

# SINK or FLOAT Activity – Where do Ocean Plastics Go?

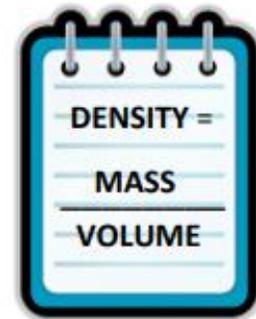


## Background

Plastics of all shapes and sizes, including the small pieces, end up in the **water column** as marine debris and can entangle or are ingested by marine animals. It's estimated more than 90% of floating marine debris is plastic.



Some plastics float in sea water, others sink and some remain neutrally buoyant. **Density** is one factor that affects the **buoyancy** and location of the plastic debris in the water column. Density is the ratio of a material's mass to its volume. It measures a material's compactness, or how much mass is squeezed into a given space.



Most plastic items are marked with a resin ID code. This code identifies the type of polymer molecules used to make the plastic item. Each type of plastic within this seven code set has a different density. If plastic is more dense than sea water, it will sink. If it's less dense, it will float.



Marine animals feed throughout different depths of the ocean. Different plastics will impact different animals depending on the buoyancy of the plastic and the depth at which the animal feeds.



## INVESTIGATE

Explore the densities of different plastics using the Density Table Card.

*This activity was developed by the Monterey Bay Aquarium and Algalita and revised by PSI.*

Density Table			
Resin Code	Name	Density (g/cm <sup>3</sup> )	Uses
<b>Plastics</b>			
1	PETE	1.38-1.39	Soft drink and water bottles, plastic butter containers, salad containers
2	HDPE	0.95-0.96	Milk jugs, detergent, household cleaners, metal oil containers, some food storage bins, butter and margarine tubs, grocery bags
3	PVC	1.39-1.45	Clear food packaging, medical equipment, window frames
4	LDPE	0.92-0.94	Disposable bottles, vegetable bags, shower caps, frozen food, shopping bags and dry cleaning, clothing
5	PP	0.90-0.91	Yogurt bottles, water bottles, caps, crates, medicine bottles
6	PS	0.99-1.07	CD cases, mail trays, egg cartons, disposable plates and cups, drinking straws
7	Other	Varies	DVD cases, iPod packaging, signs and window screens
<b>Other Substances</b>			
	Fresh Water	1.00	
	Sea Water	1.03	

## SINK or FLOAT – Where do Ocean Plastics Go?

Whether it sinks or floats, plastic in the ocean is extremely dangerous for ALL marine animals. Animals can get tangled in it or mistake it for food. The type of plastic that animals may encounter in the ocean depends upon where they spend their time living and feeding – on the surface or on the sea floor.

### INVESTIGATE:

Where do plastics go when they enter the ocean? Do they sink or float? Who's impacted?

1. **Build an ocean model.** Fill a container with water. You may add a bit of salt to make your model more realistic, but this step is not necessary.
2. **Make a prediction.** Do you think the plastic items will sink or float in the water? In the table below, record the Plastic Density using the Density Table & make your prediction.
3. **Test your prediction.** One by one, submerge each item into the water making sure that no air bubbles are trapped beneath it. Wait a moment and then record your results.

Plastic Item	Plastic Type	Plastic Density	Prediction Sink or Float?	Result
Plastic Bottle Fragment	 PETE	1.38-1.39		
Grocery Bag Fragment	 HDPE			
Clear Plastic Film	 LDPE			
Plastic Straw	 PP			
Plastic Eating Utensil	 PS			
Styrofoam Packing Peanut	 PS			
Other? _____				

# Density Table

SPI Code	Name	Density (g/mL)	Uses
<b>Plastics</b>			
1	<b>PETE</b> Polyethylene terephthalate	1.38-1.39	Soft drink and water bottles, peanut butter containers, salad dressing and vegetable oil containers
2	<b>HDPE</b> High-density polyethylene	0.95-0.96	Milk jugs, detergents, household cleaners, motor oil containers, some garbage bags, butter and yogurt tubs, grocery bags
3	<b>PVC</b> Polyvinyl chloride	1.16-1.45	Clear food packaging, medical equipment, siding, piping, windows, shampoo bottles
4	<b>LDPE</b> Low-density polyethylene	0.92-0.94	Squeezable bottles, various bags (for bread, frozen food, shopping and dry cleaning), clothing, furniture
5	<b>PP</b> Polypropylene	0.90-0.91	Syrup bottles, ketchup bottles, caps, straws, medicine bottles
6	<b>PS</b> Polystyrene (two kinds)	0.020-1.07	CD cases, meat trays, egg cartons, disposable plates and cups, packing peanuts
7	<b>Other</b> Many kinds	Varies	DVD cases, iPod packaging, signs and displays, nylons
<b>Other Substances</b>			
	Fresh Water	1.00	
	Sea Water	1.03	

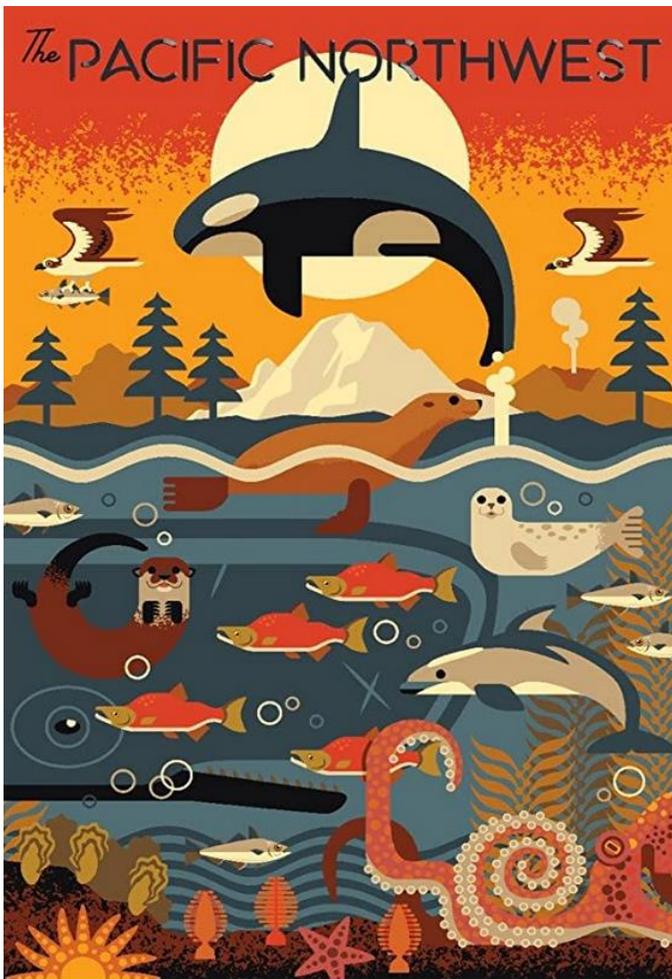


Image: Lantern Press.

## CONNECT:

Answer the questions based on your Results and this Pacific Northwest Marine Life Poster

1. Which items floated?
2. What animals might encounter these items while living or feeding near the surface?
3. Which items sank?
4. What animals might encounter these items while living or feeding near the bottom?
5. Do you think that an item that floats can eventually sink? How?

## TAKE ACTION!:

Great news! We can all take actions to keep trash out of the ocean and protect wildlife!

1. **Use a garbage can!** Wind and water can carry trash to the sea. Make sure garbage stays in the can and doesn't spill out. And of course, don't litter!
2. **Participate in a trash cleanup!** Check out Washington CoastSavers for local cleanups or organize your own using Ocean Conservancy's Do-It-Yourself Cleanup Kit or the CleanSwell app.
3. **Choose to reduce and reuse!** Reduce single-use plastics by carrying your own re-usable water bottles, mugs and bags. While you're at it, why not skip the straw, too!?



## ENGINEERING SOLUTIONS:

Check out these amazing engineering solutions that keep trash out of the ocean!

Mr. Trash Wheel in Baltimore, Maryland: <https://www.mrtrashwheel.com/>

The Ocean Cleanup: <https://theoceancleanup.com/about/>