

RESOURCE LIBRARY
LESSON

Pollution Solutions

Students research and compare several proposed solutions to the ocean plastics crisis. Then, publishing teams create their own rubrics to evaluate competing solutions and choose a contest winner. Finally, each publishing team identifies a target audience and begins crafting their *Call to Action*. This lesson is part of the *Plastics: From Pollution to Solutions* unit.

GRADES

6 - 8

SUBJECTS

Chemistry, Conservation, Earth Science, Oceanography, Engineering, English Language Arts, Experiential Learning, Geography, Human Geography, Social Studies, Civics, Economics, Storytelling

CONTENTS

3 Activities

In collaboration with



ACTIVITY 1: SEAWORTHY SOLUTIONS | 1 HR
40 MINS

DIRECTIONS

Plastics: From Pollution to Solutions unit driving question: *How can humans solve our plastic problem in the ocean?*

Pollution Solutions lesson driving question: *Which solutions to the plastic problem are the most promising?*

1. Reassure students that there is hope for solving the ocean plastics crisis.

- Ask: *Now that we are halfway through our unit on ocean plastics, how do you feel about the plastics problem?*
 - Possible responses:
 - Scared, because it seems very dangerous and it's getting worse.
 - Hopeless, because plastic is ubiquitous and it lasts a very long time in the environment.
 - Angry, because humans are hurting animals and the ecosystem.
 - I don't care, because I don't believe this problem affects me.
 - Energized, because I want to do something to address this problem.
- Point out that plastics are a problem created by humans, and humans have the ability to solve this problem. Tell students that humans have faced big challenges before, and by working together, we can create solutions.
- Ask: *What other big problems have humans solved, and how?*
 - Possible responses:
 - We have developed vaccines to eradicate diseases such as polio and smallpox.
 - We found out that chlorofluorocarbons (CFCs) were causing a hole in the ozone layer, so we banned CFCs and the hole is getting smaller.
 - We learned that DDT was killing birds, so we banned DDT and bald eagle populations have rebounded.
 - We have expanded civil rights for women and people of color in many countries around the world.
- Tell students that it's normal and natural to feel negative emotions like sadness, hopelessness, and anger when you first learn about global problems like these. However, to reach a solution, people must move from negativity to positivity by realizing that hope is possible and solutions do exist.
- Ask: *Does anyone know of a way that people are working to solve the plastic crisis?*
 - Possible responses may include beach cleanups, bans on plastic straws and bags.

- Explain that many scientists, designers, activists, and communities around the world are working on different solutions, and that the next part of the unit will focus on the many different types of solutions, with the goal of inspiring students and helping them feel hopeful and empowered to be a part of the global solution to this global problem.

2. Model the process of evaluating a proposed solution.

- Distribute the [Seaworthy Solutions](#) handout to each student.
- Project the [Take 3 for the Sea](#) website and guide students through the process of filling out the first row of the table with a think-aloud. Use the [Seaworthy Solutions Answer Key](#) to narrate your think-aloud.
 - Navigate through the website, especially the *About* and *Programs* pages, to find answers to the questions.
 - Explain that students will use the same process for the next four rows of the table, and they must read carefully and strategically because questions may not be directly answered.

3. Assign students to jigsaw groups to investigate other solutions.

- Divide students into jigsaw groups and assign each group one of the four solutions listed in the table in the *Seaworthy Solutions* handout. Remind jigsaw groups that their job is to become an expert on their topic so they can share the information with their publishing team.
- Distribute computers to jigsaw groups and prompt each group to access the video introduction to their assigned solution.
- After each group watches their initial video, have them research their solutions independently to learn more, paying careful attention to the possible disadvantages as you demonstrated in the think-aloud.
 - [Compostable Plastics](#) (4:54)
 - [Bye Bye Plastic Bags](#) (8:11)
 - [Net-Works](#) (5:18)
 - [The Ocean Cleanup](#) (5:37)
- Circulate around the room to ensure jigsaw groups are finding answers to their questions; the table in the *Seaworthy Solutions* handout should be a good indicator of their progress.

- Using bullet points in the tables is fine, as long as the meaning of each answer is still intelligible to another student who knows nothing about that solution.
- If some jigsaw groups finish early, prompt them to research other solutions to the plastics crisis.

4. Reassemble publishing teams to share and compare information.

- Have students return to their publishing teams and take turns presenting information about the solution they investigated with their jigsaw group.
- Discuss the following questions in a whole-class debrief:
 - *What similarities do you see among these solutions?*
 - Compostable plastics and Net-Works create a marketable product; they can make money for people.
 - Bye Bye Plastic Bags and Net-Works involve the local community in being part of the solution.
 - Compostable plastics and the Ocean Cleanup are both new technologies that are promising, but still in the early phases of development with hurdles to overcome.
 - Net-Works and the Ocean Cleanup focus on recovering mismanaged plastic waste from the environment.
 - Bye Bye Plastic Bags and compostable plastics focus on source reduction, decreasing the overall amount of plastic waste.
 - *What differences do you see among these solutions?*
 - Bye Bye Plastic Bags is the only solution (out of these four) that encourages people to use less plastic.
 - Net-Works™ is the only solution (out of these four) that directly targets fishing nets, which make up almost 50 percent of ocean macroplastics, according to some studies.
 - The Ocean Cleanup is the only solution (out of these four) that directly targets microplastics.
 - *Do you think any one of these solutions can solve the plastics crisis on their own?*
 - Answers will vary, but should indicate that the problem is very big and requires a lot of different kinds of solutions, each of which have disadvantages and possible unintended consequences.

5. Launch the Ocean Plastics Pollution Solutions Contest.

- Tell students that one element of their magazines will be to announce their chosen winner of the Ocean Plastics Pollution Solutions Contest. They must compare five different solutions, separate from the five included in this activity, and decide which one is the most promising. Emphasize that no solution is perfect, but some can still be better than others.
- Ask: *What might make one solution better than another?*
 - Possible responses:
 - A solution could be better if it includes a larger geographic area or a greater number of people.
 - A solution could be better if it creates jobs for more people.
 - A solution could be better if it stops plastics from being made, used, or thrown away in the first place, rather than simply cleaning them up from the ocean.
- Distribute the handout [Ocean Plastics Pollution Solutions Contest Criteria](#).
- Tell publishing teams they will use this document to create their own contest rubric, with three different criteria and clear descriptions to measure the success of each solution.
 - Each team's criteria and descriptions will be different, but every team should be able to use their document as a rubric to evaluate the five finalist solutions they choose.
- Have teams discuss which three criteria they think are most important first, before writing descriptions for any. This part of the assignment is very open-ended, and different teams will likely come up with very different rubrics.
 - To guide teams in brainstorming good criteria for their rubrics, use the class' responses about what might make one solution better than another.
 - If students thought addressing a larger geographic area or involving a greater number of people could make one solution better than another, a criterion corresponding to this could be "Area of Impact" or "Total Population Affected."
 - If students thought creating jobs for people could make one solution better than another, a criterion corresponding to this could be "Economic Benefits."
 - If students thought reducing the amount of plastics produced or disposed of could make one solution better than another that only targets plastics after they have already been produced and thrown away, a criterion corresponding to this could be "Waste Source Reduction."

- After a team has selected three reasonable criteria for evaluation, guide them to use the [Final Project Checklist and Rubric](#) to help create descriptions of what would demonstrate high impact, moderate impact, and low impact in each criterion.
- Conclude by having teams test out their rubrics on one of the five solutions they learned about in this activity. Remind teams that they will have to find five other solutions in the next activity as contest entrants, so this is just a trial of their rubric to ensure that the team knows how to use it.
- All handouts from this activity should be stored in the publishing team's project folder for use in upcoming activities.

Tip

Step 3: It may be useful to provide headphones to students when they are working in jigsaw groups so that they can listen to the video without disrupting other groups.

Informal Assessment

Students' analysis of the five different solutions, especially the advantages and disadvantages of each, should draw on what they have learned about the sources of the plastic pollution problem and provide insights into their current understanding and ideas about evaluating competing design solutions. The ability of teams to agree on three meaningful criteria for their rubric demonstrates their higher-level thinking and collaborative group work skills.

OBJECTIVES

Subjects & Disciplines

- Chemistry
- Conservation
- **Earth Science**
 - [Oceanography](#)
- Engineering
- **Geography**
 - [Human Geography](#)
- **Social Studies**
 - Civics
 - Economics

Learning Objectives

Students will:

- Investigate solutions to the ocean plastic waste crisis.

Teaching Approach

- Project-based learning

Teaching Methods

- Jigsaw
- Modeling
- Research

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Critical Thinking and Problem Solving
- 21st Century Themes
 - Environmental Literacy
 - Global Awareness
- Critical Thinking Skills
 - Analyzing
 - Applying
 - Evaluating
- Science and Engineering Practices
 - Asking questions (for science) and defining problems (for engineering)
 - Engaging in argument from evidence
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

- Standard 14:

How human actions modify the physical environment

NEXT GENERATION SCIENCE STANDARDS

- ETS1.B: Developing Possible Solutions:

There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

- Science and Engineering Practice 7:

Engaging in argument from evidence

Preparation

BACKGROUND & VOCABULARY

Background Information

Many solutions are taking aim at the plastics crisis, but none of them are a silver bullet. All sectors of society must collaborate to solve a problem that involves every aspect of modern life and touches every corner of our planet. Solutions may come from consumers, activists, engineers, artists, governments, corporations, educational institutions, and even nature itself.

Plastic bag bans, anti-straw campaigns, compostable plastics, and reusable water bottles are gaining momentum globally. However, they are not without opponents, whether selfish or sincere. Some consumers prefer the convenience of disposable goods, and the plastics industry is large, profitable, and influential. On the other hand, people with disabilities may depend on plastic straws to be able to drink. Small businesses fear they may lose revenue if they charge customers for plastic bags. Some studies suggest that reusable coffee mugs may have a greater environmental impact than single-use cups, depending on how many times the mug is actually reused. Indeed, reusable products still require mining or harvesting raw materials and must be cleaned, both of which impact the environment.

As history demonstrates, all actions have consequences, many of them unintended. Remember that plastics were invented to halt the harvest of ivory from endangered elephants. Solutions that seem ingenious can become problematic when scaled up. For example, many so-called compostable plastics require an industrial composting facility to biodegrade, and will not break down in a landfill, a backyard compost pile, or the ocean. Highly publicized engineering feats such as the Ocean Cleanup have encountered technical difficulties, such as breaking apart in the middle of the Pacific Ocean and impacting marine food webs. Meanwhile, feel-good stories about the end of plastic straws seldom mention that straws comprise only about 1 percent of marine plastics. Hope and optimism must be balanced with a critical lens toward proposed solutions.

Prior Knowledge

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Recommended Prior Activities

- [Autopsy of an Albatross](#)
- [Follow the Friendly Floatees](#)
- [Magazine Design Workshop I](#)
- [Magazine Design Workshop II](#)
- [Plastics Aplenty](#)
- [The Life Cycle of Plastics](#)

Vocabulary

Term	Part of Speech	Definition
compostable	<i>adjective</i>	capable of disintegrating and biodegrading in a compost pile or commercial composting facility.
constraint	<i>noun</i>	limitation or obstacle.
criteria	<i>plural noun</i>	set of standards or rules.
economic	<i>adjective</i>	having to do with money.
systematic	<i>adjective</i>	following an orderly method or plan.

ACTIVITY 2: THE OCEAN PLASTICS POLLUTION SOLUTIONS CONTEST | 2 HRS 5 MINS

DIRECTIONS

Plastics: From Pollution to Solutions unit driving question: *How can humans solve our plastic problem in the ocean?*

Pollution Solutions lesson driving question: *Which solutions to the plastic problem are the most promising?*

1. Engage students with an exciting story of an ocean plastics solution.

- Remind students that although the problem of ocean plastics can seem daunting, people all over the world are working on all kinds of solutions. In fact, some of the best solutions are coming from young people!
- Show [An Investigation into the Removal of Microplastics From Water Using Ferro-Fluids](#) (2:26), a video about Fionn Ferreira's prize-winning microplastics cleanup solution. Tell students that Ferreira is 18 years old and won a \$50,000 prize for this solution.
- Ask: *What do you notice about his solution? What do you wonder?*
 - Possible responses:
 - Simplicity: It doesn't involve any high-tech gadgets or new inventions; just uses iron powder, oil, and magnets.
 - Limitations: This solution doesn't affect the amount of plastics we use, the amount of plastics that are not recycled, or the amount of plastics that enter the oceans in the first place.
 - Feasibility: Would this really work in the ocean, which is much bigger than a beaker?
 - Disposal: What will happen to all the microplastics and magnetic oil once they are removed from the water?
- Tell students that they have a very important responsibility. No solution is perfect, but some solutions are better than others. Their job during this activity is to choose the five most promising solutions that have been proposed, and then use the categories and

descriptions their team designed in the previous activity to decide which of these five is truly the best.

- Even though they aren't able to award any prize money, there is real prize money—up to \$100,000—available for powerful solutions, so they should take this responsibility seriously!

2. Guide students to resources that compile promising plastics solutions.

- Use *Innovation Challenge: Meet the Finalists* to introduce students to the 24 finalists in the 2019 Ocean Plastic Innovation Challenge and model how to further investigate the solutions.
- Highlight the small amount of information about each finalist on this page. Using one finalist, demonstrate how to find more information by searching for the name of the solution and the country of origin.
 - For example, they could search for *Astu Eco Container India* or *Chemolex Kenya* to find more information.
- If students have trouble finding more information in English, these additional resources are available. Note that the amount of information available for each solution varies widely in terms of presentation and content.
 - *Astu Eco Container (India)*
 - *Chemolex Company (Kenya)*
 - *EarthSuds (Canada)*
 - *EcoFLEXY (Denmark)*
 - *Precious Planet (United Kingdom)*
 - *Ranpak (Netherlands)*
 - *Takawiri Enterprises Limited (Kenya)*
 - *Algramo (Chile)*
 - *Hepi Circle (Indonesia)*
 - *Infinity Goods (United States)*
 - *Kabadiwalla Connect (India)*
 - *Kecipir (Indonesia)*
 - *Keko Box (United States)*
 - *Returnity (United States)*
 - *Spiffy Rebel (United States)*
 - *Vessel (United States)*

- *Cataracta (United States)*
 - *LSU Remote Plastic Assessment Group (United States)*
 - *Perpetual Plastic Project (Germany)*
 - *Inbal Rief (Israel)*
- Give publishing teams time to discuss which five of these solutions seem most promising to them. These five solutions will be their finalists.
 - Tell teams to focus on solutions that have a significant amount of information available, because they will not be able to evaluate solutions according to their chosen criteria unless there is information available.
 - At this point, teams should use their *Ocean Plastics Pollution Solutions Contest Criteria* developed in the *Seaworthy Solutions* activity to select finalists that will be easy to evaluate. They should not assign any scores or choose a final winner yet.
 - Tell teams that if they need to revise any part of their categories or descriptions, now is the time to do so because it would be unethical to change the categories and descriptions after they begin assigning scores.

3. Guide students to justify their choice of solution contestants.

- Once teams have chosen their top five contestants, ask teams to write a brief summary (three to five sentences) of each finalist on index cards that introduces each solution by name, explains the solution's approach, and why their team selected it as a finalist.
 - If there are four students in a team, they should all collaborate to write the first summary, and then each student will be responsible for writing one of the remaining five.
 - Note that these summaries will not be included in the team's final magazine, and are only intended for use in this activity.
- Instruct teams to arrange their five summaries at their team's workspace so they will be visible to other students for a gallery walk.
- Prompt students to take notes as they walk around other work areas and review their solution selections. Encourage students to take notes on the process that teams used to make their selections, rather than which solutions they chose.
- After the gallery walk, facilitate a discussion to synthesize what students learned about other teams' decision-making processes:
 - *What decision-making processes were similar/different to your own team's process?*
 - *What selection criteria were similar/different from the ones your team used?*
 - *Which criteria were particularly effective for narrowing down a winner and why?*

4. Conclude the Ocean Plastics Pollution Solutions Contest by having each team select a winner and write a profile.

- Tell students that it's finally time to select a winner.
- Distribute the handout [Ocean Plastics Pollution Solutions Scoring Rubric](#) for teams to score each of the five finalists in all three categories. Remind teams that in their role as judges, they must be fair and impartial, so they should use their rubrics to organize as much information as they can about each finalist.
- Once teams have selected their contest winner, direct them to their [Final Project Checklist and Rubric](#), which contains guidelines for how to write a profile of their contest winner.
- Distribute the [Ocean Plastics Pollution Solutions Contest Winner Profile](#) to teams and support students as needed in the writing process.
- Publishing teams should save their *Ocean Plastics Pollution Solutions Contest Criteria* and *Ocean Plastics Pollution Solutions Scoring Rubric* in their project folder until their profile of the contest winner is complete.

Informal Assessment

Students' summaries about their chosen solutions, their participation in the gallery walk debriefing discussion, their use of rubrics, and their contest winner profile all provide insights into their ability to evaluate competing design solutions based on jointly developed and agreed-upon design criteria.

OBJECTIVES

Subjects & Disciplines

- Conservation
 - Earth Science**
 - [Oceanography](#)
- Engineering
 - Geography**
 - [Human Geography](#)
 - Social Studies**
 - Civics
 - Economics
 - Storytelling**

Teaching Approach

- Project-based learning

Teaching Methods

- Cooperative learning
- Research
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Learning and Innovation Skills
 - Communication and Collaboration
- 21st Century Themes
 - Civic Literacy
 - Environmental Literacy
 - Financial, Economic, Business, and Entrepreneurial Literacy
 - Global Awareness
 - Health Literacy
- Critical Thinking Skills
 - Analyzing
 - Evaluating
- Science and Engineering Practices
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

- **Standard 14:**

How human actions modify the physical environment

- **Standard 16:**

The changes that occur in the meaning, use, distribution, and importance of resources

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.WHST.6-8.9:**

Draw evidence from informational texts to support analysis, reflection, and research.

- **WHST.6-8.2:**

Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

NEXT GENERATION SCIENCE STANDARDS

- **Engineering Design:**

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

- **ETS1.B: Developing Possible Solutions:**

There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

- **Science and Engineering Practice 7:**

Engaging in argument from evidence

Preparation

BACKGROUND & VOCABULARY

Background Information

The Ocean Plastic Innovation Challenge is a joint collaboration between National Geographic and Sky Ocean Ventures. Officially, the goals of the challenge are “to incentivize the development of commercial solutions to plastic pollution that can scale and result in transformative change; identify solutions that are ripe for early-stage investing; and accelerate the shift from a single-use plastics economy to a more sustainable circular economy.”

The challenge consists of three tracks: one for design of improved food and beverage containers; one for circular economy, which encourages the development of business models and technologies to prevent plastic from becoming waste in the first place; and one for data visualization. The total prize money awarded is \$1.5 million across all categories, with individual prizes ranging in size from \$5,000 to \$100,000.

This activity is designed to imitate the process used by the judges in the Ocean Plastic Innovation Challenge, with 21 judges from backgrounds ranging from polymer chemistry to corporate sustainability. In Phase 1, judges review submissions and choose 24 finalists. In Phase 2, each finalist is assigned an advisor to improve their solution and prepare a more detailed submission packet for the second round of judging. Just like the students in this activity, judges use rubrics to evaluate competing design solutions, which include categories like these:

- The solution is based on sound scientific principles.
- The solution is feasible, and takes production and market factors into consideration.
- The solution contains particularly innovative or creative elements or ways of addressing the problem.

Prior Knowledge

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Recommended Prior Activities

- [Autopsy of an Albatross](#)
- [Follow the Friendly Floatees](#)
- [Magazine Design Workshop I](#)
- [Magazine Design Workshop II](#)
- [Plastics Aplenty](#)
- [Seaworthy Solutions](#)
- [The Life Cycle of Plastics](#)

Vocabulary

Term	Part of Speech	Definition
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Term	Part of Speech	Definition
circular economy	noun	a system of production that extends the lifespan of consumer goods by maximizing reusing and recycling, and minimizing throwing things away.
feasible	adjective	possible.
prototype	noun	early version or model.
supply chain	noun	processes involved in the production or manufacture of a good or service.
sustainability	noun	use of resources in such a manner that they will never be exhausted.
waste disposal	noun	collection, transport, and destruction or storage of garbage and byproducts.

ACTIVITY 3: CHOOSING AN AUDIENCE | 50 MINS

DIRECTIONS

Plastics: From Pollution to Solutions unit driving question: *How can humans solve our plastic problem in the ocean?*

Pollution Solutions lesson driving question: *Which solutions to the plastic problem are the most promising?*

1. Guide the class to shift their focus from a global problem to local solutions.

- Ask students if they have ever heard the phrase “Think globally, act locally” and have them discuss what the expression means.
 - Responses will vary but should get close to the idea that while it’s valuable to think about how problems affect the whole world, it’s important to make a difference in your own community.
- Tell students they have learned about global solutions, and now it’s time to develop their own local solution. Fortunately, they now know all about the problem and the most promising solutions—but the rest of the community may not be as well-informed about the plastic problem.
- Ask: *Who in our community can help us tackle this problem?*
 - Possible responses:

- Local businesses and restaurants that use and distribute single-use plastics to customers.
- Schools and school systems that generate plastic waste and/or do not participate in recycling programs.
- Local government, which can make rules and restrictions about the types of plastics they will allow people to buy, sell, use, and recycle.
- Individuals and families who buy plastic products.

2. Help teams design their *Call to Action* for a specific audience.

- Distribute one *Call to Action Graphic Organizer Example* and one *Call to Action Graphic Organizer* to each publishing team.
- Prompt teams to review the example and then debrief as a class to ensure students have a clear understanding of how the process will narrow their team's focus and lead to a *Call to Action* that is specific and achievable.
- Advise teams that a good target audience is one you have some kind of connection to. Target audiences should be large enough that they can make a meaningful impact, but not so large that they won't pay attention to students' voices.
- Guide teams through the *Call to Action Graphic Organizer*:
 - Step 1: Teams choose and highlight a target audience and fill in the bubble below their target audience, as in the example.
 - Teams may need to conduct further research to find the name of a contact person or describe their local government. This can be assigned for homework if class time is limited.
 - Ask one member from each team to share their chosen target audience and explain why they think that person or organization will be able to help them make a difference.
 - Step 2: Teams make a plan for initial and follow-up contact in two different ways.
 - Step 3: Choose a target plastic.
 - After teams have discussed and chosen a target plastic, ask a different team member to share and explain their choice to the class.
 - Before proceeding to Step 4, point teams in the direction of resources that relate to their target audience. Prompt them to read through the following websites and look for inspiration about what kinds of local actions they can suggest to their target audiences:
 - Fellow students or school administrators: *Kids Against Plastic*

- Local government: [A Running List of Action on Plastic Pollution](#) and [Plastic Bag Ban Locations](#)
 - Local businesses and restaurants: [Ocean-Friendly Restaurants](#) and [A Running List of Action on Plastic Pollution](#)
 - Families or other consumer-oriented actions: [You Can Help Turn the Tide on Plastic. Here's How.](#)
- Step 4: Describe the current behavior of the target audience with the target plastic. Have students describe the positive and negative consequences of current behaviors as well, including any reasons that people in the target audience might choose to use the target plastic currently.
 - Step 5: Prompt teams to imagine the desired future behavior of the target audience with the target plastic.
 - Monitor teams' progress on this step. Provide feedback so that teams understand their *Call to Action* should be short, specific, and strongly worded in order to be most effective.
 - When teams finish Step 5, have one member from each publishing team share their target audience and desired future behavior.
 - Remind students that people often resist change and that they have real reasons for doing so. Facilitate discussion as a class or within teams:
 - *How will your proposed change positively impact the plastics crisis?*
 - *Why might people not want to make this change?*
 - *What negative impacts could result from making your proposed change?*
 - *What other obstacles might your Call to Action encounter?*

3. Conclude with a plan to contact their target audience.

- Tell students that when their magazines are complete, they need to be read by their target audience. Remind them of the final due date for their magazine and explain that on that date, members of the target audience will be invited to the class to read and respond to students' work.
 - Ask: *How and when will you invite your target audience to our class?*
 - Possible responses:
 - We will visit their office after school tomorrow.

- We will send them an email invitation right now!
 - We will tag them on social media this evening.
 - We will call their office phone number after school.
- Ask: *When you invite them, what will you say?*
- Possible responses:
 - We will introduce ourselves and explain our project.
 - We will tell them the date of our final presentation.
 - We will tell them the name and address of our school.
- Revisit the class *Know and Need to Know* chart to update existing questions and add new ones as publishing teams shift their focus to final production.
 - Although the graphic organizer will not be included in the final magazine, it will be useful for writing the *Call to Action for Readers* in an upcoming activity, so publishing teams should store their completed *Call to Action Graphic Organizers* in their project folders with other important documents.

Tip

Step 2: In this activity, student projects begin to diverge significantly. Projects of this nature can be difficult to manage, especially because the level of support from administrators and the availability of resources can vary widely from school to school. Ultimately, it is up to you to determine how much freedom and responsibility to give students in designing their projects. For example, you may decide to have all of your publishing teams focus on the same target audience to maximize and streamline their efforts.

Step 3: This is an excellent opportunity in the unit to partner with a social studies teacher, guidance counselor, or librarian. These partners at your school and in your community may be able to help your students better understand how laws are passed in your municipality and which individuals or organizations in the community could be valuable partners.

Step 3: Students with an interest in local business may also need assistance with research, outreach, and preparation. Once they have chosen a business, how do they contact the owner? How should they respond if the owner is resistant to their argument? What information can they provide to overcome objections, and is information sufficient? It may be helpful to research similar businesses that have taken comparable measures.

Step 3: To learn more about the spectrum of authenticity in project-based learning, read [What Does it Take for a Project to Be “Authentic”?](#) To learn more about successful examples of taking learning beyond the walls of a classroom, read [Gold Standard PBL: Public Product.](#)

Informal Assessment

The *Call to Action Graphic Organizer* and students’ justifications of their decisions provide evidence of their ability to gauge positive and negative impacts, to design solutions, to consider the needs of individuals and society, and to tailor their message to a target audience.

OBJECTIVES

Subjects & Disciplines

- Conservation
- English Language Arts
- Experiential Learning
- **Social Studies**
 - Civics
 - Economics

Teaching Approach

- Project-based learning

Teaching Methods

- Brainstorming
- Cooperative learning
- Experiential learning

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

• **ETS1.B: Developing Possible Solutions:**

There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

• **Science and Engineering Practice 7:**

Engaging in argument from evidence

Preparation

BACKGROUND & VOCABULARY

Background Information

Going public is one of the distinguishing features of project-based learning that makes it truly authentic and impactful for both students and the community. In short, going public means that the audience for students' work is not confined to their own classroom. They share their work with other community members, who can provide meaningful feedback about students' ideas, suggestions, and concerns. A public product is a powerful motivator for students. In order to publish a product that they can present to outsiders, students understand that they must hold themselves and their teams to a high standard in terms of scientific information, written quality, and artistic design.

Prior Knowledge

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Recommended Prior Activities

- [Autopsy of an Albatross](#)
- [Follow the Friendly Floatees](#)
- [Magazine Design Workshop I](#)
- [Magazine Design Workshop II](#)
- [Plastics Aplenty](#)
- [Seaworthy Solutions](#)
- [The Life Cycle of Plastics](#)
- [The Ocean Plastics Pollution Solutions Contest](#)

Vocabulary

Term	Part of Speech	Definition
activist	<i>noun</i>	person who strongly and actively supports an issue or point of view.
audience	<i>noun</i>	observers or listeners of an event or production.
ban	<i>verb</i>	to prohibit or not allow.
behavior	<i>noun</i>	standard of conduct.
community	<i>noun</i>	social group whose members share common heritage, interests, or culture.



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