STUDENT WORKBOOK

LESSON ONE:
A PLANET FULL OF PLASTIC

- ☐ How do we describe, define, quantify, and communicate about issues related to plastic waste?

- ☐ What is per-capita consumption and how do our choices and activities regarding the consumption and disposal of materials contribute to plastic waste?

- ☐ What choices are available for reducing our own personal plastic waste? What are the effects of those choices?

- ☐ How can we communicate our ideas, inform perspectives, and inspire action?

Student Name:

_____

WAVE OF PLASTIC
Meaningful Watershed Educational Experience

Unit Driving Question:
How do human choices regarding the consumption and disposal of plastics impact ecosystems and our communities and what actions can we take to minimize those impacts?

Part 1- Introduction: Building Understanding

Objectives:
- We will ask questions and make observations about how our choices regarding the consumption and disposal of materials contribute to issues of plastic pollution.
- We will conduct inventories of the amount of waste we create in a given day.

DIRECTIONS

1. Monitor the types and amount of waste that you generate in one day.

2. Use the chart below to record items that you used, why you used them, the materials from which they are made (for example: paper, food waste, plastic, cotton, etc.), and what you did with them when you were finished.

3. Answer the questions below.

   1.   What was something that surprised you about your inventory? Why?

     _____

     _____

   2.   Was this a normal day for you in terms of what you used and threw away? Why or Why not?

     _____

     _____

   3.   How do you think your inventory would compare to that of an adult? Why?

     _____

     _____

   4.   If you had to keep all your waste for a year (you could not throw anything away), what are some things you might change? Why?

     _____

     _____

My Personal Waste Inventory

Name: _____   Day & Date: _____

Item	Why was it used?	From what type of material was it made?	What did I do with it when I was finished using it?	Notes
			☐ Put it in a garbage bin ☐ Recycled it ☐ Reused it ☐ Composted it ☐ Other_____	
			☐ Put it in a garbage bin ☐ Recycled it ☐ Reused it ☐ Composted it ☐ Other_____	
			☐ Put it in a garbage bin ☐ Recycled it ☐ Reused it ☐ Composted it ☐ Other_____	
			☐ Put it in a garbage bin ☐ Recycled it ☐ Reused it ☐ Composted it ☐ Other_____	
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			☐ Put it in a garbage bin ☐ Recycled it ☐ Reused it ☐ Composted it ☐ Other_____	
			☐ Put it in a garbage bin ☐ Recycled it ☐ Reused it ☐ Composted it ☐ Other_____	

Total Number of Items: _____

Total Number of Plastic Items: _____

Number of items I put in a garbage bin: _____

Number of items I recycled: _____

Number of items I reused: _____

Number of Items I composted: _____

Other: _____

5. Summarize the information that you collected about the number and types of items that you discarded. Complete the table below.

Primary Material	Number of items of that material that I used and discarded
Plastic	
Metal (for example, foil)	
Food	
Paper/cardboard	
Other	
TOTAL NUMBER of ITEMS	

6. Scientists use different types of graphs to display data and communicate findings. A circle graph (also called a pie graph) is a circular chart divided into sections that each represent a percentage of the total.

   Create a circle graph to display the proportion of items of each material that were thrown away. (Your teacher will help you choose to create a pie graph of your own data or of the class data.) Copy, paste, or draw your graph below.

7. How many pieces of *plastic* did *you* throw away in one day? _____

8. How many pieces of *plastic* did *your class* throw away in one day? _____

9. Based on the data that you and your classmates collected, *estimate* the number pieces of plastic that the students and teachers *in your school* discards in one day.

   _____

   Does that number surprise you? Why or why not?

   _____

Part 2- Investigation: Integrating Information & Ideas

Objectives:
- We will communicate scientific and ideas about issues of plastic pollution orally, graphically, and textually.

DIRECTIONS
Review the resources that your teacher provides and answer the questions below.

1. Many of the plastic items that we use today either didn't exist or were made from other materials decades ago.

   In the table below, describe how and why each type of plastic item is used today. Then, describe how people may have met that need before plastic became common.

Item	How & Why is it used?	Before Plastic
Example: Plastic Straws	*Straws help us drink cold beverages from cups with lids.*	*People may have used paper straws or not used straws at all.*
Plastic utensils (forks, spoons, knives)		
Plastic garbage bags		
Plastic water bottles		
Your own example:		

The graph and chart below illustrate what happened to the plastic waste in the U.S. in 2015

Amount of Plastic Waste Collected in 2015

9.1%
15.5%
75.4%

- Recycled
- Combusted (burned)
- Landfilled
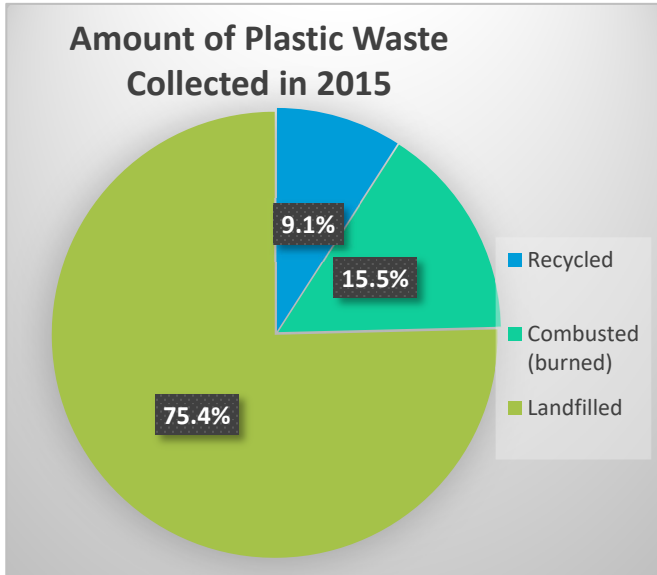
Plastic Waste Collected in 2015	
MANAGEMENT PATHWAY (What happened to the plastic waste once it was collected)	WEIGHT (In thousands of US tons)
Recycled	3,140
Combusted (burned)	5,350
Landfilled	26,010

TOTAL AMOUNT OF PLASTIC WASTE	34,500

(source: www.epa.gov)

2. According to the graph and chart, what happened to most plastic trash that was collected in 2015?

   _____

   Why do you think that is?

   _____

   _____

3. How do you think a graph and chart of the amount of plastic waste collected THIS year would compare to 2015? Explain your answer.

   _____

   _____

   _____

   _____

4. According to the Chesapeake Bay Program, an estimated *18.2 million people* were living in the Chesapeake Bay watershed in 2017. *By 2040*, experts predict the watershed's population *will grow to 21.1 million people* (source: https://www.chesapeakebay.net/state/population).

   If we continue to use and dispose of plastic in the way we do now, what impact(s) do you think this population increase could have on the environment and society in the Chesapeake Bay Watershed?

5. What are some ways that society could keep levels of plastic production and waste from increasing with the growing world population? Use words and pictures to explain and illustrate your answer.

6. We have options for choosing what items we use, how we use them, and what we do with them when we are finished. Use the chart below to describe what is meant by the options or choices that are listed. Provide an example for each choice or option, then explain how each could help to solve the problem of trash and plastic pollution.

Option/Choice	What it means	Example	How it could help
Reduce			
Refuse			
Reuse			
Recycle			
Other Ideas _____			

Part 3 – Application: Applying What We Learned Through Informed Action

Objectives:
- o   We will take action by engaging our communities with 'public service announcements' in the form of persuasive posters, flyers, or social media posts.

DIRECTIONS

1. Decide which choice for the disposal of plastic trash you think could have the biggest impact on the problem of accumulating trash.

2. Design either *a poster, a flyer, or a social media post* (limit 280 characters) that could persuade others to make that choice more often. Your poster should include a description of the choice and an explanation for why that choice is important.

3. Answer the questions below.

1. Which choice regarding the consumption and disposal of plastic do you think has the potential to best help reduce the amount of plastic that ends up in landfills?

   _____

   Why do you think that choice could be the most impactful? Use evidence from the resources you've reviewed and your work in this lesson to support your answer.

   _____

   _____

   Who will be the audience for your poster, social media message, or flyer? Explain why you

   chose that audience. _____

   _____

2. What do you hope will happen as a result of sharing your poster, flyer, or social media post with your audience?

   _____

   _____

Part 4- Assessment: Demonstrating Our Understandings

Objectives:
- o Students will construct a convincing argument, supported with evidence, that supports or refutes claims for either explanations or solutions.
- o Students describe a chain of reasoning that includes increases in the size of the human population or in the per-capita consumption of a given population cause increases in the consumption of natural resources, such as plastics.
- o Students will describe choices and impact of the disposal of plastics.

DIRECTIONS

Use the Claim, Evidence, Reasoning model to respond to the question below.

Claim/Evidence/Reasoning Writing Rubric				
	0	1	2	3
Claim – statement or conclusion that answers the original question/problem.	Does not make a claim.	Makes an inaccurate claim.	Makes an accurate but incomplete claim.	Makes an accurate and complete claim.
Evidence – scientific data that supports the claim. The data needs to be appropriate and sufficient to support the claim.	Does not provide evidence.	Only provides inappropriate evidence (Evidence that does not support the claim.).	Provides appropriate, but insufficient evidence to support claim. May include some inappropriate evidence.	Provides appropriate and sufficient evidence to support claim.
Reasoning – justification that links the claim and evidence and includes appropriate and sufficient scientific principles to defend the claim and evidence.	Does not provide reasoning	Only provides reasoning that does not link evidence to claim.	Repeats evidence and links it to some scientific principles, but not completely.	Provides accurate and complete reasoning that links evidence to claim. Includes appropriate and sufficient scientific principles.

★ Construct an argument supported by evidence to describe the connections between the number of people in a society and the amount of plastic waste that they generate.

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