

# Determining the Amount of Plastic and Plankton around Governors Island, Hudson River Estuary



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2015

**Table of Contents**

<b>Content</b>	<b>Page</b>
Rationale .....	3
Project Design .....	4
Materials.....	5
Procedures.....	6
Bibliography.....	7

**Rationale:**

Pollution in the environment has always been a problem and humans have just recently, in the past 50 years or so started noticing the problem. There are different types of pollutants and, also, where they can end up. In this case, water bodies are an example of where pollutants can end up and they can be any water body size. Plastics are examples of pollutants that can end up in water bodies. Plastics can range from any types, for example polyethylene terephthalate (PETE), high-density polyethylene (HDPE), polyvinyl chloride (PVC), low-density polyethylene (LDPE), and Styrofoam (J.Tooley, 2003). Plastics are a big problem to marine animals and animals that are around the water bodies. Plastics can kill animals through ingestion or entanglement (Day, 1980). As known of so far plastics do not decompose or biodegrade like most organic material, instead they become very small pieces even microscopic due to a process known as photo degradation (E.Sohn, 2009). Light can break down plastic in a way that is almost similar on how bacteria break down organic matter. Ultraviolet rays hit plastic and break the bonds holding the molecular chain together, then in time making big plastic pieces into lots of smaller ones (H.William, 2010). Oceans, a place where a lot of plastics end up in, receive a lot of sunlight which means that photo degradation occurs often and at a faster rate meaning more toxins from the plastic degrading in oceans (H.William, 2010) .Animals mistake plastic and plankton because they can barely distinguish the difference mostly because plankton and plastic are collected together (C.J.Moore, 2001). Animals mostly mistake plastic with neuston which are plankton resting on the surface of the water body.

Much plankton is microscopic in size and provides a crucial source of food to many large organisms such as many kinds of filter feeders (D.M.Gibson, 2003). Plankton is organisms that are too small and weak to swim against currents and found in many parts of the ocean.

Plankton is sort of a collective name for certain algae, bacteria, protozoans, etc. The New York Harbor is a body of water that is off the coast of New York City. The harbor is an estuary which means that it is a very thin body of water where salt and fresh water meet and rivers and streams flow into it. This estuary gets polluted a lot throughout the year, which also means that plastic gets dumped into it and effect living organisms in and around the water body.

### **Project Design:**

The project will measure the amount plastic and plankton in the New York Harbor specifically around Governors Island and compare it against each other to see if it could be a problem for organisms living in and or around the New York Harbor.

**Materials:**

<b>Material</b>	<b>Quantity</b>	<b>Function</b>
Flowmeter	1	To calculate how much water went through the plankton net
Sample Bottle	3	To place samples in
Plankton Net	1	To capture plankton from the harbor
Water squirt Bottle	1	To rinse off plankton net
Calculator	1	To make calculations for measurements on flow meter
Microscope	1	To view the microscopic plankton and plastic
Tweezers	1	To remove plastic from plankton
Bucket	1	To collect water
Timer	1	To time how long net has been in water
Stove	1	To dry samples
Scale	1	To weigh samples
Syringe	1	To inject tap water inside the flow meter

## **Procedures:**

### **Preparing the flow meter:**

1. Remove the pan head stainless steel screw from the flowmeter
2. Fill the syringe with tap water
3. Hold the flowmeter nose down and inject with tap water until full (little or no air should be visible, DO NOT USE DISTILLED WATER)
4. Place into use immediately
5. After use of the flowmeter flush clean immediately

### **Collecting samples:**

1. Attach flow meter to the plankton net
2. Place plankton net in the water body with the pole attached
3. Take the timer and time this for five minutes
4. Take net and flowmeter out from the water carefully
5. Record the number on the flowmeter in data table
6. Take the samples from the net and drain it into sample bottles
7. Place samples on slides and look through microscope
8. Remove plastics and plankton using tweezers and tally how many on data table
9. Place these samples in tray
10. Place tray in a stove and heat for 24 hours at 65 degrees Celsius
11. Weigh plastic and plankton and record on data table
12. Record the number on flow meter to see how much liters of water flowed into the net
13. Record the weight of plastic and plankton per liter of water

**Bibliography:**

- Moore, C.J. (2001). A Comparison of Plastic and Plankton in the North Pacific Central Gyre. *Marine Pollution Bulletin*, 1297-1300
- Britannica.com (2015) encyclopedia Britannica.inc plankton
- Harris, William. "How long does it take for plastics to biodegrade?" 15 December 2010. HowStuffWorks.com. <http://science.howstuffworks.com/science-vs-myth/everyday-myths/how-long-does-it-take-for-plastics-to-biodegrade.htm>
- Day, R.H. (1988). Quantitative Distribution and Characteristics of Neustonic Plastic in the North Pacific Ocean. National Marine Fisheries Service. 73 pp
- D.M. Gibson (2003). "Plankton" *Water and Science Issues*.
- Sohn, Emily. "Plastic decomposes quickly at sea, study finds." MSNBC. Aug. 20, 2009. (Nov. 22, 2010)