RESOURCE LIBRARY
LESSON

Knowledge + Action = Power

Publishing teams finalize their magazine's cover and a *Call to Action* aimed at their target audience. They provide constructive feedback to other teams using the *Final Project Checklist and Rubric*. Finally, teams share their completed magazines and reflect on their experiences in this unit. This lesson is part of the *Plastics: From Pollution to Solutions* unit.

GRADES

6 - 8

SUBJECTS

Arts and Music, Conservation, English Language Arts, Experiential Learning, Social Studies, Civics, Economics, Storytelling

CONTENTS

3 Activities

In collaboration with

educurious
learning that connects

ACTIVITY 1: TURNING KNOWLEDGE INTO POWER | 50 MINS

DIRECTIONS

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

Knowledge + Action = Power **lesson** **driving question**: *How can your publishing team maximize positive impact on your community and the environment?*

1. Lead students from knowledge into action, using their expertise to help solve a problem.

- On the board, write the words "Knowledge = Power." Ask students if they have heard this saying before, and whether or not they agree with it.

  - After time for discussion of various viewpoints, write a different sentence: "Knowledge + Action = Power." Ask students how these words compare to the other words, and whether or not they agree with them.

- Tell students they have gained a lot of knowledge about plastics, and now it is time to turn that knowledge into power through action by completing the final elements of their magazines, namely, their final *Call to Action* and the front and back covers.

- Prompt teams to take out previously distributed materials:

  - *Call to Action Graphic Organizer*, which was completed in the previous activity, *Choosing an Audience*
  - *Final Project Checklist and Rubric*

- Ask teams to identify the relevant sections of the rubric that will guide their work today.

2. Guide teams to finalize their *Call to Action* for inclusion in their magazines.

- Distribute the *Call to Action for Readers* handout and introduce the task to teams. This handout will help teams draft the text for their *Call to Action*.

- Guide teams to fill out the first page of the *Call to Action for Readers*, including *Who?* (the target audience), *What?* (the desired future action), and these additional sections:

  - *How?* Teams provide some details about how the change can take place. This could include addressing obstacles to acceptance and implementation of their solution.
  - *When?* Teams should create a timeline for the action that is ambitious, but reasonable. Remind students to balance the urgency of the crisis with the knowledge that real change does not happen overnight.
  - *Why?* Teams explain the negative impacts of plastics as well as the benefits of their proposed solution. They should make a convincing argument supported by data and evidence they have learned during this unit.

- For the second page of the *Call to Action for Readers* handout, instruct teams to sketch engaging images to represent before and after their desired action takes place. Remind them to sketch their drafts lightly in pencil, because they may decide to modify their images after receiving peer feedback in the following activity.

- The purpose of these images is to help the target audience visualize the differences made by following the *Call to Action*.
- The "before" image: This should include the current behaviors of the target audience with respect to the target plastic. For example, this image could show people drinking out of single-use plastic water bottles and littering them or putting them in the trash instead of recycling them.
- The "after" image: This should include the desired future behavior of the target audience with respect to the target plastic. For example, this image could show people drinking out of reusable bottles and refilling them from safe drinking water sources.

3. Explore *National Geographic* covers that are compelling and informative.

- Display the website *Five Irresistible National Geographic Cover Photos* and *National Geographic Comes Up With An Iconic Cover To Raise Awareness About Plastic Pollution,* about a cover that focuses on the problem of ocean plastics.
- Remind teams that their goal is to create a cover that is both compelling and informative. Clarify that the cover must be original visual artwork: It can be a drawing, painting, photograph, or collage, but it must be created by the publishing team and not copied from an external source.
- Ask: *What does it mean for a cover to be compelling?*

  - Possible answers:

    - It makes the reader want to open the cover and learn more.
    - It makes the reader feel a strong emotional reaction.

- Scroll to each of the five images on the website and discuss with students.
- Ask: *What makes this cover compelling? What makes this cover informative?*

  - Possible responses:

    - *Inside Animal Minds* is compelling because the dog is looking straight at the reader. It is informative because the dog looks inquisitive and relatable, which connects to the main idea of the story about animals with "a world-class vocabulary."
    - *Yellowstone Supervolcano* is compelling because it is a colorful and unfamiliar image with a teaser line about "what lies beneath the park." It is informative because you can see people if you look closely, which tells readers about the scale of the image.
    - The cover with the Afghan refugee is compelling because the girl's story is mysterious, and the reader may want to know why she is a refugee and what she fears. It is

informative because it tells the reader where she comes from and that she is fleeing some type of conflict.

- Explain that in addition to the front cover, teams will also create a back cover of their magazine.

  - The back cover does not need to be illustrated, but should contain basic information for their target audience about who created this magazine and why.
  - Basic information may include their school, grade level, and some type of contact information. The purpose of contact information is so that their target audience can reach out with questions or comments.
  - You may prefer to list contact information for the school, or for a shared class email account, if students are not comfortable sharing personal contact information.

- Provide time for teams to draft their front and back covers.
- Teams will have time to finalize these drafts in the next activity, but they should have at least a working draft of both by the end of this activity.
- At the end of class, share draft cover designs with a gallery walk.

Informal Assessment

The *Call to Action for Readers* and magazine cover provide evidence of students' ability to tailor their message to a target audience and to apply their scientific knowledge to solve a complex global problem.

Extending the Learning

Consider coordinating efforts with a social studies, visual art, and/or language arts teacher to prepare students to share their magazines with the broader community.

OBJECTIVES

Subjects & Disciplines

- Arts and Music
- Conservation
- English Language Arts

- Experiential Learning
Social Studies
  - Civics
  - Economics

Learning Objectives

Students will:

- Synthesize learning about the plastics problem and possible solutions in a Call to Action that persuades a target audience.
- Create a compelling and informative cover to interest their target audience.

Teaching Approach

- Project-based learning

Teaching Methods

- Cooperative learning
- Multimedia instruction
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Learning and Innovation Skills
    - Communication and Collaboration
    - Creativity and Innovation
    - Critical Thinking and Problem Solving
  - Life and Career Skills
    - Initiative and Self-Direction
    - Leadership and Responsibility

- Social and Cross-Cultural Skills
- 21st Century Themes
  - Civic Literacy
  - Environmental Literacy
  - Global Awareness
- Critical Thinking Skills
  - Applying
  - Creating
- Science and Engineering Practices
  - Constructing explanations (for science) and designing solutions (for engineering)

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

• **Standard 14:**
How human actions modify the physical environment

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

• **WHST.6-8.4:**
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

NEXT GENERATION SCIENCE STANDARDS

• **Science and Engineering Practice 7:**
Engaging in argument from evidence
• **Science and Engineering Practice 8:**
Obtaining, evaluating, and communicating information.

Preparation

BACKGROUND & VOCABULARY

Background Information

Science, technology, engineering, and math have long held a special place in education. Ever since Sputnik and the Space Race of the 1950s, and probably long before that as well, careers that involve science, technology, engineering, and mathematics (STEM) have sparked inspiration and innovation in students and professionals. STEM fields promise lucrative job opportunities and also allow students to make a difference in the world. However, in recent years, some teachers and education advocates have argued that STEM is not enough. Adding the arts and communication studies to the mix reminds us that science and mathematics are fundamentally human endeavors that exist in social contexts and have enormous social consequences. The real world is multidisciplinary, and 21st-century project-based learning is as well.

Art and STEM are natural allies, as this activity shows. Science and mathematics can help us understand the patterns of the natural world, but art allows us to envision and appreciate its beauty. Science and math can help us design solutions to pressing global crises like plastic pollution, but art allows us to inspire one another and to imagine better futures.

Raising awareness about problems is important, but it is not enough. In order to create change, people—individuals, communities, businesses, and governments—must act. Research suggests that the most effective calls to action are highly targeted, with a unique audience, specific place, and observable action.

Prior Knowledge

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Recommended Prior Activities

- Autopsy of an Albatross
- Choosing an Audience
- 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
argument	*noun*	reason or set of reasons given with the aim of persuading others that an action or idea is right or wrong.
audience	*noun*	observers or listeners of an event or production.
compelling	*adjective*	forceful or persuasive.
crisis	*noun*	event or situation leading to dramatic change.
obstacle	*noun*	something that slows or stops progress.

ACTIVITY 2: MAGAZINE DESIGN WORKSHOP III | 2 HRS 30 MINS

DIRECTIONS

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

Knowledge + Action = Power _lesson_ *driving question*: *How can your publishing team maximize positive impact on your community and the environment?*

1. Launch the final writing session of the project.

- Announce that publishing teams are in the home stretch. They have learned all the information they will learn in this unit, and now it is up to them to deliver their important message to their target audiences. But first, they must finalize and proofread their magazines to ensure that their products are complete, accurate, and well-organized.
- Have students take out their _Final Project Checklist and Rubric_ and instruct them to check off each element that is complete. Remind students that some elements of their project are still in progress, such as the glossary.
- Introduce the _Letter from the Editors_ handout and task:

  - Explain that the _Letter from the Editors_ will go inside the front cover of the magazine.
  - The purpose of this letter is to introduce the target audience to the problems and solutions of ocean plastics and explain why the _Call to Action_ is essential.
  - This letter will make a claim that human production, use, and disposal of plastics can have both positive and negative ecosystem impacts. This claim must be supported by

evidence and reasoning using the C-E-R format.

- Encourage publishing teams to discuss how they will divide the remaining tasks.
- Once teams have a plan for dividing up the remaining elements of their magazines, provide time in class for them to work.

2. Facilitate the process of peer review for constructive feedback.

- Remind publishing teams that every magazine needs to be proofread and edited before it can be published to ensure the target audience can read and understand the issues and information clearly.
- During the peer review process, publishing teams will review another team's work. Determine in advance how you will structure the process.
- Review expectations for peer editing and feedback:

  - Every peer reviewer must use a *Final Project Checklist and Rubric*. They should make notes on the rubric as they go through the project.
  - Peer reviewers will not write directly on the draft magazine documents. Instead, they should use sticky notes to indicate suggested changes or questions.
  - Peer reviewers should strive to make positive comments as well as constructive comments. Feedback is most useful when it is specific.

- As in other magazine workshop activities, peer editing teams should divide duties to edit their work.

  - Since there are 10 elements of the magazine and four students per team, each editor can be responsible for reviewing two to three elements. Alternatively, pairs of editors could each be responsible for reviewing five elements.
  - While teams are engaged in peer editing, circulate around the room and provide feedback to teams. Ensure that each group has completed all 10 elements on their *Final Project Checklist and Rubric* and that they are using the rubric as they finalize their work and edit the work of others.

    - Four elements of the magazine are especially writing-intensive (*Letter from the Editors*, *Call to Action for Readers*, *Featured Marine Organism Profile*, and profile of the winner of the Ocean Plastics Pollution Solutions Contest). Keep this in mind as you circulate, especially when working with teams and students who struggle with written assignments.

- Peer editing can still take place even for teams that have not yet finished all 10 elements of their magazine.

3. Return magazines to their original publishing teams for final revisions.
- Provide time for publishing teams to incorporate feedback from their peer editors.
- When final revisions are complete, have publishing teams organize all 10 elements of their magazines into their project folders and turn them in.
- When grading magazines, make comments on the *Final Project Checklist and Rubric* and/or using sticky notes so that the magazine can still be delivered to the target audience.
- If the peer editing teams did not provide comprehensive feedback, or if the publishing team did not incorporate all feedback, you may consider returning magazines to their publishing teams for another round of edits before sharing them with the target audience.
- Consider making electronic copies of each team's magazine so that you can also share your class' work with us and other National Geographic teachers around the world @NatGeoEducation.

4. Facilitate publication of team magazines.
- If your class is producing hard-copy paper magazines, try to find a way to bind each team's magazine without using plastics (see Tips for suggestions).

  - Instruct publishing teams to carefully arrange their pages exactly as they want them before binding.
  - Make sure that each team has included only the pages that will be in the final magazine, since their project folder also contains other drafts, graphic organizers, and handouts that will not be appropriate for inclusion in the published product. Teams should consult their *Final Project Checklist and Rubric* for the complete list of magazine pages.

- If your class is producing digital magazines, students can produce work online, or each page can be scanned for compilation into a single document with an appropriate title.

  - Ensure that your classroom has sufficient devices available to display each group's digital magazine during the final activity.
  - Once your magazines are digitized, consider sharing them with the broader National Geographic educator community online!

Modification

If your class is creating digital magazines, determine how publishing teams will combine all elements into a single shareable document that contains all components.

Tip

Step 2: To read more about making peer review meaningful, read _Peer Review Done Right_. The video _Austin's Butterfly_ (6:32) also provides examples of meaningful peer feedback and revision.

Step 3: Reach out to your students' English Language Arts teacher to support students in their written work. The following resources support the development of evidence-based argumentative writing:

- _Writing in Science (Integrated Middle School Science Partnership)_
- _STEM Teaching Tools (Incorporating Scientific Argumentation into Your Classroom)_

Step 4: Approaches to consider for paper magazine publication:

- Staples or binder clips are simple, quick solutions.
- If your project folders have prongs inside, students can glue the front and back covers onto their project folders and then hole-punch each page included in the magazine.
- See this ReadWriteThink resource for _Three Ways to Bind a Handmade Book_.

Rubric

Evaluate students' published magazines with the _Final Project Checklist and Rubric_ to assess their fulfillment of the standards addressed in this unit. Be sure not to write on the magazines themselves so that they remain in their original condition for the final activity.

OBJECTIVES

Subjects & Disciplines

- Arts and Music
- Conservation
- English Language Arts
  Storytelling

Learning Objectives

Students will:

- Write a Letter from the Editors that presents an evidence-based argument that the way humans produce, use, and dispose of plastics on land can affect ocean ecosystems positively as well as negatively.
- Provide feedback to another team using the Final Project Checklist and Rubric.
- Incorporate peer feedback into their final draft.

Teaching Approach

- Project-based learning

Teaching Methods

- Peer tutoring
- Reading
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information Literacy
  - Learning and Innovation Skills
    - Communication and Collaboration
    - Creativity and Innovation

- Life and Career Skills
  - [Flexibility and Adaptability](#)
  - [Productivity and Accountability](#)
- Critical Thinking Skills
  - Analyzing
  - Creating
  - Evaluating
- Science and Engineering Practices
  - 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

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.SL.7.5:**
Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.
- **CCSS.ELA-Literacy.WHST.6-8.1:**
Write arguments focused on discipline-specific content.
- **CCSS.ELA-LITERACY.WHST.6-8.2.D:**
Use precise language and domain-specific vocabulary to inform about or explain the topic.
- **Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12:**
Production and Distribution of Writing, WHST.6-8.5.

NEXT GENERATION SCIENCE STANDARDS

- **MS. Ecosystems: Interactions, Energy, and Dynamics:**
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- **Science and Engineering Practice 7:**

Preparation

BACKGROUND & VOCABULARY

Background Information

There is ample evidence that the process of peer review significantly improves the quality of students' work. Strong writing skills help students become better scientists. Scientists must be able to summarize their data, draw conclusions, communicate with colleagues, and write grant applications. Perhaps even more importantly, scientists have a responsibility to share their findings with the press and the general public so that people can make informed decisions. After all, not all science students will grow up to pursue STEM careers, but they all need a basic level of scientific literacy.

Even for an experienced science teacher, taking the dive into activism is not easy, but it is rewarding. More importantly, students often experience significant changes and improved educational outcomes as they grow from passive learners into active participants.

Scientists sometimes debate whether they should engage in advocacy and activism. But throughout history, many scientists have engaged in political movements and campaigns. The most famous scientist of the 20th century, Albert Einstein, was so outspoken on subjects from racism to nuclear nonproliferation that the FBI kept a 1,400-page file about his political views. Naturalist and glaciologist John Muir fell in love with the flora, fauna, and geology of the American West and convinced President Theodore Roosevelt to establish the National Park System. Biologist Rachel Carson learned about the devastating effects of pesticides like DDT on ecological food webs, and her book *Silent Spring* ultimately resulted in DDT being banned. Nobel Prize-winner Wangari Maathai was a biologist who established the Green Belt Movement, which is responsible for planting over 20 million trees across Africa. National Geographic Fellow Jenna Jambeck's research into plastic pollution fundamentally changed the landscape of studying plastics, and she has provided her expertise to national and international organizations including the U.S. Congress, the European Union, and the United Nations.

Prior Knowledge

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Recommended Prior Activities

- Autopsy of an Albatross
- Choosing an Audience
- 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
- Turning Knowledge into Power

Vocabulary

Term	Part of Speech	Definition
audience	noun	observers or listeners of an event or production.
constructive feedback	noun	tool to enhance the teaching and learning process; highlighting strengths and achievements as well as areas for improvement.
impact	verb	to influence or have an effect on something.
publish	verb	to provide a written piece of work, such as a book or newspaper, for sale or distribution.
waste disposal	noun	collection, transport, and destruction or storage of garbage and byproducts.

ACTIVITY 3: PUBLICATION PRESENTATIONS AND REFLECTIONS | 1 HR 15 MINS

DIRECTIONS

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

Knowledge + Action = Power **lesson** driving question: _How can your publishing team maximize positive impact on your community and the environment?_

1. Facilitate the publication presentations to an invited audience.
- Display each team's final magazine around the room for a gallery walk.
- The time necessary for this step will vary greatly depending on your students' success in inviting their target audiences to your class.
- Welcome any guests to your classroom.

  - Provide name tags so guests can write their names and titles. Students may also want to wear name tags.
  - Ask for a student volunteer to explain the purpose of this unit of study.

    - Possible response:

      - We studied the crisis of plastic pollution in the oceans and the problems that it causes.
      - We also researched solutions and proposed our solution to members of the community.

  - Ask another student volunteer to introduce the various elements that are included in each magazine.

    - Possible response:

      - Each magazine has a front and back cover, a _Food Web Infographic_ showing biomagnification in a marine ecosystem, an _Ocean Plastics Movement Model_, a _Featured Marine Organism Profile_, a profile of the winner of the Ocean Plastics Pollution Solutions Contest, a glossary of vocabulary words, a _Letter from the Editors_, and a _Call to Action_.

  - Explain to guests that each publishing team chose a different target audience and developed a different _Call to Action_. Ask each team to briefly name their target audience and describe their _Call to Action_.

- At this point, make sure all outside guests know which publishing team invited them.
- Provide time for guests to receive a presentation of the magazine from the publishing team or read the magazine in paper or digital format.

- Provide time for guests to ask questions of students and to give their initial reactions to the *Call to Action*. The guests may answer questions, such as:

  - *What did you learn from reading the magazine?*
  - *What did you find interesting or thought-provoking?*
  - *What questions do you have for the publishing teams about their projects?*
  - *How realistic is it that you will be able to accomplish this* Call to Action *and why?*
  - *What barriers or obstacles would prevent you from being able to accomplish it?*
  - *What suggestions or advice do you have for the publishing team?*

- Thank your guests for attending and make sure students have exchanged contact information to stay in touch with them in the future.

2. **Show the picture of reflections and ripples.**
- After guests have left, ask: *What do you see in this picture?*

  - Possible responses:

    - clean water, a drop of rain, waves or ripples in the water, reflections of trees

- Congratulate students on the work they have done and explain that on this last day of the *Plastics: From Pollution to Solutions* unit, their final activity is focused on reflections and ripples.
- Ask: *What are reflections, and what are ripples?*

  - Possible responses:

    - A reflection is what you see in the mirror, or in the water.
    - A ripple is a wave that travels outward from a single point.

- Tell students that even though the unit is ending today, the problem of ocean plastics does not end today, and neither should their journey from knowledge to action.

  - The reflection represents students looking inward at themselves and how they have changed.
  - The ripples represent the effects of small actions, like a single drop of water, moving outward into the world and affecting others.

3. **Divide the class into two equal groups to reflect internally and externally.**

- Orient students to the reflection banner hanging in the room (see Setup for directions). Explain or post directions for how the banner works:

  - Top half: Students write or draw at least one individual action they plan to take in relation to plastics.
  - Bottom half: Students draw or write one or more collective actions they want to see other people take in relation to plastics.

- Explain that one half of the class will complete the _Ripples and Reflections Survey_ handout while the other half of the class will reflect on the banner with markers.

  - After both groups have finished their assigned reflections, tell the groups to trade places until all students have taken the survey and written on the banner.
  - Once students have completed their surveys and written on the banner, teachers are encouraged to share their class' responses, along with the students' final projects, digitally with the broader National Geographic educator community.

- **Conclude the unit with a whole-class discussion about next steps.**

  - Discussion questions:

    - _If a member of your target audience did not attend today, what is your plan to reach out to them?_
    - _If a member of your target audience did attend today, what is your plan to follow up with them to check on their progress in completing the_ Call to Action?

  - This is a good opportunity for a final review of the class _Know and Need to Know_ chart.

    - _What questions about plastics do you still have that were not answered in this unit?_

Tip

- **Step 1:** To learn more about best practices for conducting a gallery walk, read _How to Use a Gallery Walk_.

- **Step 1:** Determine strategies for handling presentations with limited guests. For example, if multiple publishing teams invited guests who did not attend, prompt them to read each

other's magazines and provide feedback. For teams whose invited guests did not attend, read their magazine and talk to them about next steps:

- Do they have a plan to follow up with their target audience and deliver the magazine?
- If they have tried to reach out multiple times and not gotten any response, there are a couple of options.

  - They could escalate their campaign by having other people call on their behalf or report to the news media that they have requested meetings and been ignored.
  - They could choose a different target audience with a similar message and reach out to them instead.

- **Step 2:** Learn more about reflective resources and questions for students and teachers:

  - Student reflection: Explore _Reflection in the Classroom_.
  - Teacher reflection: _Reflecting on Your PBL Implementation_ and _PBL Teachers Need Time to Reflect, Too_.

Informal Assessment

Students' ideas about individual and collective action to address the plastics crisis demonstrate their answer to the unit driving question: _How can humans solve the problem of plastic pollution in the ocean?_

OBJECTIVES

Subjects & Disciplines

- Arts and Music
- Conservation
- Experiential Learning
  Social Studies
  - Civics

Learning Objectives

Students will:

- Present their magazines to their target audience and respond to their feedback.
- Discuss how their attitudes and behaviors have changed as a result of new understanding.
- Imagine new actions they will take to become better stewards of the planet.

Teaching Approach

- Project-based learning

Teaching Methods

- Brainstorming
- Discussions
- Reflection

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Life and Career Skills
    - Initiative and Self-Direction
    - Leadership and Responsibility
    - Productivity and Accountability
- 21st Century Themes
  - Global Awareness

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

- 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.SL.7.1.A:**
Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

• **CCSS.ELA-LITERACY.SL.7.5:**
Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

• **CCSS.ELA-LITERACY.WHST.6-8.6:**
Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

NEXT GENERATION SCIENCE STANDARDS

• **Crosscutting Concept 7:**
Stability and change

• **MS-ESS3: Earth and Human Activity:**
 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

Preparation

BACKGROUND & VOCABULARY

Background Information

Like the scientific method and the engineering design cycle, project-based learning is an iterative process. Students and teachers both benefit from taking the time to reflect on successes as well as failures. It's tempting to turn in the final project and feel like the unit is finished, and indeed, reflection is often skipped over as a waste of time when there are always more standards to cover. However, taking the time to reflect has real benefits. Students need time to process, articulate, and internalize what they learned. They need to see it, hear it, say it, write it, draw it, and experience it in multiple modalities. Once learning has been processed, then it can be applied to new situations and contexts such as future projects.

Prior Knowledge

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Recommended Prior Activities

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

Vocabulary

Term	Part of Speech	Definition
audience	*noun*	observers or listeners of an event or production.
crisis	*noun*	event or situation leading to dramatic change.
maximize	*verb*	to make as big as possible.
meditate	*verb*	to engage in deep thought, contemplation, or introspection.
socioscientific issue	*noun*	a problem that requires both scientific knowledge and evaluation of ethical concerns to solve.

NATIONAL GEOGRAPHIC