

**RESOURCE LIBRARY**

ACTIVITY : 2 HRS 5 MINS

## The Ocean Plastics Pollution Solutions Contest

Publishing teams research five promising solutions to the plastics crisis and write a summary explaining why they chose each one. They engage in a gallery walk to share their selected solutions. Then, using rubrics of their own design, teams select a winner for their Ocean Plastics Pollution Solutions Contest and write a profile for their magazine.

**GRADES**

6 - 8

**SUBJECTS**

*Conservation, Earth Science, Oceanography, Engineering, Geography, Human Geography, Social Studies, Civics, Economics, Storytelling*

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4 PDFs

## OVERVIEW

Publishing teams research five promising solutions to the plastics crisis and write a summary explaining why they chose each one. They engage in a gallery walk to share their selected solutions. Then, using rubrics of their own design, teams select a winner for their Ocean Plastics Pollution Solutions Contest and write a profile for their magazine.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/ocean-plastics-pollution-solutions-contest/>

## In collaboration with

# 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.&nbsp;

- **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**

### **What You'll Need**

### **REQUIRED TECHNOLOGY**

- Internet Access: Required
- Tech Setup: 1 computer per pair

### **PHYSICAL SPACE**

- Classroom

### **GROUPING**

- Small-group learning
- Small-group work

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

## For Further Exploration

### Reference

- [Ocean Plastic Innovation Challenge Rules](#)

### Websites

- [Meet the Judges](#)



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