Name: Date: Class:

# Plastic Properties: Student Worksheet

**Station 1: Plastic Decomposition**

Instructions:

- Look at the composition kit with decomposing materials on both sides. One side of the kit has organic materials and the other side has plastic materials.
- Using what you understand about decomposition, answer the following questions.

1. What is decomposition?

2. Describe what the two sides look like. If left untouched, predict what each side would look like in 10 years. In 100 years.

3. How long do you think it takes a banana to decompose? How for paper to decompose? (Do not look this up on the internet!)

4. How long do you think it takes a plastic water bottle to decompose? (Do not look this up on the internet!)

Name: Date: Class:

Using the internet, research how long it takes the following items to decompose:

| Item | Number of Years to Decompose |
|---|---|
| Banana Peel | |
| Newspaper | |
| Metal Can | |
| Glass | |
| Baby Diaper | |
| Polyester T-shirt | |
| Tennis Shoe | |
| Plastic Bottle | |
| Plastic Shopping Bag | |
| Styrofoam cup | |

5. Which item takes the longest time to decompose? Which takes the shortest time to decompose?

6. What surprised you about the numbers?

7. Why do you think plastic causes such a problem when thrown away as garbage, even though other items take longer to decompose?

**Name:** **Date:** **Class:**

## Station 2: Microplastics and Microbeads

Instructions:

- To extract microbeads from face wash, first line the funnel with one coffee filter and place the funnel tip into an empty beaker.
- Squirt a small amount of face wash onto the coffee filter.
- Fill another beaker with water and then gently flush the facewash through the filter. (Note: The microbeads should remain on the filter.)
- Gently pull out the filter and examine the microbeads with a magnifying glass or with a microscope.
- Read this article and answer the following questions: https://www.chemistryworld.com/news/us-bans-microbeads-from-personal-care-products/9309.article?fbclid=IwAR0wfnJ2M0r5gxsmWwQTWBf6yJJBDKrzcGxOIJaI1KkCVxoZrIpoZ7VQdYo

1. What are microbeads and where are they found?

2. What does marine life mistake the beads for?

3. How many years do microbeads take to break down?

4. How many microbeads enter US aquatic systems every day?

Many microplastics over many years entered the ecosystem as microbeads that were contained in cosmetic products such as make-up, face wash, and toothpaste. Today these microbeads are banned in the United States. Some other countries still use them. However, the microbeads that came from these products before the ban have already made their way into all our major waterways.

**Name:** **Date:** **Class:**

**Station 3: Microfiber and Microfilaments**

Instructions:

- Watch the video from Story of Stuff and answer the questions: https://storyofstuff.org/movies/story-of-microfibers/
- Complete the microfiber activity and draw your observations.

1. What type of clothes are made from polyester?

2. What is polyester made from?

3. What problems are associated (big and small) with reusing plastic bottles?

4. What are microfibers, how many are produced in a single wash, and how do they make their way to our water systems?

5. How many microfibers are believed to be in our oceans as of now?

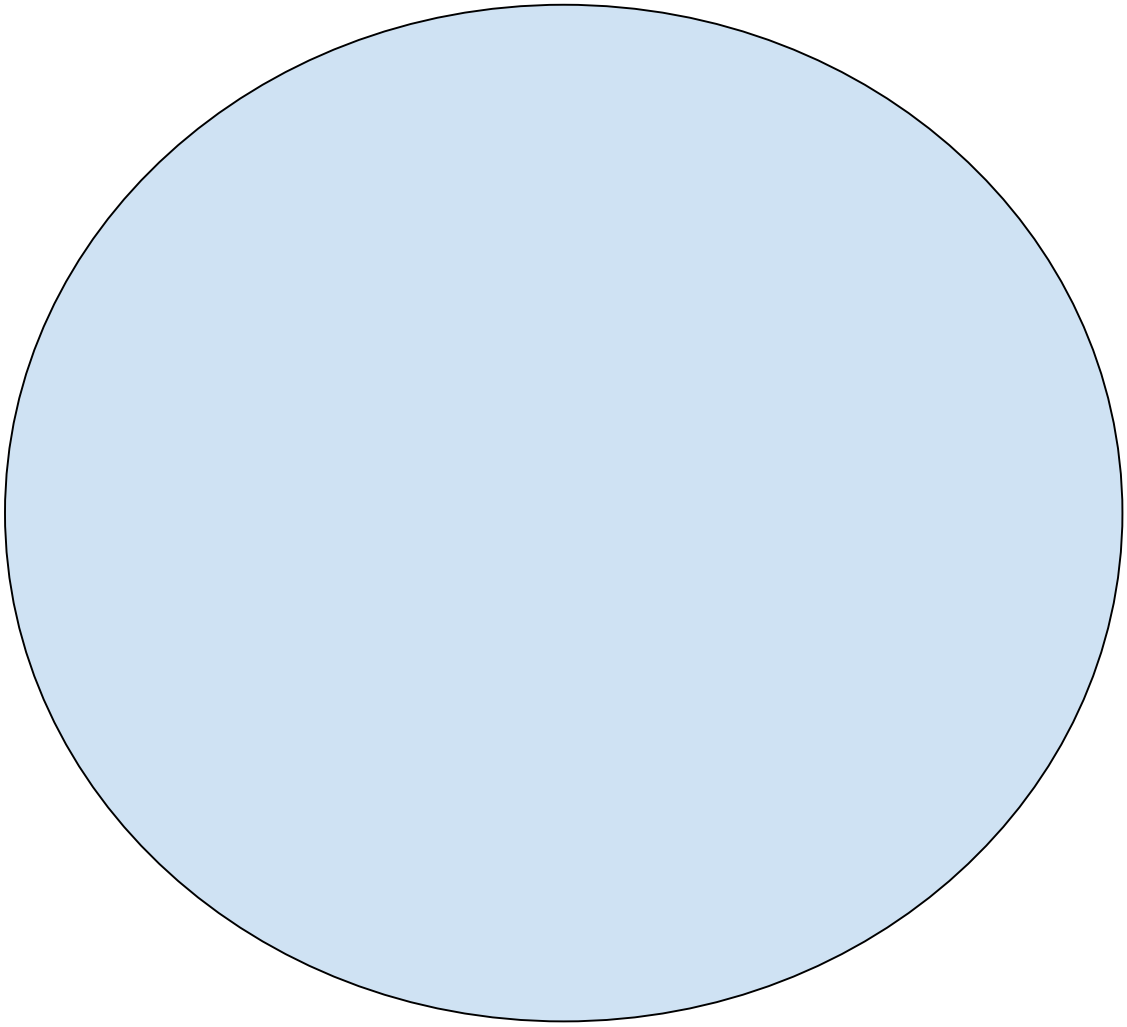
6. What happens to these microfibers once they are in the waterways? What happens to fish and eventually people?

**Name:** **Date:** **Class:**

Instructions for the microfiber activity:

- Take a sample of the microfiber material
- Place the sample into bowl and pour one cup of water over the sample.
- Simulate washing (e.g., scrub the sample)
- Take a water sample out after “washing” for 1 minutes.
- Examine the sample under a microscope and locate fiber strands.

7. Draw what you see in your microscope.



**Name:** **Date:** **Class:**

**Station 3: Density of different plastics**

Determining the type of plastic can also help determine which marine animals could be affected by its presence in the ecosystem. Using density, you can determine which plastics can be present in different water ecosystems and then make predictions to which marine animals could be affected.

Refer to the Background Sheet on the different densities of plastic. Then answer the following questions:

1. What is a water column?

2. What is density?

3. Will an object of density 1.09 sink or float in a lake? (remember that fresh water is 1.0)

4. What is an SPI resin code and how many exist for plastic?

Use the density table provided and make a prediction of whether the items will sink or float. Document your prediction in the data table. After you make your prediction add water the jar, place the item in the jar, and observe. Document in data table whether the item floats or sinks.

| Plastic Item | Resin Code (SPI code) | Prediction (sink or float) | Results |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |

- Which plastic do you think would most likely affect plankton and zooplankton?

- Which plastic do you think would most likely affect organisms at the bottom of the ocean?

**Name:** **Date:** **Class:**

**Station 4: Plankton and Microplastic**

Instructions:

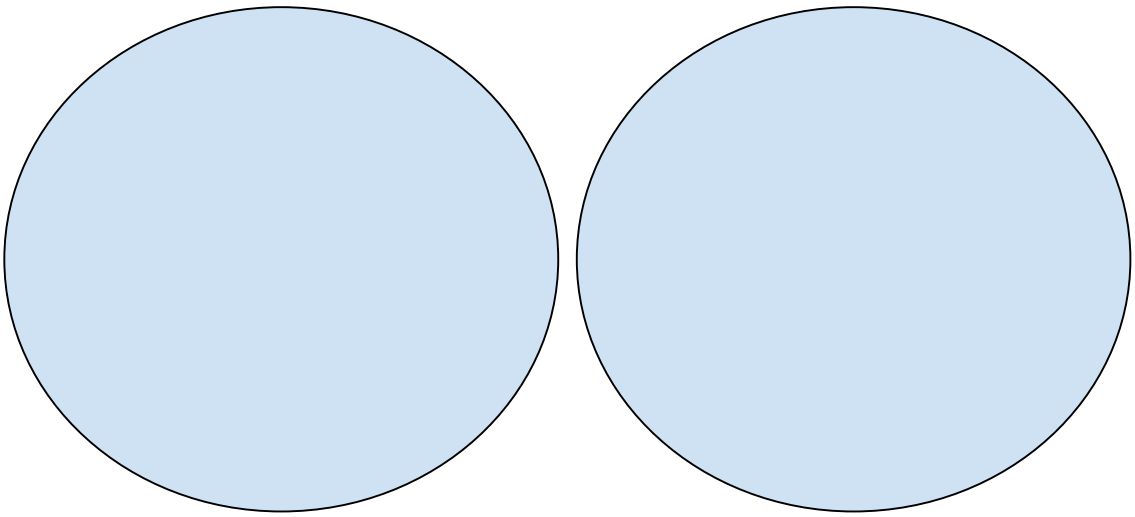
- Carefully pick up the jar containing both plankton and microplastic.
- Observe the differences and similarities between the plankton and microplastic.
- Pour sample into petri dish.
- Place under the microscope and focus.

1. Can you tell the two apart?

2. How are they alike?

3. How are they different?

4. Draw what you observe:



Microplastic Plankton

5. Do you think that live plankton eat microplastic? (circle) Yes or No

**Name:** **Date:** **Class:**

Watch the following video and answer the questions:
https://www.youtube.com/watch?v=FAi1okMUdQ8

1. What type of zooplankton are they studying in this experiment?

2. What is the hypothesis? Is it correct?

3. What other animals are also eating plastic?

4. Do they know how plastic affects these organisms yet?

5. Create a food chain that shows the effects of plastic:

Read the article: “Great Pacific Garbage Patch”
https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/

1. What is the Great Garbage Patch of the North Pacific?

2. What kind of plastic is found in the Great Garbage Patch?

3. What kind of effects does it have on wildlife? Give three examples

Name: Date: Class:

## Final Assessment

**Summary Discussion:**

Now that you have observed different properties of plastic, describe in your own words why plastic has such an effect on ecosystems and why it is so hard to eliminate the garbage that it creates?