

# Module1: What Is Oceanography?

## Topic 3 Application: Towing for Plankton Scientific Investigation Report

Before you begin the scientific investigation, make sure to download the Towing for Plankton Scientific Investigation Report. As you complete this scientific investigation, fill in any needed information on the report template. If you need more information about each section of the report, please visit the Developmental Module.

### Introduction

Oceanographers use plankton nets to collect samples of plankton and other tiny ocean organisms. Often the plankton net is dragged behind a boat, or manually dipped into the water at a specific location. It is relatively simple and fun to construct a small plankton net and use it for collecting plankton. Even if you do not live near a body of saltwater, a plankton net can be used to examine local microorganisms.

### Objectives

In this scientific investigation, you will:

- construct a simple plankton net.
- collect and observe a local microorganism sample.

### Hypothesis

Using the Procedure and Data Collection section below, read through the procedural information for this scientific investigation. Based on your understanding of the procedure, develop your own hypotheses which describe your expected results. Specifically, what do you think you will find in a sample from a local waterway? Record your hypotheses in the Hypothesis section of your Towing for Plankton Scientific Investigation Report.

### Equipment and Materials

- Large round metal washer or key ring
- Large, thick rubber band
- Pair of nylon stockings
- Roll of duct tape
- Small plastic bottle (remove the lid if there is one)
- Magnifying glass
- Ten feet of kite string, twine, or similar thing strong string
- Wire coat hanger
- Pliers
- Scissors
- Bowl or Small Bucket
- Device to capture images (digital camera, phone, etc.)

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### Procedure and Data Collection

#### Making Your Plankton Net

##### Build the Ring

1. Unwind and straighten out the coat hanger.
2. Create a ring with the metal hanger from 6 to 12 inches in diameter.
3. Use the pliers to join each end of the hanger by twisting or crimping the two ends together.
4. Alternatively, you can use duct tape to fasten the two ends together.
5. When finished, the wire ring forms a mouth as shown in the figure below.

##### Form the Net

1. Use the scissors to cut off one leg of the nylon stockings near the top.
2. Insert the top end of the nylons through the center of the wire ring.
3. Working slowly around the entire ring, carefully roll a flap of the nylon up-and-over the ring about an inch, and then secure this flap to the ring with duct tape. Double check that the duct tape creates a tight seal around the entire ring.
4. When finished, the nylons create a net attached to the wire ring mouth as shown in the figure below.

##### Attach the Collection Bottle

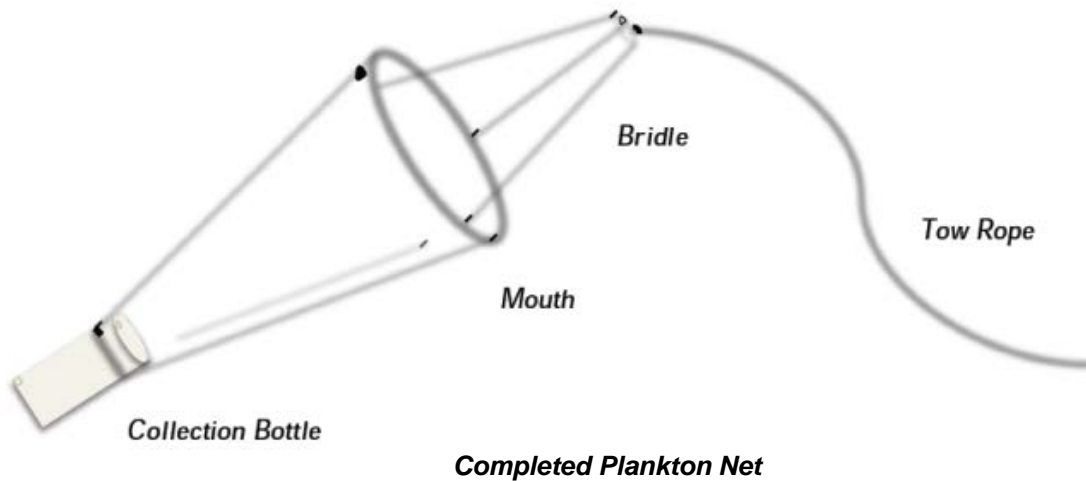
1. Use the scissors to cut a small hole in the bottom of the nylons about an inch in diameter.
2. Stretch the small hole of the nylons over the plastic bottle's mouth (don't forget to remove the lid, if there is one) then secure the nylons to the bottle with a rubber band. Make sure the rubber band is tight around the bottle's mouth. For additional strength, you can wrap duct tape around the rubber band and the bottle.
3. When finished, the bottle functions as the collection end as shown in the figure below.

##### Attach the Bridle and Tow Rope

1. Use the scissors to cut three pieces measuring two feet each from the kite string or twine.
2. Tie one end of each string to the wire ring, making sure to space all three strings around the ring at equal intervals.
3. Tie the other end of each string to the metal washer or key ring.
4. Tie one end of the remaining four feet of string or twine to the washer or key ring.
5. When finished, the bridle and tow rope form a triangle as shown in the figure below. Make sure to take a photograph or video of your completed plankton net to submit along with your completed scientific investigation report.

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### Collecting Plankton

1. Your new plankton net should be ready for use. Find a nearby location preferably with calm, shallow water. The location you use can be saltwater, brackish, or freshwater. Record the location in the Data section of your Towing for Plankton Scientific Investigation Report. In addition, make several notes about any characteristics of the location that you think are important (i.e. wind, temperature, time of day, etc.)
2. Carefully lower the mouth of the net so that it is just below the water's surface, and then allow the collection end to drop in behind the net.
3. Grab the tow rope and slowly pull the net through the water for a few minutes. Make sure that the entire net extends fully and stays just below the water's surface.
4. As you tow the net, the plankton should gather in the water bottle at the collection end.
5. Once you have towed the net for a few minutes, hold the bottle upright in one hand and the mouth of the net in the other hand, and then slowly lift the net and the bottle out of the water.
6. Slowly pour the contents of the collection bottle into the bowl or small bucket.
7. Depending on the clarity of the water, you will likely see very tiny creatures swimming around. These may be zooplankton, along with other possible organisms.
8. Use the magnifying glass to take a closer look. If you do not see anything, try collecting another sample of water. Record your observations and a sketch of the sample in the Data section of your Towing for Plankton Scientific Investigation Report.
9. Repeat Steps 1-8 three more times, making sure to record your findings from each sample.

### Data

Using the spaces and the data table below, record your data from this scientific investigation.

- Sample Location:
- Observations About Sample Location:

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### Sample Collection Data Table

Sample Number	Estimated Number of Plankton or Microorganisms	Other Observations About Sample
1		
2		
3		
4		

### Data Analysis

In the Data Analysis section of your Towing for Plankton Scientific Investigation Report, provide responses to the following questions. Make sure to completely answer each question.

1. How would you describe the water? Was it murky or clear? Was it salty or freshwater?
2. Did you collect a lot of plankton or microorganisms? Why or why not?
3. What did any items in your samples look like? Were there other organisms in the sample?
4. Were there any surprises while collecting your samples?

### Conclusion

Using the Conclusion section of your Towing for Plankton Scientific Investigation Report, compose three to four sentences describing an overall conclusion, based on your results. Were your hypotheses true or false, and how do you know? Use the data and notes that you collected from your experience to form your conclusion. Make sure that you include information that you gained from data analysis to support your conclusion.

### Experimental Sources of Error

On your Towing for Plankton Scientific Investigation Report, provide responses to the following questions: Are there any sources of error? If so, what are they, and what could be done to minimize error?



Once you have completed the Towing for Plankton Scientific Investigation Report, please submit your report and an image or video of your plankton net to the dropbox.