



The **Recycling Coalition of West Virginia** (RCWV) is a non-profit environmental organization whose mission is to promote the effective and sustainable reduction, reuse, and recycling of materials otherwise destined for disposal. As an educational outreach, the coalition has developed lessons for West Virginia teachers so they and their students may recognize materials which may be recycled, realize decomposition eventually restores some materials back to the soil, develop an understanding of the solid waste management practices related to recycling, incineration, sanitary landfills and hazardous waste disposal, and consider the role engineers play in solid waste management. The lessons align to WV CSOs, address content literacy, and may be used for across-curriculum instruction. Lessons may be modified in order to be grade level appropriate and used at different grade levels.

Recycling Lesson Plans with Cash Prizes for Science Classrooms

The RCWV has prepared four lessons in this document:

- ***Don't Waste the Moment***, page 2 - research the amount of waste generated in the school cafeteria;
- ***One Man's Trash is Another Man's Treasure***, page 3 - research the cost of waste disposal and possible savings when recycling and composting;
- ***Waste Not, Want Not***, page 4 - investigate and make decisions about composting; and
- ***Reclaiming and Replacing***, page 5 - investigate what happens when landfills get filled and propose solutions.

An additional lesson, ***Recycling Investigations*** with informational text and investigation prompts, is also available. After RCWV Recycling Lessons have been used for instruction, teachers may register on the ***RCWV Recycling Lesson Award Application***. Participating teachers will be eligible to win one of six \$200 gift cards to be used to purchase instructional materials. Student participants must be registered and attending West Virginia schools. Teachers may submit one entry for each class lesson. So, if a teacher presents the material to five periods or classes and assigns two of the assignments the teacher may submit ten entries (or five classes times two assignments from the teacher equals ten.) **Entries must be received by June 15, 2018.** All decisions are final. Recycling Lesson Plans and the Recycling Investigations material may be found on our website at wvrecycles.org.



Recycling Lesson Plan- Don't Waste the Moment

Driving question- How much of the waste which is thrown away in the school cafeteria may be composted or recycled?



Lesson - Divide students into groups so that each group may be given a different assignment for collecting data about the waste generated in the school cafeteria; some students may collect data in different locations, during different breakfast and lunch periods, or on different days during the week. Students will survey and record items placed in the trash and record the number of students eating during that time. Their data collecting may include categories such as Styrofoam plates, plastic forks, food scraps, paper products, and packaging materials. After collecting data, information must be categorized as compostable, recyclable, or trash.

Information from each group may be compiled on charts. If students have experience working with spreadsheets, they may consider using Microsoft Office Excel or Google forms; tutorials are available online. TechSteps also provide instruction for Excel. Graphs may be created to illustrate data from the cafeteria waste research.

After analyzing their data, students will be asked to identify how much waste was generated; they may express it as the mass or the volume of the waste. They should provide details about what was thrown away and state what could be have been recycled or composted. Students should be able to answer questions about how they determined what could be composted and what the triangles on plastic materials represent.

Following their research, student teams should propose a solution to reduce the amount of solid waste in the garbage and present it to the class. They should consider the best way to manage the sorting of the waste materials from the school cafeteria. How might students be involved in the process? Students should cite resources used in their research.

Informational Text- As part of their presentations, students should be prepared with an, “If you want to learn more...” recommended reading for their peers, which includes the book or article and the name of the newspaper or magazine, author, a quick summary, and the ISBN.



Recycling Lesson Plan- One Man's Trash is Another Man's Treasure

Driving question- What does waste disposal cost anyway?



Lesson - Following the research from the *Don't Waste the Moment* lesson, student teams can research the cost of waste disposal and continue with interviewing the cafeteria workers, janitors, teachers, and the principal. Their questions may extend to other members of the school system and community so they may get answers to questions such as:

- How often is trash removed from cafeteria?
- How often is trash removed from school?
- What does trash service cost for the school per month?
- What are the transportation or disposal charges for trash?
- How might we reduce our impact on the amount of waste generated?
- Could we reduce the cost of waste removal and save money for other purposes?

Information from each group may be compiled on charts. If students have experience working with spreadsheets, they may consider using Microsoft Office Excel or Google forms; tutorials are available online. TechSteps also provides instruction for Excel. Graphs may be created to illustrate results of waste disposed.

Following their research, student teams should present their findings about the cost of waste removal for the school. They should propose a solution to reduce the amount of solid waste in the garbage. If their proposals show a saving of school funds, the students may also propose what could be done with the money.

Informational Text - As part of their presentations, students should be prepared with an, "If you want to learn more..." recommended reading for their peers, which includes the book or article and the name of the newspaper or magazine, author, a quick summary, and the ISBN.



Recycling Lesson Plan- Waste Not, Want Not

Driving question- How does a compost pile reduce waste?

Lesson- Students may use the internet, visit libraries and greenhouses, and interview farmers, neighbors, or family members with gardening experiences to gain information about composting. As part of this lesson, students will:

- Compost materials to observe and record what happens in the process;
- Experiment to determine what types of materials biodegrade;
- Research why the compost needs air and water;
- Investigate how to control compost odors;
- Consider why they should bother with composting; and
- Plan what might be done with the compost from their experiments.

Following the research, student teams should consider how composting might be done at home or on a larger scale for a school or community and what might be done with the compost from large scale composting operations. They should prepare to present a composting plan recommendation to the principal, school board, or city council. Teachers may contact these individuals and arrange for them to attend the students' presentations.

Informational Text- As part of their presentations, students should be prepared with an, "If you want to learn more..." recommended reading for the principals or members of the school board or city council, which includes the book or article and the name of the newspaper or magazine, author, a quick summary, and the ISBN.



Recycling Lesson Plan- Reclaiming and Replacing

Driving question– What happens to garbage when it leaves the school or my house?

Lesson- Students will collect household trash for analysis and build model landfills in order to understand the processes and impacts of solid waste management. They should consider the following questions:

- What is going into landfills?
- What kind of barriers are at modern landfills to prevent chemical leaching?
- What happens when a landfill is filled to capacity?
- Are the laws the same in all states?

Student teams are to consider what might be done when a local landfill is filled to capacity and propose how the land may be reclaimed for future use. Teams will also design a landfill to take the place of the current landfill. They must determine where to put it and explain the reason for choosing that location. How will they prevent chemicals leaching into the environment? They may use models, drawings, or multi-media presentations to share their ideas with the class and explain the reasons for the choices they make in both design plans.

http://www.teachengineering.org/view_lesson.php?url=http://www.teachengineering.org/collection/cub_/lessons/cub_environ/cub_environ_lesson04.xml

http://www.teachengineering.org/view_lesson.php?url=collection/cub_/lessons/cub_environ/cub_environ_lesson05.xml

Informational Text- As part of their presentations, students should be prepared with an, “If you want to learn more...” recommended reading for their peers, which includes the book or article and the name of the newspaper or magazine, author, a quick summary, and the ISBN.



Recycling Lesson Plan- Recycling Investigations

The Recycling Investigations Lesson document is a more text driven lesson and is available at [Recycling Investigations](#) or on our website. The lesson aligns to WV CSOs, addresses content literacy, includes text dependent questions, provides graphical representations of data, prompts students with investigations, and may be used in the curriculum instruction.



Students may work in small groups and be assigned different parts of the document. Each group will read informational text, answer the text dependent questions, and pursue the investigation for the section (s) they are assigned. Follow-up may be a jig-saw activity as each group teach the others what they learned. It may be informal class discourse as each group takes its turn leading the discussion or multi-media presentations which include content specific language.

Getting the Most Out of Compost, some recommended websites:

- [Composting 101](#)– the basics.
- [Anytime Lesson Plan, Composting: A Scientific Investigation](#)—an indoor investigation.
- [The GreenTeam Compost Lesson Plan](#)– an outdoor investigation.

Recycling Competitions

Recycling Coalition of West Virginia [ReFashion Show competition](#).

Recycling Coalition of West Virginia [Youth Contests](#) .

RecycleMania is a friendly competition and benchmarking tool for college and university recycling programs to promote waste reduction activities to their campus communities at <http://recyclemaniacs.org/about> .

The initiation of [Keep America Beautiful Recycle-Bowl Competition](#) for K-12 schools, has received an enthusiastic response from over 1,200 schools. These schools have taken advantage of the platform and resources to promote recycling awareness, education and performance.





Additional Information

For more than thirty years, the U.S. Environmental Protection Agency (EPA) has been collecting data on the generation and disposal of waste in the United States. Waste reduction and recycling programs across the country are measured and used to determine the amount of waste generated. In 2014, Americans generated about 258 million tons of trash and recycled and composted over 89 million tons of material, which is equivalent to a recycling rate of 34.6 percent. On average of the 4.6 pounds of solid waste generated by every person each day, we recycle or compost about 1.51 pounds of that waste.

Recycling is the process of turning used waste and materials into new products. This prevents potentially useful materials from being wasted, as well as reduces energy use and pollution.

The energy required to convert raw materials such as minerals, oil, and trees into metals, plastics, and paper is far greater than the amount of energy required to collect and recycle our paper, bottles, and cans into new products.

A wide variety of different materials can be recycled, including paper, plastic, glass, metal, textiles and electronic equipment. Historical evidence shows that humans have been recycling various materials for thousands of years.

Recycling Resources

Find recyclers at earth911.com/ or www.recyclingcenters.org/ .

West Virginia Solid Waste Management Board or Solid Waste Authority Contact Information at www.state.wv.us/swmb/ .

The Recycling Economic Information Report aims to increase the understanding of the economic implications of material reuse and recycling. www.epa.gov/smm/recycling-economic-information-rei-report

TerraCycle - Recycling systems for previously non-[recyclable](#) or hard-to-recycle waste. www.terracycle.com/en-US/

www.facingthefuture.org/ A nonprofit leader whose mission is to create tools for educators that equip and motivate students to develop critical thinking skills, build global awareness and engage in positive solutions for a sustainable future.

www.epa.gov/recycle/ Learn how reducing, reusing, and recycling can help you, your community, and the environment by saving money, energy, and natural resources.

Characterization fact sheet and data tables provide the most recent available data on annual US waste generation, recycling, and disposal, as well as the benefits of recycling. www.epa.gov/sites/production/files/2016-11/documents/2014_smm_tablesfigures_508.pdf

American Forest & Paper Association recovery, 2016. www.paperrecycles.org/statistics/paper-paperboard-recovery

2015 report on high density polyethylene (HDPE) and polypropylene (PP) bottles collected and the rate of recycling. www.plastics.americanchemistry.com/2015-United-States-National-Postconsumer-Plastic-Bottle-Recycling-Report.pdf

Can Manufacturers Institute's educational curriculum www.cancentral.com/curriculumSelect.cfm