

SURFRIDER PACIFIC RIM
OCEAN FRIENDLY
Y.E.S
YOUTH ENVIRONMENTAL
STEWARDSHIP



· STUDENT WORKBOOK ·

NAME _____

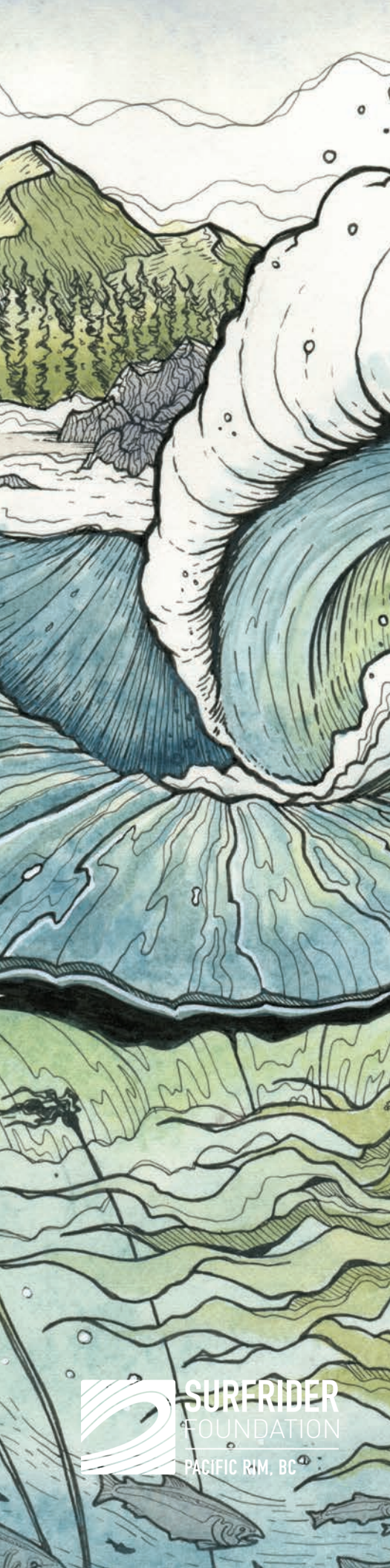
DATE _____

CLASS _____



CONTENTS

INTRODUCTION	2
CLASS 1 : PLASTICS IN THE OCEAN	3
The Plastic Problem: How Much Do You Know	4
Activity: Plastic Science! Plastics In The Water Column	5
Table 1.0 - Water Column Cross Section	6/7
Activity: Bioaccumulation! How Plastic Ends Up In The Food Chain	9
CLASS 2: BEACH CLEAN	11
Activity: Beach Clean Up Data	12
Colouring Page	14
CLASS 3: TRASH TO TREASURE	15
Project: Art Attack	16
Activity: Be The Change	17
Colouring Page	18
CLASS 4: OCEAN FRIENDLY CAMPAIGNER	19
Campaign Presentation	20
OCEAN FRIENDLY QUIZ	21
Appendix 1.0: Activity Resources: Resin Code Key	24
Appendix 2.0: How To Lead A Beach Clean	25
Appendix 3.0: Ten Ways To Rise Above Plastics	26
Resources	27



INTRODUCTION

Surfrider Pacific Rim is a Chapter of Surfrider Foundation, a nonprofit organization dedicated to the protection and enjoyment of the ocean, beaches and waves through a powerful activist network. The Pacific Rim Chapter operates along the Esowista Peninsula, in Ucluelet and Tofino, as well as Ahousaht on Flores Island.

The Pacific Rim Chapter focuses on eliminating single use plastics, implementing progressive recycling practices for petroleum products, and working with the public, youth and businesses through programs and events that raise awareness about coastal stewardship and ocean friendly behaviours

The Youth Environmental Stewardship Program works with local schools to create awareness around protecting the beaches and ocean. The goals of the youth environmental stewardship programs are to promote safe and healthy access to coastal habitats for generations to come.

In this program, you will learn about marine debris, plastic pollution and the impact this issue has on our environment and communities. You will also gain insight on how your consumption impacts the oceans, and what you can do to make a positive difference. This program is multidisciplinary, and includes the science of plastics, how to record data following a beach clean up, how to think critically about human behaviour and the environment, writing and research, as well as an art project using the marine debris you will collect. Through this program, you will gain the skills to steward your environment and share your knowledge with those around you! Enjoy!

THE PLASTIC PROBLEM: HOW MUCH DO YOU KNOW?

How does trash end up on the beach and in the ocean?

- a) Storm water outfalls
- b) Litter dropped by people inland.
- c) Falling off shipping containers.
- d) All of the above.

True or False: Plastic never fully biodegrades. Why?

How does marine pollution affect animals?

- a) Entanglement
- b) Suffocation
- c) Starvation
- d) Poisoning
- e) All of the above.

What are the 5 “R”s?

R _____

R _____

R _____

R _____

R _____

ACTIVITY: PLASTIC SCIENCE! PLASTICS IN THE WATER COLUMN

	PLASTIC ITEM	RE-CYCLING #	PREDICTION: DO YOU THINK THIS PLASTIC SINKS OR FLOATS?	RESULTS: DID IT SINK OR FLOAT	MARINE ANIMALS THAT MIGHT EAT IT
1					
2					
3					
4					
5					
6					
7					
8					

ANSWER THE FOLLOWING QUESTIONS

1. Are there similarities with the buoyancy of the plastics? What are the recycle/resin code numbers? Refer to the Resin Code Key (Appendix 1.0) for help!

TABLE 1.0 – WATER COLUMN CROSS SECTION

Not all plastic in the ocean is visible. In fact, the majority of plastic in the ocean is out of sight, either because it has sunk (as we discovered during our experiment), or has broken down into tiny particles called microplastics. Over the next few pages we will discover the effect this plastic has on marine animals...

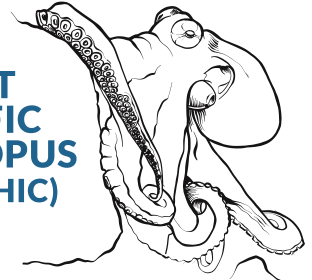
SURFACE FEEDERS

PELAGIC FEEDERS

BENTHIC FEEDERS



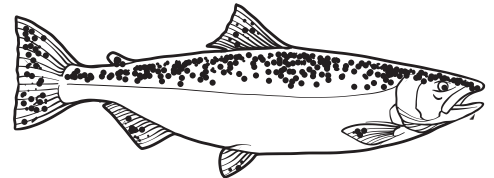
**GIANT
PACIFIC
OCTOPUS
(BENTHIC)**



**BALD
EAGLE
(SURFACE)**



**TUFTED
PUFFIN
(PELAGIC)**



**COHO SALMON
(PELAGIC)**



**TRANSIENT
ORCA
(BENTHIC & PELAGIC)**

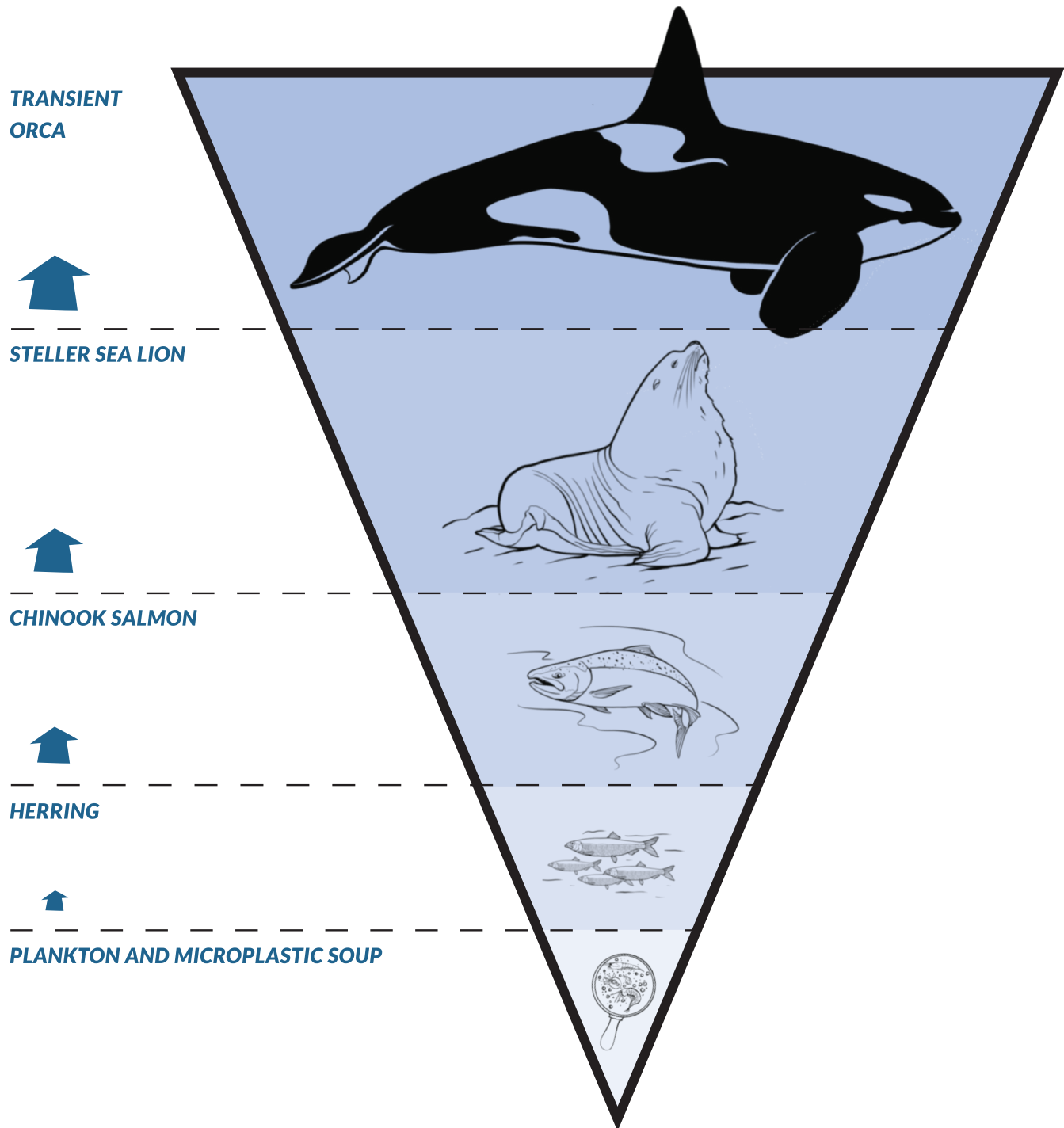


**SEA OTTER
(BENTHIC)**

ACTIVITY: BIOACCUMULATION! HOW PLASTIC ENDS UP IN THE FOOD CHAIN

1. Pollutants are absorbed by microplastics, and mix with plankton.
2. This toxic soup is ingested by filter feeders.
3. These pollutants bioaccumulate and biomagnify up the food chain.

TOXICITY LEVELS



CLASS 2: BEACH CLEAN

FOCUS

Become a beach clean steward! Learn how to effectively and efficiently clean the beach, collect marine debris data, and then discuss how the debris can be used and / or recycled. You will learn about ocean currents and gyres, and how these systems impact the dissemination of marine debris.



LABEL THE GYRES:

A) NORTH PACIFIC B) NORTH ATLANTIC C) INDIAN OCEAN D) SOUTH PACIFIC E) SOUTH ATLANTIC

HYPOTHESIZE

Using what you have learned about how wind, ocean gyres and currents impact marine debris, hypothesize on what kinds of debris you might find at your local beaches and where it may have come from.

ACTIVITY: BEACH CLEAN UP DATA

NAME OF LOCATION _____ LENGTH OF COASTLINE CLEANED _____

STYROFOAM (VOLUME):		HARD PLASTICS INCLUDING ALL MICROPLASTICS (VOLUME AND INDIVIDUAL WEIGHT):	
PLASTIC BOTTLES (#):		PLASTIC BAGS/FOOD WRAPPERS/ SOFT PLASTICS (#):	
CIGARETTE BUTTS (#):		ROPE (VOLUME):	
**PLEASE NOTE: ITEMS BELOW CAN BE COUNTED IF THEY ARE PRESENT AT THE CLEAN UP. ITEMS ABOVE AND BESIDE THIS BOX ARE MANDATORY.		FISHING/AQUACULTURE DEBRIS (# AND INDIVIDUAL WEIGHT):	
PLASTIC STRAWS (#):		PLASTIC 6 PACK HOLDERS (#):	
PLASTIC LIGHTERS (#):		PLASTIC BOTTLE CAPS (#):	
PLASTIC CUPS (#):		PLASTIC CUTLERY (#):	
PAPER/CARDBOARD (#):		DOG POOP (#):	
METAL CANS (#):		CLOTH/ CLOTHING/ SHOES (#):	
METAL (#):		TIRES (#):	
FOOD (#):		BALLOONS (#):	
GLASS BOTTLES OR CONTAINERS (#):		SHARPS (#):	
ENTANGLED OR DEAD ANIMALS (SPECIFY):		OTHER ITEMS NOT LISTED:	
TOTAL WEIGHT (KG):		ADDITIONAL COMMENTS:	
TOTAL SINGLE USE PLASTICS:			

This data is important and will be used to influence local businesses and the public on changing their behavior to stop debris from ending up on our beaches and in our oceans. Count items in groups of five and record the total. Do not write the words "Lots" or "Many." Please count each item. Please leave natural items like driftwood and seaweed on the beach.

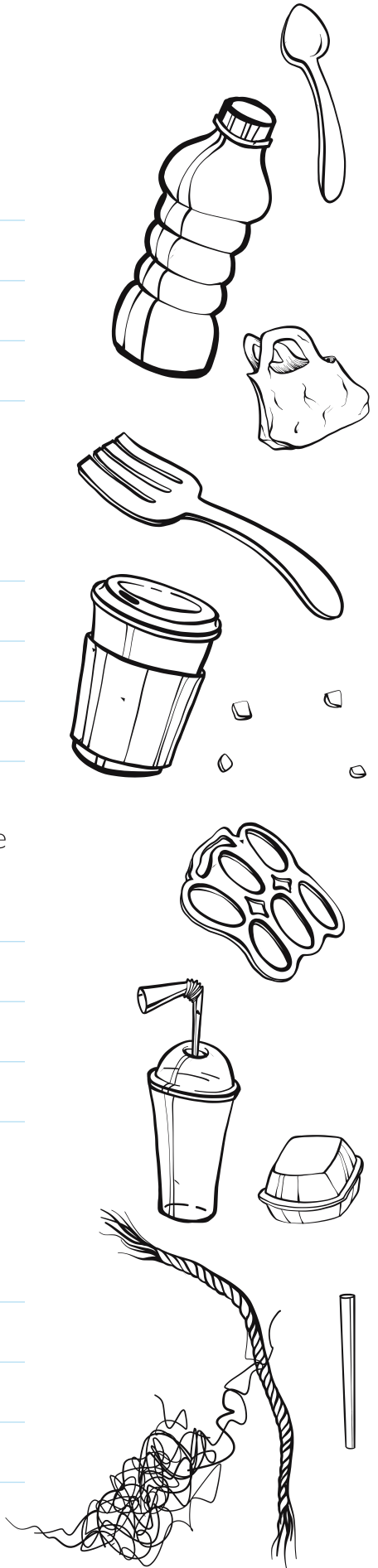
DISCUSS & WRITE

What were your top 5 trash trends?

Did you find any items that you use in your day to day life?
List them below:

How could we REDESIGN some of these items to create reusable alternatives? What materials could we use instead of plastic?

How can YOU take responsibility for reducing plastic pollution?





CLASS 3

TRASH TO TREASURE

FOCUS

Quantify the data you collected on your beach clean, and use it the trash to create a marine debris masterpiece! Develop your own campaign plan.

ACTIVITY

Sorting Party! Sort the debris, weigh it, and record it in the table on page 12. Choose some of your favourite items for your art project!



PROJECT: ART ATTACK

Create art out of your debris, make sure to take some pictures!



REFLECT & WRITE

Think of someone you know and admire who is a great leader. What qualities do they have? Write down 3:

Creating change requires strong leadership, but there are lots of different ways to be a good leader - some you have already demonstrated during this program. Read the examples below and consider what leadership style suits you best, or come up with your own!

LEAD BY EXAMPLE: Refuse single use, take three for the sea, eat waste free - actions speak louder than words!

BE A TEACHER: Share what you have learned, share your beach cleans on social media, explain why you refuse single-use - knowledge is power!

BE AN ARTIST: Increase visibility of the plastic problem by creating marine debris masterpieces

BE THE CHANGE!

In groups, share the campaign ideas you came up with for homework, and pick one to work on. *Remember: your campaign should be SMART**

CAMPAIGN NAME:

AIM:

SLOGAN:

HASHTAG:

ACTION:

.....

*SMART stands for:

SPECIFIC- less “end plastic pollution”, more “stop using single-use plastic cutlery “

MEASURABLE - how will you measure the outcome?

ACHIEVABLE - can you meet your objective?

RELEVANT - will this campaign have a meaningful effect in your school / community?

TIME-BOUND - set a timeline for when you will achieve each step of your campaign.



CLASS 4: OCEAN FRIENDLY CAMPAIGNER

FOCUS

Bringing together all you've learned in the Youth Environmental Stewardship Program. Present your own campaign, take the quiz, and earn yourself an Ocean Friendly Student certificate to show off to your friends and family!

REFLECT & WRITE

Think about the kinds of debris you found on your beach clean. Who are the people we need to convince to make a real difference for our marine ecosystems?

- A. Our parents
- B. Our friends
- C. Government leaders
- D. Business owners
- E. All of the above

Some groups have more influence than others. Why is the Ocean Friendly Business Campaign important?

OCEAN FRIENDLY QUIZ

What are the five R's?

What are the 3 zones of the ocean?

What does Bioaccumulation mean?

Give an example of a plastic, and what zone of the ocean it could be found in?

How many gyres are there in the oceans?

What ocean gyre causes marine debris to wash up onto the beaches of the Pacific Rim? What other elements influence how marine debris is dispersed?

What was the most common type of debris you found on the beach clean ups? Why is this type the most common?

Explain why it's important to quantify data? What can you do with the data you've collected to create change?

What is a microplastic? What is a nurdle?

How did it make you feel collecting the debris?

WELL DONE, YOU DID IT! FINAL THOUGHTS...



What did you learn?

What plastic are you going to eliminate/reduce in your own life?

What does your school need to do to become Ocean Friendly?

APPENDIX 1.0 – ACTIVITY RESOURCES: RESIN CODE KEY



PETE

Polyethylene Terephthalate

Soft Drink & Water Bottles, Peanut Butter Containers, Salad Dressing & Vegetable Oil Containers

SINKS



HDPE

High-Density Polyethylene

Milk Jugs, Detergents, Household Cleaners, Motor Oil Containers, Some Garbage Bags, Butter & Yogurt Tubes

FLOATS



PVC

Polyvinyl Chloride

Clear Food Packaging, Medical Equipment, Siding, Piping, Windows, Shampoo Bottles

SINKS



LDPE

Low-Density Polyethylene

Squeezable Bottles, Various Bags (For Bread, Frozen Food, Shopping & Dry Cleaning), Clothing & Furniture

FLOATS



PP

Polypropylene

Syrup Bottles, Ketchup Bottles, Caps, Straws, Medicine Bottles

FLOATS



PS

Polystyrene

CD Cases, Meat Trays, Egg Cartons, Disposable Plates & Cups

SINKS OR FLOATS



OTHER

DVD Cases, iPod Packaging, Signs & Displays, Nylons

VARIES



APPENDIX 2.0 – HOW TO LEAD A BEACH CLEAN

Follow this guideline to lead your very own beach cleanup! You've participated in a beach clean, now it's your turn to lead with your friends and family!



Before heading out on your beach clean, **check the weather and tides** to make sure conditions are safe!

Bring an adult to help you with the clean up, and invite any friends! More hands make work light!

Bring your own reusable bag to put litter/debris in.

Dress for the weather and be sure to wear gloves to protect your hands!

While walking, **scope out different areas** of the ground and see what stands out, it may be small pieces like a plastic straw or a large item like a tire. Make sure to only pick up foreign debris, and **leave any natural elements** in their respective environment.

If you're on the beach, you will most likely be able to **find all kinds of microplastics**. Look behind driftwood and in the vegetative line to find tiny colourful pieces of plastic!

Take photos, visuals help to tell a story and serve as evidence for the data you collect.

Bring all materials home to sort, with the goal of diverting as much material from landfill as possible.

Reflect on your clean up and how you can prevent plastic pollution through your own actions. Discuss your ocean friendly behaviours with your friends and work together to make a difference!

APPENDIX 3.0 – TEN WAYS TO RISE ABOVE PLASTICS

Rise Above Plastics and become Ocean Friendly! Here are **ten easy things** you can do to reduce your 'plastic footprint' and help keep plastics out of the marine environment.

Skip plastic bags and bottles! **BRING YOUR OWN** cloth bag when you go out shopping with your family, and carry a metal or glass reusable bottle for water.

REFUSE single-serving packaging, excess packaging, straws and other 'disposable' plastics. Carry reusable cutlery in your backpack or in your bike crate!

REDUCE everyday plastics such as sandwich bags and juice cartons by replacing them with a reusable lunch bag/box that includes a thermos.

Bring your to-go mug with you to the smoothie shop or restaurants. A great way to reduce lids, plastic cups and/or plastic-lined cups.

RECYCLE. If you must use plastic, try to choose #1 (PETE) or #2 (HDPE), which are the most commonly recycled plastics. Avoid plastic bags and polystyrene foam as both typically have very low recycling rates. Remember to wash all items thoroughly before they go into the recycling bin.

Start your own DIY projects! Skip plastic packing by making your own trail mixes, yoghurts, bread, treats, and more! DIY projects are a great activity to do with your families, and there are many resources to start your own project online. For ideas, check out Surfrider Pacific Rim's Stitch N Beach group that meets monthly.

SUPPORT LOCAL business that are part of Surfrider campaigns like Ban the Bag, Ocean Friendly business Campaign, Hold On To Your Butt, and STRAWS SUCK.

JOIN Surfrider as a Grom Volunteer at a beach cleanup or join your schools Surfrider youth club! Surfrider Pacific Rim hold cleanups monthly or more frequently – check out the web site for the next beach clean event.

RESOURCES

Algalita Marine Research Foundation (2013). "2 Investigating Plastic Pollution/The Basics" [video file]. United States: Algalita Marine Research Foundation. Video.

Audubon. "Tufted Puffin", Web. Retrieved from <http://www.audubon.org/field-guide/bird/tufted-puffin>

Canadian Geographic (2014). "Animal Facts: Bald Eagle". Web. Retrieved from <https://www.canadiangeographic.ca/article/animal-facts-bald-eagle>

Department of Fisheries and Oceans (2015). "Pacific Halibut". Web.

Retrieved from <http://www.dfo-mpo.gc.ca/fm-gp/sustainable-durable/fisheries-peches/halibut-fletan-eng.htm>

Department of Fisheries and Oceans (2017). "Salmon Facts - Pacific Salmon". Web. Retrieved from

<http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/facts-infos-eng.html>

Live Science (2018). "Orcas: Facts About Killer Whales". Web. Retrieved from <https://www.livescience.com/27431-orcas-killer-whales.html>

Monterey Bay Aquarium Foundation (2010). "Plastic in the Water Column", Print.

Nanaimo Science and Sustainability Society (2015). "Trash to Treasure". Web. Retrieved from <http://nanaimoscience.org/trash-to-treasure/>

National Geographic (2018). "Giant Pacific Octopus. Web. Retrieved from <https://www.nationalgeographic.com/animals/invertebrates/g/giant-pacific-octopus/>

National Oceanic and Atmospheric Administration Marine Debris Program (2018). "Movement". Web. Retrieved from <https://marinedebris.noaa.gov/discover-issue/movement>

Vancouver Aquarium (2018). "Sea Otters". Web. Retrieved from <https://www.livescience.com/27431-orcas-killer-whales.html>

ADDITIONAL STUDENT RESOURCES FOR RESEARCH:

<https://5gyres.org>

<https://oceanlegacy.ca/>

<https://marinedebris.noaa.gov/>

www.plasticpollutioncoalition.org

<https://www.plasticoceans.org/>

oceana.org/



SURFRIDER
FOUNDATION
PACIFIC RIM, BC

Written by
Jason Sam
Michelle Hall
Lilly Woodbury
Alys Hoyland

Photography
Keenan Bush
Paul Levy
Michelle Hall

Cover models:
(left to right)
Yemaya Windle
Jasper Windle
Seville Mcleod
Hobbes Mcleod
Toby Theriault

Design & Illustrations
Claire Watson

Sponsors include:
Clayoquot Biosphere Trust
Government of Canada
VANS



www.pacificrim.surfrider.org

