



Department of Environmental Protection Solid Waste Recycling Curriculum Plastics - Worth the Cost?

COURSE Marine Science 1	TIME FRAME 8 Class Periods (45 - 50 minutes)
LESSON SUMMARY Students will investigate the causes, effects, and potential solutions to the microplastic problem in the oceans, and will develop a plan to reduce their personal plastic use.	
NGSSS SCIENCE CONTENT BENCHMARK SC.912.L.17.16 Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution. <i>Note - This lesson addresses the surface and groundwater pollution portion of the benchmark and human activity that contributes to environmental impacts.</i>	
NGSSS NATURE OF SCIENCE BENCHMARK SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science...	
LEARNING OBJECTIVES <ul style="list-style-type: none"> Students will evaluate the impact of microplastics on the marine environment and understand the mechanics of plastic pollution. Students will reflect on personal behavior changes, such as recycling, to reduce plastic pollution and determine how regulation can contribute to less plastic use. 	
SCIENCE VOCABULARY <ul style="list-style-type: none"> microplastic nurdle 	ACADEMIC VOCABULARY <ul style="list-style-type: none"> claim evidence reasoning
INQUIRY QUESTION(S) <ul style="list-style-type: none"> Is the convenience of plastic worth the cost? 	STATEMENT OF STUDENT MASTERY <ul style="list-style-type: none"> I can explain how nurdles and microplastics are formed and describe the journey that carries them into the ocean. I can improve my carbon footprint by developing an action plan to reduce my reliance on single-use plastics.



CROSS-CURRICULAR CONNECTIONS

SOCIAL STUDIES

SS.912.C.2.3 Experience the responsibilities of citizens at the local, state, or federal levels.

ELA.K12.EE.1.1 Cite evidence to explain and justify reasoning.

ELA.K12.EE.4.1 Use appropriate collaborative techniques and active listening skills when

Lesson Overview

ENGAGE

1 Class Period

Students will formulate questions about nurdles and other plastics and their impact on the ocean environment over time.

Teacher Moves

- Share pictures of the Great Pacific Garbage Patch and animals who have eaten plastics. Facilitate discussion on the long lasting effects of plastic use.
- Take students outside (or use the inside option) to set up the plastic bottle. Ask questions to prompt predictions. Assist students in setting up a before and after observation table.

Student Moves

- Look at pictures and begin to ask questions about microplastics and their effect on the environment.
- Begin to make observations about a plastic bottle (continue to make observations over the unit).

EXPLORE

2 Class Periods

choices and the personal impact they have on the growing microplastic

Teacher Moves

- Ask students: How do you use plastics in your everyday life? Do you use exfoliation/scrubby soaps? Have you read the ingredients? Facilitate discussion.
- Facilitate the hands-on activity. Circulate and assist students as needed, asking questions to spark student thinking.

Student Moves

- Discuss everyday use of plastics, including soaps and cleansers that may contain microplastics.
- Work through a lab activity, isolating microplastics from different soaps/cleansers/toothpaste.
- Look at microplastics under a microscope (or look at provided images) and predict where they came from.
- Formulate ideas of what happens to microplastics in soaps/cleansers/toothpaste when they wash down the drain.
- Explore the webquest trip through <https://portal.ct.gov/DEEP/Municipal-Wastewater/Microbeads> using the provided guided task sheet or in a free inquiry format.



EXPLAIN

2 Class Periods

Students will build their knowledge of the causes, effects, and solutions to the microplastic problem in our oceans.

Teacher Moves

- Play the TedEd video:
<https://ed.ted.com/lessons/the-nurdles-quest-for-ocean-domination-kim-preshoff>
- Facilitate classroom discussion using the watch guide as discussion starters about nurdles.
- Facilitate a student Jigsaw. Circulate and join small groups asking leading questions to assist students in gathering information and developing graphic organizers.

Student Moves

- Students watch the TedEd video on nurdles and complete the watch guide. They begin to build knowledge of how microplastics enter the ocean.
- Students work through a Jigsaw and develop a graphic organizer for cause/effect and solutions to microplastic problems.

ELABORATE

3 Class Periods

Students will develop an action plan to reduce their reliance on single use plastics.

Teacher Moves

Wrap up discussion: Facilitate discussion - How can we be better environmental stewards?

Choose out of two pathways:

- Social Studies connection - Write a letter to Congress/Senate about microplastics.
- Call to action student project: Work with students to develop a 6 - 8 week civil service project as a call to action.

Student Moves

- Students generate their own solutions and create an action plan to reduce their single use plastic dependency.

EVALUATE

1 Class Period

Students will use evidence to argue whether the convenience of plastic use is worth the environmental cost.

Teacher Moves

- Wrap up the plastic bottle observation study.
- Facilitate as students write an answer to the following question using the C-E-R framework: Plastics - is the convenience worth the cost?

Student Moves

- Finalize the plastic bottle observational study by evaluating original predictions and expanding on new predictions based on knowledge gained over the unit.
- Write a C-E-R to answer the question: Plastics - is the convenience worth the cost?

