

3 lessons

**50
minutes**

Age range

**7 - 11
years**








PLASTIC

Changemakers

MODULE 1: PLASTIC - THE STORY SO FAR

MODULE 1: PLASTIC, THE STORY SO FAR

Module facilitator: Mylene	Module Objectives
	<p>Students will be able to:</p> <ul style="list-style-type: none"> Understand the benefits of plastic, why it was made or used and evaluate its usefulness Analyze the path of plastic from human use to the ocean or environment Evaluate the impact of plastic on humans, animals and the environment

Note to teachers:	Icon Legend
<ul style="list-style-type: none"> This module is divided into 3 lessons of approximately 50 minutes each which can be completed sequentially in one day or split over days depending on availability of time. Extension activities are provided for Literacy and Numeracy connections as well as differentiated opportunities for all levels of learning. This module is intended for students ages 7-11 but could be adapted otherwise. 	<div> <p>LITERACY</p>  </div> <div> <p>NUMERACY</p>  </div> <div> <p>DIFFERENTIATION</p>  </div> <div> <p>STEM</p>  </div>

Link to the Miraculous Ladybug “Action” Episode

This module is directly linked to the Miraculous Ladybug Episode, particularly in these scenes:

- In minute 1** of the episode, Nino explains to his friends the journey of plastic waste and how it ended up in the river.
- In minute 4** of the episode, Mylene and her friends explain the history of plastic to Bertrand King, its benefits, why it has become a problem, as well as the negative impact it has on humans, animals and the environment.


LESSON 1

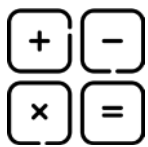
The history of plastic: why it was created and its benefits


Lesson Objectives

Students will be able to:

1. Describe what plastic is and why it was invented.
2. Categorize plastics as useful, necessary and unnecessary.

Time	Activities	Resources/ Materials
STARTER		
 5 minutes	<p>Key Vocabulary: Necessary, convenient, unnecessary, single-use, synthetic, overuse, overproduction, disposal</p> <p>Share the vocabulary sheets with the students before starting the lesson. Allow them to familiarize themselves with some of the keywords and help them to define any unknown words.</p> <p>Introduce the following questions (Teacher Powerpoint Slide 2):</p> <ul style="list-style-type: none">• What do you know about plastic? (partner talk and share some ideas)• How do you feel about it? <p>Ask the class to line themselves up on a 'continuum' in the classroom (extremely negative views at one end, very positive views at the other).</p> <p>Encourage students to justify and explain their position. As this is a personal reflection, ask the students to take a note or remember where they are standing for later in the lesson.</p>	<p>Projector/Internet Whiteboard/Screen for presentation</p> <p>Vocabulary Worksheet - Lesson 1 (page 1 of resource booklet)</p> <p>Print out poster: Where would you place yourself on this scale? (Teacher PowerPoint, slide 3)</p>

Time	Activities	Resources/ Materials
MAIN		
15 minutes	<p>Plastic Hunt: Students go around the classroom and identify what is made out of plastic. Students can move these things to a box/table or mark them with a sticky note.</p> <p>During the hunt, ask students prompting questions - how do you know this is plastic? Why do you think this is made out of plastic? Have you seen this made out of anything other than plastic?</p>	Stickers/labels to mark plastic items or boxes or post-it notes. (Teacher PowerPoint, slides 4 to 8)
10 minutes	<p>Teacher input:</p> <ul style="list-style-type: none"> • What do you think humans did before plastic? • Why was it invented? When was it invented? • How has it helped us? <p>Facts for discussion:</p> <ul style="list-style-type: none"> • Plastic is a word that originally meant “pliable and easily shaped.” • The first synthetic polymer was invented in 1869 by John Wesley Hyatt - made to be a substitute for Ivory. • 1907 - the first fully synthetic plastic = nothing natural within it. 	Plastic history, facts, and pictures (Teacher PowerPoint, slide 10 and 11)
15 minutes	<p>Independent task: (can be done in pairs or small groups)</p> <p>Ask students to sort and categorize plastic products - this can be done with actual items or pictures of plastic products.</p>	Categorize Plastic Products Worksheet: items are surrounded by dotted lines where students can cut (page 2 of resource booklet)
	<p>Students may use large hoops, baskets or cut and sort pictures from the ‘Plastic Items’ worksheet. Ask students to sort into necessary (such as medical plastics, technological, mechanical, etc), useful (not necessary but it provides a key use - containers, furniture, etc), and unnecessary single-use (plastic cutlery, cling film, etc). Note to teacher: this activity is differentiated by level 1 and level 2.</p>	Understanding Plastic: Necessary/ Unnecessary Worksheet with Venn diagrams (page 3 and 4 of the resource booklet). Teacher Powerpoint slides 11-12

Time	Activities	Resources/ Materials
	<p>This should lead to the students identifying that some plastics fit into more than one category and thinking about how to better sort the items.</p> <p>Share the Venn diagram worksheet and model using the example of a plastic pen, which could be both useful and necessary - people could only use pencils but how would they write something that can't be rubbed out.</p> <p>Link to episode:</p> <ul style="list-style-type: none"> • In minute 4 of the episode, Mylene and her friends explain the history of plastic to Bretrand King, its benefits, why it has become a problem, as well as the negative impact it has on humans, animals and the environment. <p>Differentiation opportunity:</p> <p>For younger students or students that find the above independent work too challenging, offer students two hoops instead of three - necessary and unnecessary. Talk about the words being opposites and can be used to sort objects either/ or.</p> <p>For older students or students that find the above independent work too easy, after they have finished sorting the given words or pictures, ask them to give their own examples of necessary, useful, and unnecessary plastics.</p> <p>Look at the items in necessary and useful sections of your work, how would it look if these products didn't exist? What alternatives could we use, and how would things work?</p>	<p>You may want to print these onto A3 to enable more space for sticking on the images.</p>

CONCLUSION		
5 minutes	Revisit the continuum and ask the students to answer the question again. Talk to the person beside you - why did you pick your spot? Has it changed your mind and why or why not? What did you learn that changed your mind?	Print out poster: Where would you place yourself on this scale? (Teacher PowerPoint, slide 13)

Differentiation and Extension Opportunities
<ul style="list-style-type: none"> Trash can audit of the classroom - go through the trash can and divide up the contents into categories. From there, do the mathematical calculations to create the following graphs. (**NUM**) Percentages (%) of different items (for example, what % of items in the trash can are food packaging (**NUM**)) Pie chart of all the different material types (for example plastic, paper, metal, etc). (**NUM**) Line graph showing the accumulation of plastic over a set time (e.g. a week). (**NUM**) Bar graph with results of who uses single vs reusable water bottle after the whole school survey (**NUM**) Venn diagram- use a Venn Diagram to show where some plastics are categorized as necessary, useful, unnecessary (as above) (**NUM**) Students can come up with their own definition of necessary, unnecessary and useful plastics. Discuss and break apart words by their Prefixes and Suffixes. Un-, -ful, give other words with these beginnings and endings. (**LIT**)

Notes for low-tech or non-tech classrooms
<ul style="list-style-type: none"> Follow the discussion-based activities in the starter, main and conclusion sections of the lesson. If there is access to a printer, print a copy/copies of the resources for both yourself and your students or just for your reference. If there is no access to a printer, instead of using the 'vocabulary worksheet,' students find the vocabulary in a dictionary, making it a game of who finds it first. Create a word wall where students keep adding vocabulary as they progress through the modules. For the independent task, instead of using the student worksheet, ask students in pairs or independently to create their own Venn diagram using chalk/hoops/large circular objects and draw or find examples of necessary, unnecessary and useful. Ask them to talk with a partner about their examples and why they have grouped them accordingly.

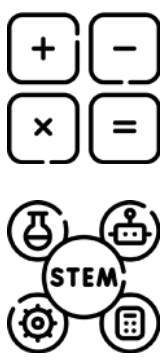
LESSON 2



The journey of plastic: from human use to waterways and landfill

Lesson Objectives

Students will be able to:

1. Describe the journey of plastic from use to waterways and landfills
2. Analyze how the journey of plastic can affect the environment

Time	Activities	Resources/ Materials
STARTER		
10 minutes	<p>Key Vocabulary: Journey, waterways, landfill, environment</p> <p>Show students two or more pictures that show plastic waste in a location (transported by either water or on land).</p> <p>How did the plastic get there?</p>	<p>Vocabulary Worksheet - Lesson 2 (page 8 of resource booklet)</p> <p>Pictures of displaced plastic available in the teacher PowerPoint page 15 - 16.</p>
MAIN		
15 minutes 	<p>Teacher-led demonstration/discussion:</p> <p>Weather play: Give students different plastic items, a pen, water bottle, wrapper, etc. Put these objects in water using a bucket or tray. If no water is available, place it on the ground. Explain to students that they will act as the weather.</p>	<p>Materials needed:</p> <p>Plastic items, water in a bucket or similar, straw if needed</p> <p>Jugs or small bowls and cups to pour water</p>

<p>15 minutes</p>  	<p>Be the wind: Ask students to blow on the items and see where and how the objects move (a straw can be used here to make this easier to direct the flow of 'wind' if needed). Ask students to act as the rain, by pouring water on or near the item and observe what happens. The idea is that plastic will move from one side of the bucket to the other and possibly sink or float. If possible, try to see if the experiment can be done outdoors in a large area. Encourage students to discuss which item moves faster or easier and why (weight, size). Create a shared mind-map of the students' observations.</p> <p>Discussion questions linked to weather play:</p> <ol style="list-style-type: none"> 1. Why do the objects go in some directions and not others? e.g. Downhill instead of uphill? 2. What happens if the wind or rain is stronger or lighter? <p>Sequencing cards - Sequencing is an important part of storytelling in literacy. Students can create their own comic strip or put the journey cards provided in order to show the story of the plastic item (see the Plastic Journey - correct order as reference).</p> <p>Roleplay: The class can be split into different groups and each group is given either the set of cards for Journey 1 or Journey 2. The cards will explain a journey of a plastic item from use (e.g. a student buying a single-use water bottle) and a route into the natural environment.</p> <p>Each journey card will have a different route (for example to a landfill or blown from a rubbish collection truck into a river). The students act out the journey of the plastic in small groups.</p> <p>You may want to use the 'Plastic journey worksheet' for students who would like to design their own comic strip instead.</p>	<p>Plastic Journey Cards in correct order (page 9 - 10 of the resource booklet)</p> <p>Plastic Journey Worksheet (page 13 of resource booklet)</p> <p>Plastic Journey Cards Worksheet (page 11 - 12 of the resource booklet)</p> <p>Plastic Journey Worksheet (page 13 of resource booklet)</p>
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	<p>Differentiation: To challenge your students further, you may just want to give the starting and end picture in the set of cards for either Journey 1 or 2 and ask students to create their own story.</p> <p>Connection to film:</p> <ul style="list-style-type: none"> • In minute 1 of the episode, Nino explains to his friends the journey of plastic waste and how it ended up in the river. <p>Differentiation opportunity: For the role-play above, journey cards can be more detailed for younger students or students that need extra support. For older students, or students that can benefit from a challenge, journey cards can be vague and allow students to describe the path of plastic.</p>	Plastic Journey Cards Worksheets (Page 11 - 12 of resource booklet)
CONCLUSION		
5 - 10 minutes	<p>Ask students to think of ways in which they have learned more about how plastic travels in our environment.</p> <p>Which of these routes is the best for the environment and why? A landfill is mostly controlled/contained and the natural environment could be damaged).</p>	
Differentiation and Extension Opportunities		
<ul style="list-style-type: none"> • Map out your local area and where you are, where the local river is, and where the local landfill is. Work out the distance from them to the water source. (**NUM**) • Class survey - Students carry out a survey on their class members' predictions about where the majority of plastic goes. Provide students with different options e.g. landfill, waterway, ocean, recycling center. Students practice data collection and interpretation skills e.g. converting data to pie charts, bar graphs etc. • Point of view writing - Students can discuss point of view by looking at the journey of plastic from the perspective of the piece of plastic, or the wind, or the bird in the ocean. (**LIT**) • Poem about the journey of plastic - Students can write a poem about the journey of plastic from its use by humans to ending up in waterway, or about the animals who might be affected by it. (**LIT**) 		

Notes for low-tech or non-tech classrooms

- If there is access to a printer, print the resources for the students and use the PowerPoint as reference.
- If there is no access to a printer - for the starter activity, discuss the words from the vocabulary sheet and the students' experiences or previous knowledge of them. Instead of using the pictures of displaced plastic, students can draw or write in groups their own predictions of where they think plastic might end up once it is thrown away.
- For the sequencing and role-play activity, write out the following prompts on a board and ask students in groups to act or draw a comic strip of the journey of a plastic item and where it ended up.
 1. a) Student buys water bottle b) bottle floats in a river
 2. a) Boy is given a packet of chips at home b) chip bag is in a landfill
 3. a) Girl empties plastic bag and throws away in a street b) plastic bag is in the ocean
 4. a) Boy bursts a plastic balloon at a party b) Balloon ends up at a recycling center


Lesson 3

The impact of plastic: animals, humans, and the environment

Lesson Objectives

Student will be able to:

1. Analyze the impact of plastic on animals, particularly ocean life
2. Conduct experiments to see how plastics break down and how that can affect humans, animals, and the environment
3. Create a pledge to make changes in daily life to reduce the impact of plastic use and the effects on the environment

Time	Activities	Resources/ Materials
STARTER		
10 minutes 	<p>Key Vocabulary microplastics, microbeads, food chain, ingest, nurdles</p> <p>Share and discuss the vocabulary using the worksheet.</p> <p>Read as a whole class Fish with the stomachache. Ask students to sequence and act out the story in groups.</p>	<p>Vocabulary Worksheet - Lesson 3 (page 14 of resource booklet)</p> <p>The Story of the Mysterious Stomachache Worksheet (page 15 of resource booklet)</p>

	<p>Note for teachers - facts:</p> <ul style="list-style-type: none"> • All tested fish have been found to have plastic in their stomachs • Birds which eat fish have been found to have plastic in their stomachs 	
MAIN		
<p>15 minutes at designated station</p>	<p>Note to teachers Exploration science experiment activities - small group work. These could be several stations around the classroom. Discuss the three stations and rules for small group work beforehand. Split the class into 3 groups. Each group will move to a station for 15 minute rotations.</p> <p>Station 1: The JellyFish Experiment</p> <p>Aim: To demonstrate how a plastic bag floating in water looks like a jellyfish.</p> <p>Do: Students observe how plastic can mimic animal life and they will make conclusions on how this affects ocean life Make observations as you complete the student experiment card.</p> <p>Station 2: Milk Bottle Experiment</p> <p>Aim: To demonstrate how microplastics behave in water and how they can affect sea life. Do: Students use an empty milk bottle from home and a hole punch and punch out some holes from the milk bottle, to represent microplastics/nurdles. Place some water in a bottle, and some of these 'microplastics'. Add a handful of sand and shake! Make observations as you complete the student experiment cards.</p>	<p>Plastic Experiment Stations Worksheets (page 16, 17, 18 of resource booklet)</p> <p>3 x Experiment Cards: one for each experiment (pages 19, 20 of the resource booklet)</p> <p>Items needed: Plastic bottle, plastic bag, food coloring (optional), water.</p> <p>Items needed: milk bottle (pre-cut), Hole punch, water, sand</p>

<p>10 minutes</p>	<p>Station 3: Fiber Experiment</p> <p>Aim: To demonstrate how microplastic fibers can be released from clothes.</p> <p>Do: A piece of plastic fabric (ideally a dark jumper) can be put into a clear water bottle and shaken around in the water. Remove the fabric after shaking and hold the water bottle up to the light. Fibers will be distributed throughout the water.</p> <p>Make observations as you complete the student experiment card.</p>	<p>Items needed: a piece of fabric - dark jumper, clear water bottle, water.</p>
<p>10 minutes</p>	<p>Impact on Animals</p> <p>Ask questions from the experiment cards and to students from each group.</p> <p>*Note to teachers</p> <p>Plastic bag, milk bottle, and fiber experiment - why do these get eaten by fish?</p> <p>Look at their shape, and size - they look like fish food. After being in the ocean for only 2 days, they also start to grow algae so then they smell like fish food too.</p> <p>The fake microplastics, and any ones existing in the sand already, will float to the surface while the sand will settle. They float because they are light, but after a while, once covered in algae they will start to sink as they will become heavier.</p> <p>Link back to the story of the fish with a stomachache who ate plastic - what happens to animals when they ingest plastic?</p>	<p>Images of animals tangled in plastic (in Teacher PowerPoint slides 30 to 32)</p>

<p>10 minutes</p> <div data-bbox="145 244 301 398"> <div>+</div> <div>-</div> <div>x</div> <div>=</div> </div>	<p>The impact on humans Share the three items of measurement from PowerPoint, slide 32.</p> <p>Item 1: a credit card or a piece of paper the size of a credit card Item 2: 21g, 3 pens Item 3: 250g, iPhone 13</p> <p>Question: Why have the sizes been included?</p> <p>Discussion: How did it get there? You didn't eat a phone, but you do INGEST plastic.</p> <p>Revisit the vocab word that to Ingest is to take (food, drink, or another substance) into the body by swallowing it. Describe the food chain and how plastic moves up the food chain to humans (see further comments in PowerPoint speaker notes).</p>	<p>Images of 3 cutouts: credit card, pen, and iPhone (Teacher PowerPoint Slide 33)</p> <p>> Useful link for teachers</p> <p>Image of the food chain (In Teacher PowerPoint Slide 34)</p>
<p>CONCLUSION</p>		
<p>5 minutes</p>	<p>What could you do to help this problem? How do you feel about this problem?</p> <p>To say to students: "It's really common when learning about this topic to feel sad or angry or upset because you aren't sure what to do or who to blame. But there are so many ways we can all help this problem of plastic and some of them are so easy to do. We will learn all about this in our next module!"</p>	<p>Option 1: Use Reflections Worksheet to draw pictures: (page 21 of resource booklet)</p> <p>Draw two pictures</p> <ol style="list-style-type: none"> 1. How do you feel about the plastic problem you learned about today? 2. What could you do to help the problem?

		<p>Option 2: Use Writing Assessment Worksheet (page 22 of resource booklet)</p> <p><i>Assessment opportunity -</i> Use these questions to prompt writing to assess their understanding of their learning so far.</p>
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Notes for low-tech or non-tech classrooms

If there is no access to a printer -

- For the starter activity, write out these prompts and instructions on a board/flipchart paper instead of using the printed script -

Scenario - Fish, turtle and seabird all go to visit the whale doctor for the same reason; a bad stomachache.

Option 1 - The statements below show why they think they have a stomachache. Create a dialogue or script to show each character's ideas.

Option 2 - Hot-seating - In pairs, take turns to be a different character whilst your partner asks you about how you feel, think and what you have seen about plastic in the ocean.

Fish - 'It's because humans use plastic for everything'

Turtle - 'I don't understand why I have a stomachache'

Seabird - 'It must be all the plastic bags that end up in the ocean'

Whale doctor - 'When plastic is not reused or recycled, it travels through the rivers to our ocean in big pieces or breaks down into tiny pieces called microplastics. We end up eating these thinking it's food'.

Example for students to start their script:

Fish: Hello doctor, I've had a really bad stomachache for some time now.

Turtle: That's funny, I have too but I have no idea why.

Fish: Well, I think I might have some idea, I've noticed that...

- For the experiments, students work in groups and follow the steps in the experiments as a whole class. Provide time for students to reflect on their observations in their groups. For further challenge, ask students how they will achieve learning objectives for each experiment by looking at the materials they have been given.
- For the assessment, provide each student with post-it notes or adhesive putty or tape and small pieces of paper. Students use these to record their responses to the questions in the conclusion and stick them to a board or wall to form a class response.

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