saved**	**51,080**	**gallons of water saved**
18	**therms of gas saved**	**126**	**therms of gas saved**
466	**kWh of electricity saved**	**3,307**	**kWh of electricity saved**
7,605	**gallons of wastewater saved**	**51,080**	**gallons of wastewater saved**

PROGRAM **OVERVIEW**

For more than seventeen years, Resource Action Programs (RAP) has designed and implemented resource efficiency and education programs – changing household water and energy use while delivering significant, measurable resource savings for program sponsors. All RAP Programs feature a proven blend of innovative education, comprehensive implementation services, and hands-on activities to put new knowledge to work in students' homes.

RAP Programs serve more than 450,000 households each year through elementary school, middle school, and adult programs. Our fifty person staff manages the implementation process and program oversight for nearly 250 individual programs annually. Recognized nationally as a leader in water and energy efficiency education and program design, RAP has a strong reputation for providing a high level of client service to its sponsors as part of a wide range of conservation and resource efficiency solutions for municipalities, utilities, states, community agencies and corporations.

RAP Programs serve more than 450,000 households each year through elementary school, middle school, and adult programs.

All aspects of program design and implementation are completed from the Program Center in Sparks, Nevada. These include graphic and web design, print production, warehousing and distribution, kit production, marketing, program tracking, data tabulation and reporting.

The school-based WaterWise Program is fully implemented and designed to generate immediate and long-term savings by bringing interactive "real world" education home with motivated students. The program staff identifies and enrolls students and teachers within the designated service territory. Enrolled participants receive educational materials designed to build knowledge and demonstrate simple ways to save, by not only changing habits, but also changing devices. Materials meet state and national educational standards, which allow the program to easily fit into teachers' existing schedules and requirements.

The program begins with classroom discussions teaching the importance of using water and energy efficiently, followed by hands-on, creative problem solving. Next, participants take home a WaterWise Kit that contains high-efficiency measures. With the help of their parents/guardians, they install the measures in their home and complete a Home Survey. The WaterWise staff tabulates all responses, including Home Survey information, teacher responses, student input, parent/guardian responses, and generates a Program Summary Report. By installing and monitoring the new efficiency measures in their own homes, students are able to measure what they learned with actual water, energy, and monetary savings! These savings benefit both the participating student households and their communities.

Each participant receives classroom materials and a WaterWise Kit containing efficiency measures for their homes to perform the hands-on activities. Modifications were made to select materials which incorporated the Post Oak Savannah Groundwater Conservation District logo and color scheme.

Each student/teacher receives:

Student Guide

Student Workbook

Program Introduction Letter to Parent/Guardian*

Home Survey

Certificate of Achievement

WaterWise Kit containing:

- High-Efficiency Showerhead*
- Kitchen Aerator*
- Bathroom Aerator*
- Mini Tape Measure
- Digital Thermometer*
- Drip/Rain Gauge*
- Flow Rate Test Bag
- Natural Resource Fact Chart
- Toilet Leak Detector Tablets*
- Parent/Guardian Program Evaluation

"GetWise" Wristband

Unlimited Interactive Program Website Access

Toll Free HELP Line

Each teacher/classroom receives:

Teacher Book

Step-by-Step Program Checklist

Lesson Plans

Program Video (VHS and DVD)

Teacher Program Evaluation

Supplemental Activities*

Texas State Education Standards Correlation Chart

Pre/Post Test Answer Keys

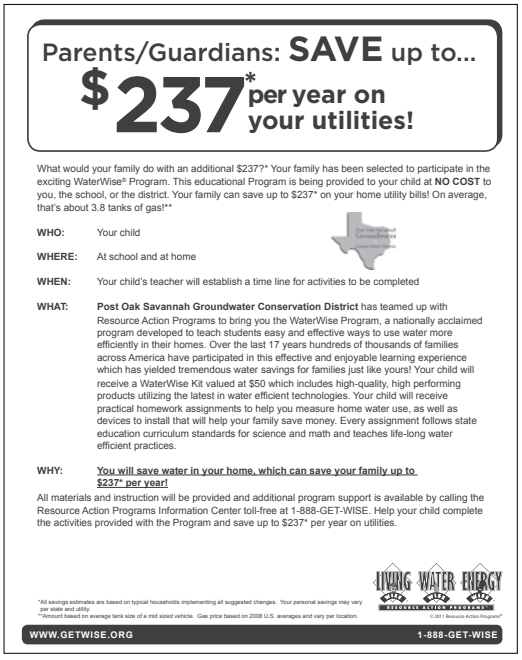
Water Poster

Self-Addressed Postage-Paid Envelope

*Materials/Installation Instructions Provided in English and Spanish

PROGRAM **MATERIALS**

In addition to increasing resource awareness and efficiency, the program strengthens bonds between sponsors and their communities. The program has been designed from start to finish with this in mind. One of the steps taken to ensure our sponsors receive the greatest possible exposure is to feature the Post Oak Savannah Groundwater Conservation District logo. Each WaterWise Kit was labeled with the Post Oak Savannah Groundwater Conservation District logo. In addition to the WaterWise Kit, the Program Introduction Letter to Parent/Guardian and Teacher Program Evaluation featured sponsor branding.



Parents/Guardians: **SAVE** up to...

$237* per year on your utilities!

What would your family do with an additional $237?* Your family has been selected to participate in the exciting WaterWise® Program. This educational Program is being provided to your child at **NO COST** to you, the school, or the district. Your family can save up to $237* on your home utility bills! On average, that's about 3.8 tanks of gas!**

WHO: Your child

WHERE: At school and at home

WHEN: Your child's teacher will establish a time line for activities to be completed

WHAT: **Post Oak Savannah Groundwater Conservation District** has teamed up with Resource Action Programs to bring you the WaterWise Program, a nationally acclaimed program developed to teach students easy and effective ways to use water more efficiently in their homes. Over the last 17 years hundreds of thousands of families across America have participated in this effective and enjoyable learning experience which has yielded tremendous water savings for families just like yours! Your child will receive a WaterWise Kit valued at $50 which includes high-quality, high performing products utilizing the latest in water efficient technologies. Your child will receive practical homework assignments to help you measure home water use, as well as devices to install that will help your family save money. Every assignment follows state education curriculum standards for science and math and teaches life-long water efficient practices.

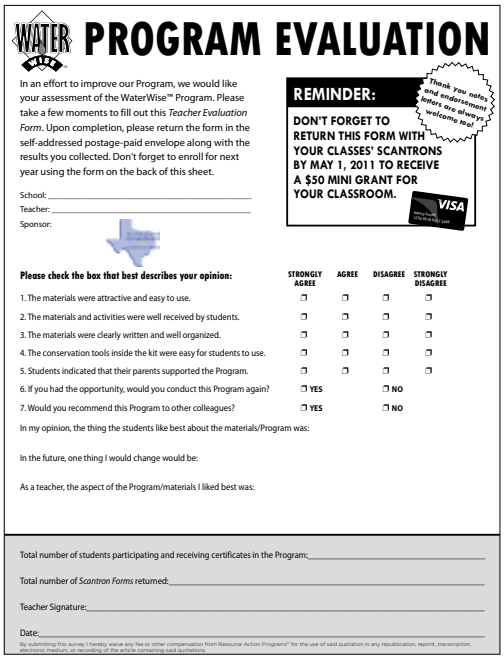
WHY: **You will save water in your home, which can save your family up to $237* per year!**

All materials and instruction will be provided and additional program support is available by calling the Resource Action Programs Information Center toll-free at 1-888-GET-WISE. Help your child complete the activities provided with the Program and save up to $237* per year on utilities.

LIVING WATER ENERGY WISE RESOURCE ACTION PROGRAMS

*All savings estimates are based on typical households implementing all suggested changes. Your personal savings may vary per state and utility.
**Amount based on average tank size of a mid sized vehicle. Gas price based on 2008 U.S. averages and vary per location. © 2011 Resource Action Programs®

WWW.GETWISE.ORG 1-888-GET-WISE



WATER WISE

PROGRAM EVALUATION

In an effort to improve our Program, we would like your assessment of the WaterWise™ Program. Please take a few moments to fill out this *Teacher Evaluation Form*. Upon completion, please return the form in the self-addressed postage-paid envelope along with the results you collected. Don't forget to enroll for next year using the form on the back of this sheet.

REMINDER:

DON'T FORGET TO RETURN THIS FORM WITH YOUR CLASSES' SCANTRONS BY MAY 1, 2011 TO RECEIVE A $50 MINI GRANT FOR YOUR CLASSROOM.

Thank you notes and endorsement letters are always welcome here!

VISA

School: _____

Teacher: _____

Sponsor:

Please check the box that best describes your opinion:

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
1. The materials were attractive and easy to use.	❒	❒	❒	❒
2. The materials and activities were well received by students.	❒	❒	❒	❒
3. The materials were clearly written and well organized.	❒	❒	❒	❒
4. The conservation tools inside the kit were easy for students to use.	❒	❒	❒	❒
5. Students indicated that their parents supported the Program.	❒	❒	❒	❒
6. If you had the opportunity, would you conduct this Program again?	❒ YES		❒ NO	
7. Would you recommend this Program to other colleagues?	❒ YES		❒ NO	

In my opinion, the thing the students like best about the materials/Program was:

In the future, one thing I would change would be:

As a teacher, the aspect of the Program/materials I liked best was:

Total number of students participating and receiving certificates in the Program: _____

Total number of *Scantron Forms* returned: _____

Teacher Signature: _____

Date: _____

By submitting this survey I hereby waive any fee or other compensation from Resource Action Programs® for the use of said quotation in any republication, reprint, transcription, electronic medium, or recording of the article containing said quotations.

The 2010-2011 Post Oak Savannah Groundwater Conservation District WaterWise Program followed this comprehensive implementation schedule:

1. Identification of Texas State Education Standards & Benchmarks
2. Curriculum development and refinement (completed annually)
3. Curriculum correlation to Texas State Education Standards & Benchmarks
4. Materials modification to incorporate the Post Oak Savannah Groundwater Conservation District logo and color scheme
5. Incentive program development
6. Teacher/school identification – with Post Oak Savannah Groundwater Conservation District's approval
7. Teacher outreach and program introduction
8. Teachers enrolled in the program individually
9. Implementation dates scheduled with teachers
10. Program material delivered to coincide with desired implementation date
11. Delivery confirmation
12. Periodic contact to ensure implementation and teacher satisfaction
13. Program completion incentive offered
14. Results collection
15. Program completion incentive delivered to qualifying participants
16. Thank-you cards sent to participating teachers
17. Data analysis
18. Program Summary Report

Participating teachers are free to implement the program to coincide with their lesson plans and class schedules. The next table is a comprehensive list of fifth-grade classrooms that participated during the 2010-2011 school year.

School	Teacher	Teachers	Students
Buckholts School	Dustin Collins	1	20
Caldwell Intermediate School	Amy Alford	1	56
Caldwell Intermediate School	Deborah Sears	1	38
Caldwell Intermediate School	Shelly Tucker	1	38
Cameron Elementary School	Chris Reue	1	47
Cameron Elementary School	Bonnie Tumlinson	1	47
Cameron Elementary School	Teri Vaculin	1	46
Milano Elementary School	Wendy Morgan	1	16
Milano Elementary School	Dorcas Popham	1	17
Rockdale Intermediate School	Whitney Pounders	1	120
Snook Elementary School	Carrie Wiggins	1	44
St. Paul Lutheran Church and School	Corey Moss	1	16
Thorndale Elementary School	Renee' Oslick	1	39

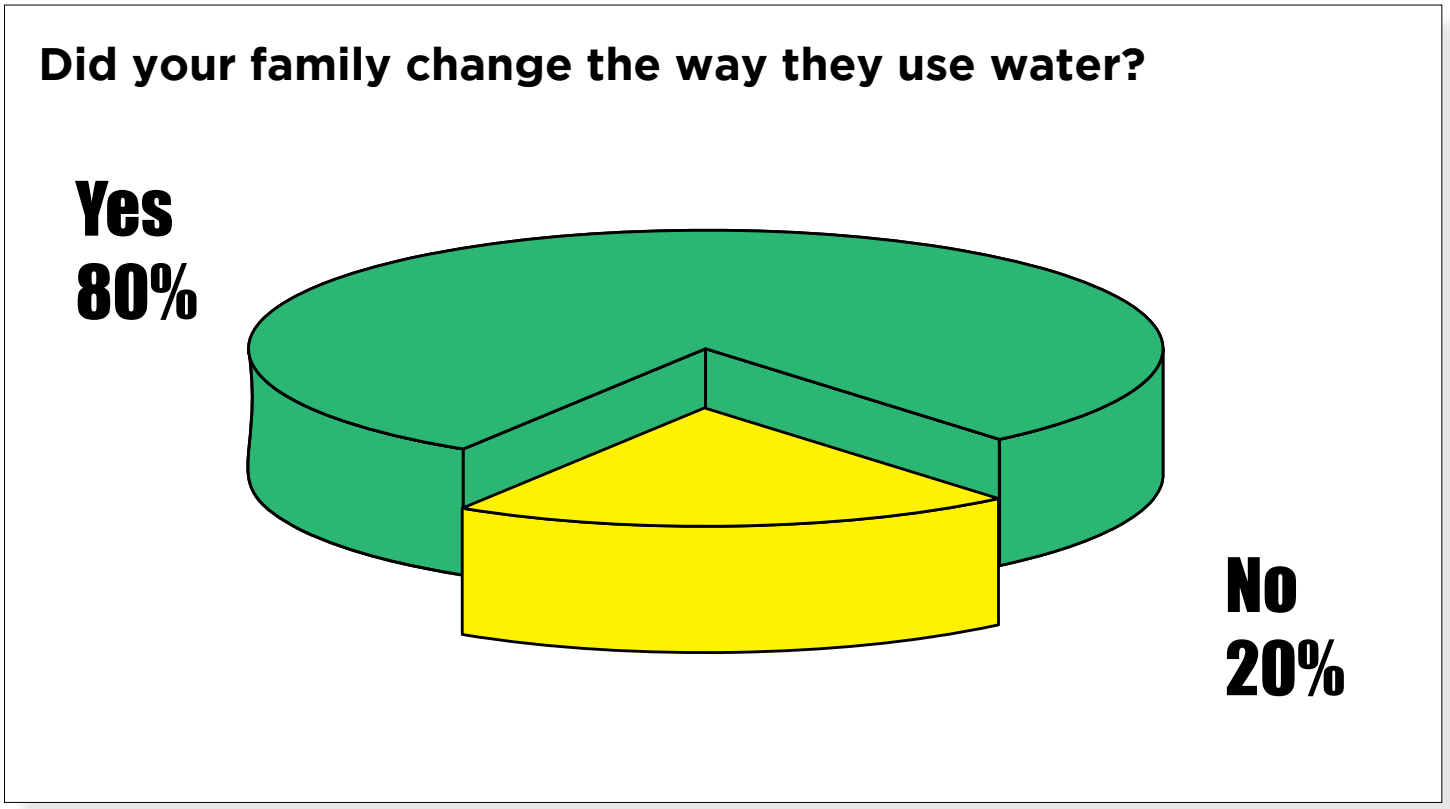
Totals	13	544
Total Participants	557	

The Post Oak Savannah Groundwater Conservation District WaterWise Program has had a significant impact within the community. As illustrated below, the program successfully educated a portion of the community about water and energy efficiency while generating resource savings through the installation of efficiency measures in homes. Home Survey information was collected to track projected savings and provide household consumption and demographic data to sponsors. Program evaluations and comments were collected from teachers, students, and parents/guardians. The following program elements were used to collect this data:

A. Home Survey

Upon completion of the program, participating families are asked to complete a home survey to assess their resource use, verify product installation, provide demographic information and measure participation rates. A few samples of questions asked are below while a complete summary of all responses is included in the appendices.

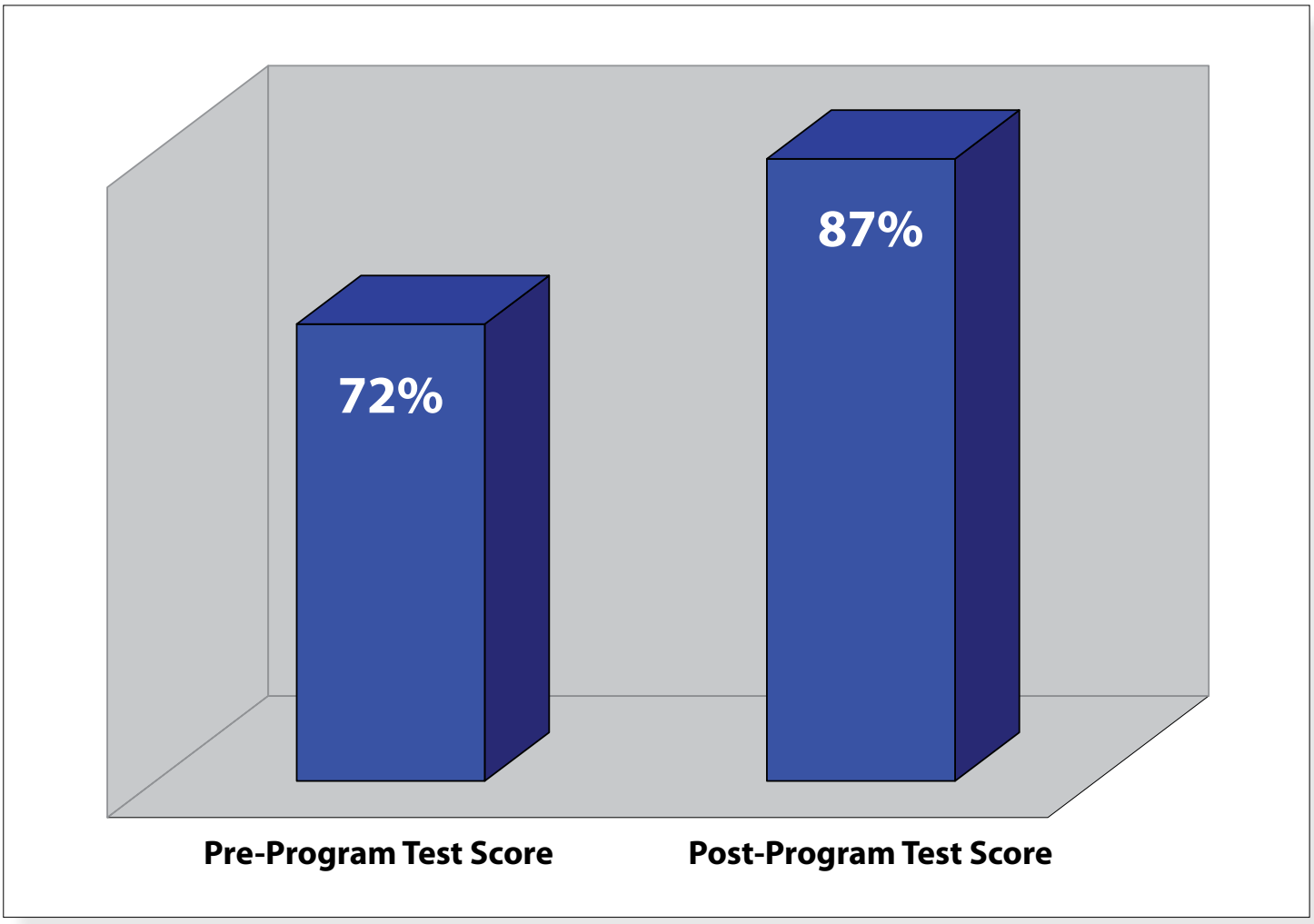
Did you install the new High-Efficiency Showerhead?	**Yes - 69%**
Did you work with your family on this Program?	**Yes - 87%**
Did your family change the way they use water?	**Yes - 80%**



B. Pre-Program and Post-Program Test

Students were asked to complete a ten question test before the program was introduced and then again after it was completed to determine the knowledge gained through the program. The average student answered **7.2** questions correctly prior to being involved in the program and then improved to answer **8.7** questions correctly following participation.

Scores improved from 72% to 87%



C. Home Activities

As part of the program, parents/guardians and students installed resource efficiency measures in their homes. They also measured the pre-existing devices to calculate savings that they generated. Using the family habits collected from the Home Survey as the basis for this calculation, five-hundred fifty-seven (557) households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come.

Projected Resource Savings

(A list of assumptions and formulas used for these calculations can be found in Appendix A)

Number of Participants: 557

	Annual	Lifetime	
Projected reduction from showerhead retrofit:	1,454,460	14,544,596	gallons
Product Life: 10 years	4,109	41,090	therms
	108,936	1,089,361	kWh
Projected reduction from kitchen aerator retrofit:	1,267,379	6,336,895	gallons
Product Life: 5 years	2,648	13,241	therms
	68,567	342,835	kWh
Projected reduction from bathroom aerator retrofit:	1,514,023	7,570,113	gallons
Product Life: 5 years	3,163	15,817	therms
	81,911	409,554	kWh
TOTAL PROJECTED PROGRAM SAVINGS:	**4,235,861**	**28,451,603**	**gallons**
	9,921	**70,148**	**therms**
	259,414	**1,841,751**	**kWh**
TOTAL PROJECTED PROGRAM SAVINGS PER HOUSEHOLD:	**7,605**	**51,080**	**gallons**
	18	**126**	**therms**
	466	**3,307**	**kWh**

D. Teacher Program Evaluation

Program improvements are based on participant feedback received students and teachers. Each asked to evaluate relevant aspects of the program. Each response is reviewed for pertinent information to both the program and Post Oak Savannah Groundwater Conservation District. The following is the feedback from the Teacher Program Evaluation that was collected during the program.

Teacher Response

(A summary of responses can be found in Appendix C)

100% of participating teachers indicated they would conduct the Program again given the opportunity.

100% of participating teachers indicated they would recommend the Program to their colleagues.

In my opinion, the thing the students like best about the materials/Program was:

"...getting the kits."
Jennifer Sanders, Cameron Elementary School

"...receiving the conservation tools."
Deborah Sears, Caldwell Intermediate School

"...working with their parents."
Shelly Tucker, Caldwell Intermediate School

"...the activities, such as the soap boat."
Wendy Morgan, Milano Elementary School

As a teacher, the aspect of the Program/materials I liked best was:

"Great review but we use the water cycle."
Jennifer Sanders, Cameron Elementary School

"...students and parents interacting together."
Deborah Sears, Caldwell Intermediate School

"...teaching conservation. Hands-on!"
Shelly Tucker, Caldwell Intermediate School

Teacher Response (cont.)

"...The lesson plans, activities and organization."
Wendy Morgan, Milano Elementary School

In the future, one thing I would change would be:

" the two books. All information should be in one."
Jennifer Sanders, Cameron Elementary School

"...easier formulas."
Shelly Tucker, Caldwell Intermediate School

E. Parent/Guardian Program Evaluation

From both a utility and teacher perspective, parent/guardian involvement with program activities and their children is of paramount interest. When parents/guardians take an active role in their child's education it helps the schools and strengthens the educational process considerably. When students successfully engage their families in the retrofit and home efficiency projects, utility efficiency messages have been powerfully delivered to two generations in the same household. The Program is a catalyst for this family interaction, which is evidenced by the Parent/Guardian Program Evaluations which are received each year. The following is the feedback from the Parent/Guardian Program Evaluation that was collected during the program.

Parent/Guardian Response

What comments would you like to express to your child's Program sponsor?

"I really think there needs to be more projects like this one. It's more of an opportunity for a dad and son to do school work together."
Michael Rader Sr., Milano Elementary School

"I am really happy that you make it possible, thank you"
Robyn Dimon, Caldwell Intermediate School

As a parent which aspect of the Program did you like best?

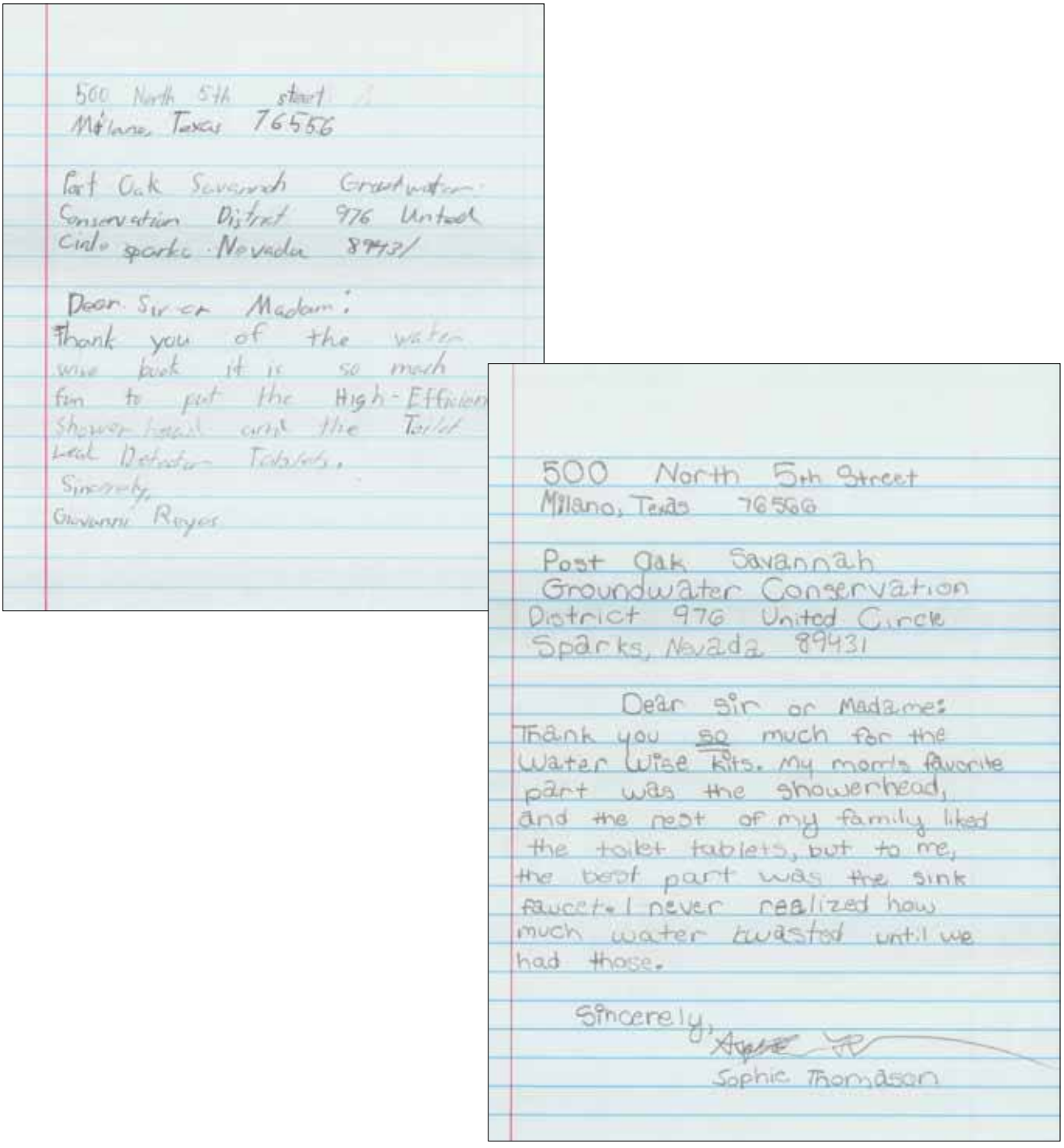
"Helping my child with this project."
Michael Rader Sr., Milano Elementary School

"Helping teach how to conserve water."
Lisa and Fernando Pinch, Caldwell Intermediate School

"For my child to understand that saving water is fun and easy"
Robyn Dimon, Caldwell Intermediate School

F. Student Letters

Student Response



500 North 5th street
Milano, Texas 76556

Post Oak Savannah Groundwater Conservation District 976 United Circle Sparks, Nevada 89431

Dear Sir or Madam:
Thank you of the water wise book it is so much fun to put the High-Efficien Shower head and the Toilet Leak Detector Tablets.
Sincerely,
Giovanni Reyes

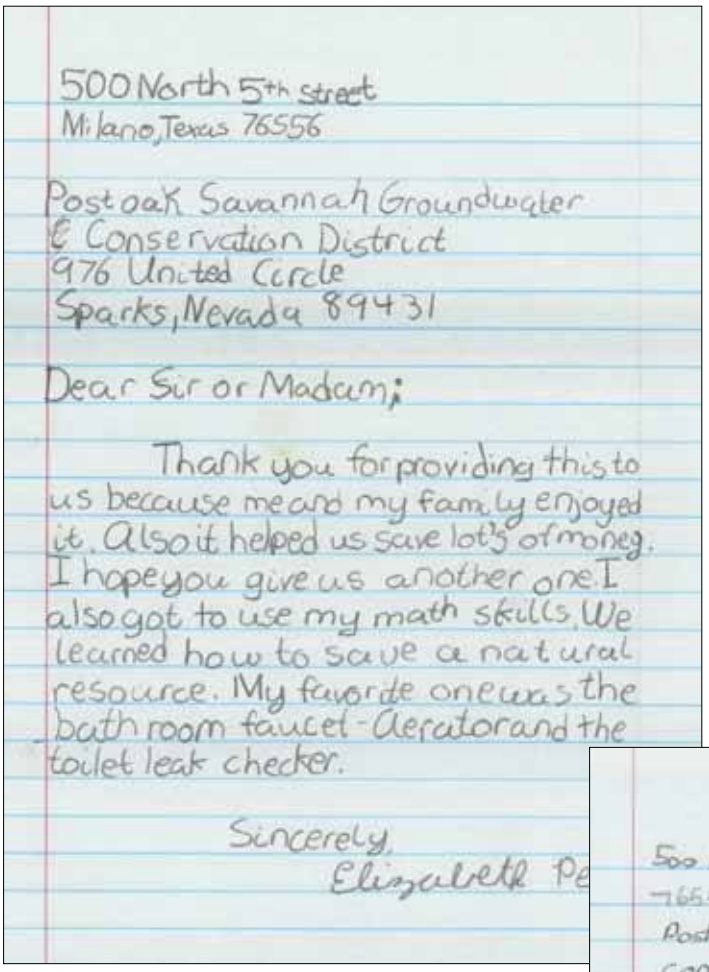
500 North 5th Street
Milano, Texas 76556

Post Oak Savannah Groundwater Conservation District 976 United Circle Sparks, Nevada 89431

Dear Sir or Madame:
Thank you so much for the Water Wise kits. My moms favorite part was the showerhead, and the rest of my family liked the toilet tablets, but to me, the best part was the sink faucet. I never realized how much water twasted until we had those.

Sincerely,
Sophie Thomason

Student Response (cont...)



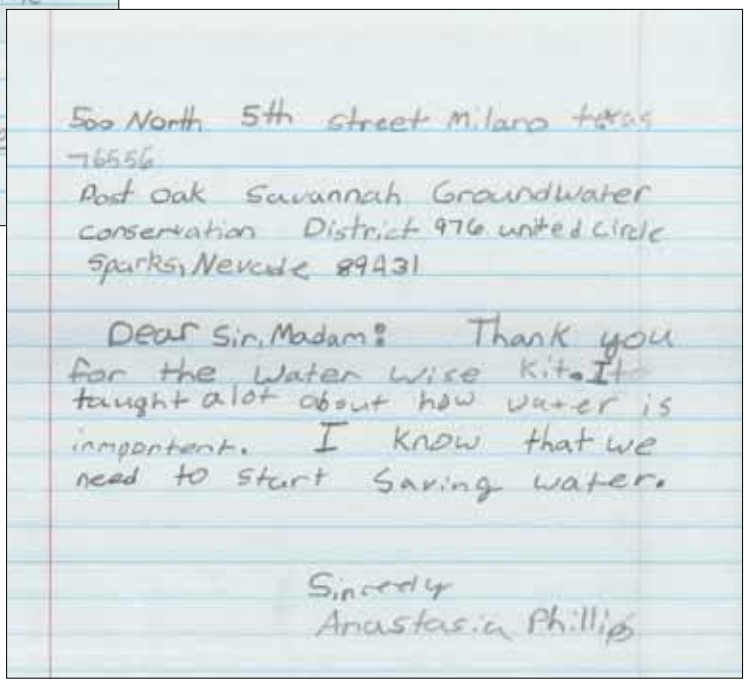
500 North 5th street
Milano, Texas 76556

Post oak Savannah Groundwater
& Conservation District
976 United Circle
Sparks, Nevada 89431

Dear Sir or Madam;

Thank you for providing this to us because me and my family enjoyed it. Also it helped us save lot's of money. I hope you give us another one. I also got to use my math skills. We learned how to save a natural resource. My favorite one was the bath room faucet - Aerator and the toilet leak checker.

Sincerely,
Elizabeth Pe



500 North 5th street Milano texas 76556

Post oak Savannah Groundwater conservation District 976 united Circle Sparks, Nevada 89431

Dear Sir, Madam: Thank you for the Water wise kit. It taught a lot about how water is important. I know that we need to start saving water.

Sincerly
Anastasia Phillips

Appendix Contents

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Projected Savings from Showerhead Retrofit

Showerhead retrofit inputs and assumptions:

Average household size:	4.94	people[1]
Average number of full bathrooms per home:	1.78	full bathrooms per home[1]
% of water heated by gas:	43%	[1]
% of water heated by electricity:	57%	[1]
Installation / participation rate of:	69%	[1]
Average showerhead has a flow rate of:	1.87	gallons per minute[1]
Retrofit showerhead has flow rate of:	1.19	gallons per minute[1]
Number of Participants:	557	[1]
Shower duration:	8.20	minutes per day[2]
Showers per day per person:	0.67	showers per day[2]
Product life:	10.00	years[3]

Projected Water Savings:

Showerhead retrofit projects an annual reduction of:	1,454,460	gallons[4]
Showerhead retrofit projects a lifetime reduction of:	14,544,596	gallons[5]

Projected Electricity Savings:

Showerhead retrofit projects an annual reduction of:	108,936	kWh[2,6]
Showerhead retrofit projects a lifetime reduction of:	1,089,361	kWh[2,7]

Projected Natural Gas Savings:

Showerhead retrofit projects an annual reduction of:	4,109	therms[2,8]
Showerhead retrofit projects a lifetime reduction of:	41,090	therms[2,9]

[1] Data Reported by Program Participants.

[2] (March 4, 2010). *EPA WaterSense® Specification for Showerheads Supporting Statement* . Retrived from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf

[3] Provided by manufacturer.

[4] [(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days

[5] [(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days x Product Life

[6] Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity

[7] Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life

[8] Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas

[9] Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life

Projected Savings from Kitchen Aerator Retrofit

Kitchen Aerator retrofit inputs and assumptions:

Average household size:	4.94	people[1]
% of homes with a dishwasher:	66%	[1]
% of homes without a dishwasher:	34%	[1]
% of water heated by gas:	43%	[1]
% of water heated by electricity:	57%	[1]
Installation / participation rate of:	60%	[1]
Number of Participants:	557	[1]
Average Kitchen Aerator has a flow rate of:	2.50	gallons per minute[2]
Retrofit Kitchen Aerator has flow rate of:	1.50	gallons per minute[3]
Product life:	5.00	years[3]
Length of use without dishwasher:	15.00	minutes per day[4]
Length of use without dishwasher (each family member):	1.00	minute per day[4]
Length of use with dishwasher:	3.00	minutes per day[4]
Length of use with dishwasher (each family member):	0.50	minutes per day[4]

Projected Water Savings:

Kitchen Aerator retrofit projects an annual reduction of:	1,267,379	gallons[5]
Kitchen Aerator retrofit projects a lifetime reduction of:	6,336,895	gallons[6]

Projected Electricity Savings:

Kitchen Aerator retrofit projects an annual reduction of:	68,567	kWh[4,7]
Kitchen Aerator retrofit projects a lifetime reduction of:	342,835	kWh[4,8]

Projected Natural Gas Savings:

Kitchen Aerator retrofit projects an annual reduction of:	2,648	therms[4,9]
Kitchen Aerator retrofit projects a lifetime reduction of:	13,241	therms[4,10]

[1] Data Reported by Program Participants.
[2] Vickers, Amy (2002). *Water Use and Conservation* . Amherst, MA: WaterPlow Press.
[3] Provided by manufacturer.
[4] Quantec, LLC. (2008). *Impact of Flipping the Switch: Evaluating the Effectiveness of Low Income Residential Energy Education Programs* . Portland: Drakos, Jamie et al.
[5] {Length of use without dishwasher + [Average household size x Length of use without dishwasher (each family member))] x % of homes without dishwasher} + {Length of use with dishwasher + [Average household size x Length of use with dishwasher (each family member))] x % of homes with dishwasher} x [Average Kitchen Aerator flow rate – Retrofit Kitchen Aerator flow rate] x Number of participants x Installation rate x 365 days
[6] {Length of use without dishwasher + [Average household size x Length of use without dishwasher (each family member))] x % of homes without dishwasher} + {Length of use with dishwasher + [Average household size x Length of use with dishwasher (each family member))] x % of homes with dishwasher} x [Average Kitchen Aerator flow rate – Retrofit Kitchen Aerator flow rate] x Number of participants x Installation rate x 365 days x Product Life
[7] Projected Annual Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (3413 x water heater efficiency (0.90)] x % of Water Heated by Electricity
[8] Projected Lifetime Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (3413 x water heater efficiency (0.90)] x % of Water Heated by Electricity
[9] Projected Annual Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (100,000 x water heater efficiency (0.60)] x % of Water Heated by Natural Gas
[10] Projected Lifetime Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (100,000 x water heater efficiency (0.60)] x % of Water Heated by Natural Gas

Projected Savings from Bathroom Aerator Retrofit

Bathroom Aerator retrofit inputs and assumptions:

Average household size:	4.94	people[1]
% of water heated by gas:	43%	[1]
% of water heated by electricity:	57%	[1]
Installation / participation rate of:	67%	[1]
Number of Participants:	557	[1]
Average Bathroom Aerator has a flow rate of:	2.50	gallons per minute[2]
Retrofit Bathroom Aerator has flow rate of:	1.00	gallons per minute[3]
Product life:	5.00	years[3]
Length of use (per family member):	1.50	minutes per day[4]

Projected Water Savings:

Bathroom Aerator retrofit projects an annual reduction of:	1,514,023	gallons[5]
Bathroom Aerator retrofit projects a lifetime reduction of:	7,570,113	gallons[6]

Projected Electricity Savings:

Bathroom Aerator retrofit projects an annual reduction of:	81,911	kWh[4,7]
Bathroom Aerator retrofit projects a lifetime reduction of:	409,554	kWh[4,8]

Projected Natural Gas Savings:

Bathroom Aerator retrofit projects an annual reduction of:	3,163	therms[4,9]
Bathroom Aerator retrofit projects a lifetime reduction of:	15,817	therms[4,10]

[1] Data Reported by Program Participants.
[2] Vickers, Amy (2002). *Water Use and Conservation* . Amherst, MA: WaterPlow Press.
[3] Provided by manufacturer.
[4] Quantec, LLC. (2008). *Impact of Flipping the Switch: Evaluating the Effectiveness of Low Income Residential Energy Education Programs* . Portland: Drakos, Jamie et al.
[5] [Length of use (each family member) x Average household size] x [Average Bathroom Aerator flow rate – Retrofit Bathroom Aerator flow rate] x Number of participants x Installation rate x 365 days
[6] [Length of use (each family member) x Average household size] x [Average Bathroom Aerator flow rate – Retrofit Bathroom Aerator flow rate] x Number of participants x Installation rate x 365 days x Product Life
[7] Projected Annual Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (3413 x water heater efficiency (0.90)] x % of Water Heated by Electricity
[8] Projected Lifetime Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (3413 x water heater efficiency (0.90)] x % of Water Heated by Electricity
[9] Projected Annual Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (100,000 x water heater efficiency (0.60)] x % of Water Heated by Natural Gas
[10] Projected Lifetime Water Savings x [(8.33lbs. / gallon x 35°FΔT) ÷ (100,000 x water heater efficiency (0.60)] x % of Water Heated by Natural Gas

Home Survey Data

Home Check-Up

1 What type of home do you live in?	
Single family home	71%
Multi-family (2-4 units)	19%
Multi-family (5-20 units)	6%
Multi-family (21+ units)	4%
2 Was your home built before 1992?	
Yes	65%
No	35%
3 Is your home owned or rented?	
Owned	77%
Rented	23%
4 How many kids live in your home (age 0-17)?	
1	12%
2	38%
3	24%
4	15%
5+	10%
5 How many adults live in your home (age 18+)?	
1	13%
2	63%
3	16%
4	5%
5+	2%
6 Does your home have an automatic sprinkler system?	
Yes	14%
No	86%
7 Does your home have a dishwasher?	
Yes	66%
No	34%
8 How many half-bathrooms are in your home?	
0	77%
1	15%
2	5%
3	2%
4+	1%

9 How many full bathrooms are in your home?

1	35%
2	56%
3	7%
4	2%
5+	0%

10 How many toilets are in your home?

1	28%
2	56%
3	12%
4	2%
5+	2%

11 How is your water heated?

Natural Gas	43%
Electricity	57%

Due to rounding of numbers, percentages may not add up to 100%.

Home Activities

1 Did you install the new High-Efficiency Showerhead?	
Yes	69%
No	31%
2 What is the flow rate of your old showerhead?	
0 - 1.0 gpm	20%
1.1 - 1.5 gpm	13%
1.6 - 2.0 gpm	28%
2.1 - 2.5 gpm	18%
2.6 - 3.0 gpm	11%
3.1+ gpm	10%
3 What is the flow rate of your new showerhead?	
0 - 1.0 gpm	34%
1.1 - 1.5 gpm	35%
1.6 - 2.0 gpm	31%
4 Was your toilet leaking?	
Yes	18%
No	82%
5 Did your family install the Bathroom Aerator?	
Yes	67%
No	33%
6 What is the flow rate of your old bathroom faucet?	
0 - 1.0 gpm	27%
1.1 - 1.5 gpm	19%
1.6 - 2.0 gpm	22%
2.1 - 2.5 gpm	11%
2.6 - 3.0 gpm	11%
3.1+ gpm	10%
7 Did your family install the Kitchen Aerator?	
Yes	60%
No	40%

APPENDIX B

8 What is the flow rate of your old kitchen faucet?

0 - 1.0 gpm	22%
1.1 - 1.5 gpm	22%
1.6 - 2.0 gpm	33%
2.1 - 2.5 gpm	14%
2.6 - 3.0 gpm	2%
3.1+ gpm	7%

9 How many faucets are leaking?

0	83%
1	15%
2	1%
3	0%
4	1%
5+	0%

10 Did you work with your family on this Program?

Yes	87%
No	13%

11 Did your family change the way they use water outdoors?

Yes	52%
No	48%

12 Did your family change the way they use water?

Yes	80%
No	20%

13 How would you rate the WaterWise™ program?

Great	45%
Pretty good	34%
Okay	19%
Not so good	2%

Due to rounding of numbers, percentages may not add up to %.

Teacher Program Evaluation Data

1 The materials were attractive and easy to use.

Strongly Agree	40%
Agree	60%
Disagree	0%
Strongly Disagree	0%

2 The materials and activities were well received by students.

Strongly Agree	40%
Agree	60%
Disagree	0%
Strongly Disagree	0%

3 The materials were clearly written and well organized.

Strongly Agree	20%
Agree	80%
Disagree	0%
Strongly Disagree	0%

4 The conservation technologies were easy for students to use.

Strongly Agree	20%
Agree	80%
Disagree	0%
Strongly Disagree	0%

5 Students indicated that their parents supported the program.

Strongly Agree	0%
Agree	80%
Disagree	20%
Strongly Disagree	0%

6 If you had the opportunity, would you conduct this program again?

Yes	100%
No	0%

7 Would you recommend this program to other colleagues?

Yes	100%
No	0%

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