

PLASTICUS MARITIMUS

An Invasive Species

by Ana Pêgo and Isabel Minhós Martins,
illustrated by Bernardo P. Carvalho



A Discussion Guide



Title: Plasticus Maritimus: An Invasive Species

Author: by Ana Pêgo and Isabel Minhós Martins,
illustrated by Bernardo P. Carvalho

Genre: non-fiction

Themes: life science, environment, Earth and
human activity, climate change, sustainability, art

Suitable for: Grades 5 and up

Guided Reading Level: W

Lexile Level: 1040L

Common Core Standards:

W.6.1,2,3,4,8,9,9b,10

RI.6.1,2,3,4,5,6,7,8,9,10

L.6.3,4,4a,4b,4d,5,5a,5b,5c,6

SL.6.1,1c,1d,2,3,4,5,6

Next Generation Science Standards:

MS-LS1-From Molecules to Organisms: Structures and Processes

MS-LS2-Ecosystems: Interactions, Energy, and Dynamics

MS-LS4-Biological Evolution: Unity and Diversity

MS-ETS1-Engineering Design

MS-PS1-Matter and its Interactions

MS-ESS2-Earth's Systems

MS-ESS3-Earth and Human Activity

MS-PS2-Motion and Stability: Forces and Interactions





Before Reading

Look at the cover illustration and book title. What information do the cover illustration and book title give the reader?

Analyze the impact of specific word choices the author uses in the title of the book.

The title may seem unfamiliar. What smaller words do you recognize in “Plasticus Maritimus”?

Identifying Unknown Words

*The study of the history of words is called **etymology**. Breaking up unfamiliar words into parts and looking at word origins can be helpful in learning unknown word meanings.

Plastic

The word *plastic* existed long before the first plastic material, as we know it. As early as the 1600s, plastic was used as a term to describe something that could be easily molded or shaped. Plastic is derived from the Latin word **plasticus** and the Greek word **plastikos**.

Maritime

The word **maritime** is borrowed from the Latin word **maritimus**, meaning “of the sea.”

Understanding Invasive Species

Essential Questions

- ▶ What are invasive species?
- ▶ What are examples of invasive species?
- ▶ How do they become invasive?
- ▶ Why are they a problem?
- ▶ What responsibilities do people have in introducing invasive species?
- ▶ What is their impact on human activities?
- ▶ How do we prevent the spread of invasive species?



An invasive species is a species or organism that is not native to a location, but which has a tendency to take over habitats and cause damage to the environment, human economy and human health. Invasive species impact biodiversity in a harmful and negative way.

Why do you think author Ana Pêgo chose the subtitle “An Invasive Species,” even though plastic is not technically a living organism?

Text Types and Features

What differentiates a book of fiction from non-fiction?

Will this book be fiction or non-fiction? Explain.

Based on what you have observed so far, what is the central idea of ***Plasticus Maritimus***?

Explain the purpose of including a Table of Contents in an informational text.

Read through the Table of Contents. What information can you gather about the topic of water pollution caused by plastics?

How is the topic presented?

What questions do you have about the book?

As you read through the book, look for headings, colored and bold print, and charts and diagrams.



The Introduction

From whose point of view is the story told?

How does Ana Pêgo develop the point of view?

How does Ana Pêgo's background influence her writing?

What kind of person is Ana Pêgo?

How does her background and point of view contribute to authenticity of the text?

Why does she focus on ocean plastics?

Is Ana Pêgo an expert on the topic?

Why did Ana Pêgo write this book? What is her purpose?

Explain her message to the reader.

Fill out the worksheet, *Plastics We Use Everyday*.

How is this quote important to understanding the point of view of the author?

"Going to the beach was like going to visit a friend to get a sense of how they were feeling."



The author believes that there are many professionals in the field of science today who are capable of solving many of the pollution problems in the world. However, there are some obstacles. **Write each problem in a box below.**

1.	2.	3.
----	----	----

As you read the book, analyze how the style, content, and illustrations contribute to the power, persuasiveness, and beauty of the text.

Think about how you can make a difference.

During Reading

What is the role of the ocean in the life of our planet?

How is plastic produced?

What are the consequences of plastic garbage for life on earth?

Compare and contrast the past to the present day in terms of how we use plastics.



Important Functions of the Ocean

1.

2.

3.

Explain the importance of healthy phytoplankton.

How is the ocean food chain severely impacted by plastic pollution?

CREATE AN OCEAN FOOD CHAIN

Most Important Interactions Between Us and the Ocean

Read the Timeline

What important impacts did individuals throughout history make on the advancement of pollution awareness?

When did we begin to realize that plastic pollution was becoming a problem worldwide?

What action was taken to reduce plastic pollution and when?

How is plastic pollution tracked?

How did Captain Charles Moore influence the fight against plastic pollution?

In 2014, what new vocabulary word became common in everyday language?

What is “microplastic”?

What specific actions are countries around the world taking to keep our planet free from microplastics?

Where do we stand as a world in recognizing and taking action on plastic pollution now, in our current year?

FIELD GUIDE

What is the purpose of the Field Guide?

Why is the species *Plasticus maritimus* on the list of “exotic invasive species”?

How does plastic behave like an animal species? Base your answers on the “Identification Sheet.”

What variables determine how much plastic is found in the oceans?

Look back at your list of plastics that you use daily. How much of it was packaging?

What are some good solutions to plastic pollution? How can humans contribute to the eradication of plastics in the oceans?

Where is plastic found in the oceans? Use evidence from the text.

How do the illustrations enhance the meaning and tone of the text?

What tone is the author creating and why?

[Example: The water bottles are wearing medals.]

What point are Ana Pêgo, Isabel Minhós Martins, and Bernardo P. Carvalho trying to make through their illustrations and words?



Is plastic biodegradable? Explain.

What is your reaction to the chart describing the breakdown of plastic? Is it surprising?

Explain the consequences of plastic pollution in the oceans.

What are some of the ways that animals die or become sick from plastics?

1.

2.

3.

4.

5.

6.

What is the most shocking thing that you read?

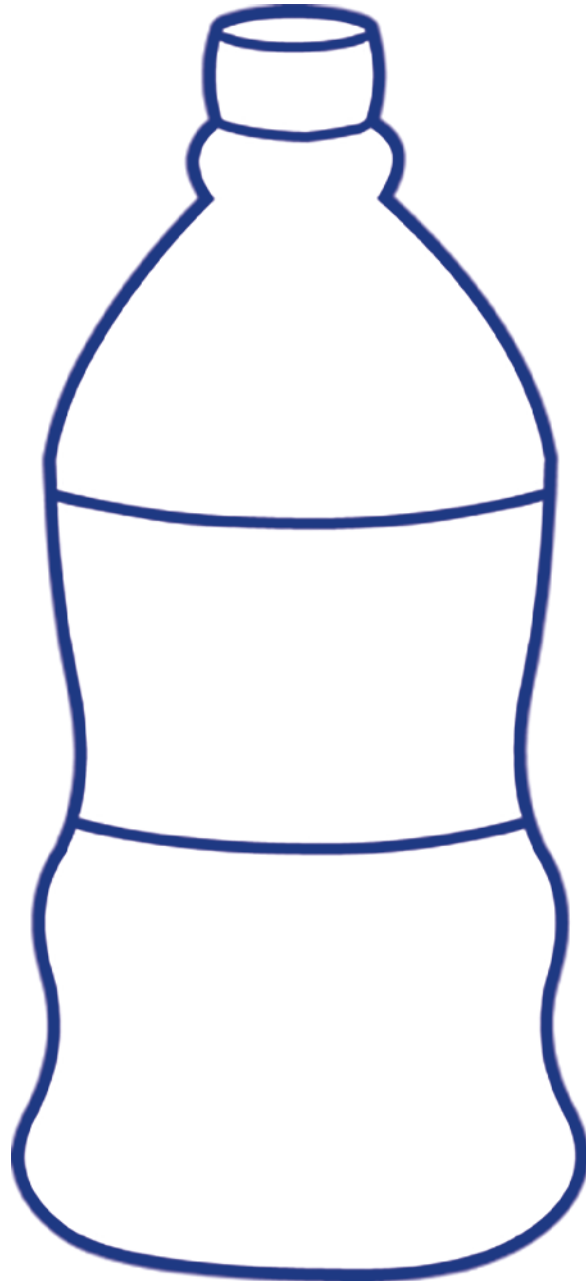
Microplastics

- What does the heading “Microplastics are a macroproblem” insinuate?
- What does “toxic” mean?
- Describe what microplastics are.
- What are examples of microplastics?
- How do they get into our oceans?
- Microplastics are found in oceans. However, they are also found in other bodies of water. Explain.
- How does plastic pollution affect freshwater sources?
- Explain the relationship between drinking water and plastic pollution.
- Discuss the problem in the Great Lakes.
- Why are microplastics so deadly?
- What is the connection between microplastics and bioaccumulation?
- Who is this a problem for?
- How does plastic make its way into the soil?
- What long-term problems does this cause?



PLASTICS WE USE EVERYDAY

Brainstorm the types of plastic you use daily at home, in school, and elsewhere.



What does this quote mean?

“Plastic is a useful material with huge impacts on the environment.”

Not all plastics are the same. Explain.

Where is plastic produced?

What are the environmental consequences of plastic production?

Where does all of this garbage come from? Create an **“Origin of Plastic Pollution”** chart.

How do we solve the problem of plastic pollution, knowing that most people have good intentions?

Common Plastics	Exotic Plastics

What are the **“Seven Rs”**?

What would it take for you to adhere to the “Seven Rs”?

Take a survey of classmates.

Where are we at as a world with recycling? Where do we need to be?

What are common attitudes of people that are directly connected to their lack of urgency in making personal changes?

Draw a picture of your facial expression after understanding the hard truths in ***Plasticus Maritimus***.

What are some good examples of new ways to approach the plastics pollution problem?

Uses of plastics that are necessary/essential	Uses of plastic that are unnecessary	Alternative solutions

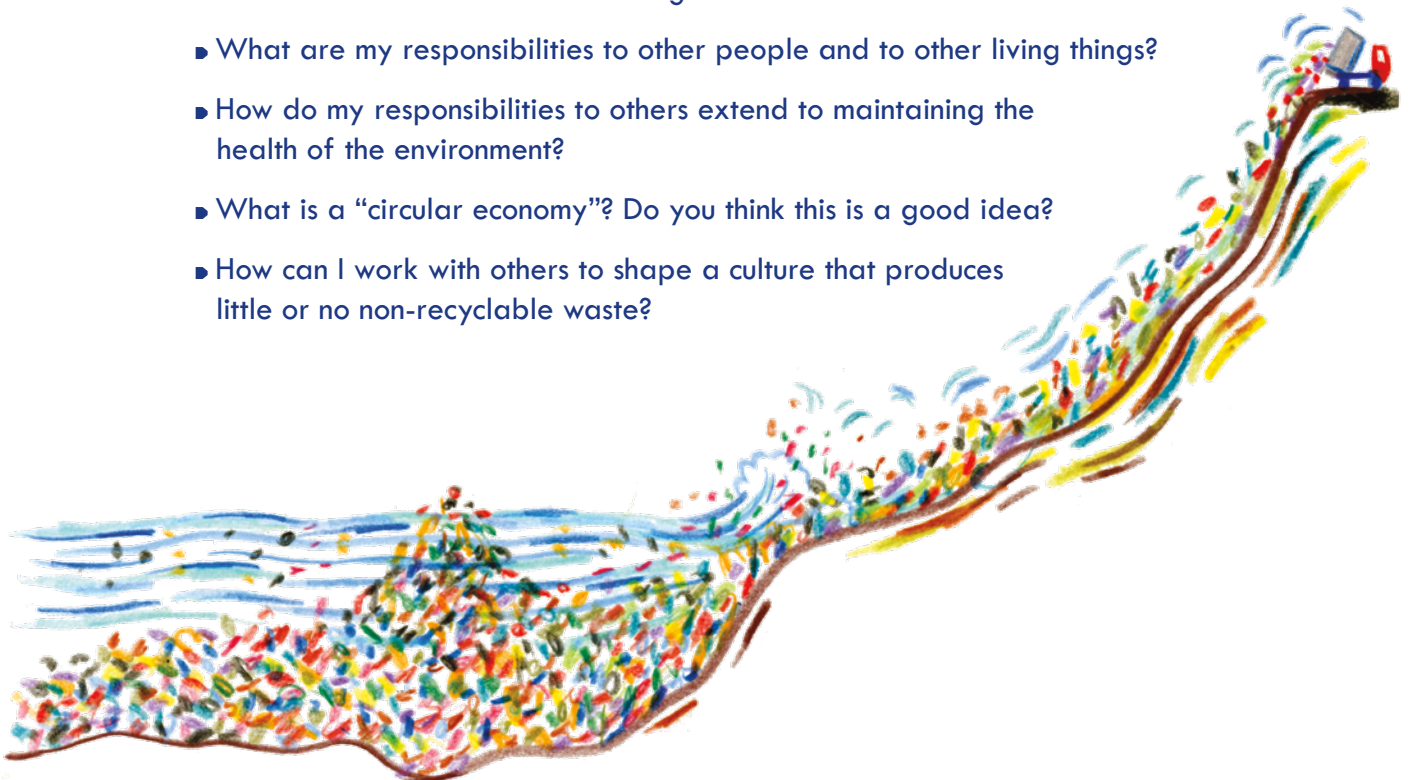
After Reading

MAKING CONNECTIONS

Now that you have read *Plasticus Maritimus: An Invasive Species*, discuss these questions and make connections to the text, the world, and yourself.

Human Actions

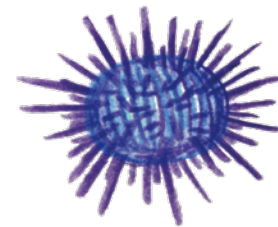
- Why is it important to recognize human impact on the environment?
- How can my actions affect the health and quality of my environment?
- How are human actions destroying and degrading natural habitats, leading to premature extinction for many species?
- Describe the relationships between various forms of pollution and human actions.
- In what ways are human activities putting stress on ecosystems?
- How do my experiences affect the decisions/choices I make and my role as a citizen of the global community?
- How do I determine what is the “right behavior” toward our environment?
- What are my responsibilities to other people and to other living things?
- How do my responsibilities to others extend to maintaining the health of the environment?
- What is a “circular economy”? Do you think this is a good idea?
- How can I work with others to shape a culture that produces little or no non-recyclable waste?



Importance of a Clean Water Supply



- Where is water found on Earth?
- How does water move on Earth?
- Is there enough water on Earth for everyone?
- Why is clean, fresh, and available water so important to humans?
- What are direct and indirect uses of water?
- How do our actions on the land affect water quality?
- What is a watershed?
- How does pollution get from one place to another?
- How can I learn about water pollution in my watershed?
- How is groundwater connected to surface water?
- How does groundwater move?
- How can groundwater become polluted?
- How do we know our water is safe to drink?
- What units are used to measure water pollution?
- Has our water always been clean?
- Who is responsible for protecting our drinking water?
- What is stream monitoring and how is it done?
- How do you know if a stream is healthy?
- What are bioindicators?
- What makes a good habitat for fish?
- Where does storm water come from and where does it go?
- What are potential contaminants in runoff?
- How do people affect the quantity and quality of runoff?
- How can communities grow without impacting aquatic ecosystems?



Plastics

- ▶ What causes ocean pollution?
- ▶ Where do plastics in the ocean come from?
- ▶ How much plastic is in the ocean?
- ▶ Do some countries allow more plastic pollution in the ocean than others?
- ▶ How can we prevent ocean pollution due to plastics?
- ▶ What is plastic waste management?
- ▶ What advancements are being made in recycling plastics?
- ▶ Where do microplastics come from?
- ▶ What are microbeads?
- ▶ How much do plastic straws contribute to pollution in the ocean?
- ▶ Will a ban on plastic straws help reduce plastic pollution in the ocean?

Write About It!

1. How much plastic do you personally use in a week?
Create a journal and chart your usage.
2. Technology, designed to make our lives more comfortable, can impact the natural environment in a negative way. What is one negative way that technology impacts the environment?
3. Authors often write stories that illustrate real problems. Try writing your own short story that illustrates a problem you are concerned about?
4. We share our environment with other living things—both plant and animal—and depend on them to live. Therefore, we need to take care not to damage our natural environment. What is one way that you plan to take care of your environment?



Citizen Science Projects on Plastic Pollution

www.arocha.org/wp-content/uploads/2018/01/citizen-science-projects.pdf