Onondaga County Resource Recovery Agency
Interactive Online Education Program
2016 SWANA Excellence Award Entry:
Educational Program

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Educational Program
Onondaga County Resource Recovery Agency (OCRRA)

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OCRRA Interactive Online Environmental Education

Jurisdiction: Onondaga County, New York
Population: 468,463
$0.185 / household
Budget: $75,000 (50% provided by NYSDEC Grant)

www.OCRRA.org
Executive Summary
In order to foster the environmental champions of tomorrow, young students must be energized to assume stewardship of their waste and empowered to see that they can make a difference in their community and their world. The Onondaga County Resource Recovery Agency (OCRRA)’s interactive education program aims to achieve just that with a fresh web-based approach that brings environmental education to the digital age.

This innovative educational program is the first-of-its-kind, as it combines advanced classroom technologies with required Federal and State curriculum standards for English, Math and Science. It is an online waste management educational series for elementary students addressing not only recycling, but all elements of waste management, including waste and litter reduction, composting, landfilling and waste-to-energy technology. The program is special as it aligns with required curriculum using professionally-produced online videos, interactive digital games, and teacher-developed classroom activities (including vocabulary lists with full definitions and pre- and post evaluation tests). This makes it easy for teachers to integrate this creative and engaging format into classroom environmental lessons.

Web Link to Project: www.OCRRA.org/educational_resources

Please note that OCRRA intends to revise its website in the near future; if above referenced link is “broken,” please visit www.OCRRA.org to access the online educational program.

1. Statement of Intent
Education is a key motivation and focus of OCRRA’s current waste reduction, compost and recycling programs. In order to influence good reduction, compost and recycling behaviors throughout the community, education is critical. Teacher feedback that we received through surveys indicated that while educators enjoyed bringing in a guest speaker for a classroom recycling presentation, they would actually prefer the ability to utilize environmental education on a moment’s notice, and save the time of scheduling back and forth with an agency outside of the school. This project provides that opportunity through a fresh, convenient online approach to environmental education that makes sustainability lessons engaging, memorable and modern, in a format that is easy for teachers to implement and fun for students to complete.
To ensure program efficacy, feedback from both teachers and students was incorporated into the development of the videos, games and over 30 classroom activities including:

- Acrostic poetry,
- Context clues,
- Persuasive essay,
- Memory match vocabulary,
- Creative writing,
- Equations,
- Word bank,
- Sequencing,
- “Cloze” paragraph,
- 3-2-1 strategy chart,
- Graphic organizer,
- Haiku, etc.

The digital content combines upbeat animation with footage of actual facility operations and highlights local landmarks, making the learning concepts tangible to students. The program can be accessed on classroom Smartboards as well as desktops, tablets and other mobile devices, which increases teacher and student convenience. The technological innovation, in combination with environmental, economic, and social benefits, inspires this submission for OCRRA’s Interactive Online Environmental Education program for SWANA’s 2016 Educational Program Excellence Award.

2. Research and Planning

The Need

Education is a key tool for growing and improving our community’s recycling efforts and waste minimization success. In spite of Onondaga County’s excellent recycling rate of 60%, consistent opportunities for diversion in the garbage thrown away by residents and businesses remain. Education creates support for diversion processes as comprehensive educational efforts encourage participation and result in higher recycling rates. Continuously revamping education programming to keep it fresh, exciting, and modern is imperative to engaging young students and shaping the recycling rate for years to come. Additionally, teacher workloads have become increasingly overloaded and challenging in recent years. It is essential to tie recycling education directly into the already required curriculum standards, ensuring teacher ease of lesson planning, and making them more likely to utilize environmental education.

Program Development

In order to meet the need for engaging and convenient environmental education, it was imperative to work with both teachers and students directly. A collaborative working group of teachers from school districts throughout Onondaga County, including the large, urban Syracuse City School District and the small, rural Marcellus Central School District was formed to ensure that:
1. The video series, interactive digital games and classroom activities would be enthusiastically received by the target audience of 3rd – 5th grade students, and
2. The information presented, including the lessons, would be closely tied to Core Curriculum requirements for English, Math and Science.

OCRRA facilitated hands-on, in-person meetings for the teachers over the course of several months in order to research the applicable curriculum requirements and develop the program. During this time OCRRA also worked closely with Pinckney Hugo Group, an award-winning, local advertising agency, to professionally produce the videos and digital games and to research relevant technological platforms currently available across all 18 of Onondaga County’s school districts. The program’s research and planning was done through surveys and teacher working group meetings.

Education Standards
In working collaboratively with urban, suburban and rural teachers in our community, we learned that educators are required to regularly submit lesson plans to school administrators that clearly define and outline the specific curriculum requirements that will be addressed in their classrooms. Researching the curriculum standards to pull out those that are applicable to each lesson is a time-heavy task. When asking teachers to implement a new education program on our behalf, the curriculum research work is a potential barrier. Teachers are increasingly stretched for time trying to meet federal and state requirements already, and they might see environmental education as something extra to get to if they have time at the end of the school year, not as something that can fold right in with their current required lessons. Thus, OCRRA took the time to review the required standards and identified those that aligned with our interactive online education program. We verified accuracy with teachers directly, and then outlined them very clearly on the website where the program is accessed. For example, as you can see in the screenshot below, the compost video, game and classroom activities address the following required curriculum standards:

- CCSS English Language Arts RI 3.7, 4.7, 5.7
- CCSS English Language Arts RI 3.1, 4.1, 5.1
- CCSS English Language Arts RI 3.4, 4.4, 5.4
- NYS Science Standard 4: Living Environment
Providing the curriculum standards to the educators in advance makes lesson planning faster, easier and more efficient on their end. Having prepared these curriculum standards for the teachers ahead of time, along with a comprehensive Teachers Guide, makes this program more attractive to them as it does not further burden their planning time and therefore, they are more likely to implement our program in their classrooms. Including the curriculum is what makes this specific program truly innovative, unique and special. The result: 100% of school districts in OCRRA’s service area have downloaded the videos!

**Resources and Materials Used**

As a new program, all of the digital and classroom activity materials had to be developed and generated from scratch. Prior to the program’s implementation, in-person classroom visits to individual classrooms on an as-needed/as-requested basis were the primary means of educating students on what could be recycled and composted in the region.

New technologies were created for this project including interactive games focusing on composting, recycling, and waste-to-energy that can be accessed on classroom Smartboards, individual computers and laptops and tablets and mobile devices. Our educational operations have improved as a result of this increased capacity to educate a larger student audience in the community through readily available, innovative and engaging technology.
Target Audience
The primary target audience is third-fifth grade students. The goals of the program are to help kids understand what happens to the waste materials they generate, to think about how they can better manage them, and to instill wide-spread environmental responsibility in our community’s youth through modular lessons that teachers will readily embrace.

Program Goals, Objectives and Tactics
The purpose of this program is to help students assume leadership roles in consistently practicing smart waste reduction behaviors. We aim to educate students about good recycling and waste reduction behaviors and to encourage positive peer pressure that results in students carrying out the same sustainability measures they observe in their classmates. This will ideally lead to a social win with excellent student recycling and waste reduction behavior, an economic win with reduced school waste disposal costs, and an environmental win with less litter and less school-generated waste requiring disposal in landfills or waste-to-energy facilities. The specific objectives include:

- Students who are more knowledgeable about waste management systems and the impact their actions have on their environment,
- Students who model good waste reduction practices at home, and at school, and are able to communicate the importance of these actions to their peers, as well as to younger school children and family,
- Students who remain mindful of good waste reduction behaviors as they progress through the school system’s middle and senior high schools, and later in life.

The program goal was to meet these objectives in a manner that adhered to required curriculum standards, and was convenient and engaging to both teachers and students.

Tactics
The younger children are when they first become interested in conserving energy and the earth’s resources, the more likely they will be to support public projects for ecological well-being when they grow up. In order to engage our community’s young children in conservation and to accomplish our goals, OCRRA created a teacher task force and facilitated several educator focus groups to ensure the videos, games and classroom activities would be embraced by teachers, and would effectively engage students in learning about their role in waste management, and then taking action (i.e. waste reduction and recycling) based on that new knowledge.
Obstacles for Meeting the Goals
A key development challenge of this program was technological accessibility. We conducted a survey of school Information Technology Departments to better understand and appreciate their various school district technology limitations such as potential web blockers, lack of touchscreen hardware, etc. Understanding these limitations from the survey feedback helped us design the program to accommodate the most commonly used platforms in schools across the County.

Opportunities for Meeting the Goals
The interactive online education program has a great opportunity for growth in the number of classrooms and students who can be reached. When the program initially debuted in 2015, it was quickly downloaded in over 50 classrooms, bringing environmental education to over 1,000 students throughout Onondaga County simultaneously.

The program is continuously promoted through OCRRA's typical training efforts including Constant Contact email-blast messages to community teachers, school support staff and administrators, hard-copy letters to elementary principals and teachers, several feature articles about the project in OCRRA's quarterly newsletters, social media paid Facebook posts about the project, press releases and television advertisements on kid channels, etc. Each time OCRRA’s Recycling Specialist interacts with a school and/or teacher in the program’s target audience, the program is described and encouraged. The project is accessible via OCRRA’s website, so there is always plenty of promotional information about it there. Additionally, we have promoted this project in write-ups in popular teacher publications and in teacher professional development workshops. This project has also been highlighted at the Federation of New York Solid Waste Association annual conference.

A further opportunity to meet the program goals is presented each time a teacher downloads the project, whether for immediate or future use, contact information and email permission are sent to OCRRA, which enables future communication and training opportunities with our community’s teachers. Finally, this program churns out students that are able to communicate sustainability messages with their families and peers, further expanding environmental education. These efforts have benefited the project by raising its profile, demonstrating its value, and by showing the teachers and students exactly how to access and use it at their convenience.

3. Implementation and Execution

Program Implementation – Timeline of events

| Timeframe: September 2013 – December 2013 | Major Objectives & Benchmarks:  
|------------------------------------------|----------------------------------------|
| Develop teacher task force working group  
| Research required curriculum education standards  
| Establish video and digital game concepts with PHG advertising agency |
| December 2013 – April 2014 | • Develop video scripts and storyboards  
                          • Create vocabulary lists and definitions  
                          • Facilitate teacher-development of classroom activities |
|--------------------------|----------------------------------------------------------------------------------------------------------------|
| April 2014 – June 2014   | • Video production  
                          • Interactive, digital game production |
| July 2014 – August 2014  | • Create “Teacher Guide” to supplement project  
                          • Reach out to pilot schools to test project and collect teacher feedback |
| August 2014 – December 2014 | • Develop and prep a marketing/promotion/outreach plan to bring the program into classrooms |
| January 2015 – Present   | • Program debut  
                          • Continuous outreach |

**Program Activities used to Achieve Goals**

The 30+ curriculum-aligned classroom activities that were created by the teacher task force working group help this program’s participants learn problem-solving and decision-making skills through hands-on environmental education. Each of the five topics in this program, including the local waste system overview, composting, recycling, reduction, and trash, are accompanied by classroom activities that require students to think critically about the information that was provided in the videos and games and apply it to real-world applications.

For example, in the recycling topic, students are asked to write a “persuasive essay” that urges their local grocery store to recycle. They are provided a “4-square organizer” to help guide their thoughts, and they are asked to give three specific reasons why the grocery store should recycle and explain why those reasons are important. Also, in the compost topic, students are asked to pretend that they are an apple that has been eaten down to its core and then put in a compost bin. They then have to write about their composting experience from the viewpoint of the apple core.

**Project Budget**

The actual implementation costs of this program totaled: $75,000.

OCRRA paid costs in connection with producing the videos and the computer programming to build the digital games, as well as offered some funds to the teachers in the collaborative working group that helped develop the curriculum-aligned classroom activities.

OCRRA received two grants to aid in the development of this project: $4,500 from the Syracuse University Environmental Finance Center in 2014, which represented about 7% of OCRRA’s total costs to develop and produce this innovative online school environmental education project. Additionally, OCRRA’s recycling education programs are reimbursed by 50% with an annual grant from the New York State Department of Environmental Conservation (NYSDEC).
Partnerships and Collaborations
This project involved a unique collaboration between OCRRA and teachers from urban, suburban and rural school districts across Onondaga County, including the Syracuse City School District and the Marcellus Central School District. The goal: to ensure that the video series, interactive games and classroom activities would be enthusiastically received by the target elementary school audience, as well as to verify that the information presented would align with Core Curriculum requirements for English, Math and Science.

A Unique Approach and Program Achievements
This program is unique, special and distinct as it is truly the first-of-its-kind, due to the creative use of modern classroom technology including Smartboards, laptops, tablets and mobile devices, in combination with the fact that it aligns with Federal and State curriculum requirements for English, Math and Science. Including the required curriculum component make this project revolutionary in the environmental education industry. The program incorporates practices that achieve environmental benefit beyond what can be achieved using standard education techniques through its ability to reach multiple students simultaneously across widespread geographic areas. The technology involved in this project is superior to what others are doing, as it involves an interactive online approach to environmental lessons. The ability of the project to cross technology platforms, in combination with the convenience to both teachers and students through 24/7 internet access, make this project stand out from the crowd. Students enthusiastically embrace these types of interactive educational tools, as evident by our local student feedback (in audience response section) and by Brighthouse.com’s national study regarding the importance of technology in the classroom:

- 92% of teachers believe the internet has a major impact on their ability to access content, resources, and materials.
- Data shows that traditional scholastic materials such as textbooks and a printed syllabus, are becoming obsolete.
- Teachers must adjust to future innovations in education such as online programs.
FUTURISTIC FUNDAMENTALS
THE IMPORTANCE OF TECHNOLOGY IN THE CLASSROOM

In the age of flourishing technological capabilities, schools must address the transformative role of technology in the classroom. Equipping students with access to computers and software is no longer enough. Technology must become the epicenter of the classroom and the forefront of the curriculum.

Technology is exponentially playing a key role in the classroom. Technology in the classroom has expanded exponentially in the past decade as mainstream media devices, historically used for personal use, become prevalent in classrooms as effective tools of learning.

MOST USED MEDIA DEVICES IN THE CLASSROOM:

- Educational Websites: 56%
- DVDs: 78%
- Online Images: 44%
- Streamed and Downloaded (Relevant) Content: 78%
- Online Games and Activities: 43%

According to recent data from Pew Internet, 92% of teachers believe the Internet has a major impact on their ability to access content, resources, and materials.

Top 3 Reasons Teachers Use Technology in the Classroom:

- Increase Student Motivation
- Reinforce and Expand on Content
- Respond to Various Learning Styles

Additional data shows that traditional scholastic materials, such as textbooks and a printed syllabus, are quickly becoming more and more obsolete.

How Teachers Support the Role of Technology in the Classroom:

- Frequent Use of Digital Media in the Classroom: 62%
- Belief that TV and Video Content Stimulates Discussions: 68%
- Streaming or Downloading of TV & Video Content: 76%
4. **Results and Evaluation**

**Target Audience Response**

The initial response, from both educators and their pupils, has been overwhelmingly positive so far:

- A 5th-grade student from Nate Perry Elementary School in Liverpool, NY, noted, "It was fun to learn about where you put garbage. I look forward to playing the games at home."

- Additionally, Robin Brenner, a teacher at Eagle Hill Middle School in Manlius, NY, remarked, "Students in Family and Consumer Sciences classes thoroughly enjoyed exploring the Smartboard games on the OCRAA website, the games were relevant, challenging and fun."

- Another teacher from the Marcellus Central School District commented, "The students really enjoyed the videos and games. Both were a huge topic of conversation after the presentation."

As an added bonus, when students are given pre-tests to evaluate their knowledge about the topics before viewing the videos and working through the games and activities, and then also given the same tests afterwards, **student test scores increased an average of 13%** as a direct result of the program's implementation.

Screenshots from the interactive, educational "Reduction" video and game in which students either individually, or collaboratively, sort specific items into Trash Can, Blue Recycle Bin, or Compost Bin to earn points. This game can be played on a classroom Smartboard or individual computer, laptop, tablet or mobile device.
**Measured Success**

The achievements of this program have been highlighted not only by our target audience in the metrics below, but also through an "Outstanding Achievement" Award from the Interactive Media Council, which recognizes the "highest standards of excellence in website design and development."

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<tr>
<th>Metrics</th>
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<tr>
<td>- The project has been downloaded by 52 total individual classrooms, across 40 distinct schools, in all 18 Onondaga County School Districts, and including some schools in areas as far as Texas, New York City, and Niagara Falls.</td>
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<td>- Student recycling knowledge have an increased an average of 13% from their pre-assessment test scores after working through the program.</td>
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<td>- By eliminating the need for OCRRA personnel to drive to all 18 school districts to repeatedly present these 5 distinct lessons in person, 1.3 metric tons of greenhouse gas emissions* are reduced annually.</td>
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*Calculated using average miles traveled to schools in 2015 by 1 OCRRA Recycling Specialist: 3,945 average miles/year.

**Future Possibilities**

This program’s future possibilities include extending the target audience to middle and high school grade levels and adding in more curriculum-aligned classroom activities. Additionally, it would be nice to invite teachers to engage in a social media forum, established by OCRRA, to describe how they implemented the activities in their classrooms, in order to nurture wider use by highlighting unique approaches by individual teachers. Future possibilities could also involve new videos to address additional topics, such as exploring the actual technical processes by which old paper, metal cans and plastic become new materials.

**How to Replicate**

The program easily lends itself to replication and instant use in schools as the curriculum contents adhere state-wide, and the video, game, classroom activity format is engaging to elementary students regardless of where they live. The OCRRA interactive education project is available online today at no charge for all to access, use, learn from and enjoy. To date, the program has already been used in schools outside of
Onondaga County, including some in the neighboring communities of Oswego and Monroe Counties (New York), and has even been used in a community refugee assistance program, a community police center, and at the Niagara Falls Air Reserve Station. Outside of New York, the program has also been downloaded in Texas and Florida!

Web Link to Project: www.OCRRA.org/educational_resources

Supplemental Material

Environmental Education

Help your students have fun while they learn to protect the environment! Check out our educational videos and games that teach students about:
- recycling,
- waste reduction,
- composting,
- waste-to-energy and
- other ways we can all work together to help save the world a little each day.

Not only are these videos and games fun, their content addresses NYS Curriculum requirements that are aimed at third through fifth graders. (Specific curriculum topics are noted in the Classroom Activity sections.*). This makes incorporating these entertaining videos into your lesson plans a snap.

*Activities include curriculum specific worksheets as well as pre- and post-tests that assess student knowledge before and after viewing the video lessons.

Overview

Tips for Best Viewing Experience (READ ME FIRST)

Video

Game - Sort it Out!

Classroom Activities

Curriculum addressed:
- CCSS ELA RI 3.7, 4.7, 5.7
- CCSS ELA RI 3.1, 4.1, 5.1
- CCSS ELA RI 3.4, 4.4, 5.4
- NYS Science Standard 4: Living Environment

Where/How to Access program at OCRRA.org; screenshot of the program home page.
Topic: REDUCTION

MAIN MESSAGE: When we each take small steps to reduce our waste, it has a big impact on our environment.

VOCABULARY:
1) Waste - A material that is thrown away or discarded.
2) Disposable - Something that is meant to be thrown out after only a few uses.
3) Natural Resources - Materials like water, oil, and trees that occur in nature and have value.
4) Environment - The natural world, the surroundings in which a person, animal or plant lives.
5) Reduction - The act of making something smaller or less in size, amount or degree.
6) Conserve - To protect something so it does not run out.
7) Energy - Power that comes from heat or electricity.
8) Litter - Trash that is left lying in an open or public space.
9) Environmental Preservation - The act of protecting the environment from pollution or destruction.
10) Single-Use - A product that is designed to be used once and then be thrown away.
11) Bulk - A large quantity of an item, such as a big tub of yogurt or a large jar of applesauce, which has less packaging than individual serving sizes.
12) Packaging - Materials used to wrap products.
13) Electronics - Personal gadgets that are intended for everyday use. A device with many small components, especially microchips and transistors, which control and direct an electric current.
14) Impact - To have a strong effect on something.

Trash: Cloze Paragraph

mixed hopper turbine pit steam ele

garbage 30,000 furnace water tubes en

When the trash arrives at the Waste to Energy Facility, it is dumped __________. Here, the garbage is __________. The ____________ is burned at 2,500 degrees Fahrenheit. As the garbage burns, it heats the water in the boilers' _____________. As water is heated, it changes from water into _____________. There is a lot of _____________ in steam. Finally, the steam energy turns the blades of the _____________. As the turbine spins, it causes a magnet to produce enough electricity to light _____________.

Recycling: Test

Directions: Answer the following questions after watching the Recycling video.

1. True or False: Batteries can go in the blue bin.
   A. True
   B. False

2. The following items can go in the blue bin except...
   A. Newspapers
   B. Plastic bags
   C. Cereal boxes
   D. Plastic bottles

3. You can go to the OCRRA website to find out how to recycle things like:
   A. TVs
   B. Batteries
   C. Computers
   D. All of the above

4. Recycled plastic can be made into things such as: