Prevalent Plastics: A Plastics Audit

Scientist Name: _____

Date: _____

Introduction

Plastics are used for just about everything, from automobiles and medical supplies to food packaging and even our clothing. Because plastic is durable and lightweight, it has allowed humans to make advances in many areas including medicine, food storage and shipping, but not without consequence. Plastic's useful qualities also make it a persistent form of waste. Plastic litter has become part of almost every landscape, affecting habitats and people all over the world. Instead of biodegrading, plastics break into smaller and smaller pieces that leach chemicals and contaminate water sources. Plastic also takes a lot of energy and resources to produce and even properly recycled plastics aren't free from impact.

While ending all plastic use isn't likely to happen, reducing plastic use can have a real impact, especially when it comes to disposable or "single-use" plastics. These items are designed for the short-term use in our human spaces, but will last in the environment for decades. One way to reduce single-use plastic use is to increase awareness of the issue in our homes, schools and communities.

In this activity, you will complete a "plastics audit" to study how much and which types of plastics you use. An audit is used to examine and evaluate something in an unbiased way. (Typically audits are performed on companies to track their financials or inventory.) In this plastics audit you will be evaluating the plastics you use and the plastic waste you produce. To do this you will spend one day tracking your household plastic use and waste in the provided activity data sheet. To reduce bias in the audit, try not to make changes from your typical behavior when you perform your audit. (For example, if you always drink a bottle of water at bed time, don't change your behavior just for the audit.)

After the audit, follow along on the activity sheet to add up, extrapolate and graph your data. Then discuss the findings of your audit with your family. Finally, develop a mini action project based on your results. How can your project help reduce the amount of plastic you use at home and/or spread awareness to others at school and in your community?

Step 1: Tally plastic use throughout one day.

Pay attention to the plastics you use throughout one day. Record everything you use that is made of plastic in the left-most column of the table below. Items include your household appliances, food wrappers, and even your clothing!

Once you've recorded an item, you can decide the approximate use time of the item in your household – how long do you use it before it's thrown away? Select the category that best fits your item and place a tally mark in that column. At the end of the day, add each "use time" column and enter the number at the bottom of the sheet to see how many of each plastic type you used.

If you need additional space, feel free to use another document or sheet of paper.

	Approximate Use Time of Plastic			
Plastics Used	**2 weeks or less**	**6 months or less**	**1-2 years**	**2 years or more**

Audit Totals for One Day:				

Step 2: Extrapolate data over 2 years.

Now let's extrapolate! By extrapolating our observations, we can get an idea of the amount of plastics we would use over a longer time period. This isn't an exact number, but instead is an approximation based on our collected data. We are going to extrapolate to estimate the amount of plastic we would use over 2 years.

The following unit conversions may be used:

1 year = 52 weeks
1 year = 12 months

First let's look at the plastics that have the shortest use time, the "2 weeks or less" category. These are items that would be replaced roughly every two weeks, like a milk or juice container.

To extrapolate, enter your number of "2 weeks or less" plastics in the first box below. We will multiply the numbers on the top of each fraction and divide by the numbers on the bottom. We can do a unit conversion, using **1 year = 52 weeks.**

$$\frac{\text{\_\_\_ plastics}}{\text{2 weeks}} \times \frac{\text{52 weeks}}{\text{1 year}} \times \text{2 years} = \text{\_\_\_\_ plastics}$$

Next, we'll calculate the "6 months or less" category. These are plastics that we would replace about every six months. For this, we'll use the unit conversion **1 year = 12 months.**

$$\frac{\text{\_\_\_ plastics}}{\text{6 months}} \times \frac{\text{12 months}}{\text{1 year}} \times \text{2 years} = \text{\_\_\_\_ plastics}$$

Now, let's extrapolate the "1-2 years" category. For the purpose of simplification, we'll approximate that these items are replaced every one year.

$$\frac{\text{\_\_\_ plastics}}{\text{1 year}} \times \text{2 years} = \text{\_\_\_\_ plastics}$$

For the final category, "2 years or more," we will again simplify and say that these items are replaced every two years. In reality, some of these items, may last much longer.

$$\frac{\text{\_\_\_ plastics}}{\text{2 years}} \times \text{2 years} = \text{\_\_\_\_ plastics}$$

Plastics Used	2 weeks or less	6 months or less	1-2 years	2 years or more
Extrapolation Over 2 Years				

Step 3: Graph your extrapolated numbers.

Create a bar graph showing how much of each type of plastic you would theoretically use over two years.
You can create your graph digitally (using Word or Excel) or draw it by hand. Don't forget to label your graph and the axis!

Step 4: Analyze your audit.
Discuss the findings of your audit with your family or household. Were you surprised by the results of your audit? What types of plastics did you use the most? How did you dispose of the plastics? Some plastics claim to be recyclable. Does your municipality's recycling program accept these? What happens to these plastics when they are sent away in recycling? You may want to take notes on your conversation or research the answers to some of your questions.

Step 5: Create a mini action project!
Come up with your own mini action project idea or try one of the ideas below:

- A catchy poster sharing an impact that plastic waste can have on the environment.
- A letter or email to a government representative urging them to support legislature limiting single-use plastics. Find your local legislator here.
- A speech to your fellow classmates at a school assembly on plastic use.
- A collage or sculpture of plastic waste from your audit, demonstrating the amount of plastic we throw away. (For digital submissions, you are invited to send photographs of the project.) Check out some of these cool artists and projects for inspiration:
    - Washed Ashore
    - Calder Kamin
    - Project Vortex
- A series of photographs of plastic objects, showing the pervasiveness of plastics. Take a look at these photographs of plastic bags by graphic designer Sho Shibuya.

Step 6: Share your project with others!
You can broaden the environmental impact of your audit by sharing your project with others. Show others why reducing plastic use is important and let them know how they can make a difference. Try sharing your project with your family and friends, or perhaps (with the help of an adult) on social media!

Resources:
The following list of online resources may be used when completing this activity:

- Allegheny County Recycling and Waste Collection
- Calder Kamin
- Monterey Bay Aquarium: Plastic use audit
- The New York Times: Take One Last Look at the (Many) Plastic Bags of New York
- Pennsylvania General Assembly Find Your Legislator
- Pennsylvania Resource Council
- Pittsburgh Pennsylvania Residential Recycling
- Project Vortex
- Washed Ashore