



## Florida Department of Environmental Protection Solid Waste Recycling Curriculum

### Solid Solutions to Solid Waste

<b>COURSE</b> Environmental Science	<b>TIMEFRAME</b> 7-8 Class Periods (45 - 50 minutes)
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**LESSON SUMMARY**  
 Students are introduced to the idea that as a society we generate lots of waste of different types that impact our environment. Through surveys and exploration, they discover that they play an active role in the problem. Through investigation they learn about the specific issues associated with e-waste, food, plastic, paper, and textile waste and mitigation efforts through the 4 R's. The lesson concludes with the student determining the best means of managing a specific waste type and then designing an initiative they can get others involved in.

**NGSSS SCIENCE CONTENT BENCHMARK**  
**SC.912.L.17.14** Assess the need for adequate waste management strategies.  
**SC.912.L.17.15** Discuss the effects of technology on environmental quality.  
**SC.912.L.17.11** Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.

**NGSSS NATURE OF SCIENCE BENCHMARK**  
**SC.912.N.1.3** Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.  
**SC.912.N.4.1** Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

- LEARNING OBJECTIVES**
- Make a connection between specific student actions and waste generation.
  - Learn about e-waste, food, plastic, paper, textile waste, and the 4 R's (Reduce, Reuse, Recycle, and Refuse).
  - Generate and defend an argument for the best means of mitigating a specific type of waste.
  - Design an informational product showcasing a waste management initiative.
  - Pledge to reduce individual student impacts.

<b>SCIENCE VOCABULARY</b>	<b>ACADEMIC VOCABULARY</b>
<ul style="list-style-type: none"> <li>● mitigate</li> <li>● municipal solid waste</li> <li>● Textile</li> <li>● Polyethylene (PET)</li> </ul>	<ul style="list-style-type: none"> <li>● viable</li> <li>● evidence</li> </ul>



<p><b>INQUIRY QUESTION(S)</b></p> <ul style="list-style-type: none"> <li>• What impacts do different types of waste have on the environment?</li> <li>• What actions can I take to reduce the impacts of solid waste?</li> </ul>	<p><b>STATEMENT OF STUDENT MASTERY</b></p> <p>I can define the ways waste impacts the environment and provide viable actions society can take to reduce those impacts.</p>
<p><b>CROSS CURRICULAR CONNECTIONS</b></p> <p><b>ENGLISH LANGUAGE ARTS</b></p> <p><b>ELA.K12.EE.1.1</b> Cite evidence to explain and justify reasoning.</p> <p><b>ELA.K12.EE.4.1</b> Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.</p> <p><b>MATHEMATICS</b></p> <p><b>MA.K12.MTR.1.1</b> Actively participate in effortful learning both individually and collectively.</p> <p><b>MA.K12.MTR.7.1</b> Apply mathematics to real-world contexts.</p> <p><b>SOCIAL STUDIES</b></p> <p><b>SS.912.G.5.3</b> Analyze case studies of the effects of human use of technology on the environment of places.</p> <p><b>SS.912.G.5.5</b> Use geographic terms and tools to analyze case studies of policies and programs for resource use and management.</p>	

### Lesson Overview

<p><b>ENGAGE</b> (20-25 min) Students are made aware of the amount of waste generated by the everyday activities of today's society and begin to realize they play a role in waste.</p>	
<p><b>Teacher Moves</b></p> <ul style="list-style-type: none"> <li>• Engage students with an eye popping article and/or video that highlights the amounts and types of waste generated today.</li> </ul>	<p><b>Student Moves</b></p> <ul style="list-style-type: none"> <li>• Students watch the video and/or read the article.</li> <li>• Think-Pair-Share: Students respond to reflection questions and participate in class level discussion.</li> </ul>
<p><b>EXPLORE</b> (45-60 min) Through a targeted survey/inventory, students start to measure their individual impact on waste production and begin to quantify how much they produce as individuals. It is through this exploration that they are also introduced to the</p>	



major forms of waste that are produced by our society. They should leave the explore phase with personal connections to each type of waste and begin to wonder about the impact and how they might be mitigated.

### Teacher Moves

- Allow students to explore their impact associated with each waste and compile group level data through the use of surveys, inventories, and calculators.

\*Classes can be compared to each other to start to show a school level impact.

### Student Moves

- In groups of five, students compile group level impact data for each waste type.
- Groups generate a list of what types of things characterize each type of waste.
- Groups share out survey results to be added to a class level data set.

### EXPLAIN

**Part 1:** Through text resources and articles, students develop a complete understanding of each type of waste. (90-100 min)

**Part 2:** Through videos and articles, students learn about the 4 R's (Reduce, Reuse, Recycle, and Rethink) and the pros/cons of each. This component of the lesson focuses on the 4 R's in relation to all waste types. Students will be asked to focus the 4 R's to a specific waste type in the Elaborate phase.

### Teacher Moves

- Through a two part lesson, provide vetted articles, videos, and resources (both digital and hardcopy) with accompanying graphic organizers so that students can build understanding around the five primary solid waste types and the four common management strategies (4 R's).
- Both parts conclude with group level discussion and consensus on essential learning.

### Student Moves

- Students, first in groups and then individually, process articles, videos and other resources to build and refine their understanding of the five primary waste types and the 4 R's associated with solid waste management and mitigation.
- Students record their learning on two graphic organizers for use in the Elaborate and Evaluate phases.

### ELABORATE (45-90 min)

Students apply what they have learned by making a claim about the most effective means of reducing the impact of a waste type (of their choosing) through one or more of the 4 R's. They defend this claim with data and evidence collected throughout the entire 5E lesson and any outside resources



they choose.

**Teacher Moves**

- Challenge students to create and defend a claim around what mitigation technique would work best for a given waste type.
- Facilitate a discussion around the students' claims.
- Evaluates the CER using a rubric.

**Student Moves**

- Based on their understanding gleaned from the explain phase, students complete a Claim, Evidence, Reasoning on which R would be the most effective means of reducing the waste type of their choosing.
- Students will use their CER to generate a campaign for the Evaluate phase.

**EVALUATE**  
(90-100 min)

At this point students should fully recognize the role they play in waste production and have researched what they believe to be the best way to mitigate the impacts of at least one type. Now they will generate action through the development of a poster/infographic/psa that advertises and promotes the initiative they supported in their CER. They commit to the initiative by creating a pledge that they sign (and/or get others to).

**Teacher Moves**

- Challenge students to develop a product that informs (and attempts to persuade) peers to make a positive change impacting the student's waste type choice from their CER.
- Evaluate the product using a rubric.

**Student Moves**

- Students select a product submission type that advertises the initiative they proposed in their CER from the Elaborate.
- Students create and sign a pledge committing to their initiative.
- Students encourage others to commit to their initiative through their product and pledge.

**Source Data**

*These are sources of data used to build this lesson/unit. You may or may not choose to share these with your students, but they are good background reading for you as the instructor.*

- <https://floridadep.gov/waste/waste-reduction>
- <https://www.epa.gov/environmental-topics>
- <https://www.theworldcounts.com>
- <https://www.sciencenews.org>
- [FloridaRecycles.org](https://www.ted.com/talks)
- <https://www.ted.com/talks>
- <https://climatechange.ucdavis.edu/>

