



take action SC

ENVIRONMENTAL EDUCATION PARTNERSHIP

Presented By SC DHEC and the Take Action SC
Environmental Education Partnership



Take Action SC Environmental Education Partnership



**ENERGY
OFFICE**



Sustainability
University of South Carolina

KIRKLAND

Meet the Partners



Angie Perry
angieperry@greenleafedu.com

Greenleaf Education
Take Action SC Coordinator

Take Action SC Educators



Mary Margaret
Mendenhall

mmmendenhall@greenleafedu.com

Statewide Teacher Training and
Workshop Educator

Student Classroom and
Virtual Presentations for
Allendale, Barnwell, Colleton,
Hampton and Jasper counties

Take Action SC Educators

Janice
Allen

janiceallen@greenleafedu.com

Student Classroom and
Virtual Presentations

Aiken, Bamberg, Beaufort, Calhoun, Clarendon, Florence, Kershaw,
Lee, Lexington, Orangeburg, Richland and
Sumter counties



Meet the Team

Take Action SC Educators



Kris
Abell

krisabell@greenleafedu.com

Student Classroom and
Virtual Presentations for

Abbeville, Anderson, Edgefield, Greenville,
Greenwood, Laurens, McCormick, Newberry,
Oconee, Pickens and Saluda counties

Take Action SC Educators

Anita
Mende

anitamende@greenleafedu.com

Student Classroom and
Virtual Presentations

Berkeley, Charleston, Dillon, Georgetown, Horry, Marion,
Marlboro and Williamsburg counties



Meet the Team

Take Action SC Educators

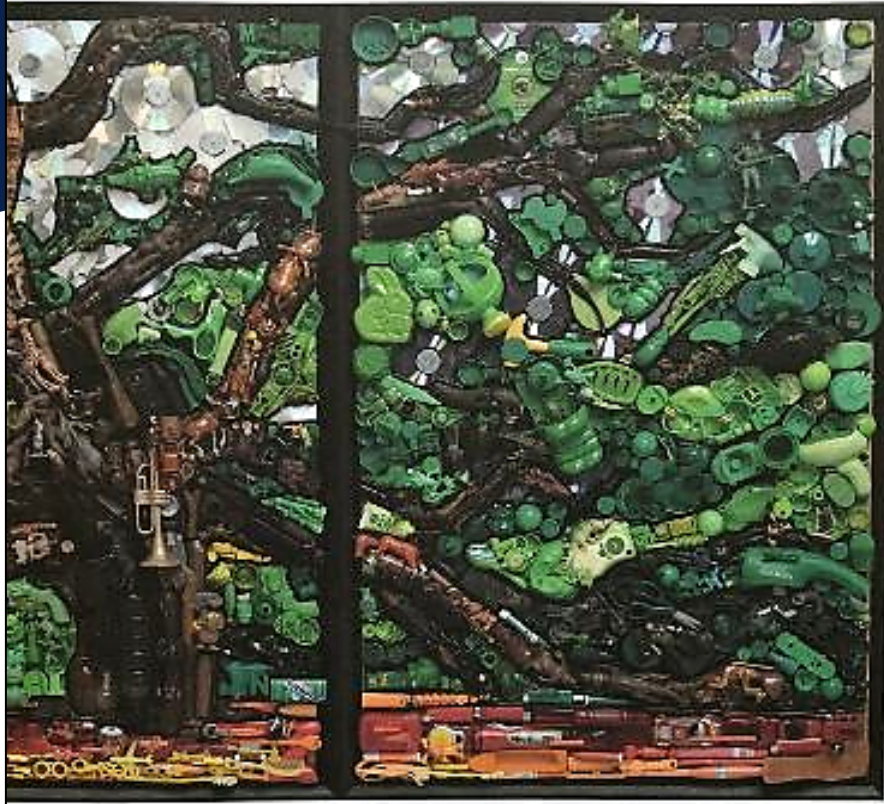


Ginger
Boney

gingerboney@greenleafedu.com

Student Classroom and
Virtual Presentations for

Cherokee, Chester, Chesterfield, Darlington,
Fairfield, Lancaster, Spartanburg, Union and
York counties



"Tree of Life" by Kildare Smith



action for a
cleaner tomorrow

A South Carolina Environmental Curriculum Supplement
Correlated to the S.C. College- & Career-Ready Science Standards 2021

A South Carolina Environmental Curriculum Supplement

Introduces and explains behaviors such as reducing, reusing, recycling, composting, reducing food waste, and smart buying habits that conserve natural resources.

Helps students meet S.C. Science Standards, Disciplinary Core Ideas and Cross-Cutting Concepts through critical thinking while analyzing their own actions and the results of those actions.

Helps students understand the concept of personal responsibility and sustainability.

Protects students' health through increased awareness of safe use, storage and disposal of household products that contain hazardous materials.



TakeActionSC
ENVIRONMENTAL EDUCATION PARTNERSHIP

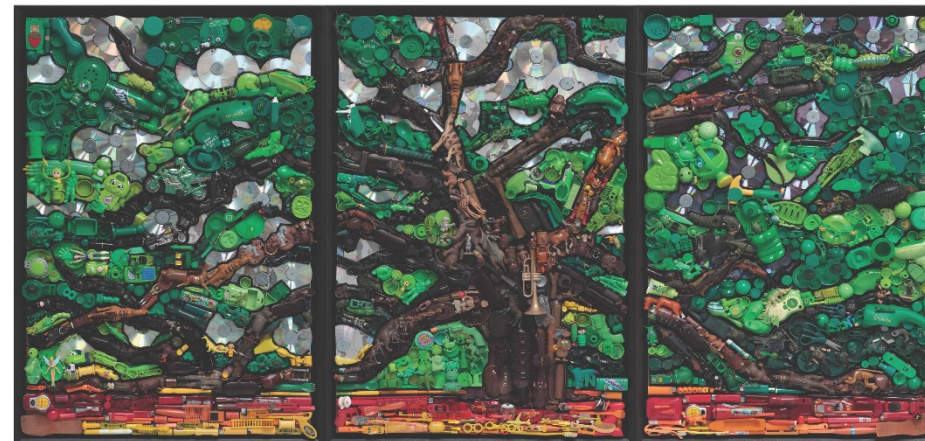
2021-2022
Report
for
Take Action SC



take action SC

2022

annual report



"Tree of Life" by Kirkland Smith

ENVIRONMENTAL EDUCATION PARTNERSHIP



KIRKLAND

S.C. Department of Health & Environmental Control • Office of Solid Waste Reduction & Recycling

1-800-768-7348 • takeactionsc.org

Key Accomplishments

55,267 STUDENTS

were taught "Action" lessons in both virtual and classroom presentations.



3,433+ TEACHERS

were reached through "Action" training and presentations.



439 SCHOOLS

from 44 of the state's 46 counties participated in the TASC Program.



51 TEACHER WORKSHOPS

were held to teach "Action" lessons.



915 PRESENTATIONS

from the TASC educators were made virtually or in the classroom.



99% ACCURACY

(on average) from students and teachers during Action lesson post-tests.



About the TASC Partnership

The Take Action SC Partnership (TASC) brings together organizations dedicated to sharing knowledge, coordinating resources and working together to offer South Carolina's teachers and students valuable resources to help protect and preserve the environment.

TASC is comprised of DHEC, Coastal Carolina University, PalmettoPride, the S.C. ORS Energy Office, Sustainable Carolina at the University of South Carolina, and Kirkland Smith, S.C. Artist. Each partner brings unique knowledge and perspectives to the partnership.

We enjoyed the field trip! It hit every science standard perfectly. Thank you for such an engaging and interesting virtual field trip. We look forward to another virtual field trip next year.

– Lake Murray Elementary Teacher

The 2021-2022 School Year at a Glance

Take Action SC (TASC) is celebrating its most successful year yet! Between students taught and teachers trained, TASC exceeded goals, while still adjusting to the ever-changing challenges of COVID-19. TASC was able to get back into the classroom as well as still offer virtual presentation options and teacher trainings. Presentations were made to 55,267 students and 2,244 teachers. Virtual presentations were open to all grade levels and in-person classroom presentations included third-grade, fifth-grade, seventh-grade and high school classrooms. TASC included lesson demonstrations on natural resources, recycling, composting, landfills, food waste, energy conservation, litter prevention and used oil recycling as well as virtual field trips. Each grade had a unique presentation correlated to that grade's science standards. Teacher workshops were held for all grade levels in various groups from schools to districts training 1,189 teachers totaling 3,433 teachers reached through this program.

One goal of TASC is to accurately measure the knowledge gained from these presentations and trainings. Each group is given a pre-test and post-test. Pre-test scores, on average, rose from 59 percent to 99 percent in post-tests for students. Post-test scores soared to 100 percent accuracy from 75 percent in the pre-tests scores for teachers.

The Student Ambassadors for Sustainability Program with UofSC completed its second year and had nine successful projects. Check out more about this year's projects on the back page. To register your high school group or class for the 2022-2023 year, visit takeactionsc.org.

Just wanted to let you know how much we appreciated your visit to Taylors. Your presentation was awesome! Our STEAM lab teacher was blown away by your presentation and is gung-ho for beginning the year next year. Thanks so much!

– Taylors Elementary School Counselor

"Thank you so much! Your presentation stirred up many conversations with my students. They refused to use plastic bags at lunch today!!!"

– Orange Grove Charter School Teacher

Looking Forward

The newest revised curriculum is out. We partnered with curriculum specialists to revise each lesson to align to the recently published S.C. College- and Career-Ready Science Standards 2021. Each lesson also includes new resources, videos to compliment the lesson, activities and printable resources from our website – takeactionsc.org.

TASC will continue to make virtual presentations for all grade levels for the upcoming year. TASC educators also will make in-person classroom presentations to fourth-grade, fifth-grade, seventh-grade and high school classrooms. The partnership will continue the Student Ambassadors for Sustainability Program for high school students with UofSC and has added Coastal Carolina University this year.

The partnership was also fortunate to be able to officially add a new partner this year, Kirkland Smith. Kirkland has presented our summer workshops and helped schools with reuse projects and is now featured in our "Trash or Treasure" lesson.

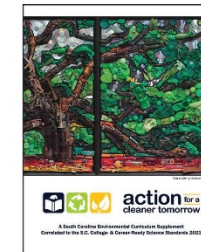
About 'Action'

The S.C. Solid Waste Policy and Management Act of 1991 – S.C. Code of Laws § 44-96-110 – requires that the S.C. Department of Health and Environmental Control (DHEC) provide a curriculum and resource material on recycling for instruction at the elementary, middle and high school levels. DHEC's Office of Solid Waste Reduction and Recycling is charged with this responsibility and as part of that obligation to consult with the S.C. Department of Education in the development and offering of these resources.

Action for a cleaner tomorrow: A South Carolina Environmental Curriculum Supplement ("Action") is an award-winning, interdisciplinary, activity-based curriculum supplement. It was created by DHEC in conjunction with a statewide team of teachers, science coordinators, the S.C. Department of Education and other education professionals. "Action" is designed to provide teachers the tools and resources to bring the environment into the classroom. The curriculum supplement originally focused on waste reduction, recycling and composting, but has evolved since its first edition in 1993 to include air, water, litter prevention, energy, natural resources and sustainability lessons for grades K-12.

All lessons are now aligned to the S.C. College- and Career-Ready Science Standards 2021 and when possible contain South Carolina-specific information. Each lesson is reviewed by DHEC staff, subject matter experts as well as education and curriculum specialists to ensure accurate information and proper alignment to the current standards. The curriculum supplement also offers background information, student activities, video links, handouts and links to additional information and resources.

"Action" is marketed throughout South Carolina and offered through teacher workshops, classroom presentations and virtual learning options – all of which are offered at no charge. To learn more, please visit takeactionsc.org or call Amanda Edwards at (803) 898-0998.



Thank You Teachers, Educators & Partners

TASC could not be as successful without the teachers and educators in South Carolina. Thank you for welcoming our educators into your classrooms and learning programs. We are grateful for all the positive feedback about the presentations as well. And an extra special thanks to our TASC educators and partners – sharing your knowledge and passion about reducing, reusing, recycling, composting and all things sustainability is the key to keeping this program going.

Acknowledgments

This report is published by DHEC's Bureau of Land and Waste Management, Office of Solid Waste Reduction and Recycling (Office).



BUREAU CHIEF..... Henry Porter
ASSISTANT BUREAU CHIEF Juli Blalock
DIVISION DIRECTOR Marty Lindler
OFFICE MANAGER Richard Chesley
ACTION PROGRAM MANAGER Amanda Edwards
LAYOUT/GRAPHICS Gregg Glymph
SPECIAL THANKS..... Angie Perry (Greenleaf Education)
For more information, please visit scdhec.gov/recycle.



take action SC
ENVIRONMENTAL EDUCATION PARTNERSHIP

Action for a Cleaner Tomorrow Teacher Workshops

Action in the Classroom Presentations

3,433+
TEACHERS

were reached through "Action"
training and presentations.



55,267
STUDENTS

were taught "Action" lessons
in both virtual and classroom
presentations.



439
SCHOOLS

from 44 of the state's 46
counties participated in the
TASC Program.



Teacher Workshops





High school students had the opportunity to work on a college level, learning and developing skills in project management, public speaking, communication, leadership and sustainability.

Each student took part in a sustainable project that they created and put their plan into motion with the help of college mentors.

They are now ambassadors for sustainability.

**Student
Ambassadors
for Sustainability
Program**



Picture: Spartanburg High School Student Ambassadors



- Establish a project management plan (PMP) with the high school students:
 - Establish Goals
 - Brainstorm steps/needs
 - Produce a task list with deadlines
 - Arrange chronologically in a step-by-step format
 - Continuously review and update
- Help students remain organized with the material and information
 - Monthly meetings with notes
 - Reminder emails about notes and upcoming tasks or meetings
 - Be available to help answer any questions



2021-2022 RECAP



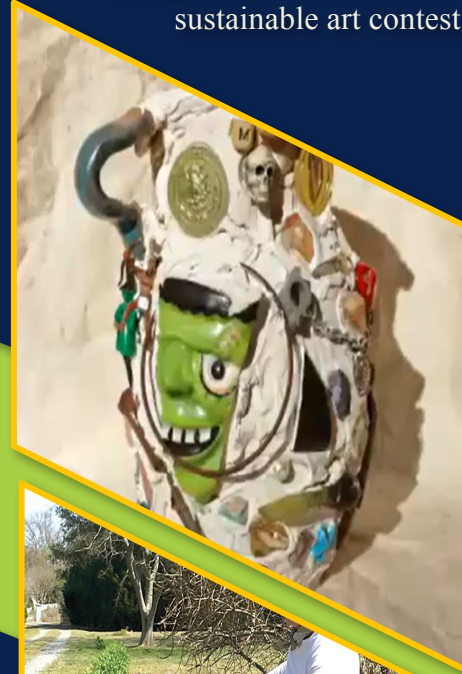
Blythewood High School
Created a compost program

Sumter High School
Community clean-up.



Dreher High School
Created an environmental newsletter (2nd year) distributed virtually to students.

JL Mann High School
Designed and conducted 2nd sustainable art contest.



Berkeley Middle College High School
Conducted a litter clean-up and recruited other students

Porter Academy Created pollinator garden.



Silver Bluff High School
Conducted a waste audit and implemented improvements for the school.

My Bag

Learning Objectives

Students will:

- Evaluate ways resources are wasted; and
- Determine alternative solutions for unwanted items.

BACKGROUND

What you call trash or garbage, industry professionals call solid waste. There are different types of solid waste, but the type discussed in this lesson is municipal solid waste (MSW). MSW is the waste we make in our homes, schools and places of work.

Each of us has the opportunity to manage the MSW we produce. Most of us, however, don't think about it and just throw things away. Where is away? Away is a landfill. The majority of MSW generated in South Carolina is disposed of in landfills. Recycling, however, is an option that conserves natural resources, creates jobs and provides regional manufacturers with raw material to make new products. Other options are reducing waste, reusing products and composting – all of which have the same economic and environmental benefits to recycling.

In this activity, the students look into a typical bag of household trash and decide which items can be reduced, reused, recycled and composted as well as those that must be thrown away.

ENGAGE

For this activity, you will need a bag with about 5 pounds of clean trash (including items that can be reduced, reused, recycled or composted). Also have items that only can go in the landfill; five clean paper bags; and a bath scale (optional). See SUPPLY LIST for details.



Student at Phoenix High School Carry Around Their Trash

Ask the students, "How many pounds of trash do you think you make each day? Each week?" Then show them the *Student at Phoenix High School Carry Around Their Trash* video. For a direct link to this video, visit takeactionsc.org/curriculum. Continue with the lesson after watching the video.

EXPLORE

- Review the background information with students.
- Ask the class, "What would you expect to find in a typical bag of household trash?"
- Show the students the bag of trash you have prepared and ask them to estimate its weight.

Continued on the following page

Aligned to the S.C. College- and Career-Ready Science Standards 2021

GRADES 2, 5 & 7



DID YOU KNOW?

Instead of using easily disposable items, reduce your waste by using reusable containers (e.g., water bottles, grocery bags, lunch boxes, to-go containers).



MORE RESOURCES ON THE WEB



Quick Recycling Tips with DHEC's Take Action SC



SUPPLY LIST

Below is a list of suggested items.

- Aluminum or Steel Can
- Cardboard (one piece) or Cereal Box
- Dryer Lint
- Egg Cartons (paperboard, plastic and fiberboard)
- Fake Food (e.g., plastic fruit)
- Food Leftovers Storage Container
- Milk or Juice Jug
- Newspaper
- Paper Products (e.g., plates, napkins)
- Product Packaging
- Plastic Forks and Spoons
- Strawberry Container
- Styrofoam or Fast-Food Cup
- Tea Bag
- Ziploc Bag

EXPLAIN

- Watch the video, *What Choices Are You Making with Your Trash?* video.
- Make five cards marked REDUCE, REUSE, RECYCLE, COMPOST and LANDFILL. Tape these cards onto the five bags. Discuss what these words mean. Find out and discuss with the class what is recyclable in your community. For more information, visit scdhec.gov/RecycleHereSC.
- Have the students open the trash bag and tell how each item is used and why it was purchased. Discuss if it was necessary or not. Now that the item has been thrown away, was it worth buying? Remind the students that we can reduce the amount of trash we throw out by only buying what we need.
- Have the students divide the contents of the trash bag into the proper categories – REDUCE, REUSE, RECYCLE, COMPOST and LANDFILL.
- After classifying, reweigh the items in the landfill category and discuss how much material was saved from going to the landfill.

ELABORATE

For a math extension, create a chart graphing the weight of the five bags after the 5 pounds of trash has been sorted into REDUCE, REUSE, RECYCLE, COMPOST and LANDFILL.

Have the class multiply 5 pounds by the number of students in the class and school to determine about how much trash the entire student body would make in one day. How much in a week, month and year?

EVALUATE

- Have the students choose one of the four ways to keep trash out of the landfill. Have them create a poster to show how people can help the environment by choosing that option and have them present it to the class.
- Have the students complete the *Bagging Trash Match Game Student Activity Page* (provided on page 54).

5 E Model: ENGAGE EXPLORE EXPLAIN EVALUATE ELABORATE



Trash or Treasure

Learning Objectives

Students will:

- Determine the importance of reuse as a waste management strategy;
- Discover that reuse has environmental, economic and social benefits; and
- Discuss and list ways that natural resources are wasted.

BACKGROUND

Reuse is the practice of using an item more than once whether for its original purpose or to perform a different function. Reuse has environmental, economic and social benefits. It requires fewer resources, less energy and less labor compared to recycling. In addition, by reusing and not recycling and reprocessing items, it prevents pollution by decreasing the need to harvest raw material. It saves the energy needed to convert an old product into new raw material. It also prevents pollution by decreasing the need to harvest raw material. It conserves natural resources – which are essential for human life and/or used to meet people's needs. It makes quality products available to others at reduced or no cost while generating business activity and jobs – creating a greener economy and stronger community.

Reuse is a growing trend with businesses, organizations and nonprofits building a nationwide infrastructure. For example, ReUSE Minnesota, a member-based nonprofit, reports that reuse generates more than \$4 billion in annual gross sales in the state. What is billed as the nation's largest thrift store, repurposedMaterials, turns would-be waste from businesses into valuable commodities. The company, which has four locations including one in Williston, South Carolina, has repurposed billboard vinyls into pond liners and tarps, synthetic turf into cushioning for egg-laying chickens and more.

It's just not for businesses – each of us can take action. Examples include:

- **Buy used.** Everything from clothes, furniture, housewares, building material and more is offered at specialized reuse stores and consignments shops;
- **Maintain and repair products** such as clothing, tools and appliances;
- **Borrow, share or rent items** that are used infrequently like party decorations and tools; and
- **Donate unwanted items.**

What can schools do? Here are a few examples.

- **Consider collecting reusable items** (e.g., clothing) for local charities.
- **Maintain a free list service of used musical instruments and sports equipment in the school newsletter.** It may encourage some children to try an activity.
- **Set up a school supply exchange.** Collect unwanted items (e.g., paper, pencils, pens, file folders, envelopes) that can be used by others.
- **Collect unwanted supplies** at the end of the school year to use next year.

Aligned to the
S.C. College- and Career-Ready
Science Standards 2021

GRADES 2 & 5



Heathwood Heron – KirklandSmith.com

A Message from Kirkland Smith, Artist

"Why do I do this art? For the last 14 years, I have been collecting everyday disposable objects that have had a life (often very brief) and are headed to the landfill, upcycling them into contemporary assemblages as an evocative way to drive home the message of environmental responsibility. By engaging the viewer with artwork that is both assessable and nostalgic, I hope to challenge viewers to consider their consumer habits. I believe that what we throw away says a lot about who we are, but what we choose to cherish and protect says more in the end. When working with students, I take them through the process of creating an assemblage. I often work with the entire school, but sometimes with a specific grade or age group, working together (in small groups) to create a piece that will become part of the school's collection."

Email Kirkland@KirklandSmith.com to find out if the artist can come to your school. Once confirmed, follow these steps to prepare for her visit. The process has three parts:

1. **COLLECTION OF MATERIALS** – The schools will need to gather supplies or send home a request for material prior to her arrival. It is a good opportunity for families to declutter and send in unwanted or broken items. (This step is not required, but encouraged.)
2. **SORTING MATERIALS** – The students help sort materials by color, giving them an opportunity to share in this part of the process and to handle the materials that will be used in the artwork.
3. **CREATING THE ARTWORK** – Students help place objects on the prepared panel and contribute to the final piece.

Extension Activities

1. Make "sun catchers." You will need used crayons, a medium hand kitchen grater, wax paper, irons, newspapers and a brown paper bag. Ask for extra adult volunteers on this day. Perhaps they could bring their own irons.
 - a. Have students sort the crayons by color and remove the paper from the crayons.
 - b. Ask an adult volunteer to grate the crayons. Crayons also can be shaved using scissors. Finish Steps A and B before teaching the lesson.
 - c. Have the students sprinkle crayon shavings on a sheet of wax paper, keeping colors separate.
 - d. Cover with a second sheet of wax paper, making a sandwich.
 - e. Prepare a pad of newspaper to protect surface from iron.
 - f. Cut open a brown paper bag and lay on top of newspaper for a blotter.
 - g. Put the wax paper sandwich on brown paper and newspaper pad.
 - h. Cover it with another piece of brown paper.
 - i. Using a medium hot iron, melt the two layers of wax paper together. This also will melt the crayons, creating a stained glass effect.
 - j. After cooling, cut the sun catcher into a shape (e.g., butterfly, fish, flower) either by tracing a shape first or by cutting freehand. A mobile of many shapes can be made or they may be hung in a window.
2. Make a "crayon candle." You will need candle wax, used crayons, candle wicks, a pencil, glass baby food jars, steel (soup) cans with the lids and labels removed, pot holders and an electric frying pan.
 - a. Clean and dry baby food jars.
 - b. Using a 4-inch piece of candle wick, tie the wick in the middle of a pencil. Rest the pencil across the jar opening with the candle wick hanging inside the jar. Repeat with remaining jars.
 - c. Students are to remove paper from crayons and sort by colors into steel cans. Add candle wax to each color to fill the can one-half full.
 - d. Pour water into the frying pan.
 - e. Set cans in the electric frying pan on low to medium heat. When melted, pour a 1/2- to 3/4-inch layer of color in each jar.
 - f. Let cool until set enough so that a layer of another color can be poured on top. Layer the colors until the jar is full. Repeat with remaining jars.

- g. After candles are completely cooled, students can trim candle wicks to 1/4- to 1/2-inch.
- h. Make labels saying "This gift was made from reused glass and recycled crayons." Then tie them around the candles.
3. Make "new" crayons. You will need used crayons, five to eight steel (soup) cans with the lids and labels removed, Popsicle sticks, an electric frying pan, a water pitcher, pot holders and candy molds.
 - a. Have students sort the crayons by color (or mix to make new colors – e.g., blue and yellow make green) and remove the paper from them.

- Finish Step A before you teach the lesson.
- b. Pour water into the electric frying pan.
 - c. Place the steel cans in the electric frying pan.
 - d. Break the crayons into small pieces and place into the steel cans so they will begin to melt.
 - e. Once melted, carefully remove the steel cans from the electric frying pan and pour the liquid crayon wax into the candy molds.
- Allow the wax to "cool" (harden). Place the molds in the refrigerator to speed up the cooling process. Pop the "new" crayons out of the mold.

S.C. Science Standards for Grades 2 & 5

GRADE 2	
2-ESS3-1	Design solutions to address human impacts on natural resources in the local environment.
DISCIPLINARY CORE IDEA (DCI):	
ESS3.C: Human Impacts on Earth Systems	Things that people do to live can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.
ETS1.B: Developing Possible Solutions	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.
ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World	Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. Thus, developing and using technology has impacts on the natural world.
CROSSCUTTING CONCEPTS (CCC):	
Cause and Effect:	Events have causes that generate observable patterns.
GRADE 5	
5-ESS3-1	Evaluate potential solutions to problems that individual communities face in protecting the Earth's resources and environment.
DCI:	
ESS3.C: Human Impacts on Earth Systems	Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.
CCC:	
Systems and System Models:	A system can be described in terms of its components and their interactions



Learning About Landfills

Aligned to the
S.C. College- and Career-Ready
Science Standards 2021

GRADES 2, 4, 5 & 7



Learning Objectives

Students will:

- State and demonstrate that a landfill is a specially designed site to safely dispose of waste;
- Identify ways that the waste we generate at home, work and school is managed and that most of this waste goes to a specific type of landfill; and
- Learn how much waste each of us makes.

BACKGROUND

A landfill is a large area of land that is specifically engineered and built to safely receive waste. Different types of landfills accept different kinds of waste including construction and demolition debris as well as industrial, hazardous and municipal solid waste (MSW). This lesson focuses on landfills that accept MSW – that is waste that comes from homes, schools and businesses.

MSW landfills are designed to protect human health and the environment from contaminants that may be present in the waste disposed of at the site. To accomplish that, garbage is buried in such a way that it will be isolated from surrounding groundwater, kept dry and away from contact with air.

Waste reduction, recycling and composting divert large parts of the waste stream from disposal. Landfills, however, remain the nation's most common management option (out of disposal, incineration and recovery) for MSW. In fiscal year 2021 (July 1, 2020 to June 30, 2021), South Carolinians generated more than 4.9 million tons of MSW. Of that amount, more than 1.2 million tons (about 24 percent) was recycled or composted while the remainder (nearly 3.8 million tons or 77 percent) was disposed of in one of South Carolina's MSW (Class 3) landfills. A closer look reveals that each of us disposed of:

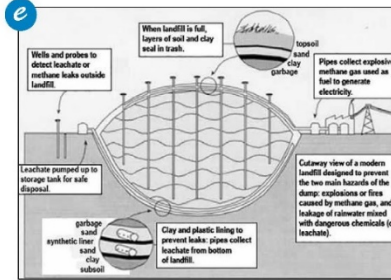
- 4 pounds of waste per day;
- 1,460 pounds of waste per year; or
- 5,840 pounds (more than 2.9 tons) for a family of four per year.

Today's landfills are bigger and take waste from larger areas and more communities often resulting in waste having to be moved longer distances. Landfills can have a life expectancy of 20 to 50 years. Space is a priority for landfill operators. Garbage is placed in a disposal cell, compacted (crushed) to maximize space and covered daily with soil or another material to reduce odor and litter as well as control rodents and pests.

South Carolina currently has 28 MSW landfills (17 of which accept waste from the public). Landfills are expensive to build and operate. Landfills must meet strict federal and state regulations on their location,



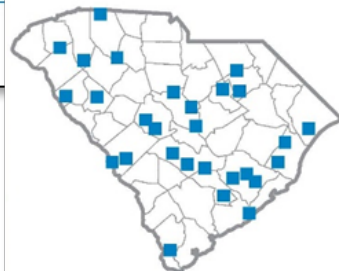
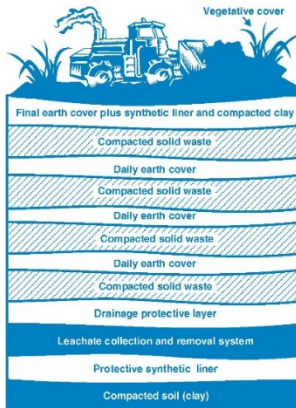
MORE RESOURCES ON THE WEB



To learn about landfills and how they are constructed, visit epa.gov/landfills/municipal-solid-waste-landfills.



LANDFILL LAYERS



CLASS 3 LANDFILLS



Where Does the Garbage Go? Video



3 Talking Trash Understanding Landfills Video



William Rathje, Garbologist – Talkin Trash Video



Exploring Horry County Landfill with Horry County Solid Waste Authority



Create a Mini-Landfill

This mini-landfill shows how garbage is layered and how landfills are designed to protect public health and the environment. The students may build their landfill individually or in groups.

For each landfill, follow these steps.

- Use a plastic cake container from the grocery store as your landfill site.
- Cut eight circles from heavyweight paperboard (cereal boxes) or cardboard. Cut one circle from a black garbage bag. The students will use these circles to represent the many layers of a landfill.
- Have the students create the following.
 - WATER TABLE** – Create a circle to represent the water table. Explain that the water table is the level below which the ground is saturated with water. Groundwater is the water below the Earth's surface that moves between soil particles and rock. This water supplies much of our drinking water. To make this layer, use crayons or markers to color the cut-out circle or – for a three-dimensional look – use clay or a salt and flour mixture colored with blue food coloring.
 - DIRT LAYER** – This represents the ground. Have students color this layer brown or glue sand to the circle.
 - PLASTIC LINER** – Use a circle cut from a black plastic garbage bag and glue it to a cardboard circle to represent the thick plastic liner in the landfill.
 - LEACHATE PIPES** – Glue two straws together to represent the pipes that collect water in the bottom of the landfill. This water (leachate) is pumped from the landfill and treated at a wastewater treatment plant.
 - TRASH LAYER** – Have the students glue a variety of trash to this circle.
 - DIRT LAYER** – Prepare as before.
 - TRASH LAYER** – For this layer have the students use only material that can be recycled.
 - DIRT LAYER** – Prepare as before. Explain to the class that landfills are covered with a dirt layer at the end of each day.
 - CAPPING LAYER** – When the landfill is filled to capacity, it is permanently covered with a combination of synthetic liner and compacted clay.
 - FINAL EARTH COVER** – The soil is then planted with vegetation, like grass, to prevent erosion.
- After the students prepare their landfills, discuss how garbage takes up space in the landfill. Then let them remove the recyclables from Layer G. Let the students see how keeping recyclables out of the landfill saves valuable space and resources. Explain that we must separate recyclable items from the garbage before it goes to the landfill.

Extension Activities

- Take a trip to the local landfill to see how it works and how big it is.
- Does your school have a **recycling** program? If so, how much and what does it collect? If not, can you start one?
- Does your school have a **composting** program for food waste? If so, how much and what does it collect? If not, can you start one?

See DHEC's *Composting: A Guide for S.C. Schools* and *Recycling: A Guide for S.C. Schools* for more information. Visit takeactions.org/curriculum to view the online versions.



DID YOU KNOW?

In South Carolina, tires, used motor oil, large appliances, household electronics and yard trimmings are banned from MSW landfills to encourage recycling of them.



Closing the Loop

Aligned to the
S.C. College and Career-Ready
Science Standards 2021
**GRADES
K, 2, 5 & 7**
CCCS

Learning Objectives

- Students will:
- State what it means to recycle;
 - Identify the three steps of the recycling loop;
 - Recognize the universal recycling symbol;
 - Identify items that can be recycled; and
 - Learn and discuss how to prepare items for recycling to reduce contamination.

BACKGROUND

Most of us think of recycling as simply placing aluminum cans, plastic bottles, steel cans and paper into a curbside recycling container or taking them to a drop-off center. While these efforts are a vital part of the process, they are only the first step. Recycling is a series of steps that includes:

- STEP 1: The collection of items that otherwise would be considered waste.** Collection methods include

curbside collection, drop-off centers, single-day collection events, take-back programs and deposit or refund programs;

- STEP 2: Processing and remanufacturing the recycled material into new products.** After collection, recyclables are sent to a material recovery facility (MRF) to be sorted, cleaned and processed into material that can be used in manufacturing. Recyclables are bought and sold just like raw material and prices go up or down depending on supply and demand; and
- STEP 3: Buying recycled products.** The loop is closed when products made from recycled material are purchased. It's easy, too. Thousands of products contain recycled material. When shopping, also look for products that can be recycled in your community. These steps create a closed loop that makes recycling work.

These three steps create a "closed loop" that ensures the overall success and value of recycling.



Processing includes sorting the recyclables by type and removing contaminants (i.e., non-recyclables) and turning them into marketable commodities – raw material – for remanufacturers. Recyclables are bought and sold like any commodity and the value (prices) for the material fluctuates in the marketplace.

Thousands of products are made from recycled-content material. Recycled cardboard and newspaper are used to make new boxes, paper towels, napkins and other paper products. Recycled plastic soft drink and water bottles are used to make carpet, clothing, bottles and auto parts. Recycled plastic milk jugs and detergent bottles are remanufactured into many products including plastic lumber, toys and trash bags. Recycled aluminum cans are remade into new cans or building material. Recycled glass is used for new glass containers and fiberglass.

ENGAGE

The chasing arrows symbol is one of the most recognizable logos in the world. Discuss with the class that it is a common misconception that the symbol represents the three Rs (reduce, reuse and recycle). The design, created in 1970 by college sophomore Gary Anderson as part of a nationwide competition, actually symbolizes the closed loop system with each arrow representing a step (collection, processing/manufacturing, buying recycled) in the process.

Show the video *Closing the Loop of Recycling* by Steve Trash. Visit takeactionsc.org/curriculum for a direct link to this video.

SOURCE: Earth911.com

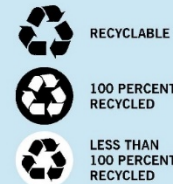
EXPLORE

- Show the video *REPREVE* video. Visit takeactionsc.org/curriculum for a direct link to this video.
- Ask, "What does recycle mean?" (Recycle means minimizing waste by recovering and reprocessing usable products that might otherwise become waste (e.g., recycling of aluminum cans, paper, bottles). Hold up an item that has a recycling symbol on it. Draw the symbol on the board. Explain that the symbol is made of three arrows in the shape of a triangle. Show that, if you start at one arrow and follow it, you go around in a loop. Explain that this loop represents how recycling works. Go through this process with several items, such as a plastic soda bottle or aluminum can. See *Recycle Cycle Student Handout* (provided on page 60) for the complete process.
- Pass around products with recycling symbols. Explain to the students that there are several versions of the recycling symbol. Ask the students if they know the difference between *recycled* and *recyclable*. (Recycled means the item was made from material that already has been used. Recyclable means the item can be recycled and used to make something new.)
- Discuss the importance of looking for the symbol when you shop. Explain that many people *pre-cycle*. Pre-cycling means that they buy products that can be recycled or reused as well as buying products made from recycled material whenever they can.
- Ask the students to name items at home that can be recycled. List those recyclable items on the board.
- Distribute *What Can Recycled Items Become? Student Handout* (provided on page 61) and review.

WATCH THE WORDS

Beware of the word "recyclable," which is not the same as "recycled." Many products are recyclable, but what matters is what you can recycle in your local program. When shopping, look for the chasing arrows on the products you buy.

- The first symbol simply means the product or package can be recycled.
- The second means 100 percent of the product or package is made from recycled materials.
- The third means the product or package is made from both recycled and virgin materials. Each symbol and meaning are shown below.



Closing the Loop of Recycling by Steve Trash YouTube



Discovery Channel: How REPREVE Is Made YouTube

EXPLAIN

Each step of the recycling loop is important, but getting the first step right is key to making the loop successful. This section will focus on the first step and understanding how collection works and what happens to recyclables after they are collected. There are several methods for collecting recyclables, including curbside collection, drop-off centers, and deposit or refund programs depending on where you live.

Discuss the following questions with the students.

- What collection options are available in our area?
- What items can we recycle here?
- How do we find out what's recyclable in our area to make sure we're not contaminating? Discuss this and review facts from your local recycling office at scdhec.gov/RecycleHereSC.

Show the video *What Happens to Your Recycling After It's Collected?* For a direct link to this video, visit takeactionsc.org/curriculum.

After watching the video discuss the following questions with the class.

- Why is collecting the right recyclables for your area so important?
- How can contamination affect the recycling process?
- What ways can recyclables be collected? (drop-off, curbside, commercial collection and more)
- Do you recycle at home? What items? Where do they go? Ask the same questions for school collection if you have a recycling program.

ELABORATE

Knowing that recycling is a series of three steps, this section will focus on the last two steps, processing and manufacturing as well as buying recycled products. As discussed under EXPLAIN, knowing what items are recyclable in your area and preparing those items for recycling jump starts the three step process of closing the loop.

With 75 percent of what is going to our landfills being recyclable and the fact that we are only recycling one-third of those items means we have much work to do.

Show students the video *Close The Loop EARTH*. Visit takeactionsc.org/curriculum for a direct link to this video.

Discuss with the students that the product in the video is now being recycled and made into a new product that we all use daily.

- Discuss with the students what circular economy means?
- Describe what happens when an item is given a new sustainable life?
- Describe the manufacturing process for the sustainable product.
- List other items that are used daily and could be recycled and given a new sustainable life.

Show the video *Sustainable Style*. Visit takeactionsc.org/curriculum for a direct link to this video. Discuss with the students how the company in the video is contributing to a successful circular economy.



Recycle Here SC Website



What Happens to Your Recycling After It's Collected? YouTube



Close The Loop EARTH YouTube



Sustainable Style YouTube

Composting: Recycling Naturally

Learning Objectives

Students will:

- Review the basics of composting;
- Discuss how organic waste can be recycled by composting;
- Observe how composting works;
- List the benefits of composting; and
- Discuss the indispensable importance of soil in our lives.

Aligned to the
S.C. College- and Career-Ready
Science Standards 2021

GRADES
5, 6 & 7



ENGAGE

FOR YOUNGER STUDENTS

Show *Composting for Kids* created by the Highfields Center for Composting. For a direct link to this video, visit takeactionsc.org/curriculum.



Composting for Kids



FOR OLDER STUDENTS

Show *Jason Mraz & Alison Teal Discussing Compost and Regenerative Agriculture – Kiss The Ground*. For a direct link to this video, visit takeactionsc.org/curriculum.



Jason Mraz & Alison Teal
Discussing Compost and
Regenerative Agriculture –
Kiss The Ground



EXPLAIN

FOR YOUNGER STUDENTS

1. Read aloud the story *Compost Stew* by Mary McKenna Siddals. For a direct link to this video, visit takeactionsc.org/curriculum. This book introduces composting, from A to Z, by teaching what goes into a composting bin.
2. After reading the story, follow up with discussion questions. *Which items in the book surprised you? Which are plants? Which aren't? What would you add to your own compost stew?* (Allow a variety of answers. Be sure students are able to explain their reasoning for including such items.)



Compost Stew

FOR OLDER STUDENTS

1. Ask the students to name a food in their lunch that did not come from soil.
2. Help the students determine the ingredients in different foods and, as a class, trace each food's origin back to the earth.
3. Ask the students to list everything they are having for lunch.



MORE RESOURCES

For information about starting a school composting program, see *Composting: A Guide for SC Schools*. DHEC's *Composting: Simple Steps for Starting at Home*. Both guides are available at sodhec.gov/compost.



DID YOU KNOW?

The first week of May is *International Compost Awareness Week*.

To learn more about events and ways to participate, visit fao.org/world-soil-day.



MORE RESOURCES

You can have fun and learn about composting while singing with your students! *Banana Peel Blues* should be sung to the tune of *Take Me Out to the Ballgame*.

Banana Peel Blues

Take me out to the compost,
Take me out to the heap.
Grind me up in a food grinder,
I don't care if I'm chopped to bits.
Cause it's root, root, root for recycling.
If we all compost, we'll gain.
For it's two, four, six weeks I'm out,
To the old garden!

EXPLORE

As a class project, build a mini-composter. See the **SUPPLY LIST** on the following page.

Use this activity as a demonstration lab for the class to view composting at work. The teacher should collect the material (including greens and browns) to use in the mini-composter prior to the lesson to expedite demonstration. Explain to the students that they will be able to view composting in the classroom on a small scale.

Show the students the material collected.

- **STEP 1:** Remove the label from the soda bottle, leave on the lid and cut around it about three-fourths of the way up to form a flip top. Don't cut it off! Teachers may need to do the cutting depending on the ages of the students.
- **STEP 2:** Fold the flip top back on the bottle to fill it as detailed in the following steps.
- **STEP 3:** In the bottom, place 1 inch of soil. Do not compact the soil. If it is dry, lightly spray with water.



COMPOST IN A BOTTLE

GREENS

VEGETABLE
SCRAPS

FOOD PREP
WASTE

OTHER GREENS

COFFEE
GROUNDS
& EGG SHELLS

BROWNS

OTHER
BROWNS

DRIED
GRASS

DRIED
LEAVES

SHREDDED
NEWSPAPER

SOIL



Healthy Soil

Learning Objectives

Students will:

- Define soil;
- Understand that soil is an essential natural resource;
- Discuss that soil is an ecosystem; and
- Determine why soil needs to be healthy.

BACKGROUND

Soil is a living and life-giving natural resource. It is an ecosystem comprised of air, water, minerals (e.g., clay, silt, sand) and organic matter that provides essential services for life such as providing a foundation to build structures and grow food. Healthy soil provides clean air and water, crops and forests, grazing lands, diverse wildlife and picturesque landscapes according to the U.S. Department of Agriculture (USDA).

Soil does this through five indispensable functions.

1. **Regulates water** – Soil helps control where rain, snowmelt and irrigation water go.
2. **Sustains plant and animal life** – The diversity and productivity of living things depend on soil.
3. **Filters and buffers potential pollution** – The minerals and microbes in soil are responsible for filtering, buffering, degrading, immobilizing and detoxifying organic and inorganic material including industrial and municipal byproducts and atmospheric deposits.
4. **Cycles nutrients** – Carbon, nitrogen, phosphorus and many other nutrients are stored, transformed and cycled in soil.
5. **Provides physical stability and support** – Soil structure provides a medium for plant roots. Soil also provides support for human structures and protection for archaeological treasures.

The ground beneath our feet is an ecosystem – that is a biological community of interacting organisms and their physical environment. An ecosystem contains both living (biotic) and non-living (abiotic) elements. Healthy soil is an ecosystem.

There is a world of microorganisms – bacteria, fungi and protozoa – in the soil that cannot be seen without a microscope. There are also bugs that we can see like ants, beetles, worms, millipedes and more. These organisms use the soil as their home while playing a vital

role in the breakdown of organic material and supporting the balance of the ecosystem.

The organic material is called soil organic matter (SOM). SOM is composed of humus, mature or well-decomposed leaves and old plant material that is no longer part of the living plant, actively decomposing material and living roots and organisms. The materials sand, silt and clay are the non-living material in the soil. Sand, silt and clay are all different sized particles. In your examination of the soil types, see if you can see the fine silt and clay and sand pieces.

When a soil has a healthy level of organic matter, about 10 percent of the soil makeup, there is enough organic material for the microorganisms to thrive. With microbial activity, soil aggregates form. Soil aggregates are groups of particles in the soil that bind together. The space that is made in between the groups of particles allows for air and water in a balanced soil makeup.

What is most important to remember is that a healthy soil ecosystem is essential for healthy plant life. The soil and living plants share an environment together and help each other live. When the microorganisms in the soil break down decaying material, this makes the minerals and nutrients available to the plant's roots. In exchange, the plant roots give the microorganisms something important to their makeup. The plant roots transfer carbon to the microorganisms which they retrieve from the air through photosynthesis. This exchange and transfer of material is an example of the complimenting cycles in nature positively benefiting each other.

With healthy soil, plants can be healthy. When plants are healthy, they can grow healthy food for us full of vitamins and nutrients to support our health.

ENGAGE

Show the video **Take Action SC Soil Video** with Chanda Cooper from Richland Soil and Water Conservation. Visit takeactionsc.org/curriculum for a direct link to this video.



Take Action SC Soil Video



Aligned to the
S.C. College- and Career-Ready
Science Standards 2021

GRADES
5 & 7



EXPLORE



FLOUR VS. BREAD DEMONSTRATION ACTIVITY

The teacher will need to gather material for this experiment ahead of time. See the SUPPLY LIST for this activity. Use the **Healthy Soil with Kris Abell and Take Action SC** video for assistance with this demonstration. For a direct link to this video, visit takeactionsc.org/curriculum.



SUPPLY LIST (FLOUR VS. BREAD)

White flour (gluten-free substitute flour is okay), about 1 cup for each group

Sliced bread, 2-3 slices for each group

Paper cups (any size, but smaller is better so water is not overdone), two for each group (Make sure you can poke holes in them.)

Water with blue food coloring for each group – in water bottle or second cup

Toothpicks or unfolded paper clips (to poke small holes in cups) – This is to simulate rain.

Large plastic plates, two per group (Make sure there is room to leave space around the bread for water to flow without dripping off the edge.)



Healthy Soil
with Kris Abell
and Take Action SC



MORE RESOURCES

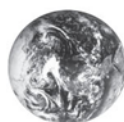
Below is a list of additional teacher resources. For a direct link to these resources, visit takeactionsc.org/curriculum.

- Soil Microorganisms
- The Soil Story Curriculum
- Soil Organic Matter
- Flour vs. Bread: How Soil Aggregate Structure Influences Water Flows
- Ecology: Soil Properties
- The Soil Story with Pashon Murray



DID YOU KNOW?

December 5th is World Soil Day. Visit www.fao.org/world-soil-day to learn more.



GRANTS

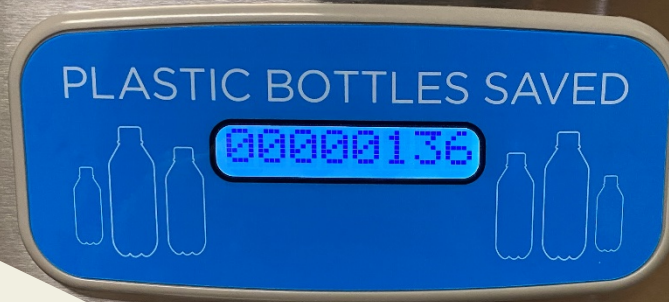


Stefanie Vandiver

scdhec.gov/K12RecyclingGrant

Opening Mid-August

K-12 Public or Private Schools



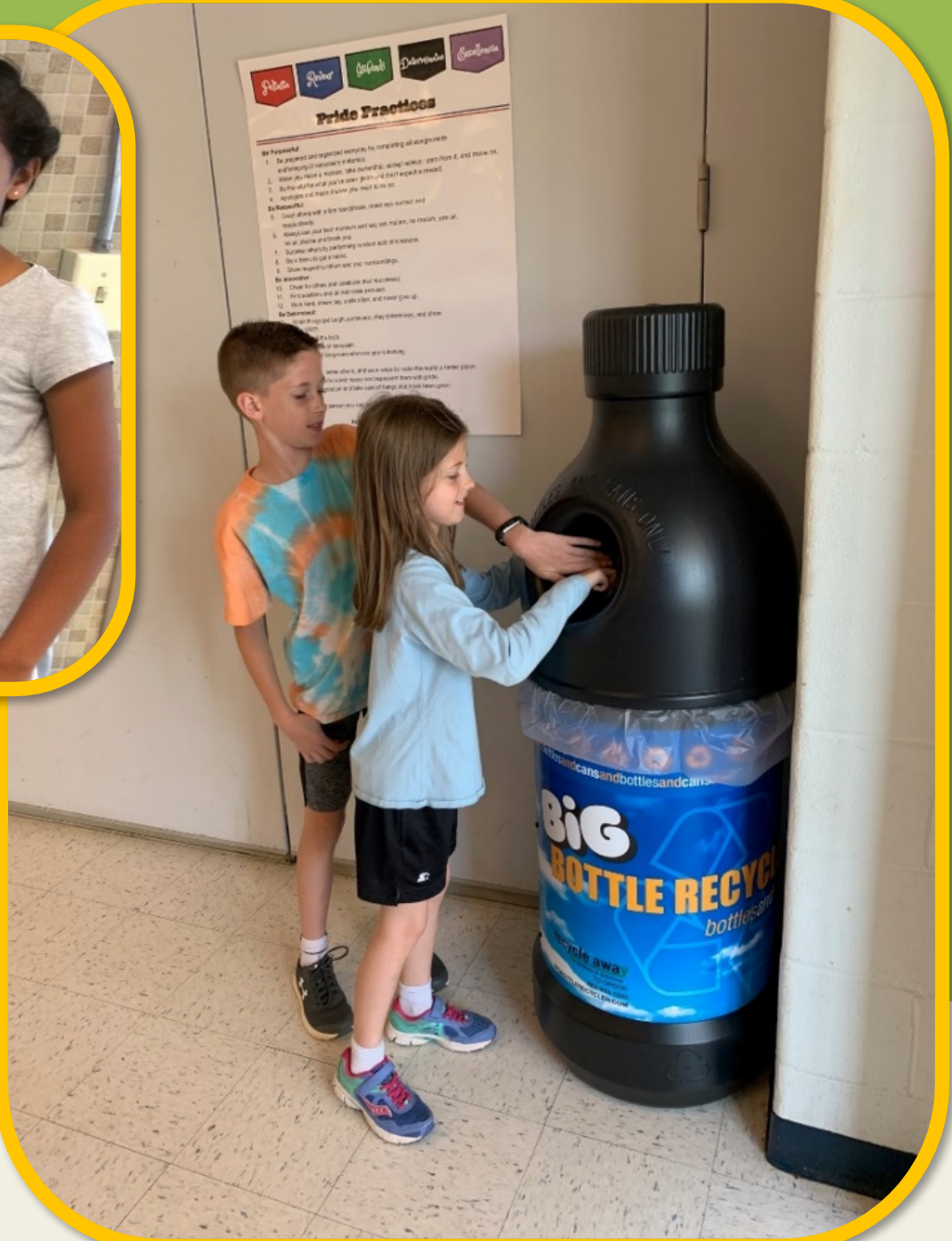
Picture: School District of Oconee
County
1st day of Refilling
Stations

Grant Applications

- Eligibility: Any K-12 School in South Carolina
 - Public
 - Private
 - School District
- Applications will be available on our website:
 - www.scdhec.gov/k12recyclinggrant
- Applications will be awarded on a first-come, first-served basis

Grant Guidelines

- Max award: \$1,500 per school
- Allowed Categories:
 - Recycling Containers and Supplies
 - Composting Containers and Supplies
 - Share Table Supplies
 - Recycling and/or Composting Related Field Trips
 - Supplies for Virtual Lessons from the Take Action SC Curriculum









take action SC
ENVIRONMENTAL EDUCATION PARTNERSHIP

Questions??

**Thank
you!**

