

SNOHOMISH COUNTY ELEMENTARY SCHOOL WASTE REDUCTION AND RECYCLING PROGRAM

School-wide Assembly, Classroom Workshops, and Technical Assistance and Action Projects

2013 EVALUATION REPORT



*Prepared by Triangle Associates, Inc. with Christine Patmont
February 2013 - January 2014*

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Program Background and Overview

In 2013, Waste Management continued working with Triangle Associates, Inc. to offer waste reduction and recycling for elementary schools in the Waste Management service areas of Snohomish County. The intent of the program is to educate students and their families on why and how to reduce waste, increase recycling and compost, and support schools interested in setting up or improving their recycling infrastructure. The program consists of three key components: an all-school assembly show (targeted at grades K-6); individual classroom workshops (grades 2-6); and technical and project assistance to an entire school (all students/staff). All components of the program are evaluated for both effectiveness and to gain teacher feedback. Key messages, scripts and materials for program components were developed with consultation and oversight by Waste Management and Snohomish County.

While the three core components of the program continued to build upon the 2012 pilot, each piece was enhanced and expanded upon for 2013. Based on recommendations, the Triangle team added the following to the 2013 program components.

- **Assembly:** Created an assembly discussion guide that provides key vocabulary and facts, discussion questions, online resources, and age-appropriate activities for teachers to use with their classes both before and following the assembly. Made minor revisions to assembly script to further encourage students to take new information home to families.
- **Workshops:** Made revisions to workshop scripts to incorporate feedback from 2012 pilot and better address students' frequently asked questions. Changed the name of *Recycling 101* to *Sort it Out* and enhanced the separation between Primary and Intermediate versions. Created a "4R Activity and Coloring Pages" booklet for students with activities, coloring pages, and ideas for how to reduce waste and recycle. Also, revised the "Home Survey" take-home assignment to connect more with families and understand recycling questions and concerns from the community.
- **Technical Assistance and Action Projects:** Developed a Green Team support program component to support individual classrooms and student groups with projects that serve to educate their school community on recycling and waste reduction. Created a leave-behind document that provides simple guidelines and resources for structuring a school's recycling program. The document walks staff through steps needed to ensure a successful school-wide recycling program and includes sample PA announcements, classroom curriculum connections and related online recycling resources.



All aforementioned items may be found in Appendix A and B of this report. The Table 1 provides an overview of the program components and numbers served in the Waste Reduction and Recycling Program in 2013.

TABLE 1
Program Activities

Program Component	Activity	# of Schools	# of Districts	# of Programs	# of Students /Teachers
Assembly	School-wide assembly teaches the four Rs, and the importance of keeping waste out of the landfill.	27 ¹	13	37	9,839
Classroom Workshops	Classroom workshops expand on concepts introduced in the assembly.	40	14	234	6,217
Technical Assistance	Technical assistance helps schools implement or improve waste reduction and recycling programs.	17	7 Districts, 1 private	26 visits	10,136
Green Teams	Green Teams support student groups with projects to increase school-wide recycling.	5			
TOTAL CONTACTS					26,192 ²

1. Two additional assemblies were presented for an America Recycles Day event at the Brightwater Learning Center
2. This number reflects the total number of student and teacher contacts, understanding that they may have participated in multiple program components.

Assembly Program

In 2013, Triangle presented 37 assemblies at 27 public and private schools reaching 9,839 teachers and students in 13 school districts. Twenty six of these schools were new to the program, and one had received the assembly in 2012 for their intermediate students and in 2013, scheduled it for their primary students. In addition, a special assembly was held at the Brightwater Wastewater Treatment Plant in honor of America Recycles Day.

The school-wide live assembly show ignites school-wide interest, resonating with both students and staff, in recycling and waste reduction by taking students on a fun and interactive adventure to learn:

- The importance of recycling and reducing waste.
- What can and can't be recycled.
- Simple everyday actions to cut down on garbage.

In both primary and intermediate versions of the show, actors entertain while presenting typical situations at home and at school. Students walk away understanding that recycling and waste reduction are important, and that they play a role at home and at school in preventing waste.

Students learn that garbage in Snohomish County is picked up by trucks and then transported by trains every day to a landfill in eastern Washington where it remains forever. Intermediate students also learn how throwing away items includes throwing away all the resources that went into



producing and distributing those items. With that image in mind, students are then encouraged to take specific actions to reduce the amount of waste going to the landfill such as packing their lunch in reusable containers, using both sides of a piece of paper before recycling, and using a reusable water bottle. All attendees learn that many easily-recycled items are made into other useful products such as fleece clothing, carpets, and more.

Based on recommendations from the previous initial year of the program, the Triangle team created an assembly discussion guide that provides key vocabulary and facts, discussion questions, online resources, and age-appropriate activities for teachers to use with their classes both before and following the assembly. Teachers are encouraged to read through the discussion guide prior to the assembly and introduce the four Rs to their students:

- *Rethink what we purchase and use.*
- *Reuse materials in functional and creative ways.*
- *Reduce the amount of garbage we create and have to send to the landfill.*
- *Recycle appropriate materials at school and at home.*



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In the second year of the program, the assembly continued to receive rave reviews and high evaluation marks. Students and teachers alike clearly leave the assembly with a better understanding of what happens to their garbage, the importance of reducing waste, and how to properly recycle. They walk away able to identify specific actions to take. The following teacher comments exemplify the assembly's value:

- *Clear messages delivered repeatedly in many comical ways creates ultimate learning opportunities! Including volunteers adds to engagement and buy-in. This is a top-notch teaching performance!*
- *Maybe the best assembly ever!!! Funny! Smart! Great performances by the two superstars! Costumes- sets - Justin Bieber sightings! ☺ Wonderful info - wonderfully presented!*
- *Wow! Actors were excellent keeping a whole schools attention for 45 minutes. A clever, fun way to teach this important info.*
- *A wonderful program. As I watched the students it was obvious how much they were taking in.*
- *Excellent, every student was engaged and are now more aware of the four R's.*
- *Oh, wow! What a fun, motivational, and inspirational presentation! I wish we had started this 10 years ago! Thank you SO MUCH!*

Classroom Workshops

In 2013, 234 classrooms at 40 schools received classroom workshops, reaching 6,217 students and teachers. Thirty of the 40 schools were new to the program in 2103.

Classroom workshops provide students with a deeper understanding of the importance of reducing waste and how this connects to a sustainable environment. The classroom workshops use hands-on activities combined with small and large group games to make learning fun and reinforce key program messages. Three different waste reduction and recycling workshops target different grade levels with appropriate curriculum tie-ins:

- Recycling 101/Sort It Out (grades 2-5)
- Habitat Connections (grades 2-3)
- Landfill Laboratory (grades 4-6)



TABLE 2
Classroom Workshops for WRR Elementary Education

Workshop	Description	# of Workshops	# of Students /Teachers
Recycling 101 /Sort it Out (Grades 2-6)	Teaches students the concepts of waste reduction and recycling at home and in school. Students learn about natural resources through an activity that shows the life cycle of a piece of paper, sort recyclables, play a fast-paced quiz game, and learn how to reduce contamination and improve recycling.	62	1,673
Habitat Connections (Grades 2-3)	Introduces students to the basic components of habitat —food, water, shelter, and space—through a variety of examples and hands-on activities. Students then make the connection between their waste reduction and recycling actions and protecting the habitat of native Northwest animals. Students sort recyclables and discuss the 4Rs.	102	2,594
Landfill Laboratory (Grades 4-6)	Explores with students what happens to the things we throw in the trash. Students learn where their garbage goes and, using inquiry-based activities, students “dig into” what a landfill is, the simple science of decomposition, and the importance of the four Rs.	70	1,950
TOTAL		234	6,217

Workshops align with Grade Level Expectations and presenters challenge students to use critical thinking skills and explore the impacts of their choices, thus encouraging behavior change. After each workshop, the teacher receives a list of student activity ideas and each student receives a take-home survey. Teachers also fill out a post-workshop evaluation form.

Teachers continue to find the workshops highly engaging, educational and important in enhancing their students’ understanding of waste reduction and recycling. Representative comments from the post-workshop evaluation form include:



- *The kids really had a great time and we all learned a lot. What more could you ask for? We are very appreciative and grateful to everyone there who made it happen for our school.*
- *I thought the enthusiasm, pacing, classroom management and “props” were fantastic!*
- *Very hands on and eye opening for students.*
- *The presenter was very engaging and dramatic and both the students and I were engaged! I would love to have her come back to my class every year!! She was so enthusiastic and had great visuals!*

In 2013, the Triangle team updated the student take-home survey used in the previous year. The new “pre” workshop version was designed to engage family members and help answer recycling-related questions from home in the classroom. This new activity will be piloted in 2014. Students in 2nd-5th grades will be encouraged to work with their families before the workshop, to identify their current knowledge of recyclables and questions. Students will then bring these questions from family members to the classroom workshop and the presenter integrates these questions and answers into the workshop. Students will then bring the answers back to their family members so that an entire household gains a stronger understanding recycling dos and don’ts.

For second-grade students, Triangle also created a “4R Activity and Coloring Pages” booklet (see appendix). This booklet included various activities such as maze, a reuse matching game, a personalized certificate and a coloring sheet in which students identify recyclables and reusables within a common kitchen setting.

Technical Assistance

In 2013, Triangle Associates conducted 27 in-person technical assistance visits to 17 schools in Snohomish County that have Waste Management as their current recycling hauler. Of these only five had received technical assistance in 2012. The Triangle team also communicated with 15 and met with two school district Resource Conservation Managers to increase collaboration and support for the Waste Management schools program throughout districts.

Once an entire school or some classes have experienced the assembly and/or workshops, a technical assistance representative helps a school harness the recycling enthusiasm garnered by these program components and sets up a comprehensive recycling program for all students and staff. The technical assistance team also works with schools that have not yet had assemblies and workshops but that have expressed interest in enhancing their recycling programs.

Triangle’s technical assistance team conducts waste audits and provides bins and signs to help increase recycling throughout the entire school. Typically, a technical assistance representative conducts an initial in-person site visit to gather baseline data about a school’s waste practices, and



then s/he returns for a second visit with the site-specific bins and signs needed for an enhanced recycling program. Recycling representatives also help schools with data tracking and monitoring changes in their recycling rate. Each school is eligible to receive up to \$200 worth of recycling bins. A representative may conduct another in-person visit depending on a school's needs, (e.g. if they need additional supplies, to help with a program kick-off event, etc.).

More specifics on the technical assistance and action project assistance conducted in 2013 are provided in Table 3.

TABLE 3 Technical Assistance							
School Name	Assisted	Visits	Bins Delivered	Recycling Signs Delivered	Aprons	Recycling Rates	
						Pre	Post
Arlington High	Y	1	In progress	In progress	N	TBD	TBD
Cedar Way Elementary	Y	2	In progress	In progress	N	40%	TBD
Cedarhome Elementary	Y	1	In progress	In progress	N	12%	TBD
College Place Elementary	Y	2	10	50	6	40%	49%
Crystal Springs Elementary	Y	1	N/A	N/A	N/A	N/A	N/A
Discovery Elementary	Y	3	8	50	5	38%	58%
Edmonds Heights K-12	Y	1	In progress	In progress	N	35%	TBD
Fryelands Elementary	Y	1	In progress	In progress	N	43%	TBD
Hazelwood Elementary	Y	1	In progress	In progress	N	16%	TBD
Liberty Elementary	Y	1	N/A	N/A	N/A	N/A	N/A
Maplewood K-8	Y	3	7	25	N	20%	28%
Martha Lake Elementary	Y	2	9	50	4	38%	TBD
Mukilteo Elementary	Y	2	5	50	5	15%	49%
Odyssey Elementary	Y	2	2	50	N	36%	TBD
Twin City Elementary	Y	1	20	25	N	27%	TBD
Utsalady Elementary	Y	2	6	50	N	20%	TBD
Zion Lutheran	Y	2	21	25	2	14%	TBD
TOTALS	17	26	88	375	22	-	-

The Triangle team tracked the following information for the 17 schools that received technical assistance in 2013:

- Communication with an average of 3 people per school, via multiple emails and phone calls (in addition to tracked visits).
- An average of \$143 per school on new bins and accessories (e.g. rolling bases).*
- An average of 10 new recycling bins and accessories per school.*
- An average of 42 recycling signs per school.*

(* Note that not all schools require bins, accessories or signs, so these averages are based on the number of schools receiving materials; not on the total number of schools visited.)

In addition to the in-person assistance delivered to the schools noted above, Triangle also sent promotional information, via email, to additional schools for which Waste Management is the recycling hauler. These schools did not respond or indicated that they did not have technical assistance needs at this time.

In response to recommendations from the previous year, in 2013, the Triangle team drafted a leave-behind document for teachers, custodians, principals, parent volunteers and/or other school personnel to refer to as they implement a school-wide recycling program. The “Steps to Starting a Recycling Program in Your School” document walks staff through steps needed to ensure a successful school-wide recycling program:

- Creating a collection plan
- Establishing a Green Team
- Educating the whole school community
- Setting a kickoff date
- Implementing lunchroom monitors
- Measuring success
- Contacting Waste Management for further assistance

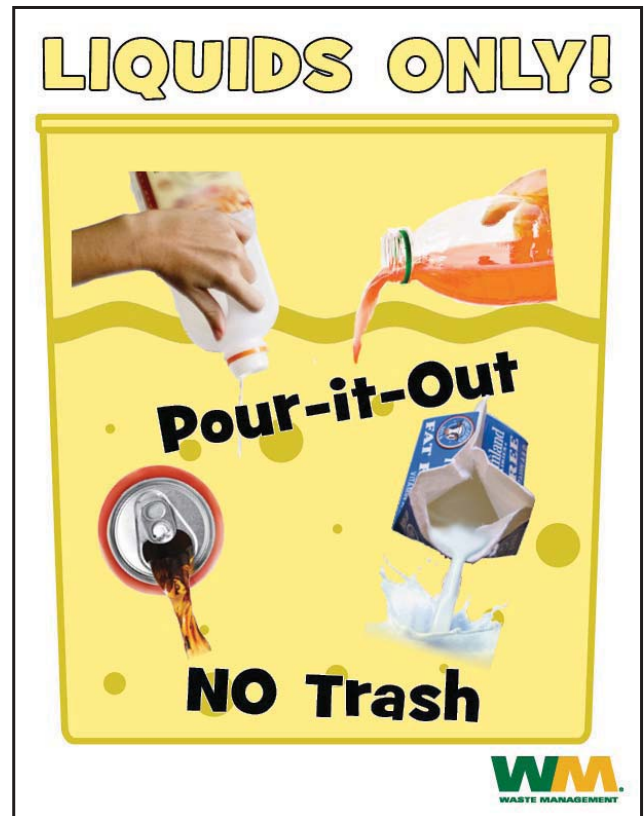
The leave-behind document also includes sample PA announcements, classroom curriculum connections, and related online recycling resources.

In 2013, Triangle worked with Waste Management to create a “Liquids Only” laminated sign that hangs on the buckets placed in cafeterias where students empty their milk cartons before recycling them. The “Liquids Only” sign is in the same style as the suite

of other signs - created the previous year - provided to schools throughout the technical assistance process: Recycling, Garbage and Food Waste (see appendix).

Staff and students alike appear to appreciate Waste Management’s free technical assistance program. Everyone is excited to receive new bins for their school and assistance with bin placement, how to educate the entire school body, how to collect waste in an efficient manner, and whom to call if there are questions or other recycling needs. Representative comments from teachers and principals include:

- *I am amazed by how helpful Waste Management has been to our needs. —Colleen Keller, Utsalady Elementary*
- *Thank you so much for your time! We are excited to move forward and look forward to the new bins and signs. —Erin Zackey, Maplewood K-8*
- *They [students] are so enthusiastic about this job [lunchroom monitoring] and have already been seeing results! Yahoo! —Anna Walter-Bell, Martha Lake Elementary*



Action Projects

In addition to creating and placing strong infrastructure for recycling practices, the Triangle team also works with interested teachers to lead student-based action projects to help recycling become second nature for students and to encourage student groups to educate the rest of the school on proper recycling practices. In the new “Action Project Support” portion of the technical assistance component, recycling education experts were available to help students work on projects for their school or community. Projects ranged from waste sorts to recycling events to creating PA announcements and waste-free lunch campaigns.

In 2013, the Triangle team registered five Green Teams in a newly created database and distributed a total of 22 “Waste Management Green Team” aprons to groups at these five schools. Student groups wear the aprons when volunteering as lunchroom monitors to help educate fellow students as they discard their lunchtime wastes. Lunchroom monitors educate their peers on proper lunchtime sorting of waste, (i.e. wrappers into the garbage, milk cartons into the recycling, and food scraps into compost bins if



TABLE 4
Green Teams

School Name	Project Description	# of Students
College Place Elementary	Worked with the custodian, 4th grade teacher and students to train lunchroom monitors (9 students wearing aprons) to educate their fellow students about throwing waste away appropriately after lunch. Worked with the 4th grade students in a follow-up project to create large customized posters for the lunchroom with actual samples of materials that go in the recycling and the garbage.	9
Discovery Elementary	Worked with a 4th grade teacher and her student monitor group to establish lunchroom monitors for the school’s new lunchroom recycling program..	5
Martha Lake Elementary	Assisted a 4th grade teacher with a waste-weighing project and a subsequent student-created recycling presentation for the school. Provided the teacher with a bathroom scale so her students could weigh garbage cans and encourage increased recycling. Also provided lunchroom monitor aprons for students to wear during lunchtime to help their fellow students know where to put their recyclables, specifically milk cartons.	25
Mukilteo Elementary	Provided lunchroom monitor aprons and recycling information to the school’s student senate leader (a 5th grade teacher) and, in particular, to the student’s “Proactive Recycling Posse”, a group of 5th grade students that took on the important job of monitoring fellow students as they sorted their wastes after lunch and also tracking the number of garbage bags produced at each lunchtime for a specific period. The students tracked the decreasing number of garbage bags and increasing number of recycling bags and shared the lunchtime successes with the entire school.	5
Zion Lutheran	Provided 2 lunchroom monitor aprons to the school’s 6th graders to wear in the lunchroom as they oversee the new recycling program. Four 2-person 6th grade teams rotate as lunchroom monitors throughout the week. Next steps are to help the students create large recycling posters for the lunchroom and other project assistance as needed.	8
TOTALS		52

applicable.) Please see the appendix for an example of apron use and Table 4 for Green Team project description by school.

To date, the Triangle team has identified six additional schools that are interested in project assistance and the team will continue to work with these as well as the previously-assisted schools to make sure their Green Teams are supported as needed. All student participants will receive Green Team water bottles.

Additionally, Triangle drafted a project assistance registration and feedback form that will be implemented with any Green Teams assisted in 2014.



Evaluation

In 2013, Triangle continued to implement multiple measures to evaluate the effectiveness of the program in meeting Snohomish County's goal of educating elementary school students on reducing, reusing, and recycling their waste. The following methods were used:

- **Assembly:** Student pre and post-tests to measure student learning and a teacher survey to measure effectiveness and satisfaction.
- **Workshops:** Teacher evaluation form to measure workshop effectiveness and satisfaction
- **Technical Assistance and Action Projects:** informal capture of qualitative comments in 2013 and drafting of an evaluation form for 2014.

In 2013, 335 students from 16 elementary schools completed the student pre-post tests, 107 teachers completed the assembly evaluation survey and 106 teachers completed the workshop evaluation.

Findings from this evaluation include elementary student knowledge assessment based on the Waste Management (WM) WRR assembly program, along with surveys of elementary teachers to determine their satisfaction with the assembly presentation and classroom workshops.

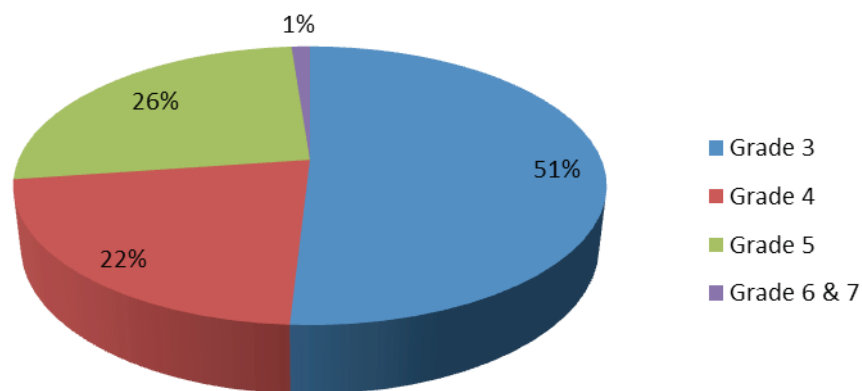
Elementary Student Knowledge Assessment

The WM assembly program was performed for elementary students from grades kindergarten through six (with one additional seventh grade group). Classrooms participating in the knowledge assessment portion of this evaluation were limited to grades three and above because pre and posttests are self-administered and require sufficient reading and writing skills. Table 5 shows the grade levels for elementary students participating in this year's evaluation along with a pie chart illustration.

This year's student participants include a majority of third grade students (51%) with the remainder split fairly evenly between fourth (22%) and fifth (26%) grade students and a small number of sixth and seventh grade students (1%). A total of 335 students were tested before (pretest) and after (posttest) the assembly presentation to assess changes in their understanding of the WRR concepts presented during the assembly. (A sample size of 335 allows estimation of population percentages within 5 percent with 95 percent confidence. Due to the abbreviated nature of this report, no testing for statistically significant differences was conducted.) Students

TABLE 5 Grade Distribution of Elementary Student Respondents (n=355)	
Grade Level	% of Respondents
3	50.9%
4	21.9%
5	26.0%
6&7	1.2%

WM Elementary Program 2013-2014
% of Participants by Grade Level (n=335)



were drawn from 16 different elementary schools to ensure representation from across the UTC code and Waste Management's service area.

The elementary evaluation instrument attempts to measure student understanding of a number of the most important WRR concepts covered in the assembly. The pretest/posttests asks students about what happens to garbage when it goes to a landfill, the natural resources that go into pop cans, plastic bottles and cardboard, items that can go into a home recycling bin, best choices for saving natural resources and things that students and their families can do to make less garbage. Identical questions were asked before (pretest) and after (posttest) the assembly presentation. Any increases in correct responses are attributed to student learning as a result of the assembly presentation. (A copy of the elementary instrument is included in the appendix.) Each of these questions follows, along with student responses. Correct answers for each question are indicated in **bold**. The first question posed to students follows.

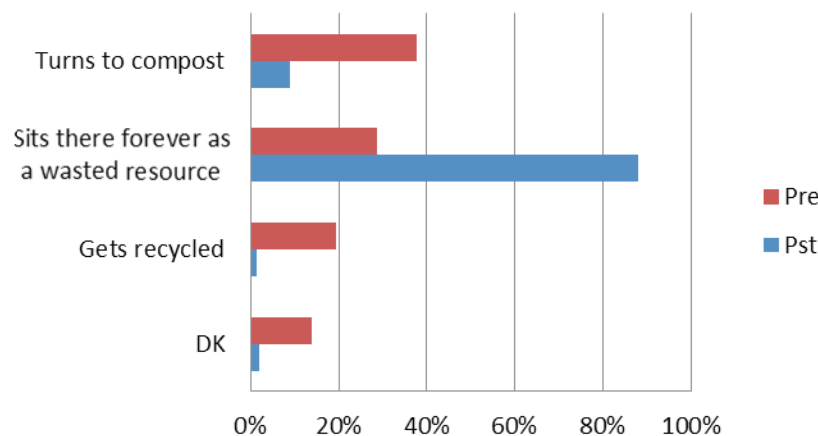
When garbage goes to a landfill, it:

- Turns to compost.
- **Sits there forever as a wasted resource.**
- Gets recycled.
- Don't know.

Student responses to this question and the associated chart are presented in Table 6.

TABLE 6 Garbage in a Landfill (n=355)		
What happens:	Pretest % of Students	Posttest % of Students
Turns to compost	37.8%	9.0%
Sits there forever as a wasted resource	28.8%	87.4%
Gets recycled	19.5%	1.5%
Don't know	13.8%	2.1%

WM Elementary Program 2013-2014
Garbage In A Landfill...



The table shows students clearly learn from the assembly that when garbage goes to a landfill, it *sits there forever as a wasted resource*. Prior to the assembly, just over one-quarter (29%) of students chose the correct option, with the greatest number (38%) thinking it turns to compost. As shown, students moved from 29 to 87 percent correct responses, a very large increase in understanding for this concept. This result appears similar to last year's, when students moved from 27 to 93 percent correct responses.

The next question presents students with a list of three common packaging items - pop cans, plastic bottles, and cardboard - and four natural resources that go into making each item - trees, oil, metal and water. The correct natural resource choice for each packaging item is shown in **bold**.

The things we use are made from natural resources. Circle all the natural resources that are used to make each thing on the list, or circle DK if you don't know.

Things	Natural Resources				
Pop cans	Trees	Oil	Metal	Water	DK
Plastic bottles	Trees	Oil	Metal	Water	DK
Cardboard	Trees	Oil	Metal	Water	DK

TABLE 7 Natural Resources in Types of Packaging (n=335)		
Pop cans	Pretest % of Students	Posttest % of Students
Trees	6.0%	4.2%
Oil	8.1%	20.3%
Metal	81.8%	83.0%
Water	5.4%	27.2%
DK	8.4%	1.8%
Plastic bottles	Pretest % of Students	Posttest % of Students
Trees	25.7%	17.6%
Oil	23.6%	60.3%
Metal	11.9%	6.3%
Water	19.7%	46.9%
DK	29.6%	7.5%
Cardboard	Pretest % of Students	Posttest % of Students
Trees	76.7%	86.9%
Oil	6.3%	9.3%
Metal	3.6%	2.7%
Water	4.8%	26.9%
DK	12.2%	6.9%

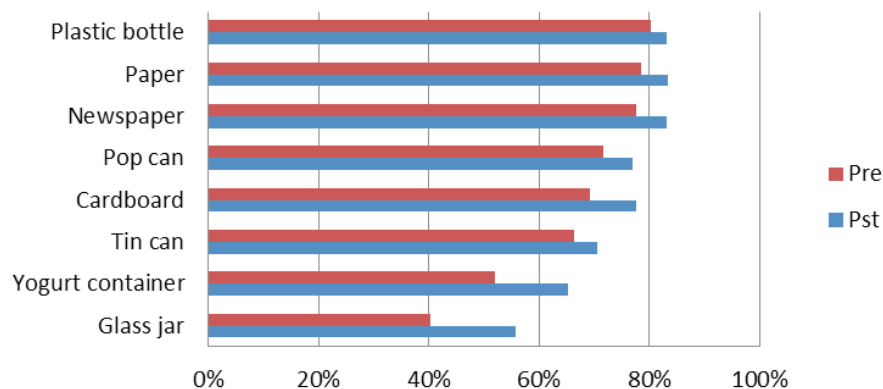
Table 7 gives students' responses and indicates percentage of correct responses for each item.

Table 7 results confirm that after the assembly students became more able to identify the natural resources used to manufacture *pop cans*, *plastic bottles* and *cardboard*. For *pop cans*, students show a sizeable increase in identifying *water* as an essential manufacturing resource with a gain of 22 percent. Students show a minimal gain in identifying *metal* (82% to 83%), but students' high level of awareness prior to the assembly likely results in the limited gain. It is interesting that after the assembly a sizeable number of students (20%) think *oil* is an essential component in pop cans' manufacture. A similar increase was observed last year, and is most likely attributed to the discussion in the assembly of how oil is used during the manufacture and transportation of products. For *plastic bottles*, students clearly learn that *oil* and *water* are necessary, with gains of 36 and 27 percent, respectively. Finally, for cardboard, students realize a 22 percent gain in recognizing *water* as a key component and move from an already high 77 percent for the natural resource, *trees*, to 87 percent after the assembly.

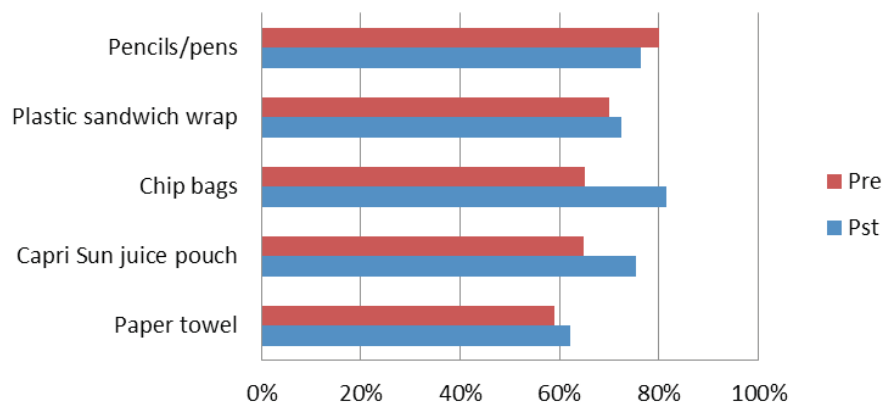
TABLE 8
Items Correctly Sorted In A Home Recycling Bin
(n=355)

<i>Recyclable Items</i>	<i>Pretest % of Students</i>	<i>Posttest % of Students</i>	<i>Non-recyclable Items</i>	<i>Pretest % of Students</i>	<i>Posttest % of Students</i>
Plastic bottle	80.3%	83.0%	Pencils and pens	80.0%	76.4%
Paper	78.5%	83.3%	Plastic sandwich wrap	69.9%	72.5%
Newspaper	77.6%	83.0%	Chip bags	65.1%	75.5%
Pop can	71.6%	77.0%	Capri Sun juice pouch	64.8%	75.5%
Cardboard	69.2%	77.6%	Paper towel	59.1%	62.1%
Tin can	66.3%	70.4%			
Yogurt container	51.9%	65.1%			
Glass jar	40.3%	55.8%			

WM Elementary Program 2013-2014
Items That Can Be Recycled (n=335)



WM Elementary Program 2013-2014
Items That Cannot Be Recycled (n=335)



Another key message for elementary students is identifying items that are appropriate for their home recycling bin. Students were presented with a list of containers and wrappers and asked to circle the ones that could be recycled. Their percentage of correct responses, grouped by recyclable and non-recyclable items, are presented in Table 8.

Table 8 and the two charts show changes in student understanding of what items are recyclable or non-recyclable. For example, *plastic bottles* are recyclable and 80.3 percent of students correctly identified this at pretest and 83 percent correctly did so at posttest. Similarly, *pens/pencils* are non-recyclable, and 80 percent of students correctly categorized them at pretest and 76.4 percent did so at posttest.

Of the eight recyclable items (*plastic bottle, paper, newspaper, pop can, cardboard, tin can, yogurt container, glass jar*), *plastic bottle* is correctly sorted into the recycle bin by 80 percent of students (before) and 83 percent (after) the assembly. The next five items -*paper, newspaper, pop can, cardboard, tin can* - show modest gains of four to eight percent improvement after the assembly, with all posttest scores showing between 70 and 80 percent of students correctly sort these items and place them in the recycle bin.

The remaining recyclable items, *yogurt container* and *glass jar*, show the largest improvement at 13 and 16 percent, respectively. Just over one-half to two-thirds of the students correctly identify these last two items as recyclable after the assembly, indicating there is still some confusion among students about their proper placement in the recycle bin.

Of the five non-recyclable items (*pencils/pens, plastic sandwich wrap, chip bags, Capri juice pouch, paper towel*), only *chip bag* and *Capri juice pouch* showed improvement with between 10 and 15 percent more students able to identify them as non-recyclable, respectively. It is interesting to note that these two items were called out specifically in the assembly as being non-recyclable and this identification appears to be effective in relaying this message. The remaining items were relatively unchanged, though approximately two-thirds or more of students could correctly identify them as non-recyclable even before the assembly presentation.

The next question posed to students included two everyday activities where they had the opportunity to save natural resources. Students were asked to identify the best choice for each. The question and student responses follow.

If you want to save natural resources, check the best choice in each group.

#1 - You are packing a snack for school.

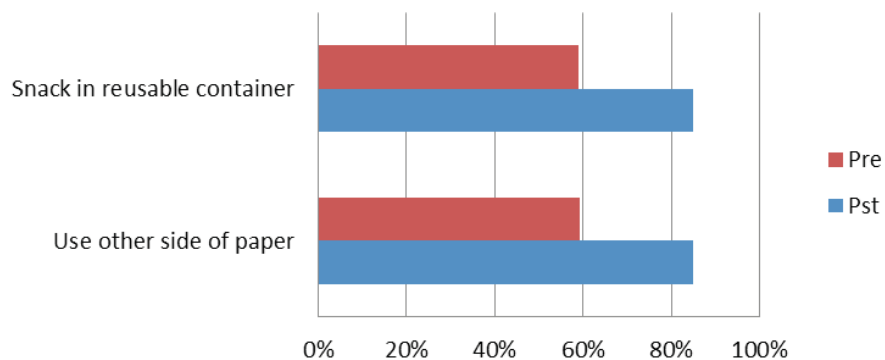
- You put it in a plastic bag that you can throw away.
- You put it in your own reusable container.
- You put it in a paper bag and recycle it when you're done.
- Don't know.

#2 - You are done with your spelling paper.

- You put it in the recycle bin.
- You throw it in the garbage.
- You save it to reuse the other side.
- Don't know.

TABLE 9 Best Choices To Save Natural Resources (n=355)		
<i>Packing a snack for school:</i>	Pretest % of Students	Posttest % of Students
Put in a plastic bag that you can throw away	13.8%	5.3%
Put it in a reusable container	59.2%	85.0%
Put in a paper bag and recycle when done	20.7%	6.3%
Don't Know	6.3%	3.3%
<i>Done with your spelling paper:</i>	Pretest % of Students	Posttest % of Students
Put it in the recycle bin	33.0%	10.8%
Throw it in the garbage	2.0%	2.4%
Save it to reuse the other side	59.0%	85.0%
Don't Know	7.0%	1.8%

WM Elementary Program 2013-2014
Best Choices for Saving Natural Resources
(n=335)



In responding to the questions on best choices to save natural resources, students clearly learn their best choice is to pack a snack in a reusable container (59% pre, 85% post) and to use the back side of a piece of paper before recycling it (59% pre, 85% post). Both of these choices emphasize reuse options before students choose to recycle or dispose of an item.

In a final pretest/posttest question, students were presented with an open-ended question and asked to: *List three things you or your family could do to make less garbage*. Table 10 displays student responses to the question before and after the assembly.

<p>TABLE 10</p> <p>Three Things To Do To Make Less Garbage</p> <p>(Pretest, Posttest)</p> <p>(n=355)</p>		
<i>Actions</i>	Pretest % of Students	Posttest % of Students
Choose reusables	26%	32%
Recycle/Recycle more	18%	23%
Buy/waste less	9%	9%
Earth friendly practices	5%	2%
Use proper disposal practices	3%	1%
Compost/yard waste	2%	3%
Reduce, 4REs	1%	4%
Don't Know	27%	21%

Student responses were grouped into the categories listed in the chart above. The most frequent responses were *choose reusables* (26%, 32%), *recycle/recycle more* (18% pretest, 23% posttest), and *buy/waste less* (9%, 9%). Student responses change modestly after the assembly, with the *choose reusables* category showing the largest change at 6 percent, followed by a 5 percent increase for *recycle/recycle more*. These response categories were followed by relatively small numbers of students reporting *use earth friendly practices* (5%, 2%), *use proper disposal practices* (3%, 1%), *composting/using a yard waste bin* (2%, 3%), and *reduce or 4 REs* (1%, 4%). Again, these categories were relatively unchanged from pretest to posttest. If students could not think of anything they or their families could do to make less garbage, they were instructed to write *Don't know*. The percentage of students choosing this response moved from 27 percent at pretest to 21 percent after the assembly. Examples of typical student responses to each of the categories in Table 10 follow.

Reuse/choose reusable items

Use items until it can't be used anymore
Stop using plastic bags and use containers
Reuse paper by using the other side
Bring your own bag when shopping
Drink from glass cups
Use reusable lunch containers

Recycle/Recycle more

Recycle cans, bottles and paper
Don't throw recyclables in trash
Sort recyclables and garbage
Sort through garbage to make sure there's nothing recyclable there
Make the recycling bins visible

Buy/waste less

*Don't use a lot of stuff
Eat all our food
Freeze the food
Stop using a lot of things
Use less paper, paper towels and plastic bags
Get what's needed
Don't waste paper
Less shopping*

Use earth friendly practices

*Pick up litter
Save trees
Make a club to help garbage clean up
Help clean parks
Get water using rain
Tell my family, myself and friends to put garbage away*

Use proper disposal practices

*Throw away right things
Only throw garbage if it goes in there
Trash not in recycle bin
Put the garbage in the right container*

Composting/using a yard waste bin

*Have a compost pile
Put rotten fruits in compost
Don't throw away food scraps
Compost sandwich
Put uneaten food in compost
Use our yard waste*

4 REs and reduce combinations

*Think before you throw things in garbage
Recycle, reuse
Reduce, reuse, recycle
Rethink*

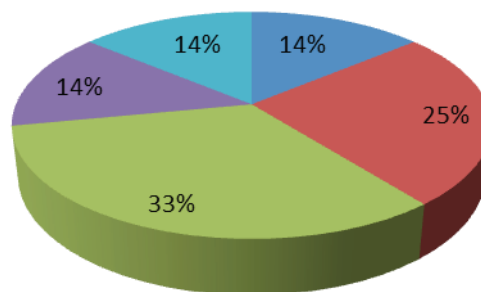
Elementary Teacher Satisfaction Survey Results

In addition to student testing, elementary educators were asked to complete a survey to determine their satisfaction with the assembly presentation. The grades taught by educators participating in the elementary assembly evaluation are displayed in Table 11. Teachers taught kindergarten through grade 7, with the greatest number of respondents teaching grades 1-2 (25%) and grades 3-4 (33%). Smaller percentages taught kindergarten (14%), grades 5-6 (14%) and an Other category (14%) including mixed grades, specialists (e.g., library, music, administration) and those not reporting. These figures are presented in Table 11 and the accompanying pie chart.

TABLE 11 Grade Distribution of Grade Taught by Elementary Teacher Respondents (n=107)	
Grade Level	% of Respondents
Kindergarten	14.0%
1 - 2	25.2%
3 - 4	32.7%
5 - 6	14.0%
Other	14.0%

WM Elementary Program 2013-2014
Grades Taught By Teacher Respondents (n=107)

■ K ■ 1 to 2 ■ 3 to 4 ■ 5 to 6 ■ Other



Assembly Effectiveness

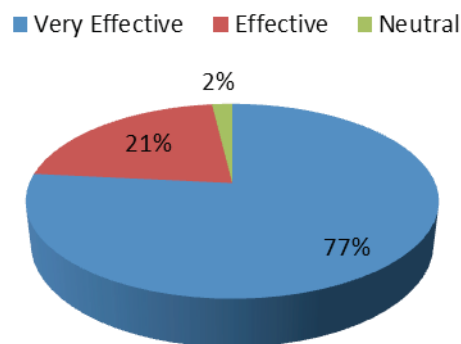
Elementary teachers were asked to provide feedback on their overall impression of the elementary assembly sponsored by Waste Management. They were asked to *Rate the effectiveness of this assembly in educating your students about the importance of reducing waste and recycling* using a five-point scale, ranging from *Very effective* to *Not at all effective*. The results of this rating are shown in Table 12. A pie chart illustrating the ratings also follows.



As Table 12 and the accompanying chart show, teachers rated the assembly as being highly effective in educating students about the importance of reducing waste and recycling. Just over three quarters (77%) rate it as *Very effective*, with 21 percent rating it as *Effective*, and only two percent rating it as *Neutral*. No teachers assigned ratings of *Not effective* or *Not at all effective*.

TABLE 12 Effectiveness In Educating About Importance Of Reducing Waste And Recycling (n=107)	
Overall Effectiveness	% of Respondents
Very effective	76.6%
Effective	21.5%
Neutral	1.9%
Not effective	0%
Not at all effective	0%

WM Elementary Program 2013-2014
Effectiveness In Educating About Importance of
Reducing Waste and Recycling (n=107)

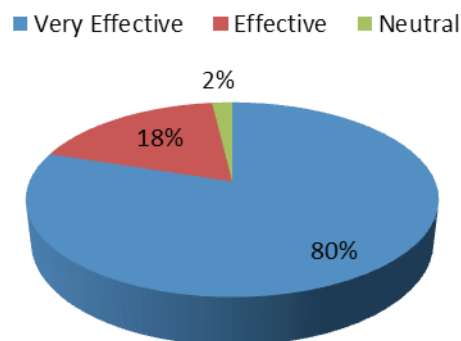


In a similar question, teachers viewing the assembly were asked to rate the *effectiveness of this assembly in educating your students about how to reduce, reuse and recycle*. Again, teachers were asked to use a five-point scale, ranging from *Very effective* to *Not at all effective*. The results of this rating are shown in Table 13. A pie chart illustrating the ratings also follows.

Table 13 and its accompanying chart show teachers assign great effectiveness to the assembly for its ability to educate students about how to reduce, reuse and recycle. Eighty percent rate it as *Very effective*, with 18 percent rating it as *Effective*, and just two percent rating it as *Neutral*. No teachers assigned ratings of *Not effective* or *Not at all effective* to this dimension.

TABLE 13 Effectiveness In Educating How To Reduce, Reuse and Recycle (n=107)	
Overall Effectiveness	% of Respondents
Very effective	80.0%
Effective	18.1%
Neutral	1.9%
Not effective	0%
Not at all effective	0%

WM Elementary Program 2013-2014
Effectiveness In Educating About How To
Reduce, Reuse and Recycle (n=107)



The assembly presentation often acts as a catalyst for classroom activities that implement its message to reduce, reuse and recycle. Teachers were presented with a list of possible activities and asked to identify any that their classroom undertook. Each of these activities follows, with the percentage of teachers selecting each item indicated.

- Improved ongoing classroom recycling -76.6%
- Prompted classroom discussion on recycling/waste reduction - 75.7%
- Reduced waste in the classroom -43.9%
- Set up a reuse box -40.2%
- Moved the recycle bin next to the trash can - 25.2%
- Started to do classroom recycling -11.2%
- Inspired class to do a waste reduction or recycling project -9.4%

As the list shows, teachers' top two choices of activities include *improved ongoing classroom recycling* (76%) and *prompted classroom discussions* (75%). These two activities were undertaken by a majority of the respondents. Next, *reduced waste in the classroom* (44%), *set up a reuse box* (40%), and *moved the recycle bin next to the trash can* (25%), were mentioned by one quarter to nearly one-half of all teachers. The two final items on the list, *started to do classroom recycling* (11%) and *inspired class to do a waste reduction or recycling project* (9%), were chosen by a small percentage of teachers. In addition to these activities, teachers could also list "other" activities their classrooms did as a result of the program. Several responses were given:

- Topic for persuasive writing - eliminate Styrofoam trays on lunch line.
- Learn in a new way about recyclable material.
- Focus on books/ideas to reuse, recycle, natural resources,
- 1st and 2nd grade music program will tie into recycling and Earth Day.
- Good review for all kids.
- Initiated "recycle/reuse" art projects.

In a final question, elementary teachers were asked to make comments or suggestions regarding the assembly program. The vast majority of teachers' comments were positive and complimentary. A number of teachers also made suggestions for improvements. Representative comments in each area, along with the grade being taught, are listed below. A complete list of comments is included in the appendix.

General positive comments

- *Excellent, engaging recycle play that captivated my students. We will continue the importance of reducing waste and recycling. (3)*
- *The assembly was awesome! My class loved it and I can tell they learned a lot based on their discussion afterwards. (3)*
- *I thought the script was written so that the very young K's and the sixth graders could understand and enjoy. Thanks! (4)*
- *I've never seen so many kids engaged the whole time during an assembly. (2)*
- *The assembly was outstanding. Wonderful content communicated fabulously by such talented actors. Kid friendly way to review great information. (Principal)*
- *The presentation was engaging, informative and memorable! The students continue to give ways we can reuse items. (2)*
- *This assembly was scheduled after I had taught my students indepth recycle lessons. This helped to clarify unclear issues, i.e., which paper items go into the garbage vs. recycling. (4)*
- *Maybe the best assembly ever! Funny! Smart! Great performances by the two superstars! Costumes, sets, Justin Bieber sitings! Wonderful info, wonderfully presented! I am going to recommend you to all my Snohomish County teacher friends. (4)*
- *The students were completely engaged! The humor was a big part of their paying attention. Two of my students want to start recycling in the lunchroom. Excellent job! (5)*
- *Wow! Actors were excellent, keeping a whole school's attention for 45 minutes. A clever, fun way to teach this important information. After assembly students were more open to really thinking about recycling and reusing. (5)*

- *We loved the high energy of the actors. Also, we appreciated the “rethink” concept. This was new for us. (1)*
- *Clear messages delivered repeatedly in many comical ways creates ultimate learning opportunities! Including volunteers adds to engagement and buy-in. This is a top-notch teaching performance! (3)*
- *Very fun and funny! Students loved it. I wish our district had composting so we could teach kids about it. They waste so much food! (4)*

General positive comments

- *Give more examples of recycling garbage items other than the usual plastic/paper. Do more composting. (Library)*
- *Use more volunteers. Have more actors. Stress the importance of world effects. We felt it was an entertaining assembly! (Missing)*
- *It was engaging for the kids. The oldest volunteer was in 4th grade, so maybe include some of the older kids to keep them interested. Review materials that can be recycled and those that can't. (5)*
- *Great presentation, lots of energy to keep kids interested. More emphasis on the importance of recycling, we talk about the 4 REs but not the consequences of failing to do so. (K)*
- *I thought the gay cross dresser was a bit much for elementary school. But the assembly should help us in the lunchroom recycling program. (1)*
- *Loved it! Some of the concepts were a little hard for kinders to grasp. (K)*
- *Primary grades, needs to be slowed down. Too much dialogue. (1)*
- *Microphone would be helpful. Handouts to put on recycle bin or any flyers about how to recycle/compost. (5)*

Classroom Workshop Effectiveness

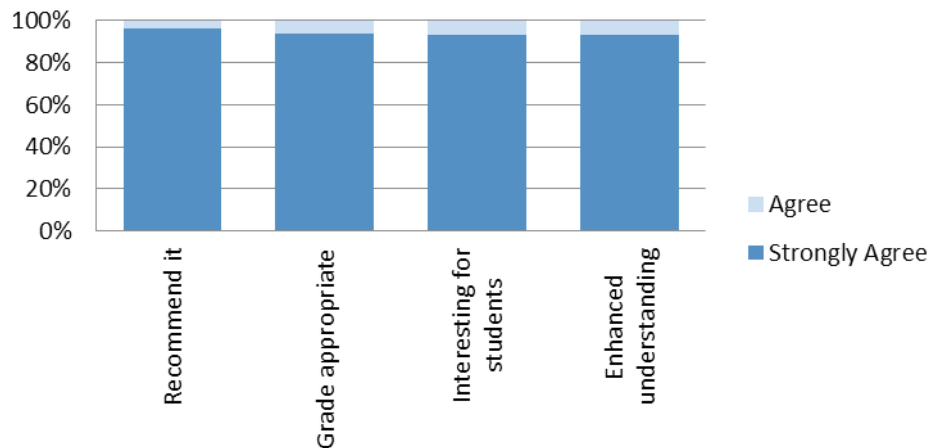
Teachers whose classrooms participated in workshops after the assembly presentation were asked to complete an online survey to determine the effectiveness of the workshop presentations. A total of 106 teachers completed workshop surveys with one teaching first grade, 37 respondents teaching second grade, 15 teaching third grade, 21 teaching fourth grade, 16 teaching fifth grade, four teaching sixth grade, and twelve teaching mixed grades or not reporting the grade taught. Class sizes ranged from a low of 12 to a high of 56, with an average class size of 25. Teachers were presented with a series of statements regarding their satisfaction with various aspects of the workshop and asked to rate their agreement on a five point scale ranging from *Strongly Agree* to *Strongly Disagree*. The results are presented in the following table.



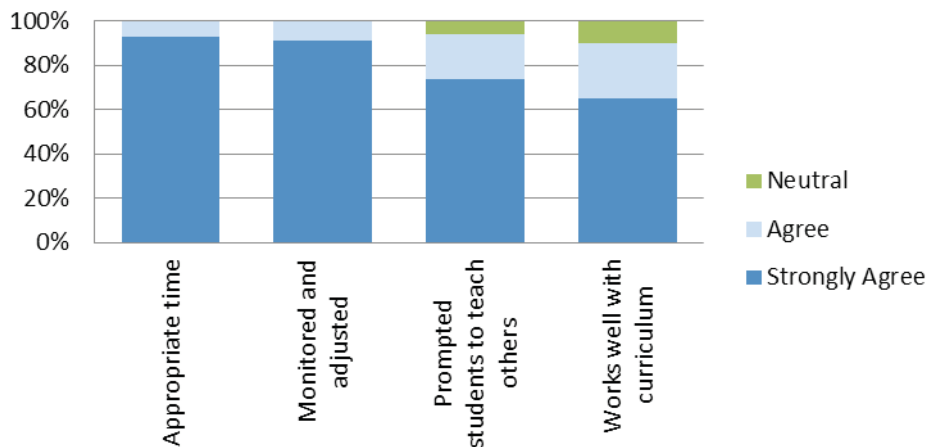
TABLE 14
WM Classroom Workshop Teacher Satisfaction
(n=106)

Statement	Strongly Agree	Agree	Neutral	Disagree
Would recommend to other teachers	96%	4%	0%	0%
Grade level appropriate	94%	6%	0%	0%
Interesting for students	93%	7%	0%	0%
Enhanced student understanding	93%	7%	0%	0%
Appropriate time	93%	7%	0%	0%
Monitored and adjusted	91%	9%	0%	0%
Prompted students to teach others	74%	20%	6%	0%
Works well with curriculum	65%	25%	10%	0%

Waste Management Elementary Program 2013-2014
Classroom Workshop Teacher Satisfaction (n=106)



Waste Management Elementary Program 2013-2014
Classroom Workshop Teacher Satisfaction (n=106)



Teachers show strong satisfaction with the classroom workshops, with **over 90 percent** stating they *strongly agree* they would *recommend the workshop to other teachers*, felt it was *appropriate for the grade level*, was *interesting for the students* and kept them engaged, that it *enhanced student understanding* of waste reduction and recycling, that the *appropriate amount of time* was allowed, and that the instructor used *effective teaching strategies*, *monitoring and adjusting* as necessary. All other respondents rated these statements as *agree*. The remaining two statements - the workshop *prompted students to teach others* about waste reduction and recycling and that workshop contents *work well with existing curriculum* - while not as high as the other statements, still show that the great majority, 74 and 65 percent (respectively) *Strongly Agree* with these statements with most of the remainder choosing *Agree*. Overall, teachers express very high levels of satisfaction with all aspects of the classroom workshops.

In a final series of open-ended questions, teachers were asked to comment on the most valuable aspects of the workshops, any suggestions for improvements, and any general comments they would like to share. These comments are presented for each of the three classroom workshops, Habitat Connections, Landfill Laboratory and Recycling 101/Sort it Out. Teachers are very enthusiastic about the hands-on activities, the presenters' skills and organization, and the important new content on recycling and reuse. Selected responses to each of these open-ended questions follows. A complete set of comments on each workshop is included in the appendix.

Habitat Connections

Most valuable aspect of the workshop

- *Loved how they did different things for best learning/loved hands on materials.*
- *Very strong message about recycling and reusing.*
- *Sorting activity (garbage/recycling).*
- *Vocabulary/concept development and helping kids make connections.*
- *Visual resource to illustrate learning target.*
- *Hands on activity with bags as it really involved the students.*
- *Being aware of how to reduce, reuse, recycle.*
- *That it was interactive and a good way to get them excited about recycling.*
- *Relating waste to animal habitats makes sense to the students.*



Suggestions for improving the workshop

- *Try to reduce instructions while props are out.*
- *Offer more courses.*

Other comments

- *Take home paper was an important addition; Presenter had wonderful classroom management skills; Good connections of why we recycle; Such great learning!*
- *Excellent presentation! Presenter is well organized and knowledgeable. She got all students engaged! This is a great way to learn about habitats. Students will be able to remember.*
- *The presenter was very engaged and dramatic and the students and I were engaged. I would love to have her come back every year!! She was so enthusiastic and had great visuals.*
- *I thought the enthusiasm, pacing, classroom management and "props" were fantastic.*
- *A great workshop to encourage them to recycle and to think about their waste and their connection to animals.*
- *Great workshop to reinforce the concepts we have been learning.*
- *Loved it! The pictures and activities were awesome! My students loved it and learned a lot!*

Landfill Laboratory

Most valuable aspect of the workshop

- The students need to rethink what they throw away.
- Planting the seed of making wise choices.
- Kids were completely engaged and thinking about the 4 REs.
- Showing students that recycling is important.
- Connecting the 4 RE's to the prior learning - assembly.
- Understanding how long it takes things to decompose. Keeping things out of landfill.
- Conservation of natural resources, the part they play in that.
- Having students work in groups for decomposition timeline; sorting.
- Recycling and landfill information that will make an impact on student habits.

Suggestions for improving the workshop

- You have a good message, however you need at least an hour to present it well.

Other comments

- Program was very engaging. Appreciated the additional resources.
- Very engaging! Kids loved it and paid attention, good hands on activity.
- Great energy! Very fun and informative! Presenter was fun but maintained excellent control of the learning environment.
- Great pacing. Love the decomposition timeline. Posters were helpful, all kids were engaged.

Recycling 101/Sort it Out

Most valuable aspect of the workshop

- Hands on sorting of recycle vs. trash and hand actions to go with “paper trail”.
- Great visual/ learning (RE's), great chant “bottle, cup, paper, can”, great hands-on movement.
- Reviewing what to do with certain items.
- Learning what can be recycled and what cannot.
- Talking about reusing and how we can do it.
- Building awareness and the vocabulary that goes along with recycling.
- Having kids actually sort!
- Life cycle of a piece of paper - actually recycling!
- Hands on activities to teach recycling process - choosing what to do with each item.
- Hands on! Hands on! Very engaging.

Suggestions for improving the workshop

- More info about what is recyclable.
- Need updates at schools. Why small bins for recycling? What if not blue?

Other comments

- We would love it again next year!
- Presenter is fabulous! He truly understands kids by using different teaching strategies.
- Would love a series of lessons over a month or so. Would love to have the other two workshops. Thank you!
- Wow, I was impressed! Fun and creative workshop that purposefully teaches about recycling and how tos.

Discussion and Recommendations

Several aspects of these evaluation results are notable. First, student results from testing before and after the assembly presentation show that student improvements in understanding remain stable from last year to this year. Students show nearly identical improvement on a number of the items tested. As mentioned, students in last year's and this year's program both showed major improvement in recognizing the waste in a landfill sits there forever as a wasted resource. In addition to student improvement, overall levels of student understanding also appear stable from last year to this year. This may indicate the assembly's effectiveness in delivering a consistent message to students.

Teacher's ratings of the effectiveness of the assembly presentation also show high levels of satisfaction this year and last. Nearly 80 percent of teachers assign the highest possible satisfaction ratings this year and last (with 98 percent combined rating the assembly as effective). Only minor modifications were made to this year's assembly script, and teacher satisfaction ratings remain stable. However, a number of improvements were made to this year's classroom presentations and teacher satisfaction measures showed a notable increase. While last year's satisfaction ratings averaged near 80 percent, the bulk of this year's ratings ranged from 91 to 96 percent of teachers assigning the highest possible satisfaction ratings. Overall, these evaluation measures for students and teachers show the program's ability to deliver a consistent and effective message regarding understanding of waste reduction and recycling messages.

Teachers have been supportive of the new program elements added in 2013. Last year, teachers requested follow up activity ideas that allow them to build on the assembly. The discussion guide, coloring pages, and home survey have been well-received.

As in the previous year of the program, all schools that have received technical assistance are very pleased to have outside assistance and free resources for their school. Where post-assistance recycling rates have been assessed, schools show an improvement in recycling rates. Green Team projects engage students and involve them in improving school recycling participation.

Recommendations

For 2014, Triangle recommends the continuation of assemblies, classroom workshops, technical assistance and action project assistance, with continued effort made to reach the remaining 79 schools that have not yet participated. The Triangle team will continue to review assembly and workshop scripts and make minor modifications to incorporate teacher feedback and address any gaps in student learning. Triangle also recommends creating additional opportunities to connect the school program with the home. This includes adding a new Family Outreach task that includes implementing new student "pre" workshop assignment, working with schools to develop a family night "kit", and training student green teams in outreach at family nights.

For the Technical Assistance and Action Project components for 2014, Triangle recommends the following:

- In addition to reaching out to new schools, continue working with schools that received technical assistance in the previous year so as to maintain a consistent connection between a school and its hauler. Be the accessible link to Waste Management and help ensure a successful recycling program and increase school recycling rates.
- Finalize an evaluation form for Green Teams to fill out once they have had project assistance.

- Increased follow-up with staff/teachers that have worked with a recycling representative on technical assistance to track more qualitative feedback.
- Continue distribution of aprons for student Green Teams
- Increase distribution of water bottles by bringing them to the initial school Green Team visit.
- Continue to reach out to and meet with district Resource Conservation Managers to learn where all schools in a district can use assistance and build a collaborative partnership between hauler and district.

Overall, the Waste Management Education Program is highly regarded. By providing a consistently successful program, it should easily build on its reputation and be increasingly welcomed in schools throughout the service area.











