Plastic Avengers: High School Heroes Unite Against Cafeteria Waste!

Overview/Objectives:
This lesson plan is designed to empower high school students to take action against plastic pollution in their school cafeteria, aligning with EARTHDAY.ORG's End Plastics campaign. Through exploration of the environmental impacts of plastics and brainstorming practical solutions, students will develop an action plan to minimize single-use plastics, contributing to a more sustainable future.

Lesson plan objectives:

● Understand the environmental consequences of single-use plastics, in line with EARTHDAY.ORG's End Plastics campaign.
● Brainstorm and propose actionable solutions to reduce plastic waste in the school cafeteria.
● Develop a comprehensive action plan for implementing sustainable practices in the cafeteria environment.

Information and Additional Resources:

EARTHDAY.ORG believes every learner in every school worldwide should receive fully integrated, evaluated climate and environmental education with a robust civic engagement component. Education is an essential component in addressing climate change. Education can help encourage individuals to change their behavior or attitude to make decisions that benefit all living and nonliving things. Addressing climate change requires collaboration from global and local actions to reduce greenhouse gases, plastic pollution, biodiversity loss, and other issues. Climate literacy can provide students with the necessary knowledge and skills to better understand the impact of climate change on human activities across the globe. Also, students will be able to learn about different initiatives to spread awareness of climate change with an emphasis on climate literacy.

In line with EARTHDAY.ORG's visionary Ends Plastic Campaign, this lesson plan addresses the critical issue of plastic pollution, specifically within the school lunchroom. By integrating evaluated climate and environmental education, we equip students with the knowledge and skills needed to combat plastic waste. The school cafeteria, often laden with single-use plastics, serves as a microcosm of a broader global challenge. Through this curriculum, students will not only understand the detrimental effects of plastics on our environment but will also be empowered to take meaningful steps toward a more sustainable future. By emphasizing climate literacy and civic engagement, we inspire a generation of change-makers ready to lead the way in ending plastic pollution.
**Activities**

**Title:** Reducing Plastics in the School Cafeteria  
**Estimated Time:** 60-75 minutes  
**Subject/Course:** Environmental Science, Language Arts  
**Grade:** 9th - 12th-grade  
**Topic:** Plastics  
**SDG Integration:** 12, 13, and 14

**Summary:** This lesson empowers high school students to combat plastic pollution in their school cafeteria by investigating the environmental effects of single-use plastics, brainstorming innovative solutions, and crafting an actionable plan. By aligning with EARTHDAY.ORG’s [End Plastics campaign](https://www.earthday.org/), students actively contribute to a more sustainable future.

**Materials/Resources:**
1. Projector or Smartboard  
2. Laptop or computer with internet access  
3. Writing materials (pens/pencils, notebooks)

**Established Goals:**
- Recognize the impact of single-use plastics on the environment.  
- Generate creative and feasible solutions to reduce plastic waste.  
- Create a practical action plan to implement sustainable practices in the cafeteria.

**Essential Questions:**
- How do single-use plastics contribute to pollution and environmental harm?  
- What innovative alternatives to plastic can we propose for packaging and utensils?  
- How can we ensure our action plan is cost-effective and feasible for implementation?
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<table>
<thead>
<tr>
<th>Students will be able to...</th>
<th>Vocabulary Words:</th>
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</thead>
<tbody>
<tr>
<td>● Articulate the environmental repercussions of single-use plastics.</td>
<td>1. Plastic Pollution</td>
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<tr>
<td>● Propose practical and creative solutions to reduce plastic waste in the cafeteria.</td>
<td>2. Sustainability</td>
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<tr>
<td>● Develop a comprehensive action plan, including cost estimates and implementation timelines.</td>
<td>3. Alternative Packaging</td>
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<tr>
<td>● Advocate for sustainable practices in their school cafeteria.</td>
<td>4. Advocacy</td>
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### Assessment Evidence

#### Performance Tasks:

**Step 1:** Introduce the lesson by discussing the prevalence of single-use plastics in the school cafeteria. Highlight the environmental problems of plastics, such as pollution, wildlife harm, and the long decomposition period. Emphasize the importance of high school students taking a proactive role in reducing plastic waste.

**Step 2:** Share a [video](#) with the class introducing them to plastics and their environmental impact.

**Step 3:** Engage students in a discussion about the significance of plastics and how they relate to their daily lives.
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Learning Activities:
1. Facilitate a brainstorming session where students generate ideas to reduce plastic usage in the school cafeteria.
2. Encourage creative thinking and problem-solving by asking questions like:
   ○ What alternatives to plastic can we suggest for packaging and utensils?
   ○ How can we raise awareness among students and cafeteria staff about the issues?
3. Divide students into small groups and assign each group a specific aspect of the cafeteria (e.g., utensils, packaging, beverage containers).
4. In their groups, have students develop an action plan outlining steps to reduce plastic waste in their assigned area.
5. Each group will present its plan to the class, including details such as cost estimates, implementation timeline, and potential challenges.

Student Reflection Plan

Student Reflection:
Have each student write a persuasive letter to the principal about implementing their ideas to reduce plastic usage in the school cafeteria. Encourage the students to include information they learned about the impacts plastics have on the environment.

Additional resources
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Websites

- EarthDay.org: Plastics Pollution
  (https://www.earthday.org/issue/plastic-pollution/)
- EarthDay.org Plastic Calculator
  (https://www.earthday.org/plastic-pollution-calculator-2/)
- National Geographic: Plastic Pollution
  (https://www.nationalgeographic.org/encyclopedia/plastic-pollution/)
- Plastic Oceans International (https://plastoceans.org/)

Videos:

- "The Story of Plastic" (documentary film)
- "TED Talk: Our Relationship with Plastic" by Dianna Cohen

Books:

- "Plastic-Free: How I Kicked the Plastic Habit and How You Can Too" by Beth Terry
- "Plastic Soup: An Atlas of Ocean Pollution" by Michiel Roscam Abbing

Organizations:

- Plastic Pollution Coalition (https://www.plasticpollutioncoalition.org/)

If you want to share your student's activities, please take pictures and send them to education@earthday.org. Please share the photos on Instagram, using the hashtags #earthdayeveryday, #earthdayeducampions, and #earthdayeducators (include your name, grade level, number of students participating, and class subject).
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Alignment to NGSS / PARCC

Students who demonstrate understanding can:

**MS-ESS3-3.** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*

[Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

The performance expectation above was developed using the following elements from the NRC document A Framework for K-12 Science Education:

**Science and Engineering Practices**

<table>
<thead>
<tr>
<th>Constructing Explanations and Designing Solutions</th>
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<tbody>
<tr>
<td>Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</td>
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<tr>
<td>* Apply scientific principles to design an object, tool, process or system.</td>
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</table>

**Disciplinary Core Ideas**

<table>
<thead>
<tr>
<th>ESS3.C: Human Impacts on Earth Systems</th>
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<tbody>
<tr>
<td>* Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things. Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.</td>
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**Crosscutting Concepts**

<table>
<thead>
<tr>
<th>Cause and Effect</th>
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<tbody>
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<td>* Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.</td>
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<table>
<thead>
<tr>
<th>Connections to Engineering, Technology, and Applications of Science</th>
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<tbody>
<tr>
<td>Influence of Science, Engineering, and Technology on Society and the Natural World</td>
</tr>
<tr>
<td>* The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.</td>
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</tbody>
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Connections to other DCS in the grade-band:


Articulation of DCS across grade-band:


Common Core State Standards Connections:

<table>
<thead>
<tr>
<th>ELA/Literacy - WHST8-8.7</th>
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<tr>
<td>Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-ESS3-3)</td>
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<th>WHST8-8.8</th>
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<tr>
<td>Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-ESS3-3)</td>
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<tr>
<th>Mathematics - 6.RP.A.1</th>
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<tr>
<td>Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS3-3)</td>
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<th>7.RP.A.2</th>
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<tr>
<td>Recognize and represent proportional relationships between quantities. (MS-ESS3-3)</td>
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<th>6.EE.B.6</th>
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<tr>
<td>Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS3-3)</td>
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<th>7.EE.B.4</th>
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<tr>
<td>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS3-3)</td>
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Source: **MS-ESS3-3 Earth and Human Activity | Next Generation Science Standards (nextgenscience.org)**
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Students who demonstrate understanding can

**HS-ESS3-4.** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.* [Clarification Statement: Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, or areal changes in land surface use (such as for urban development, agriculture and livestock, or surface mining). Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale (geoengineering design solutions such as altering global temperatures by making large changes to the atmosphere or ocean).]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

### Science and Engineering Practices

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

### Disciplinary Core Ideas

**ESS3.C: Human Impacts on Earth Systems**

- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that protect ecosystem degradation.

**ETS1.B: Developing Possible Solutions**

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (secondary)

### Crosscutting Concepts

**Stability and Change**

- Feedback (negative or positive) can stabilize or destabilize a system.

**Connections to Engineering, Technology, and Applications of Science**

**Influence of Science, Engineering, and Technology on Society and the Natural World**

- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.

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Source: **HS-ESS3-4 Earth and Human Activity | Next Generation Science Standards (nextgenscience.org)**

**Alignment to SDGs (if appropriate)**

**SDG 4:** Quality Education

**SDG 12:** Ensure sustainable consumption and production patterns.

**SDG 13:** Take urgent action to combat climate change and its impact.

**SDG 14:** Conserve and sustainably use the oceans, seas, and marine resources for sustainable development