

2013-2014



POST OAK SAVANNAH WATERWISE™ PROGRAM SUMMARY REPORT

SUBMITTED BY:
RESOURCE ACTION PROGRAMS®



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Post Oak Savannah WaterWise™ Program Summary Report 2013-2014


Made possible by:



Submitted by:



June 2014




“In my opinion, what students liked best about the program/materials is the classroom activities. They were fun!”

Jana Beckhusen, Teacher

Cameron Elementary School

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“In my opinion, what students liked best about the program/materials is they felt they were actually able to do something.”

Shelly Tucker, Teacher

Caldwell Intermediate School

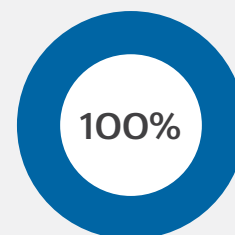
Executive Summary

Resource Action Programs (RAP) is pleased to present this Program Summary Report to Post Oak Savannah Groundwater Conservation District which summarizes the 2013-2014 Post Oak Savannah WaterWise™ Program. The program was implemented in the Post Oak Savannah Groundwater Conservation District service area in the state of Texas by 505 teachers, students, and their families.

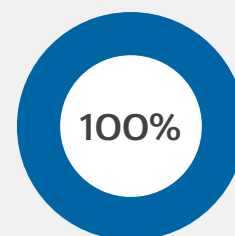
The following pages provide an overview of the program and materials, outline of program implementation, introduction to the program team, description of program enhancements, impact of the program, and summary of results from the home activities. In addition to this information, evaluations, letters, and comments are provided for a glimpse into actual participant feedback. Lastly, projected savings from the individual measures found within the WaterWise Kit are also included.

Participant Satisfaction

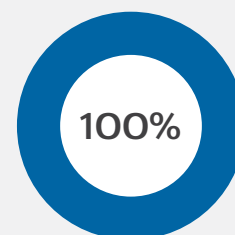
A successful program excites and engages participants. Students, parents, and teachers are asked to evaluate the program and provide personal comments. A sample of the feedback is given in the margin. >



Teachers who indicated parents supported the program.

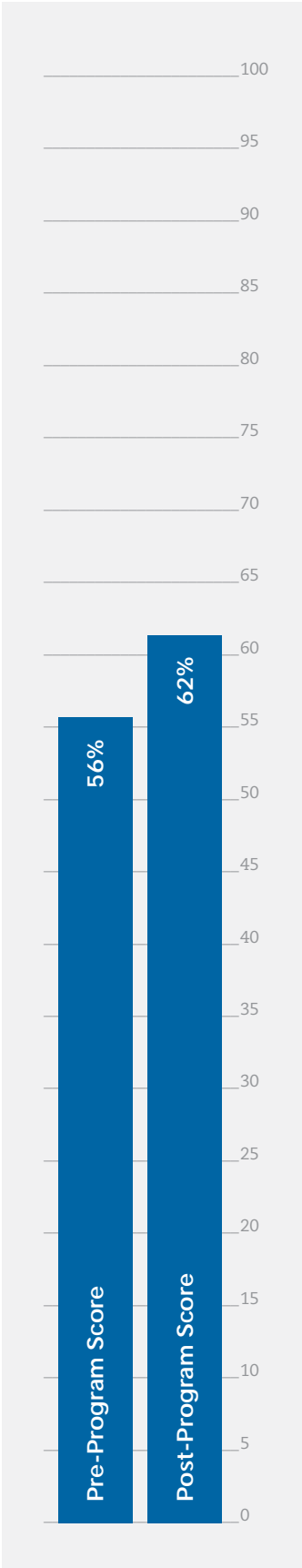


Teachers who indicated they would recommend this program to other colleagues.



Teachers who indicated they would conduct this program again.

A summary of responses can be found in Appendix D.



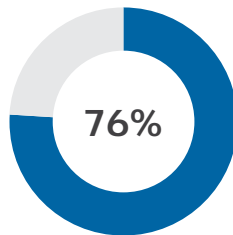
Knowledge Gained

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 56% to 62%.

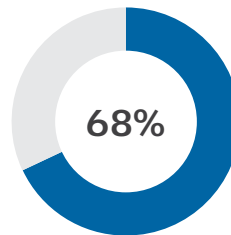
Data Obtained

Home surveys were performed by students and their families, collecting household demographic and consumption data along with program participation information.

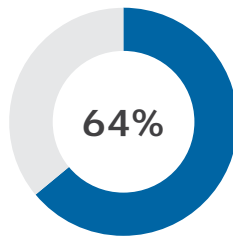
A summary of responses can be found in Appendix B.



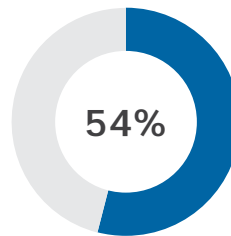
Students who indicated their family home is owned.



Students who reported that their water is heated by electricity.



Students who reported their home has a dishwasher.



Students who reported that their home was built before 1992

Water and Energy Savings Results


In addition to educating students and their parents, a primary program goal is to generate cost-effective water and energy savings. Student home surveys not only provided the data used in the savings projections, 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 LIFETIME SAVINGS	
2,303,466	gallons of water saved	15,737,917	gallons of water saved
4,012	therms of gas saved	28,862	therms of gas saved
170,246	kWh electricity saved	1,229,759	kWh electricity saved
2,303,466	gallons wastewater saved	15,737,917	gallons wastewater saved

PROJECTED ANNUAL SAVINGS PER HOME		PROJECTED LIFETIME SAVINGS PER HOME	
4,561	gallons of water saved	31,164	gallons of water saved
8	therms of gas saved	57	therms of gas saved
337	kWh electricity saved	2,435	kWh electricity saved
4,561	gallons wastewater saved	31,164	gallons wastewater saved



*“Participants and their
parents/guardians realize
actual energy savings within
their home, benefiting
two generations.”*

Program Overview


The Post Oak Savannah WaterWise™ Program, a school-based energy efficiency education program, is designed to generate immediate and long-term resource savings by bringing interactive, real-world education home to students and their families. The 2013-2014 program was taught in grade 4 in the Post Oak Savannah Groundwater Conservation District service area.

The Post Oak Savannah program team identifies and enrolls students and teachers within the designated service area. The program physically begins with classroom discussions in a Student Guide that provide the foundations of using water and energy efficiently, followed by hands-on, creative, problem solving activities led by the classroom teacher.

All program materials support state academic standards to allow the program to fit easily into a teacher's existing curriculum and requirements. The participating classroom teachers follow the Teacher Book and lesson plan. Information is given to guide lessons throughout the program in order to satisfy each student's individual needs, whether they are visual, auditory, or kinesthetic learners.

The WaterWise Kit and Student Workbook comprise the take-home portion of the program. Students receive a kit containing high-efficiency measures they use to install within their homes. With the help of their parents/guardians, students install the kit measures and complete a home survey. The act of installing and monitoring new water and energy efficiency devices in their homes allows students to put their learning into practice. Here, participants and their parents/guardians realize actual water and energy savings within their home, benefitting two generations.

A critical element of RAP program design is the use of new knowledge through reporting. At the end of the program, the Post Oak Savannah program team tabulates all participant responses—including home survey information, teacher responses, student letters, and parent feedback—and generates this Program Summary Report.



“For more than 20 years, Resource Action Programs (RAP) has designed and implemented Measure Based EducationSM programs that inspire change in household energy and water use while delivering significant, measurable resource savings.”

Program Materials

Each participant in the Post Oak Savannah WaterWise™ Program receives classroom materials and energy efficiency kits containing high-efficiency measures to perform the program's take-home activities. Program materials for students, parents/guardians, and teachers are outlined below.

Each Student/Teacher Receives

Student Guide

Student Workbook

Parent/Guardian Program Introduction Letter*

Home Survey

Certificate of Achievement

WaterWise Kit containing:

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

“WaterWise” Wristbands

Unlimited Interactive Program Website Access

Toll-Free HELP Line

Each Teacher/Classroom Receives

Teacher Book

Step-by-Step Program Checklist

Lesson Plans

Teacher Program Evaluation

Supplemental Activities*

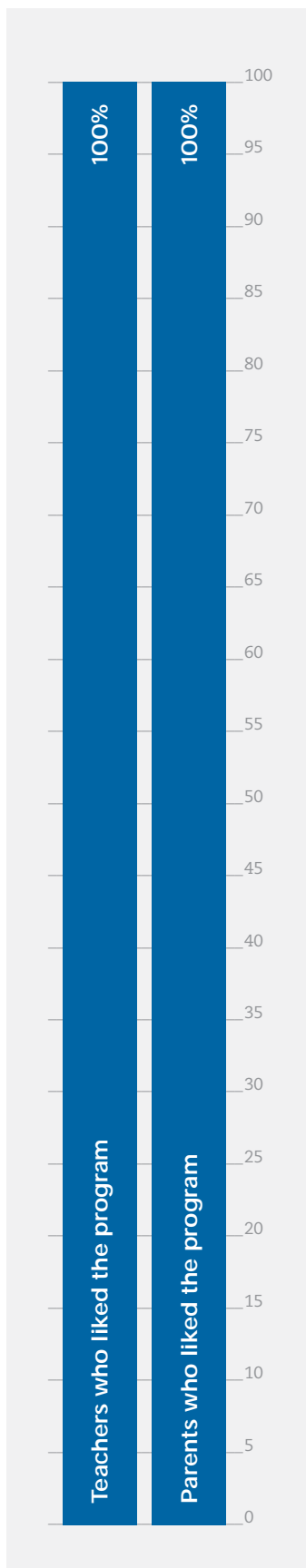
Texas State Academic Standards Chart

Pre/Post Test Answer Keys

Texas Water Poster

Self-Addressed Postage-Paid Envelope

** Materials / Installation Instructions provided in English and Spanish*



Program Customization

The Post Oak Savannah WaterWise™ Program was customized to address Texas water issues and water sources specific to Texas cities. For example, a “Texas Water” classroom poster was developed to help teachers further educate their students on water sources and regionally-specific topics such as drought, subsidence, salt water intrusion, wastewater treatment, aquifers, pumping wells and the Hydrologic Cycle.

The program was also customized to teach the importance of the Water-Energy Nexus which demonstrates that a relationship exists between both water and energy. Students learned that by saving critical water in Texas, energy is saved, and by saving energy, Texas water is also saved. This has helped students and their families reduce water consumption through their behaviors and the installation of efficiency measures.

Custom Branding


In addition to increasing resource awareness and efficiency, the program has been designed to strengthen bonds between Post Oak Savannah and the community. One of the steps taken to ensure the greatest possible exposure is to feature Post Oak Savannah branding with Texas Water Foundation’s custom design and color scheme in each WaterWise Kit. In addition to the WaterWise Kit, the Teacher Program Evaluation and Parent/Guardian Program Introduction Letter feature Post Oak Savannah branding.



Program Materials

TEACHER EVALUATION FORM

Please bring this form to your class.



Date _____
School _____
Teacher name _____
E-mail _____
Number of Student Survey Forms returned _____
Teacher Signature _____

Please answer the "Tennessee Water/Water/Water/Water" survey by filling out this Teacher Evaluation Form. Upon completion, return this evaluation, your Student Survey Forms, student thank you notes, and a letter from you to **That Co. Clean Water Conservation** in the postage-paid envelope provided.

PLEASE FILL IN THE CIRCLE THAT BEST DESCRIBES YOUR OPINION:

1. The materials were clearly written and easy to understand.

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

2. The products in the kit were easy for students to use.

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

3. Which classroom activities did you complete (check all that apply)?

☐ Concentration Circle ☐ Lettering Circle ☐ Water Wheel Cycle

☐ Text Test ☐ Pollution Cleanup

4. Students indicated that their parents supported the Program.

☐ Yes ☐ No

5. Would you conduct this Program again?

☐ Yes ☐ No

6. Would you recommend this Program to other colleagues?

☐ Yes ☐ No

7. I would like to be willing to participate on a local Teacher Advisory Board.

☐ Yes ☐ No

8. If my school or league for participation were not viable, I would like to be involved.

☐ Yes ☐ No

9. What did students like the best about the Program? Explain.

10. What did you like the best about the Program? Explain.

11. What would you change about the Program? Explain.

GET YOUR \$5.00 MIN. GRANT!

Return the following by **July 1, 2014**

- 90% of Student Survey Forms
- This evaluation form
- Student thank you notes
- A letter from you


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Teacher Evaluation Form


[illegible]

Parent/Guardian Program Introduction/Pledge Letter

This program is brought to you by:

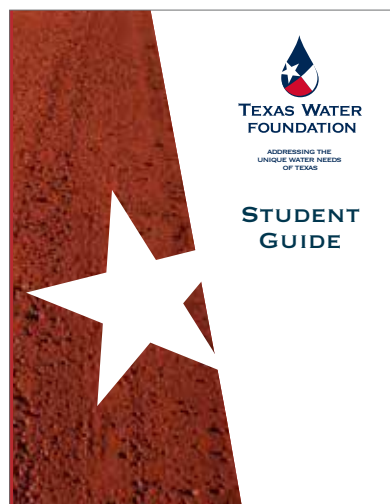


Need help? Visit
GETWISE.ORG/TEXAS
or call our TOLL FREE
help line at
1.888.GETWISE

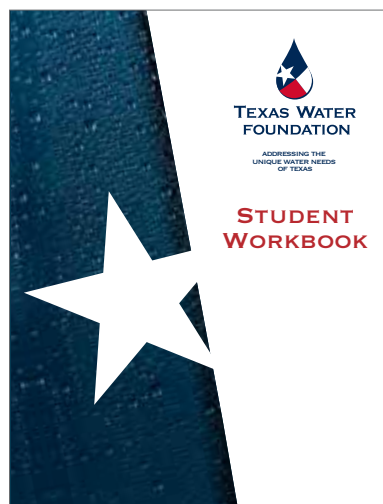


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Kit Label



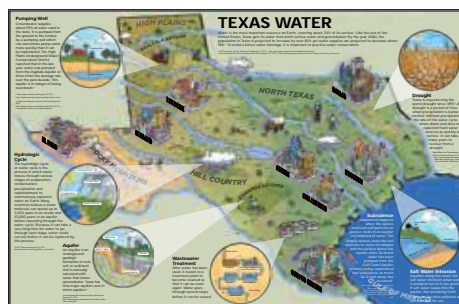
Student Guide



Student Workbook



Teacher Book




Poster



Certificate of Achievement



Kit Box



*“I love the changes you have made
with the activities. Much easier
to incorporate.”*

Shelly Tucker, Teacher

Caldwell Intermediate School

Program Implementation

The 2013-2014 Post Oak Savannah WaterWise™ Program followed this comprehensive implementation schedule:

1. Identification of Texas state academic standards & benchmarks
2. Curriculum development and refinement (completed annually)
3. Curriculum correlation to Texas state academic standards & benchmarks
4. Materials modification to incorporate Post Oak Savannah Groundwater Conservation District branding
5. Incentive program development
6. Teacher/school identification - with Post Oak Savannah Groundwater Conservation District 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 generated and distributed

Participating teachers are free to implement the program to coincide with their lesson plans and class schedules. Appendix C provides a comprehensive list of classrooms in grade 4 that participated during the 2013-2014 school year.

For more than 20 years, Resource Action Programs (RAP) has designed and implemented Measure Based EducationSM programs that inspire change in household energy and water use while delivering significant, measurable resource savings. All RAP programs feature a proven blend of innovative education, comprehensive implementation services, and hands-on activities to put efficiency knowledge to work in students' homes.

RAP has a strong reputation for providing a high level of client service as part of a wide range of energy efficiency education solutions for utilities, municipalities, states, community agencies, corporations, and more. In 2013, RAP was the only conservation services provider honored by the American Council for an Energy-Efficient Economy (ACEEE) and the Alliance for Water Efficiency (AWE) as one of 12 top programs that provides sustained achievement. RAP was honored for market penetration, innovative design, and its ability to achieve substantial/sustained energy and water savings.



Program Team

RAP implements nearly 300 individual programs that serve more than 550,000 households each year. All-inclusive program delivery occurs in its 80,000 square-foot Nevada Program Center where implementation teams and support departments work together to provide:

- 1:1 teacher support
- Curriculum development
- Customized materials
- Data tracking and reporting
- Water and energy efficiency measures
- Graphic and web design
- Kit assembly
- Marketing communications
- Shipping
- Printing
- Program management
- Participant enrollment
- Warehousing

The Implementation Team


For the Post Oak Savannah WaterWise Program, RAP assigned a specific implementation team to Post Oak Savannah Groundwater Conservation District made up of a PMP®-designated Program Manager; CEM®-designated energy analyst, graphic designer, outreach personnel, educator, and administrative staff. This team immersed themselves into the Post Oak Savannah Groundwater Conservation District brand, and handled all program implementation for Post

Oak Savannah Groundwater Conservation District. Post Oak Savannah Groundwater Conservation District also received the benefit of fully staffed support departments which worked with the implementation team to define success for Post Oak Savannah Groundwater Conservation District. These departments include education, marketing, information technology, and warehouse/logistics.

Continuous Improvement

In addition to successful implementation of the Post Oak Savannah WaterWise Program, RAP engages in continuous program improvement, as well as enhancements to educational materials, with modifications based on emerging technology, industry trends, and EM&V findings.

As part of this plan, RAP utilizes an extensive network of educators for program feedback. This feedback ensures that educational components meet the changing needs of educators, keep information relevant to students, and, in turn, provide increased energy literacy amongst program participants.



“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.”

Program Impact

The Post Oak Savannah WaterWise™ Program has had a significant impact within the community. As illustrated below, the program successfully educated participants 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. Program evaluations and comments were collected from teachers, students and parents. 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 your family install the new High-Efficiency Showerhead?

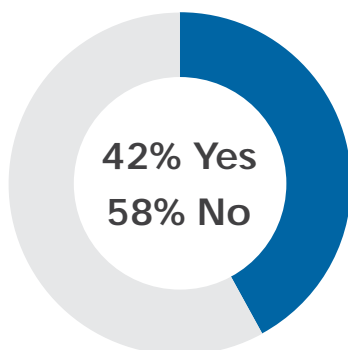
Yes - 42%

Did you work with your family on this program?

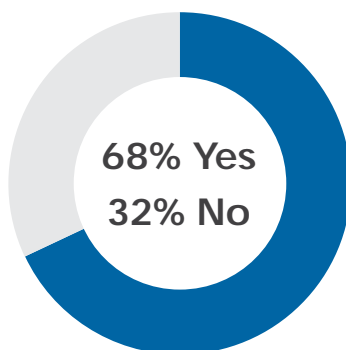
Yes - 68%

Did your family change the way they use water?

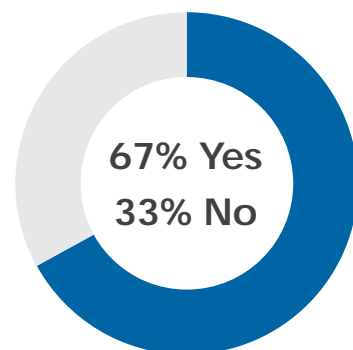
Yes - 67%



Students who indicated they installed the High-Efficiency Showerhead.



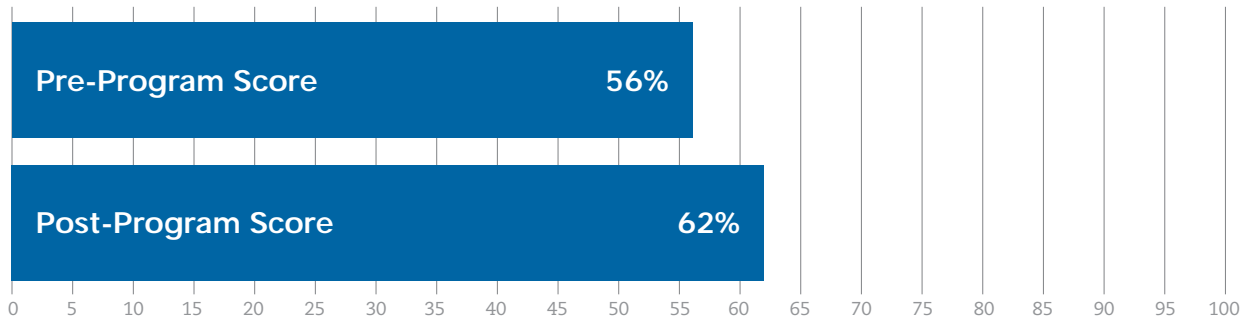
Students who indicated they worked with their family on this program.



Students who indicated their family changed the way they use water.

B. Pre-Program and Post-Program Tests

Students were asked to complete a nine-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 **56%** of the questions correctly prior to being involved in the program and then improved to answer **62%** of the questions correctly following participation.



C. Home Activities

As part of the program, parents 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, 505 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:	505	
	Annual	Lifetime
Projected reduction from Showerhead retrofit:	844,117	8,441,173 gallons
Product Life: 10 years	1,761	17,606 therms
	75,705	757,053 kWh
Projected reduction from Kitchen Faucet Aerator retrofit:	730,139	3,650,694 gallons
Product Life: 5 years	1,126	5,632 therms
	47,301	236,504 kWh
Projected reduction from Bathroom Faucet Aerator retrofit:	729,210	3,646,050 gallons
Product Life: 5 years	1,125	5,624 therms
	47,241	236,203 kWh
TOTAL PROJECTED PROGRAM SAVINGS:	2,303,466	15,737,917 gallons
	4,012	28,862 therms
	170,246	1,229,759 kWh
TOTAL PROJECTED PROGRAM SAVINGS PER HOUSEHOLD:	4,561	31,164 gallons
	8	57 therms
	337	2,435 kWh

D. Teacher Program Evaluation

Program improvements are based on participant feedback received. One of the types of feedback obtained is from participating teachers via a Teacher Program Evaluation Form. They are asked to evaluate relevant aspects of the program, and each response is reviewed for pertinent information. The following is feedback from the Teacher Program Evaluation for the Post Oak Savannah WaterWise Program.

Teacher Response

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

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.

What did students like best about the program? Explain.

“Saving Water.”

Jada Parker, Cameron Elementary School

“They liked the classroom activities. They were fun!”

Jana Beckhusen, Cameron Elementary School

“They felt they were actually able to do something.”

Shelly Tucker, Caldwell Intermediate School

“The classroom activities and their take home WaterWise kit.”

Sherri Schneider, Caldwell Intermediate School

“Using the kits.”

Laci Raspberry, Cameron Elementary School

Teacher Response

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

What did you like best about the program? Explain.

"It teaches our students about conservation!"

Jana Beckhusen, Cameron Elementary School

"I love the changes you have made with the activities. Much easier to incorporate."

Shelly Tucker, Caldwell Intermediate School

"This program fits in perfectly with our 4th grade TEKS!"

Sherri Schneider, Caldwell Intermediate School

"Showed the kids the importance of water."

Laci Raspberry, Cameron Elementary School

What would you change about the program? Explain.

"I was happy with some of the changes that were made to this program. It seemed to be more user-friendly."

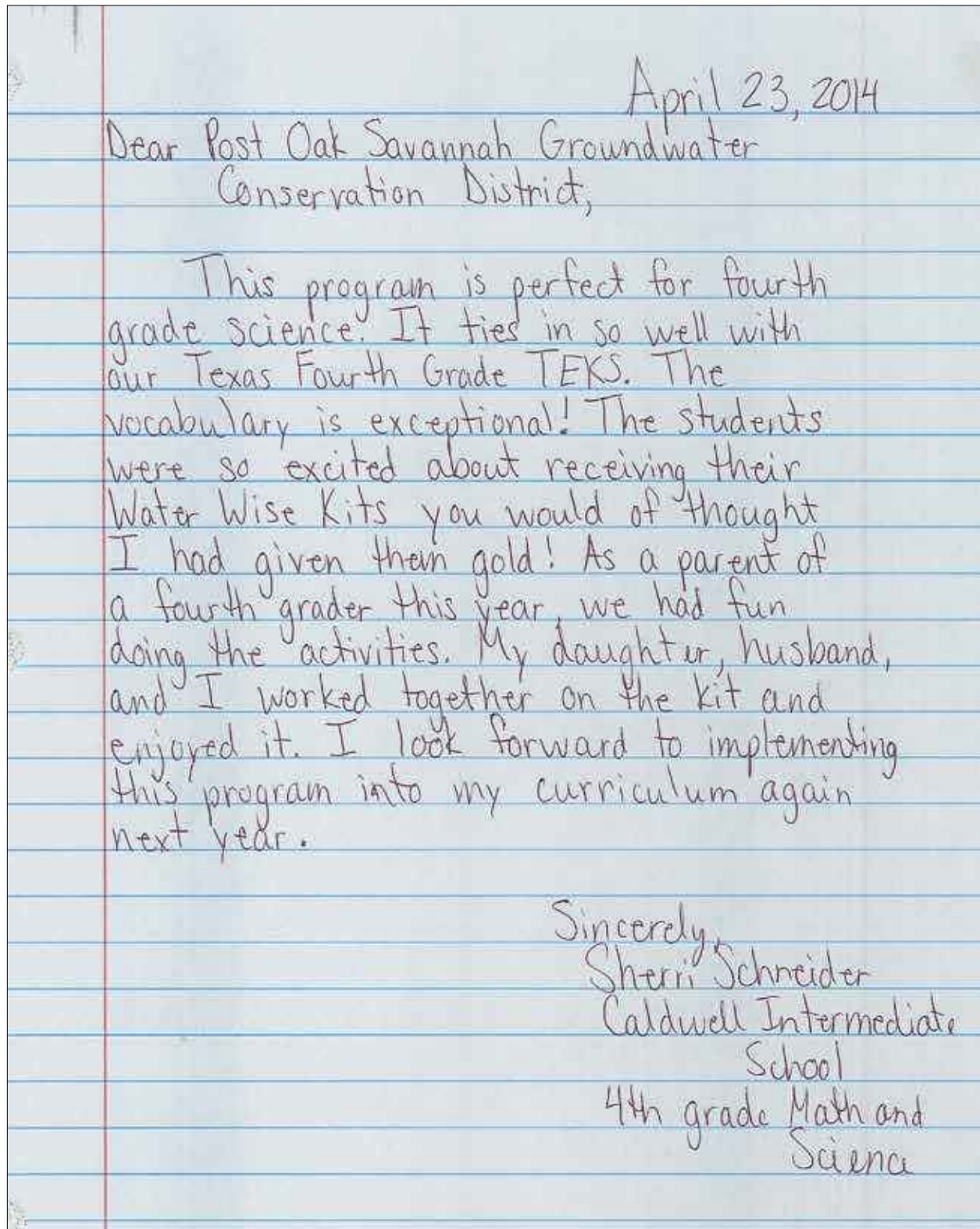
Sherri Schneider, Caldwell Intermediate School

"Some of the kit did not fit some of the kid's faucets."

Laci Raspberry, Cameron Elementary School

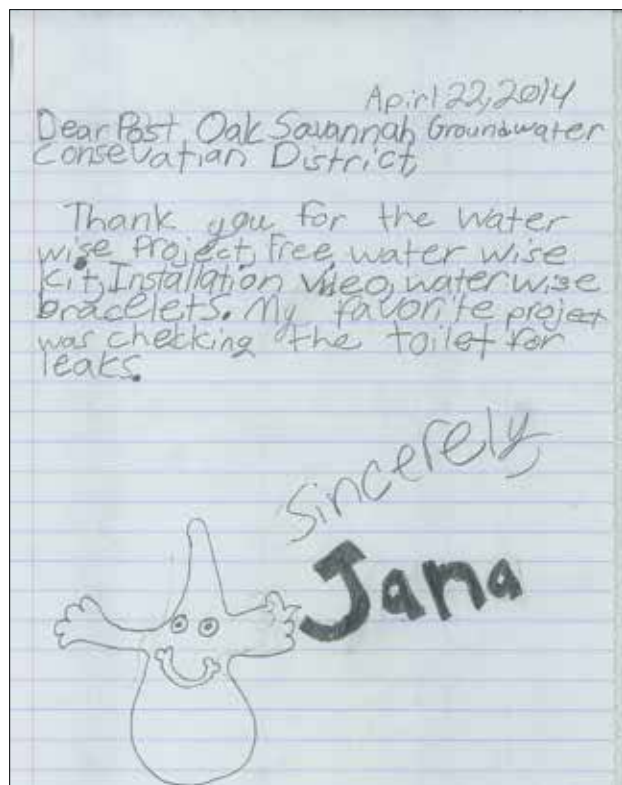
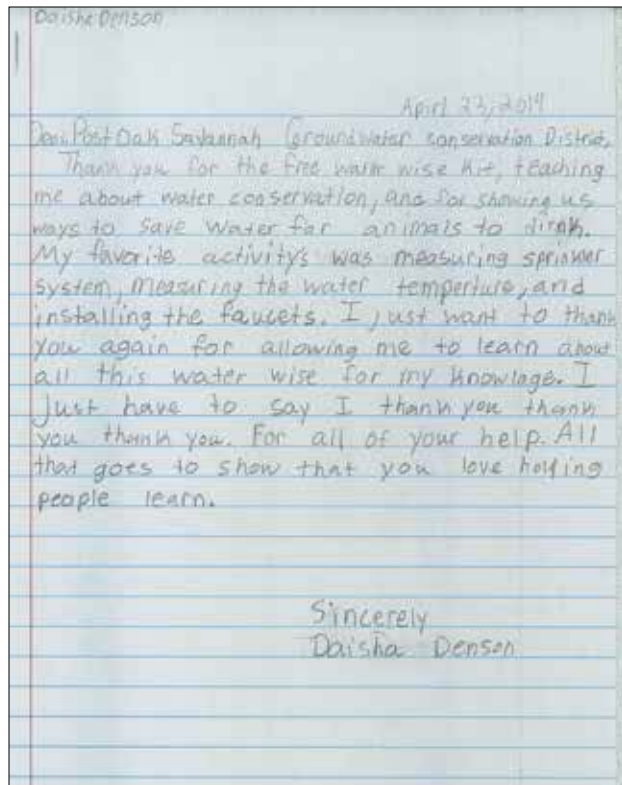
E. Teacher Letters

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



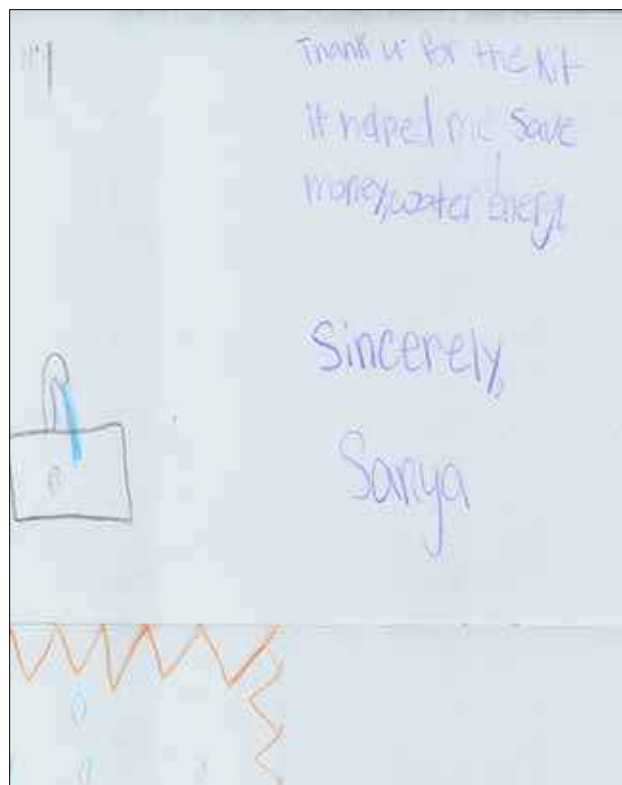
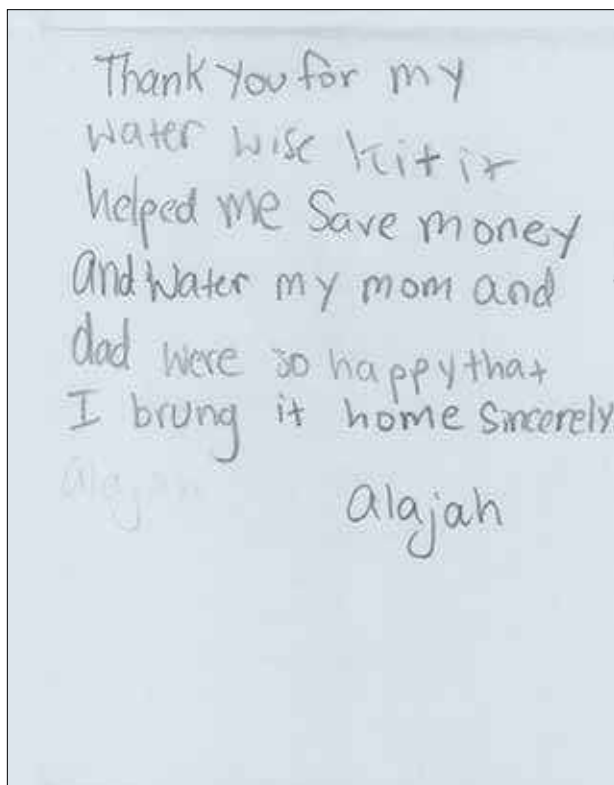
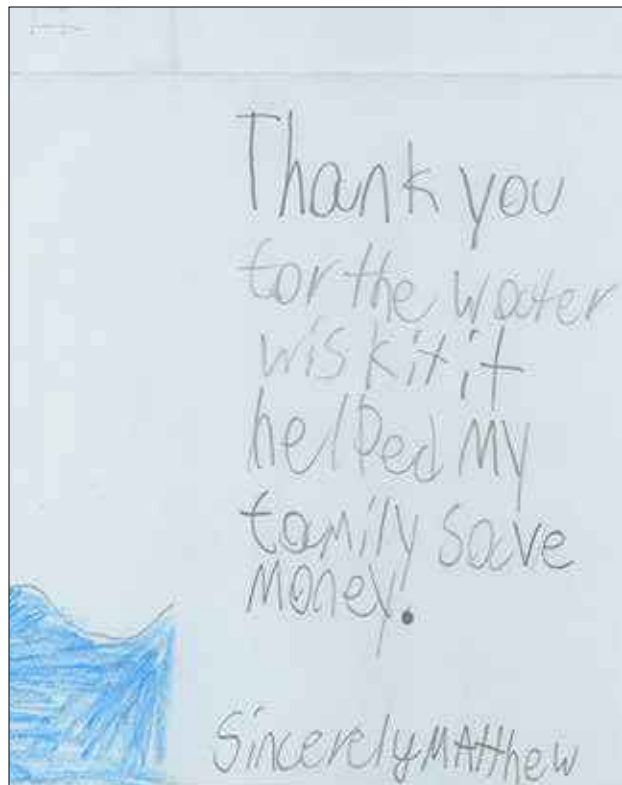
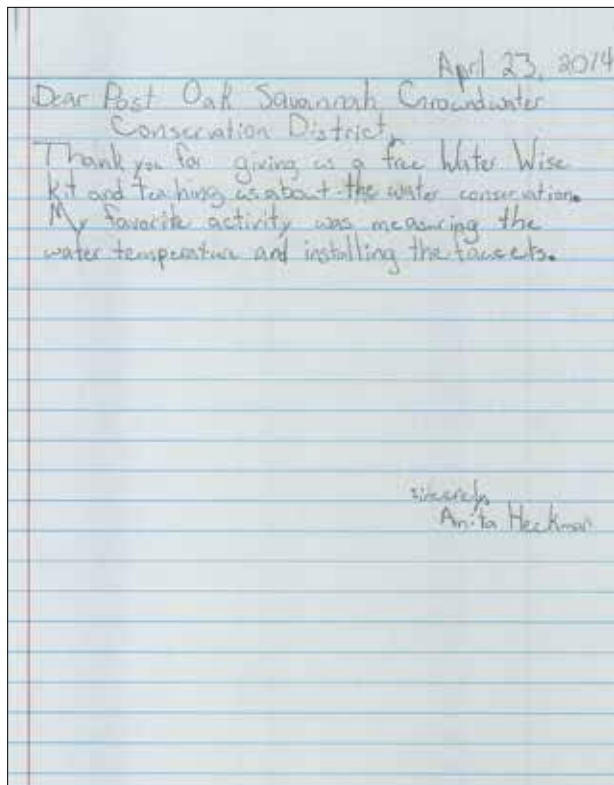
F. Student Letters

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



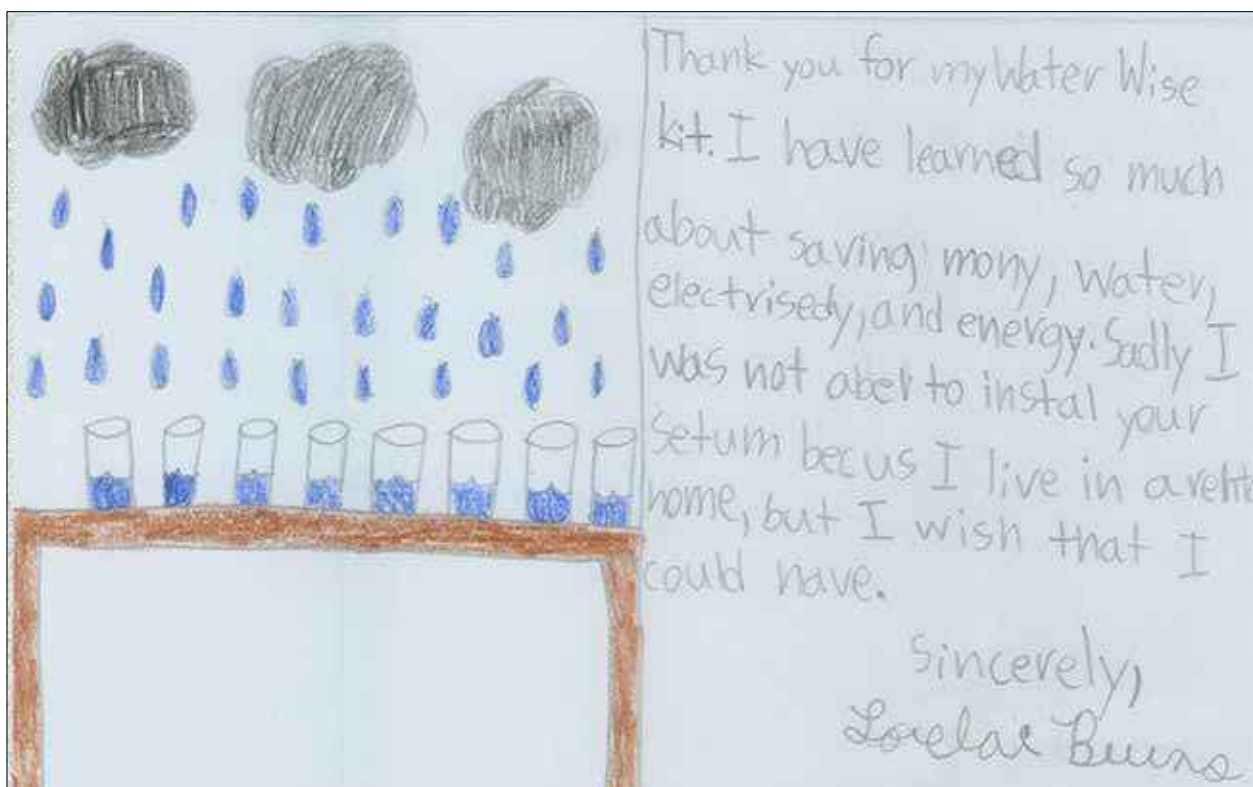
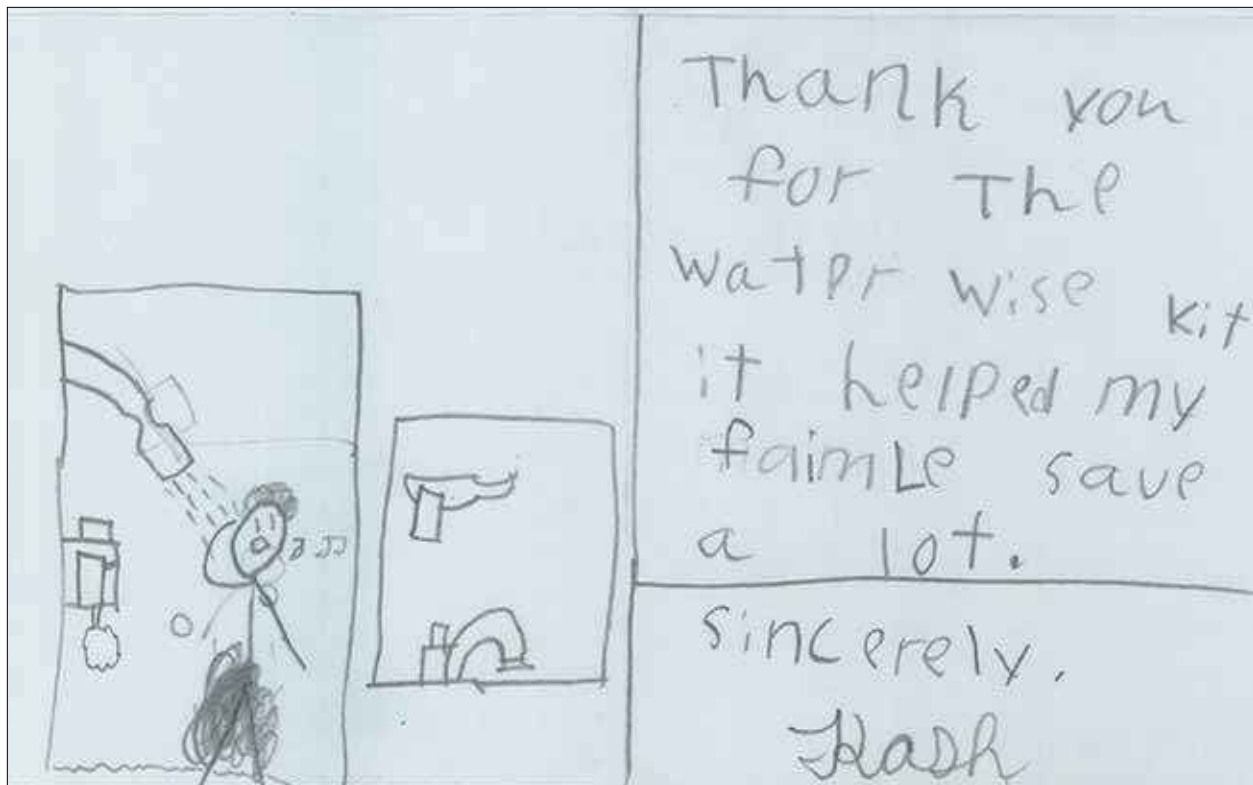
Student Letters


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



Student Letters

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





*“I was happy with some of the changes
that were made to this program.
It seemed to be more user-friendly.”*

Sherri Schneider, Teacher
Caldwell Intermediate School

Appendices

Appendix A

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Projected Savings from Showerhead Retrofit

Showerhead retrofit inputs and assumptions:

Average household size:	4.96	people ¹
Average number of full bathrooms per home:	1.81	full bathrooms per home ¹
% of water heated by gas:	31.75%	¹
% of water heated by electricity:	68.25%	¹
Installation / participation rate of:	41.71%	¹
Average showerhead has a flow rate of:	1.85	gallons per minute ¹
Retrofit showerhead has flow rate of:	1.12	gallons per minute ¹
Number of Participants:	505	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:	844,117	gallons ⁴
Showerhead retrofit projects a lifetime reduction of:	8,441,173	gallons ⁵

Projected Electricity Savings:

Showerhead retrofit projects an annual reduction of:	75,705	kWh ^{2,6}
Showerhead retrofit projects a lifetime reduction of:	757,053	kWh ^{2,7}

Projected Natural Gas Savings:

Showerhead retrofit projects an annual reduction of:	1,761	therms ^{2,8}
Showerhead retrofit projects a lifetime reduction of:	17,606	therms ^{2,9}

¹ Data Reported by Program Participants.

² (March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_nalsupstat508.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 Faucet Aerator Retrofit

Kitchen Faucet Aerator retrofit inputs and assumptions:

Average household size:	4.96	people ¹
% of homes with a dishwasher:	64.10%	¹
% of homes without a dishwasher:	35.90%	¹
% of water heated by gas:	31.75%	¹
% of water heated by electricity:	68.25%	¹
Installation / participation rate of:	37.10%	¹
Number of Participants:	505	¹
Average Kitchen Faucet Aerator has a flow rate of:	2.50	gallons per minute ²
Retrofit Kitchen Faucet 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 Faucet Aerator retrofit projects an annual reduction of:	730,139	gallons ⁵
Kitchen Faucet Aerator retrofit projects a lifetime reduction of:	3,650,694	gallons ⁶

Projected Electricity Savings:

Kitchen Faucet Aerator retrofit projects an annual reduction of:	47,301	kWh ^{4,7}
Kitchen Faucet Aerator retrofit projects a lifetime reduction of:	236,504	kWh ^{4,8}

Projected Natural Gas Savings:

Kitchen Faucet Aerator retrofit projects an annual reduction of:	1,126	therms ^{4,9}
Kitchen Faucet Aerator retrofit projects a lifetime reduction of:	5,632	therms ^{4,10}

¹ Data Reported by Program Participants.

² Vickers, Amy (2002). Water Use and Conservation. Amherst, MA: WaterFlow 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 $\{ \text{Length of use without dishwasher} + [\text{Average household size} \times \text{Length of use without dishwasher (each family member)}] \times \% \text{ of homes without dishwasher} \} + \{ \text{Length of use with dishwasher} + [\text{Average household size} \times \text{Length of use with dishwasher (each family member)}] \times \% \text{ of homes with dishwasher} \} \times [\text{Average Kitchen Aerator flow rate} - \text{Retrofit Kitchen Aerator flow rate}] \times \text{Number of participants} \times \text{Installation rate} \times 365 \text{ days}$

⁶ $\{ \text{Length of use without dishwasher} + [\text{Average household size} \times \text{Length of use without dishwasher (each family member)}] \times \% \text{ of homes without dishwasher} \} + \{ \text{Length of use with dishwasher} + [\text{Average household size} \times \text{Length of use with dishwasher (each family member)}] \times \% \text{ of homes with dishwasher} \} \times [\text{Average Kitchen Aerator flow rate} - \text{Retrofit Kitchen Aerator flow rate}] \times \text{Number of participants} \times \text{Installation rate} \times 365 \text{ days} \times \text{Product Life}$

⁷ Projected Annual Water Savings $\times [(8.33 \text{ lbs.} / \text{gallon} \times 35^\circ\text{F} - \text{T}) \div (3413 \times \text{water heater efficiency (0.90)})] \times \% \text{ of Water Heated by Electricity}$

⁸ Projected Lifetime Water Savings $\times [(8.33 \text{ lbs.} / \text{gallon} \times 35^\circ\text{F} - \text{T}) \div (3413 \times \text{water heater efficiency (0.90)})] \times \% \text{ of Water Heated by Electricity}$

⁹ Projected Annual Water Savings $\times [(8.33 \text{ lbs.} / \text{gallon} \times 35^\circ\text{F} - \text{T}) \div (100,000 \times \text{water heater efficiency (0.60)})] \times \% \text{ of Water Heated by Natural Gas}$

¹⁰ Projected Lifetime Water Savings $\times [(8.33 \text{ lbs.} / \text{gallon} \times 35^\circ\text{F} - \text{T}) \div (100,000 \times \text{water heater efficiency (0.60)})] \times \% \text{ of Water Heated by Natural Gas}$

Projected Savings from Bathroom Faucet Aerator Retrofit

Bathroom Faucet Aerator retrofit inputs and assumptions:

Average household size:	4.96	people ¹
% of water heated by gas:	31.75%	¹
% of water heated by electricity:	68.25%	¹
Installation / participation rate of:	35.45%	¹
Number of Participants:	505	¹
Average Bathroom Faucet Aerator has a flow rate of:	2.50	gallons per minute ²
Retrofit Bathroom Faucet 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 Faucet Aerator retrofit projects an annual reduction of:	729,210	gallons ⁵
Bathroom Faucet Aerator retrofit projects a lifetime reduction of:	3,646,050	gallons ⁶

Projected Electricity Savings:

Bathroom Faucet Aerator retrofit projects an annual reduction of:	47,241	kWh ^{4,7}
Bathroom Faucet Aerator retrofit projects a lifetime reduction of:	236,203	kWh ^{4,8}

Projected Natural Gas Savings:

Bathroom Faucet Aerator retrofit projects an annual reduction of:	1,125	therms ^{4,9}
Bathroom Faucet Aerator retrofit projects a lifetime reduction of:	5,624	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°F T) ÷ (3413 x water heater efficiency (0.90))] x % of Water Heated by Electricity

⁸ Projected Lifetime Water Savings x [(8.33lbs. / gallon x 35°F T) ÷ (3413 x water heater efficiency (0.90))] x % of Water Heated by Electricity

⁹ Projected Annual Water Savings x [(8.33lbs. / gallon x 35°F T) ÷ (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°F T) ÷ (100,000 x water heater efficiency (0.60))] x % of Water Heated by Natural Gas

Home Check-Up

1 What type of home do you live in?		
Single family home (mobile)		17%
Single family home (manufactured)		13%
Single family home (built)		60%
Multi-family Home (2-4 units)		6%
Multi-family home (5-20 units)		3%
Multi-family home (21+ units)		1%
2 Was your home built before 1992?		
Yes		54%
No		46%
3 Is your home owned or rented?		
Owned		76%
Rented		24%
4 How many kids live in your home (age 0-17)?		
1		10%
2		38%
3		27%
4		15%
5+		10%
5 How many adults live in your home (age 18+)?		
1		10%
2		70%
3		13%
4		5%
5+		2%
6 Does your home have programmable outdoor sprinkler system?		
Yes		21%
No		79%
7 Does your home have a dishwasher?		
Yes		64%
No		36%
8 How many half-bathrooms are in your home?		
0		74%
1		21%
2		3%
3		1%
4+		1%

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

Home Check-Up

(continued)

9 How many full bathrooms are in your home?

1	32%
2	59%
3	7%
4	1%
5+	2%

10 How many toilets are in your home?

1	24%
2	57%
3	16%
4	2%
5+	0%

11 How is your water heated?

Natural Gas	32%
Electricity	68%

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

Home Activities

1 What is the flow rate of your old showerhead?	
0 - 1.0 gpm	14%
1.1 - 1.5 gpm	21%
1.6 - 2.0 gpm	28%
2.1 - 2.5 gpm	18%
2.6 - 3.0 gpm	10%
3.1+ gpm	9%
2 Did you install the new High-Efficiency Showerhead?	
Yes	42%
No	58%
3 If you answered "yes" to question 2, what is the flow rate of your new showerhead?	
0 - 1.0 gpm	40%
1.1 - 1.5 gpm	31%
1.6 - 2.0 gpm	29%
4 Did your family install the Kitchen Faucet Aerator?	
Yes	37%
No	63%
5 Did your family install the Bathroom Faucet Aerator?	
Yes	35%
No	65%
6 Did your family lower your water heater settings?	
Yes	33%
No	67%
7 Was your toilet leaking?	
Yes	22%
No	78%
8 If you answered "yes" to question 7, were the leaks repaired?	
Yes	26%
No	74%
9 How many faucets are leaking?	
0	71%
1	21%
2	5%
3	2%
4	1%
5	1%

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

Home Activities

(continued)

10 If you answered "yes" to question 9, were the leaks repaired?		
Yes, all of them		30%
Yes, some of them		13%
No		57%
11 Did your family adjust the outdoor watering schedule?		
Yes		22%
No		78%
12 Did you work with your family on this Program?		
Yes		68%
No		32%
13 Did your family change the way they use water?		
Yes		67%
No		33%
14 How would you rate the WaterWise™ program?		
Great		38%
Pretty good		35%
Okay		24%
Not so good		3%

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

Participant List

SCHOOL NAME	TEACHER NAME	T	S
Buckholts School	Laura Baker	1	13
Caldwell Intermediate School	Shelly Tucker	1	38
Caldwell Intermediate School	Brandi Easterwood	1	39
Caldwell Intermediate School	Jill McRae	1	36
Caldwell Intermediate School	Sherri Schneider	1	38
Cameron Elementary School	Jada Parker	1	39
Cameron Elementary School	Jana Beckhusen	1	39
Cameron Elementary School	Laci Raspberry	1	20
Cameron Elementary School	Lydia Muniz	1	20
Rockdale Intermediate School	Amber Brooks	1	120
Somerville Elementary School	Jessica Jackson	1	40
Thorndale Elementary School	Cheryl Brian	1	51
TOTALS		12	493
TOTAL PARTICIPANTS		505	

Note: "T" represents number of teachers and "S" represents number of students

Teacher Program Evaluation Data

1 The materials were clearly written and well organized.		
Strongly Agree		60%
Agree		40%
Disagree		0%
Strongly Disagree		0%
2 The products in the Kit were easy for students to use.		
Strongly Agree		60%
Agree		40%
Disagree		0%
Strongly Disagree		0%
3 Students indicated that their parents supported the program.		
Yes		100%
No		0%
4 Would you conduct this Program again?		
Yes		100%
No		0%
5 Would you recommend this program to other colleagues?		
Yes		100%
No		0%
6 If my school is eligible for participation next year, I would like to enroll.		
Yes		100%
No		0%

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

Teacher Letters

(continued from page 24)

February 26, 2014

Dear Sir,

Thank you so much for sponsoring the Texas Water Foundation Water Wise Program. This is a wonderful program which teaches our student how to conserve water. All of my students were very excited when they receive the student kits. Many of the students completed the activities quickly and were very surprised to find out how much water they were wasting daily. They found out that by installing these simple devices they were able to save water and reduce their energy bills.

I look forward to participating in this program again next year.

Sincerely,



Jana Beckhusen
4th Grade Teacher
Cameron Elementary School
P. O. Box 712
Cameron, TX 76520

Teacher Letters

(continued)

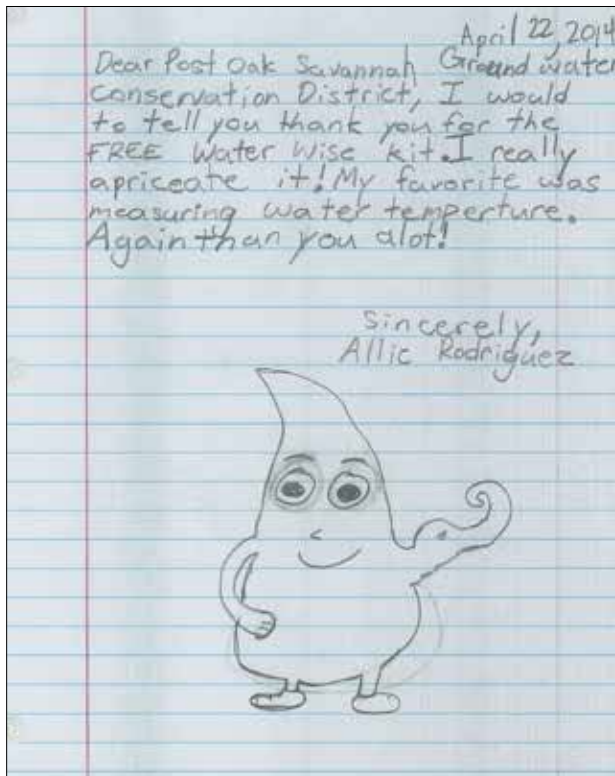
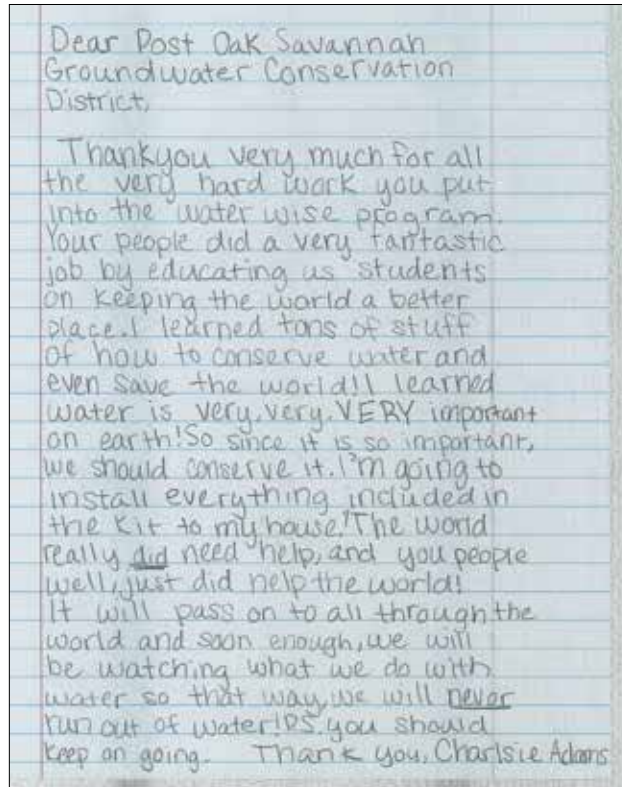
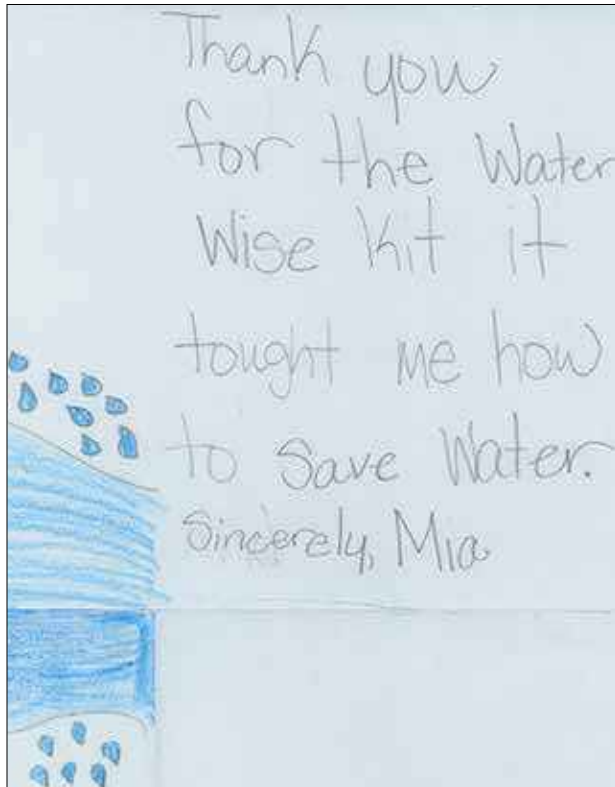
Thank you very much
for sending the materials
for my students. The
students enjoyed the
activities at school and
at home. I think this
is very valuable for them.

Thank You!

Brandi Eastwood
C/S
4th Grade

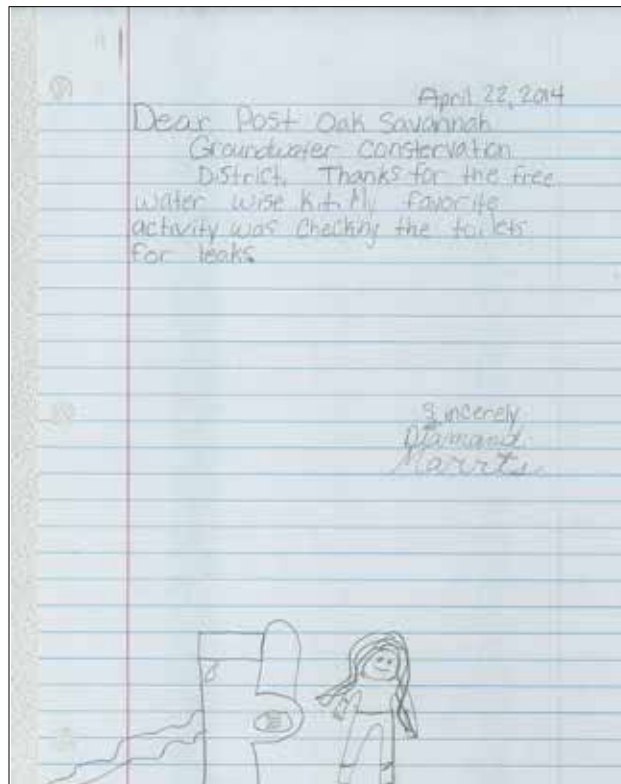
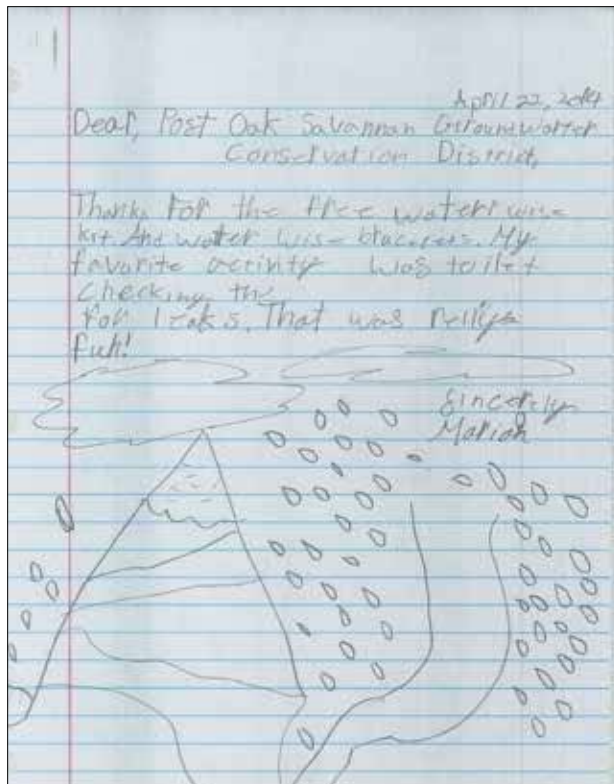
Student Letters

(continued from page 25)



Student Letters

(continued)



Student Letters

(continued)


Thank you for
the water wise
kite. I learn to save
water, money, electricity,

Sincerely
Edgar
garcia

Thank you
for the water
wise kit now
I can save
water and
money/energy.
Sincerely, [Signature]

April, 23, 2014
Dear Post Oak Savannah Groundwater
conservation District,
Thank you for letting us
have the kit for free. It
was so fun putting in the
shower head.

Sincerely,
Paulina Gausin



Thank you for the
water wise kit. It
helped me save money and
water.

Sincerely, [Signature]

April 23, 2014
Dear Post Oak Savannah Groundwater
Conservation District,
Thanks for the free water wise kit
and the project. My favorite activity
is checking the toilet for leaks.

Sincerely,
Elinorka

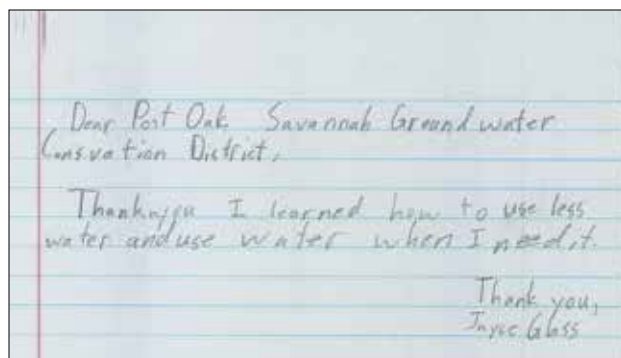
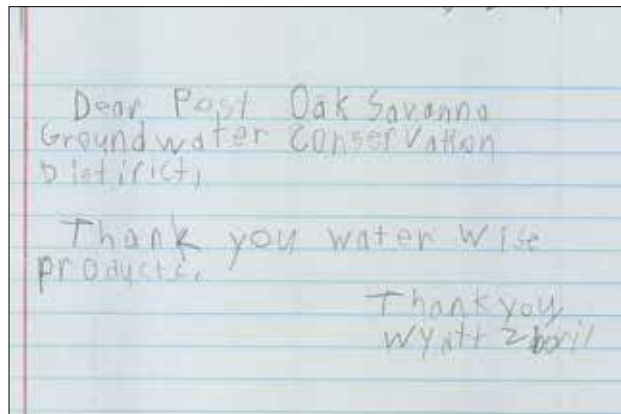
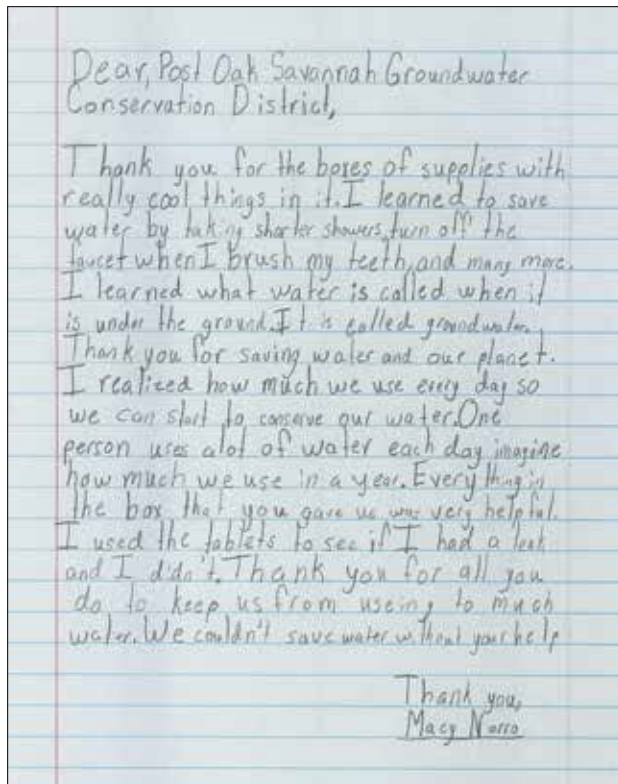
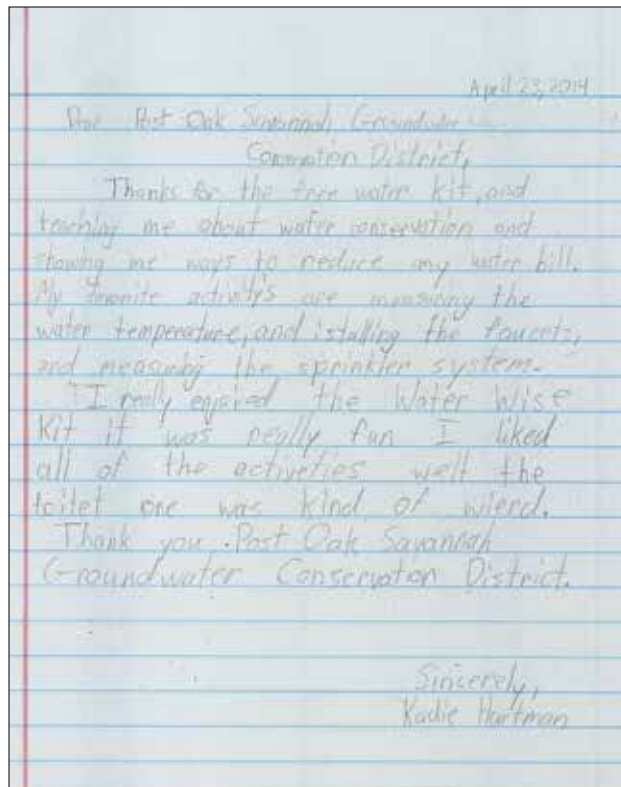
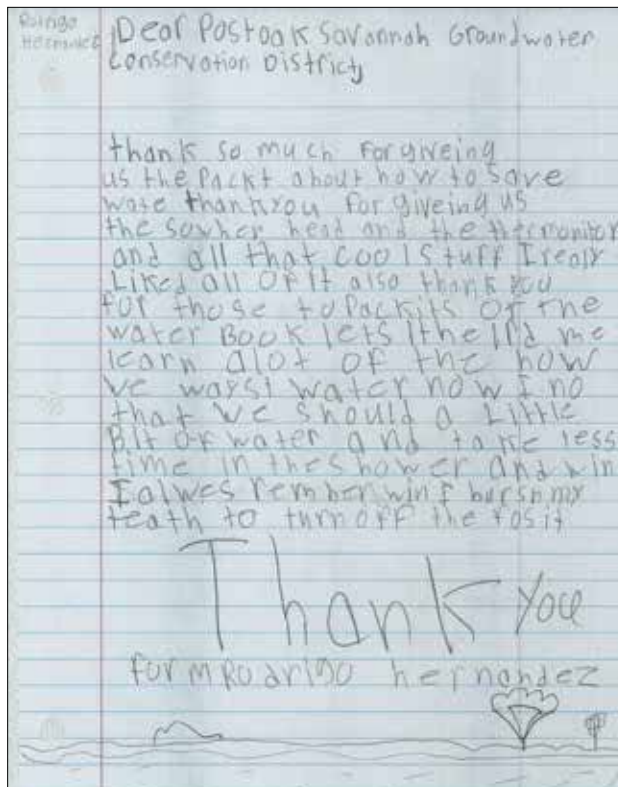
91

Thank you for the expensive
kit to teach me about
saving money, energy, and even
water. So thank you for
the so helpful Water
Wise Kit for my family.
P.S. It really save a LOT!!!

Sincerely,
Clayton Hixson

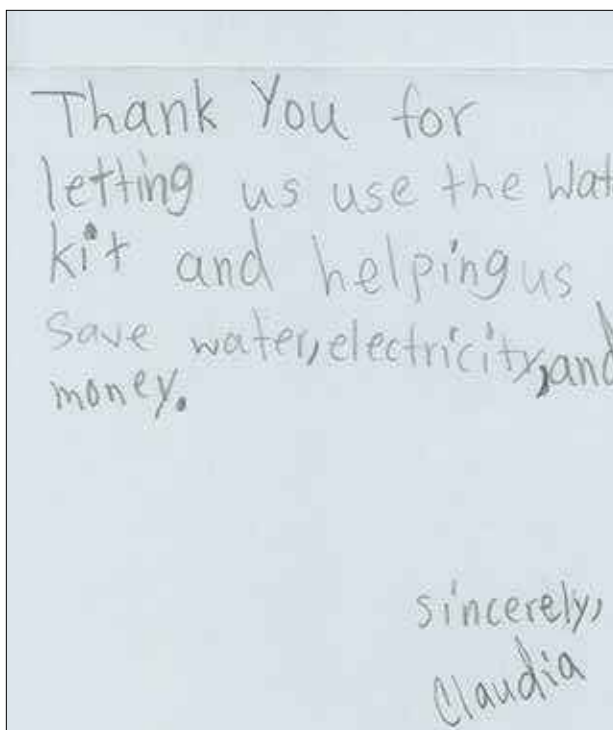
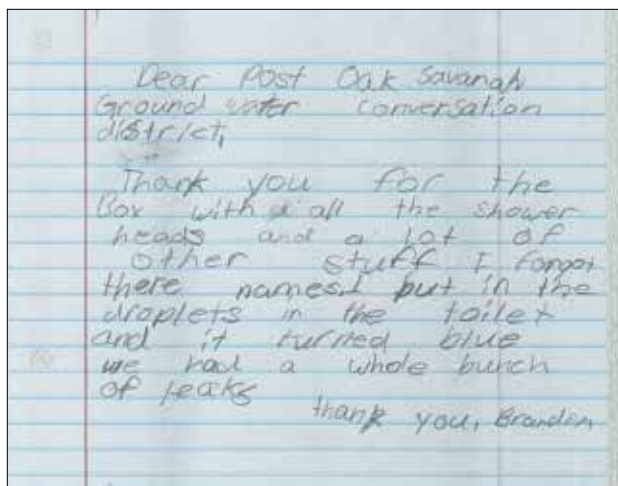
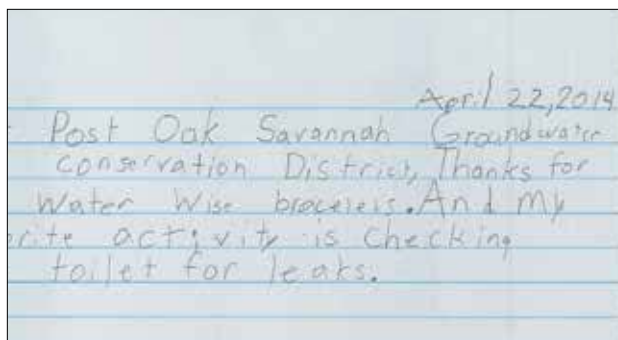
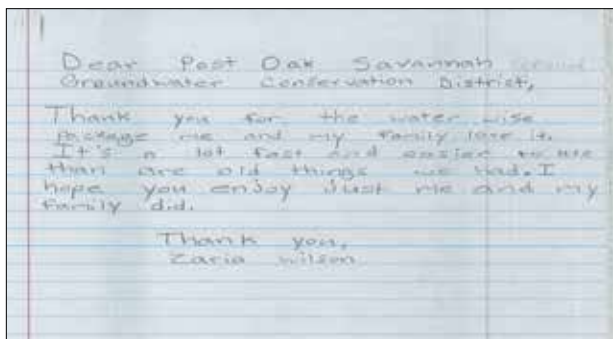
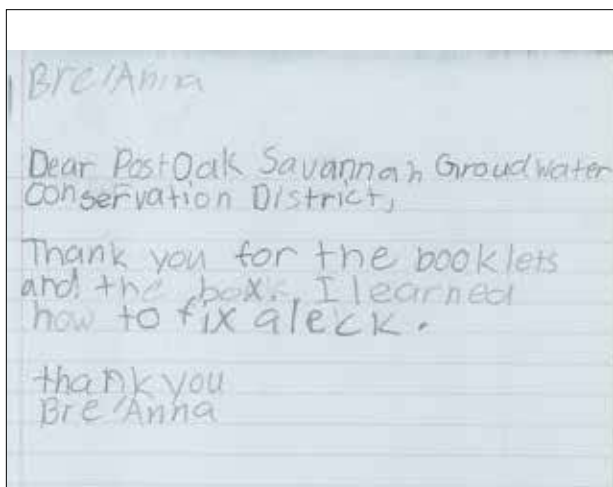
Student Letters

(continued)



Student Letters

(continued)



Student Letters

(continued)


April 22, 2014
 Dear Post Oak Savannah
 Groundwater Conservation
 District, Thank you for
 the water wise Project.
 My favorite activity is changing
 faucets.
 Sincerely
 Tomas

Thank you for
 the waterwise
 Kit it helped
 me save water.

Thank you for the water wise
 kit. It help me save water, money
 and other things. I am very please
 for the kit.
 Sincerely,
 Fabian
 Salmon

April 23, 2014
 Dear Post Oak Savannah Groundwater
 Conservation District,
 Thank you for donating
 the water wise kit and teaching
 me about water conservation.
 My favorite activity is installing
 the faucets. Once again thank
 you.
 sincerely,
 Ryan Skupak

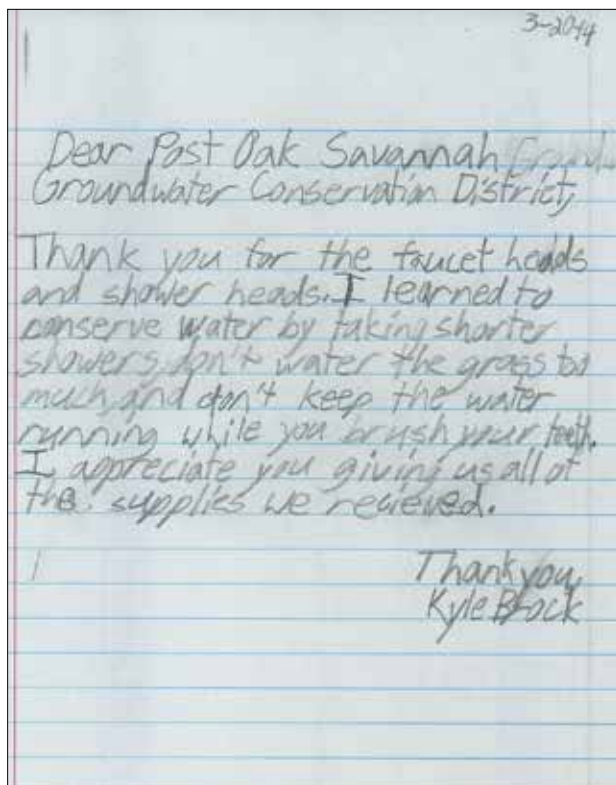
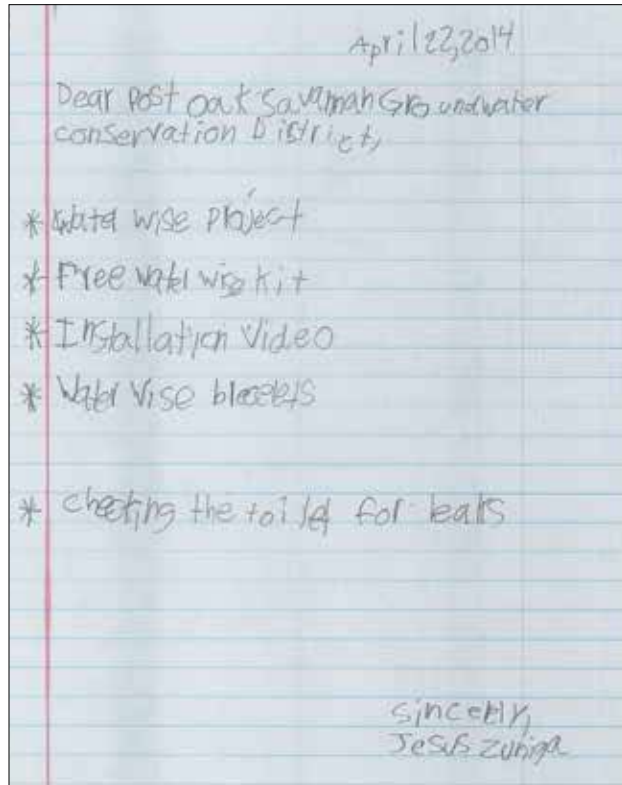
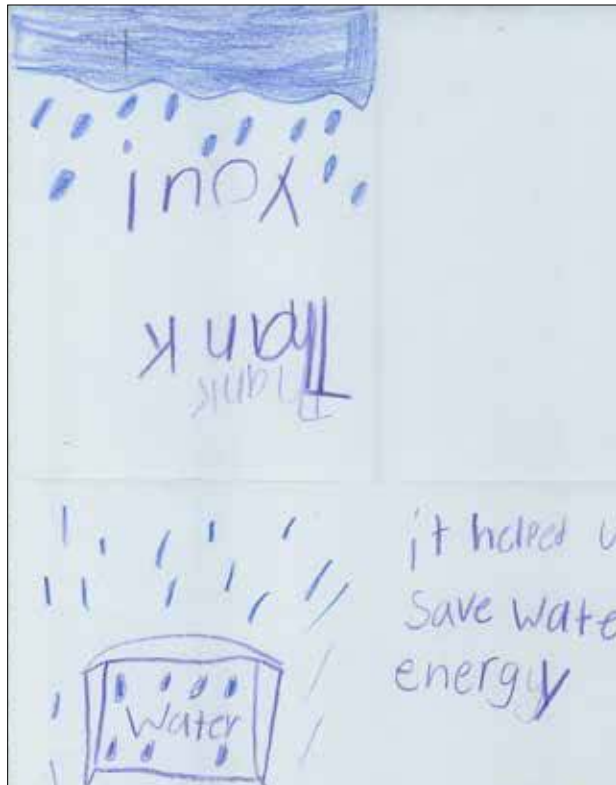
thank you for the water
 wise kit, it helped me and
 my family save money, energy and
 electricity.
 Sincerely, Natalie
 Reyes



Thank you
 for the
 Kit it helped
 Sincerely,
 John Pierce

Student Letters

(continued)



Student Letters

(continued)

Dear Post Oak Savannah Groundwater Conservation District,

I learned that there are many ways we can save water by using the items in your kit and other ways we can help like taking shorter showers, only use the dishwasher and the dryer and washer only on full loads of dishes or clothes. Your kit also helps keep our water bills low so we can save money. Your kit helps a lot.

Thank you,
Jonathan Perkins

Dear Post Oak Savannah Conservation District,

Thank you for all the cool tools you gave us in the box. Also, for the books. Thanks for teaching me so much about saving water. It was very fun!

money, energy, electrical, and the

water

Sincerely
Meranda Hernandez

April 23, 2014

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for giving us this water wise kit. My favorite was the leaking toilet check. Thank you.

Sincerely
Cole Becklen

April 22, 2014

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for giving us the free water wise kits, and bracelets. My favorite thing was measuring the water temperature.

Sincerely,
Rachel Reless

Thank you Water Wise Program. I Love Water to Drink. It Helps you Survive. So I will Save Water as good as I can. I Have a question if you can answer Can you do this next year

Sincerely Heathyl.

Student Letters

(continued)

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for giving our for the books and boxes with materials because it taught me how to save water at home, and to turn off faucet when you are not using it.

Thank you,
Ahmya Carlson

Thank you for everything you've done for us. You've helped millions of families out. You've also made a lot of things cheaper like electric bill and water bill.

April 22, 2014
Dear Post Oak Savannah Groundwater Conservation District, Thanks for the Water Wise Project and the Installation Video even for the water wise bracelets. But my favorite activity was changing my faucet.

Sincerely,
Richard Hane

April 23, 2014
Dear Post Oak Savannah Groundwater Conservation District,
I thank you for giving us a free water wise kit. My favorite activity was installing the water faucets. Once again thank you for everything.

Sincerely,
Nataly Escobedo

Thank you for the kit it helped us save money, energy, and water. My family is very happy because now we have enough money to do stuff now.

Sincerely,
Clint

Dear Post Oak Savannah Conservation District,

And thank you for all the supplies we need to save water and thank you for the booklets, too. And I think you're doing just fine at your job. And maybe you can come up with more cool ways to save water.

Thank you
Dustin Keith Vess


Student Letters

(continued)

Dear Post Oak Savannah
Groundwater Conservation District,

Thank you for all the water wise thing. The shower head saved us a lot of money. My family and I put the things in because my brother takes a long shower. We told him to take less time in the shower. I'm glad are toilet didn't have any leaks. I learned that there is very little water for humans to drink.

Thank you,
Cameron Rutherford



YOU
THANK

Thank you for
our water kit
it helped me
save water and
energy

Sincerely
Jazmin

Dear Post Oak Savannah
Ground water conservation
District,

Thank you for the box
and booklets you sent us.
I enjoyed learning about how
we could save water. The
thing in the box were fun to
do. The booklets taught me
a lot about saving water.

Thank You,
Caylee
Garza

Thank you for my
kit it helped me
save water and energy
and money.

Sincerely,
Nolan

Student Letters

(continued)

Dear Post Oak Savannah Groundwater
Conservation District,

Thank you for giving me cool
stuff in the box. I learn that
when you save water you
help by not making your mom
pay the water bill. And we can
also save water by not using
so much clean water so that
we have a little bit more
of clean water.

Thank you for our water
wise kit. It helped my
family save water, and
energy.

Sincerely,
Kyli

April 22, 2014

Dear Post Oak Savannah Groundwater
Conservation District,

Thank you for the free Water Wise
Kit. My favorite activity was the
checking the toilet for leaks.

Sincerely,
Alex

April 22, 2014

Dear Post Oak Savannah Groundwater
Conservation District, Thank you
for the Water Wise Project,
the free Water Wise Kit, the
Installation Video, and the
Water Wise Bracelets. My
Favorite activity was the
measuring sprinkler system.

Sincerely,
Courtney Matthews

April 22, 2014

Dear Post Oak Savannah Groundwater
Conservation District

Thank you, for the water wise project
it was really fun to get to do all of that.
But my favorite activity was the toilet
project.

Sincerely,
Gracie Lopez

Thank you
for the
water wise kit
it saved me
a lot of time and
money

Sincerely
Joseph

Student Letters

(continued)

April 22, 2014
 Dear Post Oak Savannah Groundwater Conservation District,
 Thank you for letting us have this project for free!
 My favorite activity is checking the toilets
 for leaks.
 Sincerely,
 Laramie Pieper

Thank You
 for providing
 the Water Wise
 kit. I'm really saving
 water, money, energy
 and electricity.
 sincerely,
 Shawn

Thank you for the water
 Wise Kit and it helps
 me by saving water and
 electricity.
 Sincerely,
 Logan Houston

April 23, 2014
 Dear Post Oak Savannah Groundwater Conservation
 district,
 Thank you for teaching me about water
 conservation. My favorite activity was checking
 my toilets for leaks. Thank you again
 for helping me learn to save water.
 Sincerely,
 Wyatt Stelag

Dear Post Oak Savannah Groundwater
 Conservation District,
 Thank you for the box and the
 booklet. I had really fun doing
 the activities with the booklet and
 I will keep supporting the water wise
 program. Thank you for the supplies
 in the box like the shower head,
 dvd, the motor, sink heads, and
 Thank you
 Jordan
 Plante

Dear Post Oak Savannah
 Groundwater Conservation
 District,
 Thank you Post Oak
 Savannah Groundwater
 Conservation District for
 all of the supplies you gave
 us. I really enjoyed the
 materials.
 Thank you
 Maegan Schneider

Student Letters

(continued)

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for the pipe and water conservation kit and for conserving our water and for the water conservation book. I learned how to conserve water by taking shorter showers turn off the faucets when you're not using it.

Thank you,
Colton Murrell

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for letting us have the Texas Water Foundation student guide book and the student work book and the box with all the tools to do activities with. I learned a lot of really cool stuff and I thought the activities were fun. I'm glad you gave us the water books and all the tools to go with the books.

Thank you,
Harlee Taylor

Dear Post Oak Groundwater Conservation District,

Thank you for letting us use the box. I enjoyed it very much. A couple things I learned was to fix leaky faucets, don't leave the water running when you are brushing your teeth.

Thank you,
Zaylee Morgan

Thank you for the water wise Kit and you helped me save water. Sincerely

Mason

Save Water

Student Letters

(continued)

3/20/14

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for giving us the water wise kits. I have learned a lot about how to conserve water. Thank you also for the student work and guide book you gave us. I will use everything in the kit you gave us.

Thank you,
Garrett Jitta

April 23, 2014

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for giving us the water wise kits. I will use everything in the kit you gave us.

April 23, 2014

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for the free water wise kit and thank you for showing me ways to reduce our water bill from the kit my favorite activity is the checking the toilet for leaks thank you ☺

Sincerely,
Ilan Grados

Dear Post Oak Savannah Groundwater Conservation District,

Thank you very much for the package and I think conserve water is fun, but sometimes difficult. I understand that water has value and you try to do this next year. Me and my family love the idea. I hope you do this for 5th grade!

Your conservers
Seth Schulz

Dear Post Oak Savannah Groundwater Conservation District,

Thank you for the Water Wise kit and booklets. You helped me learn a lot about water.

Thank you,
Tanner Kubicki

Student Letters

(continued)

Dear Post Oak Savannah
Groundwater Conservation District,

Thank you for the kit with
all the materials we needed for us to
conserve water. What I learned is that
by putting in the high-efficiency
showerhead you can save a lot of
money and water. Again thank you
for all the materials.

Thank you,
Ephie Goodman

April 23, 2014
Dear Post Oak Savannah Groundwater
Conservation District,
Thanks for the free water wise
kit teaching us about water
conservation. Showing us ways
to reduce our water bill.
My favorite activity was
measuring sprinkler system,
measuring the water temperature.

Sincerely,
Blake Hall

April 2
Dear Post Oak Savannah groundwater
conservation District,
Thanks for giving us a free water
wise kit, and thank you for giving
us free water. My favorite water kit
is the shower head, and rain gauge.

sincerely
Jamari Hewitt

April 22, 2014
Dear Post Oak Savannah Groundwater
Conservation District,
Thanks for free water wise kit.
My favorite activity is checking
the toilet for leaks.

sincerely, Jacealy

April 23, 2014
Dear Post Oak Savannah Groundwater
Conservation District,
Thanks for the Free Water Kit
Showing us ways to reduce our water bill
and Teaching us about water conservation.
My favorite activity was measuring
sprinkler system.

Sincerely,
Trysta Fernandez

April 23, 2014
Dear Post Oak Savannah Groundwater
Conservation District,
Thanks for showing us ways to
reduce our water bill, free water wise kit,
and for teaching us about water conservation.
My favorite activity is checking the toilet
for leaks. I just want to say thank you
for all your efforts.

Sincerely,
Jonathan Olivera



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