

# Post Oak Savannah Groundwater Conservation District

WATERWISE™ PROGRAM SUMMARY REPORT

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RESOURCE ACTION PROGRAMS®



# Post Oak Savannah Groundwater Conservation District WaterWise Program

### **Sponsored by:**



# Program Summary Report 2009 - 2010

**Submitted By:** 

**Resource Action Programs**°



August 2010

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# EXECUTIVE **SUMMARY**

This report summarizes the 2009-2010 Post Oak Savannah Groundwater Conservation District WaterWise Program which was welcomed and implemented by teachers at Buckholts School, Caldwell Intermediate School, Cameron Elementary School, Gause Elementary School and Milano Elementary School. The program was used by two hundred ten (210) fourth-grade students, teachers and their families, and was funded by Post Oak Savannah Groundwater Conservation District.

The program is a fully implemented, multi-resource efficiencyeducation program designed to facilitate installation of efficiency measures in homes and build knowledge of environmental issues. The program yields a variety of measurable water and energy savings results using the best messengers – students. The program



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

delivers a proven blend of teacher-designed classroom activities with hands-on home projects to install high-efficiency devices and introduce 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

"As a teacher, the aspect of the Program/materials I liked best was (that) the importance of water conservation was stressed"

Beverly Renner, Teacher Gause Elementary School

behaviors. A critical element of this approach is the actual use of the new knowledge through reporting. 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. Specifically:

- 100% 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, Teacher Evaluation Data)

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**Knowledge Gained:** Identical surveys were taken by students prior to the program and again upon program completion to measure knowledge gained. Scores and subject knowledge improved from 58% to 68%.

Data Obtained: A Home Check-Up was performed by students and their families, collecting household demographic and usage data along with program participation information.

- 76% reported that their family homes were owned.
- 53% reported that their water was heated by electricity.
- 22% reported that their homes had an automatic sprinkler system.

(A summary of responses can be found in Appendix B, Home Check-Up)

Measures Installed: Students completed retrofit Home Activities as part of the program, and reported the measures they installed in their own homes. Specifically:

- 49% reported they installed the High-Efficiency Showerhead.
- 45% reported they installed the Bathroom Aerator.

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

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**

gallons wastewater saved

(A list of assumptions	and formulas used for these calculations can be found in	n Appendix A)	
Projected An	nual Savings	<b>Projected Ten</b>	Year Savings
2,134,863 5,851 125,651 2,134,863	gallons of water saved therms of gas saved kWh electricity saved gallons wastewater saved	18,907,141 51,816 1,112,812 18,907,141	gallons of water saved therms of gas saved kWh electricity saved gallons wastewater saved
Projected Ave	erage Annual Savings per Home	Projected Ave	rage Ten Year Savings per Home
10,166	gallons of water saved	90,034	gallons of water saved
28	therms of gas saved	247	therms of gas saved
598	kWh electricity saved	5,299	kWh electricity saved

90,034

10,166

gallons wastewater saved

For more than sixteen 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 300,000 households each year through elementary school, middle school, and adult programs. Our fifty person staff manages the implementation process and program oversight for nearly 200 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 300,000 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.

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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 Post Oak Savannah Groundwater Conservation District's logo and color scheme.

#### Each student/teacher receives:

Student Guide

Student Workbook

Program Introduction Letter to Parent/Guardian\*

Home Survey Scantron Form

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 Comment Card

"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/Enrollment Form

Supplemental Activities\*

Texas State Education Standards
Correlation Chart

Pre/Post Scantron Survey Answer Keys

Classroom Water Poster

Self-Addressed Postage-Paid Envelope





<sup>\*</sup>Materials/Installation Instructions Provided in English and Spanish

# PROGRAM **IMPLEMENTATION**

The 2009-2010 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 Post Oak Savannah Groundwater Conservation District's 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 fourth-grade classrooms that participated during the 2009-2010 school year.

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School	Teacher	Teachers	Students
Buckholts School	Nikki Cottrell	1	15
Caldwell Intermediate School	Carah Burns	1	20
Cameron Elementary School	Bonnie Tumlinson	1	120
Gause Elementary School	Beverly Renner	1	14
Milano Elementary School	Wendy Morgan	1	19
Milano Elementary School	Dorcas Popham	1	16

Totals	6	204
Total Participants	2	10



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 savings and provide household consumption and audit 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:

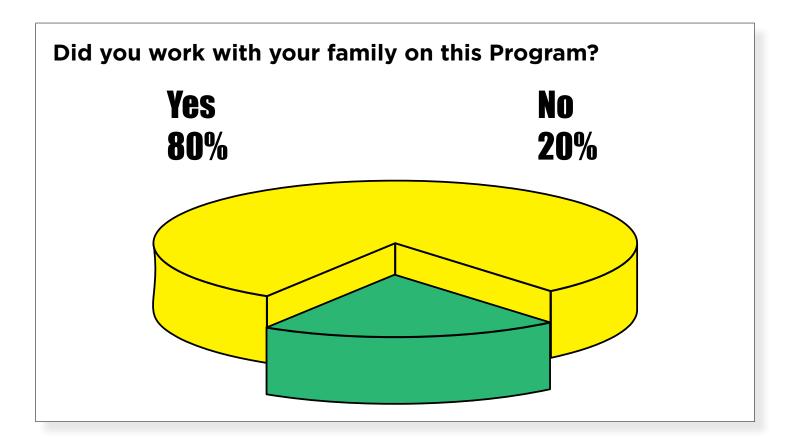
#### A. Home Survey and Retrofits

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 - 49%

Did you work with your family on this Program? Yes - 80%

How is your water heated? Electricity - 53%



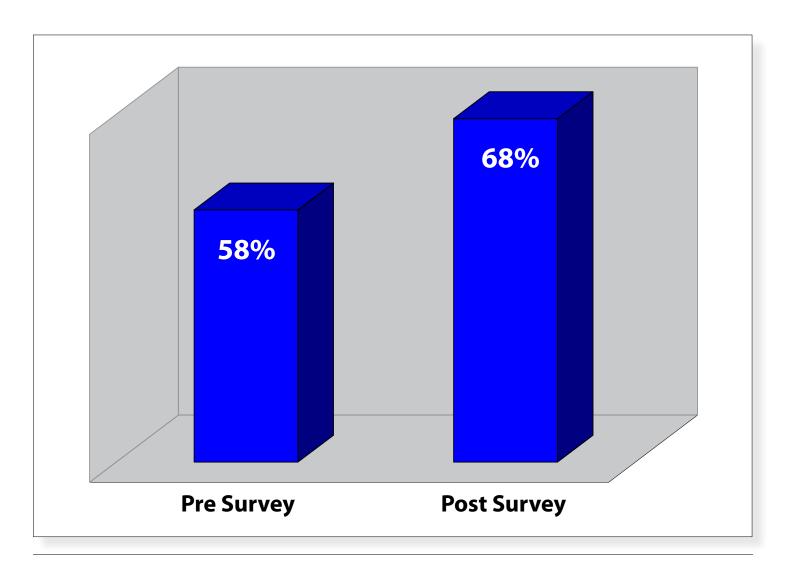
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#### B. Knowledge Gained

On the Home Survey students were asked to complete ten questions before the program was introduced and then again after it was completed to determine the knowledge gained through the program. The average student answered **5.8** questions correctly prior to being involved in the program and then improved to answer **6.8** questions correctly following participation.

#### Scores improved from 58% to 68%





#### C. Water and Energy Savings Summary

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, two hundred ten (210) 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**

**Number of Participants:** 

	<del>- 11 11 11 11 11 11 11 11 11 11 11 11 11</del>	
Reduction from showerhead retrofit:	1,646,565	16,465,646 gallons
Product Life: 10 years	4,513	45,125 therms
	96,911	969,114 kWh
Reduction from kitchen aerator retrofit:	252,025	1,260,126 gallons
Product Life: 5 years	691	3,453 therms
	14,833	74,167 kWh
Reduction from bathroom aerator retrofit:	236,274	1,181,368 gallons
Product Life: 5 years	648	3,238 therms
	13,906	69,531 kWh

**TOTAL PROGRAM SAVINGS:** 

TOTAL PROGRAM SAVINGS PER HOUSEHOLD:

210

Annual

2,134,863

5,851

125,651

10,166

598

Lifetime

18,907,141 gallons

1,112,812 kWh

51,816 therms

90,034 gallons 247 therms

5,299 kWh

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#### D. Participant Response

Program improvements are based on participant feedback received from each program. Students and teachers are each asked to evaluate relevant aspects of the program. Each response is reviewed for pertinent information to both the program and the program sponsor. The following is a sample of feedback 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. They were so excited."

Beverly Renner, Gause Elementary School

"... (the) shower head in the kit."
Bonnie Tumlinson, Cameron Elementary School

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

"... (that) the importance of water conservation was stressed."

Beverly Renner, Gause Elementary School

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

"The green book of instructions was a little wordy."
Bonnie Tumlinson, Cameron Elementary School



**Parent Comments:** 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 comments which are received each year. An excerpt is presented below.

## **Parent/Guardian Response**

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

"...the flow rate test which showed the efficiency of different water fixtures." Armando Rojas, Elementary School

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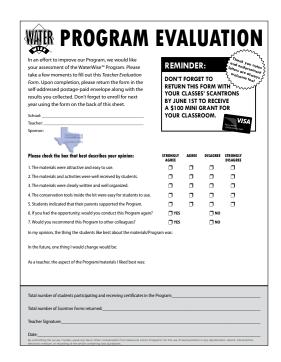
#### E. Program Enhancements

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. Some of the steps taken to ensure our sponsors receive the greatest possible exposure are as follows:

**Promotion of Sponsor Programs:** Program materials can be used to publicize and boost enrollment in additional efficiency program opportunities. This option was not used, however, WaterWise can easily promote residential programs such as toilet replacement or other programs.

**Custom Branding:** 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.







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## **Projected Savings from Showerhead Retrofit**

Average household size: 2.74 people<sup>3</sup>

Average length of use: 8.00 minutes per day<sup>4</sup>

Product life: 10.00 years<sup>1</sup>

Average showerhead has a flow rate of:

Oxygenics showerhead has flow rate of:

Flow reduction:

4.00 gallons per minute<sup>1</sup>

2.00 gallons per minute

Water:

Average showerhead requires: 87.68 gallons per day Retrofit showerhead requires: 43.84 gallons per day

Showerhead produces an annual reduction of: 16,001.60 gallons
Showerhead produces a lifetime reduction of: 160,016 gallons

Gas:

Average showerhead requires:

0.51 therms per day

Retrofit showerhead requires:

0.26 therms per day

% of water heated by gas: 47%

Showerhead produces an annual reduction of:

44 therms
Showerhead produces a lifetime reduction of:

439 therms

Electricity:

Average showerhead requires:

Retrofit showerhead requires:

9.74 kWh per day

4.87 kWh per day

wo f water heated by electricity:

53% 2

% of water heated by electricity: 53%|<sup>2</sup>
Showerhead produces an annual reduction of: 942 kWh
Showerhead produces a lifetime reduction of: 9,418 kWh

Installation / participation rate of:

Number of Participants

49%

210

Total reduction from showerhead retrofit:

**Annual:** 1,646,565 gallons

4,513 therms 96,911 kWh

**Lifetime:** 16,465,646 gallons

45,125 therms 969,114 kWh

<sup>&</sup>lt;sup>1</sup> Provided by manufacturer.

<sup>&</sup>lt;sup>2</sup> Data reported by program participants.

<sup>&</sup>lt;sup>3</sup>(2010, July 7). Retrieved July 7, 2010, from U.S. Census Bureau State and County Quick Facts Web site: <a href="http://quickfacts.census.gov/afd/states/48000.html">http://quickfacts.census.gov/afd/states/48000.html</a>

 $<sup>^4</sup>$ (2001). In Southern California Edison Evaluation of 2000-2001 School Programs Ridge & Associates.



## **Projected Savings from Kitchen Aerator Retrofit**

Average household size: 2.74 people<sup>3</sup>

Average length of use: 2.50 minutes per day<sup>4</sup>

Product life: 5.00 years<sup>1</sup>

Average kitchen aerator has a flow rate of:

Retrofit kitchen aerator has flow rate of:

1.50 gallons per minute

1.00 gallons per minute

Water:

Average kitchen aerator requires:

17.13 gallons per day
Retrofit kitchen aerator requires:

10.28 gallons per day

Retrofit kitchen aerator produces an annual reduction of: 2,500 gallons
Retrofit kitchen aerator produces a lifetime reduction of: 12,501 gallons

Gas:

Average kitchen aerator requires:

0.10 therms per day

Retrofit kitchen aerator requires:

0.06 therms per day

% of water heated by gas: 47% | 2

Retrofit kitchen aerator produces an annual reduction of:

7 therms
Retrofit kitchen aerator produces a lifetime reduction of:

34 therms

Electricity:

Average kitchen aerator requires:

1.90 kWh per day

Retrofit kitchen aerator requires:

1.14 kWh per day

% of water heated by electricity:

53% 2

Retrofit kitchen aerator produces an annual reduction of:

147 kWh

Retrofit kitchen aerator produces a lifetime reduction of:

736 kWh

Installation / participation rate of:

Number of Participants

48%

210

Total reduction from kitchen aerator retrofit:

Annual: 252,025 gallons

691 therms 14,833 kWh

**Lifetime:** 1,260,126 gallons

3,453 therms 74,167 kWh

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<sup>&</sup>lt;sup>1</sup> Provided by manufacturer.

<sup>&</sup>lt;sup>2</sup> Data reported by program participants.

<sup>&</sup>lt;sup>3</sup>(2010, July 7). Retrieved July 7, 2010, from U.S. Census Bureau State and County Quick Facts Web site: <a href="http://quickfacts.census.gov/qfd/states/48000.html">http://quickfacts.census.gov/qfd/states/48000.html</a>

 $<sup>^4</sup>$ (2001). In Southern California Edison Evaluation of 2000-2001 School Programs Ridge & Associates.



### **Projected Savings from Bathroom Aerator Retrofit**

Average household size: 2.74 people<sup>3</sup>

Average length of use: 2.50 minutes per day<sup>4</sup>

Product life: 5.00 years<sup>1</sup>

Average bathroom aerator has a flow rate of:

Retrofit bathroom aerator has flow rate of:

1.00 gallons per minute

1.00 gallons per minute

Water:

Average bathroom aerator requires:

13.70 gallons per day
Retrofit bathroom aerator requires:

6.85 gallons per day

Retrofit bathroom aerator produces an annual reduction of: 2,500 gallons
Retrofit bathroom aerator produces a lifetime reduction of: 12,501 gallons

Gas:

Average bathroom aerator requires:

Retrofit bathroom aerator requires:

% of water heated by ags:

0.08 therms per day

0.04 therms per day

47% | 2

% of water heated by gas:

Retrofit bathroom aerator produces an annual reduction of:

7 therms

Retrofit bathroom aerator produces a lifetime reduction of:

34 therms

Electricity:

Average bathroom aerator requires:

1.52 kWh per day

Retrofit bathroom aerator requires:

0.76 kWh per day

% of water heated by electricity:

Retrofit bathroom aerator produces an annual reduction of:

147 kWh

Retrofit bathroom aerator produces a lifetime reduction of:

736 kWh

Installation / participation rate of:

Number of Participants

45%

210

Total reduction from bathroom aerator retrofit:

Annual: 236,274 gallons

648 therms 13,906 kWh

**Lifetime:** 1,181,368 gallons

3,238 therms 69,531 kWh

<sup>&</sup>lt;sup>1</sup> Provided by manufacturer.

<sup>&</sup>lt;sup>2</sup> Data reported by program participants.

<sup>&</sup>lt;sup>3</sup>(2010, July 7). Retrieved July 7, 2010, from U.S. Census Bureau State and County Quick Facts Web site: <a href="http://quickfacts.census.gov/qfd/states/48000.html">http://quickfacts.census.gov/qfd/states/48000.html</a>

 $<sup>^4</sup>$ (2001). In Southern California Edison Evaluation of 2000-2001 School Programs Ridge & Associates.



# Home Survey and Retrofit Data

Home Check-Up	
1 What type of home do you live in?	
Single family home	82%
Multi-family (2-4 units)	10%
Multi-family (5-20 units)	1%
Multi-family (21+ units)	7%
<b>2</b> Was your home built before 1992?	
Yes	75%
No	25%
<b>3</b> Is your home owned or rented?	
Owned	76%
Rented	24%
4 How many kids live in your home (age 0-17)?	
1	14%
2	32%
3	31%
4	10%
5+	13%
5 How many adults live in your home (age 18+)?	
1	15%
2	69%
3	10%
4	3%
5+	2%
<b>6</b> Does your home have an automatic spinkler system?	
Yes	22%
No	78%
<b>7</b> Does your home have a diswasher?	
Yes	58%
No	42%
8 How many half-bathrooms are in your home?	
0	83%
1	11%
2	4%
3	2%
4+	0%

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<b>9</b> How many full bathrooms are in your home?	
1	43
2	40
3	7'
4	2'
5+	1'
<b>10</b> How many toilets are in your home?	41
2	4
3	1:
4	2'
5+	1
<b>11</b> How is your water heated?	
Natural Gas	4:
Electricity	5:



4 B. L		
1 Did you install the new High-Efficiency Showerhead?	V	400/
	Yes	49%
	No	51%
2 What is the flow rate of your old showerhead?		
	0 - 1.0 gpm	9%
	1.1 - 1.5 gpm	24%
	1.6 - 2.0 gpm	20%
	2.1 - 2.5 gpm	15%
	2.6 - 3.0 gpm	19%
	3.1+ gpm	13%
<b>3</b> What is the flow rate of your new showerhead?		
what is the now rate or your new showerhead:	0 - 1.0 gpm	25%
	1.1 - 1.5 gpm	43%
	1.6 - 2.0 gpm	32%
	1.0 2.0 gpm	32 70
4 Was your toilet leaking?		
	Yes	28%
	No	72%
<b>5</b> Did your family install the Bathroom Aerator?		
, ,	Yes	45%
	No	55%
<b>6</b> What is the flow rate of your old bathroom faucet?		4.407
	0 - 1.0 gpm	14%
	1.1 - 1.5 gpm	22%
	1.6 - 2.0 gpm	24%
	2.1 - 2.5 gpm	15%
	2.6 - 3.0 gpm	14%
	3.1+ gpm	10%
<b>7</b> Did your family install the Kitchen Aerator?		
	Yes	48%
	No	52%

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<b>8</b> What is the flow rate of your old kitchen faucet?		
	0 - 1.0 gpm	12
	1.1 - 1.5 gpm	24
	1.6 - 2.0 gpm	22
	2.1 - 2.5 gpm	13
	2.6 - 3.0 gpm	18
	3.1+ gpm	12
<b>9</b> How many faucets are leaking?		
	0	72
	1	19
	2	49
	3	49
	4	29
	5+	0%
<b>10</b> Did you work with your family on this Program?		
	Yes	80
	No	20
11 Did your family change the way they use water outdoors?		
	Yes	47
	No	53
12 Did your family change the way they use water?		
	Yes	71
	No	29
<b>13</b> How would you rate the WaterWise™ program?		
	Great	33
	Pretty good	31
	Okay	30
	Not so good	6%



## **Teacher Evaluation Data**

<b>1</b> The materials were attractive and easy to use.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>2</b> The materials and activities were well received by students.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>3</b> The materials were clearly written and well organized.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>4</b> The conservation technologies were easy for students to use.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>5</b> Students indicated that their parents supported the program.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>6</b> 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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