

STUDENT WORKBOOK



WAVE OF PLASTIC

Meaningful Watershed Educational
Experience

LESSON THREE: FROM HAND, TO LAND, TO SEA

Sources & Destinations of Plastic Pollution

- How do we describe, quantify, and communicate about issues related to plastic waste?
- What are the causes and effects of pollution?
- What are the sources of plastic pollution?
- How and why does plastic pollution enter our waterways?
- How can we communicate our ideas, inform perspectives, and inspire action?

Student Name: _____

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?

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Part 1- Introduction: Building Understanding

Objectives:

- We will obtain, evaluate, and communicate information about the types of pollution and the negative impacts it can have on the environment and living things.

DIRECTIONS

As you review the resources provided by your teacher, use the charts below to help collect, synthesize, organize and share information about the properties, sources, and effects of pollution.

Using your own words, pictures, and/or symbols, define the word, *pollutant*.

Source(s) I used to answer the question	Definition
	<hr/> <hr/> <hr/> <hr/>

Using your own words, pictures, and/or symbols, define the word, *pollution*.

Source(s) I used to answer the question:	Definition
	<hr/> <hr/> <hr/> <hr/>

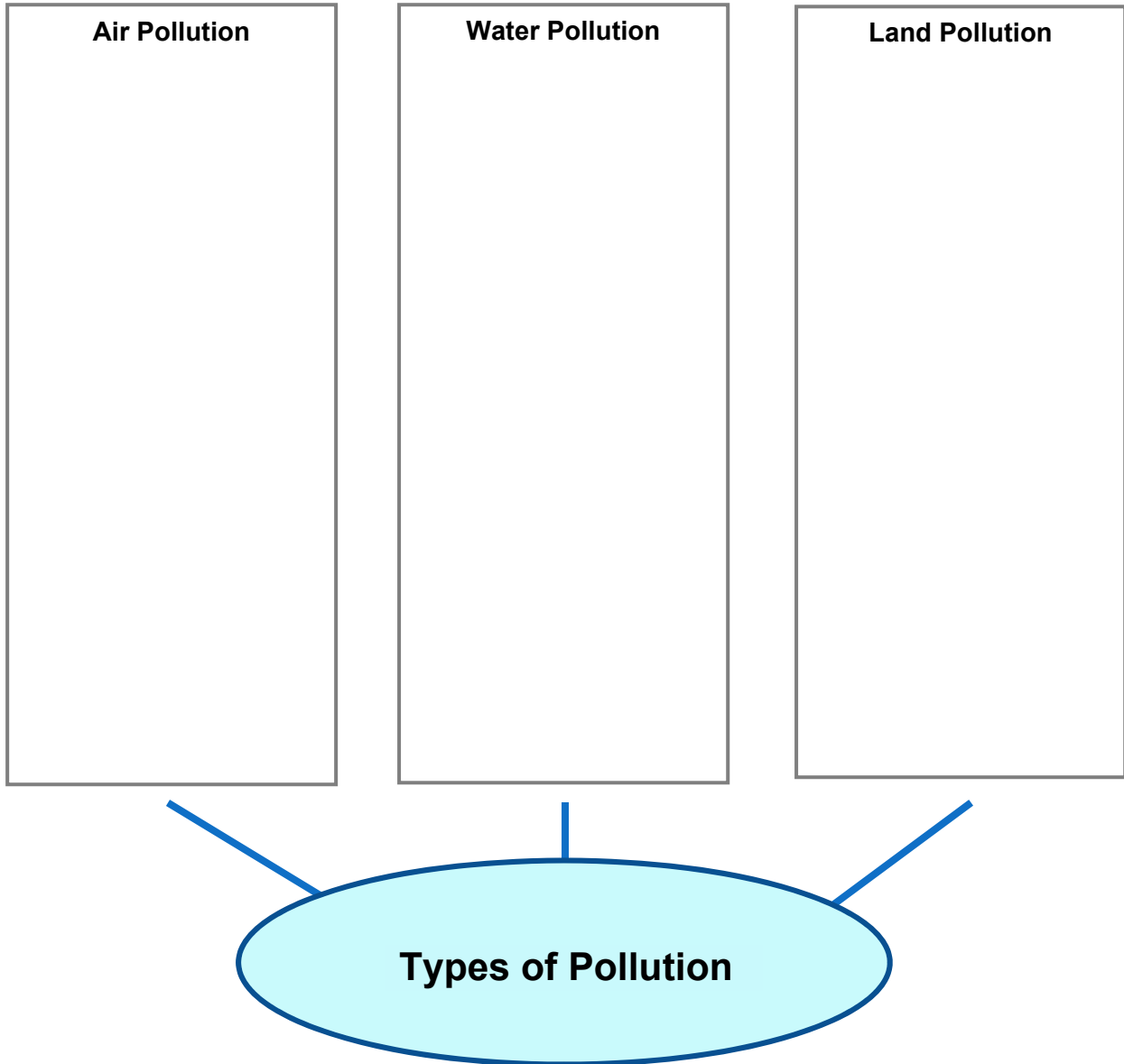
Jigsaw Activity: What Are Some of the Different Types of Pollution?

Chart Number 1 – Taking a Look at One Type of Pollution

Use words and pictures in the boxes below:

<p>Definition</p>	<p>Examples</p>
<p>Pollution type:</p>	
<p>Sources of this type of pollution</p>	<p>The most important fact about this type of pollution</p>

Jigsaw Activity: What Are Some of the Different Types of Pollution?
Chart Number 2 – Three Types of Pollution



How might these three types of pollution be connected?

Part 2- Investigation: Integrating Information & Ideas

Objectives:

- We will explore the different properties of plastics by sorting plastic waste items.
- We will read informational text about how plastic pollution moves across land and into water.
- We will investigate how water (runoff) moves across our school grounds.
- We will conduct a survey of the plastic pollution found on our schoolgrounds and in our neighborhoods.

DIRECTIONS

The picture below features plastic bottles floating in a body of water. In the comic strip boxes below, illustrate your prediction (step-by-step) for where the bottles came from and how they ended up in that body of water.



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DIRECTIONS

Read the article, “From Land, to Hand, To Sea” that your teacher provides. Then, use your own words, pictures, and/or symbols answer the questions below.

1. What is runoff?

2. Describe how runoff can move plastic from where it is discarded on land to a body of water.

3. Explain how the properties of plastic allow it to be easily transported from land to waterways.

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4. What effects might *increasing* human populations and per-capita consumption of plastic have on the potential for plastic waste to enter the environment?

5. Review the comic strip that you created above. Update your explanation for where the bottles came from and how they ended up in that body of water based on information from the article you read and class discussion.



Outdoor Field Experience A

How does water (runoff) move across our school grounds?

DIRECTIONS

1. Sketch your school site in the space below. (Be sure to include the closest waterway in your sketch) .
2. With your teacher, go outside. Bring a bucket, cup, or bottle of water with you.
3. Once you are outside, locate the storm drains on the property and add them to your map. Make any other adjustments that might be necessary. Be sure to note areas that are grassy, paved, etc. on your map.
4. Observe the shape of the land on your school site. With your group discuss how you think water will flow on the land.
5. Pour water onto the ground to test your predictions about the direction that runoff flows.
6. What evidence can you observe for how runoff flows on your school grounds? Add these details to your map.

School Site:

Closest Waterway:

DIRECTIONS

1. Take a walk around your schoolgrounds and note each item of plastic trash you see (use the “Types of Plastic Trash” handout to help you).
**Note: you do not have to pick up the trash that you see! If you’d like to pick up trash, please wear gloves!*
2. Keep track of how many of the items of plastic trash pollution that you see during your walk in the chart below.
3. Use the chart to note whether the items may easily be moved by wind or runoff into a storm drain (and thus a waterway).

TYPES OF PLASTIC TRASH



Food Wrappers



Beverage Bottles



Jugs and containers



Bottle/Container Caps



Cigar Tips



Plastic Food Bags



Other Plastic Bags



Disposable Lighter



6-Pack Rings



Coffee-Cup Lids



Plastic Cups



Plastic Utensils



Plastic Straws



Balloons



Coffee Stirrers



Plastic Fragments



Personal Care Products



Other (Sketch Your Own)

Outdoor Field Experience B
Plastic Pollution Survey: Our School Grounds

Survey Site: _____ Date: _____

The weather today: _____

The weather in the last few days: _____

Item	Total Tally (e.g. III)	Could it easily enter a storm drain? (by wind, rain, runoff?)		
		Yes	No	Unsure
Food wrappers				
Beverage bottles				
Other jugs or containers				
Bottle or container caps				
Electronic cigarette materials				
Plastic food bags				
Disposable lighters				
6-pack rings				
Plastic bags				
Coffee cup lids				
Plastic cups				
Plastic utensils				
Straws				
Coffee stirrers				
Personal care products				
Plastic fragments				
Other:				
Totals				

School Grounds Plastic Pollution Survey Results

My Team's Totals	Total number of plastic pollution items:
	Number of items near a storm drain:
	Most common item:
Class Totals	Total number of plastic pollution items:
	Number of items near a storm drain:
	Most common item:

6. Where do you think that the plastic pollution you observed during your survey will 'end up?'
How will it get there?

7. Why is it important to consider recent weather events when conducting your survey? How could weather affect the plastic you observe and where it might 'end up?'

Outdoor Field Experience C

Plastic Pollution Survey: My Neighborhood/Community

Survey Site: _____ Date: _____

The weather today: _____

The weather in the last few days: _____

Item	Total Tally (e.g. III)	Could it easily enter a storm drain? (by wind, rain, runoff?)		
		Yes	No	Unsure
Food wrappers				
Beverage bottles				
Other jugs or containers				
Bottle or container caps				
Electronic cigarette materials				
Plastic food bags				
Disposable lighters				
6-pack rings				
Plastic bags				
Coffee cup lids				
Plastic cups				
Plastic utensils				
Straws				
Coffee stirrers				
Personal care products				
Plastic fragments				
Other:				
Totals				

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

Objectives:

- We will explore how conceptual models are used in science.
- We will review examples of conceptual models in the form of infographics that explain concepts related to plastic pollution.
- We will work individually or in teams to develop a model in the form of an infographic that represents the possible sources, movement, and destinations of plastic pollution in our communities.

DIRECTIONS

Review the materials that your teacher provides. Then, answer the questions below.

1. What is a conceptual model? _____

2. How are conceptual models used in science? Provide an example to support your response.

3. What is an infographic? _____

4. What elements make an infographic effective? Explain your answer.

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DIRECTIONS

Work individually or in teams to develop a model in the form of an infographic that demonstrates the possible sources, movement, and destinations of plastic pollution in our communities.

1. Who is your audience and why?

2. What key ideas will you communicate with your infographic?

- ---
- ---
- ---
- ---
- ---

3. What is your intended impact? In other words, what do you hope will happen as a result of sharing your infographic with your audience?

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4. In the space below, sketch your plan for your infographic.
Be sure to note the elements of effective infographics you will use.

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Part 4- Assessment: Demonstrating Our Understanding

Objectives:

- Students describe how plastic pollution can enter an environment and how it might travel to other environments.

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 how plastic pollution can enter an environment and how it might travel to other environments.
