Name: ____**Teacher Version**_____ **Date:** _____ **Class/Period:**_____

ACTIVITY 1.2: GARBAGE AND SCALE

When thinking about garbage, it is important to consider scale. The amount of garbage you produce as an individual may seem small, but when you look at it from a city or national perspective the amount of garbage produced by humans is not so small. The following exercise will help you visualize how garbage can pile up quickly at greater spatial scales. A spatial scale is the size of area at which different ecological processes occur. It is important to look at ecological processes from different scales because the impact of different factors can vary depending on the scale.

For example, if you were looking at some plant cells under a microscope, it would look different than looking at the leaf that the cells came from. In turn, looking at the leaves on the entire tree would give you yet a different perspective.

Plant Cells   Leaf   Tree
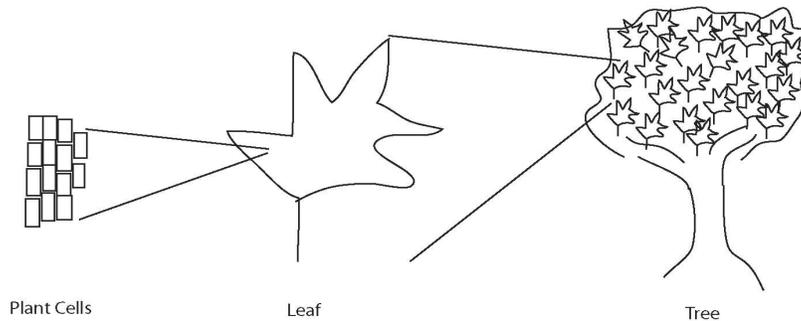
In order to understand the tree, it is important to study it from different perspectives. The same is true when studying ecosystems. Investigating ecosystems at different spatial scales allows scientists to examine environmental issues from different perspectives enabling a more complete picture of the ecosystem.

In urban ecosystems, the most fundamental scale is that of the individual, while the most encompassing is the global level. Many scales exist between these two levels

Individuals→ Households→ Communities→ Cities/Urban Areas→National→Global

How much garbage do I really produce?

In your classroom there is a plastic container with a volume of 0.1892 m³. Let us suppose that each of you produces enough garbage to fill this container everyday.

1. After 1 week, you would produce 0.1892 m³ x 7 days = ___*1.32*____ m³ of garbage.

2. After 1 year, you would produce 0.1892 m³ x 365 days= __*69.06*___ m³ of garbage.

The amount you calculated in #2 above is about the volume of a school bus. Does this seem like a lot to you? (The volume of a school bus is approximately 71 m³)
Does this seem like a lot to you?
        This number will most likely seem like a lot to students.

Looking at garbage at different scales

Group
3. How much garbage would you as a group produce in a year? _207.17 m³___
3 x .1892 m³ x 365 days= 207.17 m³ (if a group of 3)

4. How many school buses would that fill? _____3_____
207.17 m³/ 69.06 m³ x 1 school buses = approx. 3 buses

City
5. The city of Boston has a population of approximately 620,000 people.
Using the results above, that would equal 1652 school bus loads of trash a day? How many bus loads of trash would this be a year?
1652 x 365= 602,980 bus loads of trash for Boston in a year

State
6. The State of Massachusetts has a population of approximately 6,437,193 people.
That would equal 17,500 school bus loads of garbage a day. How many bus loads of trash would this be in a year?
17,500 x 365= 6,387,500 bus loads of trash for MA in a year

National
7. The United States of America has a population of approximately 300,000,000 people.
How much garbage (in m³) is produced in a day? A year?

300,000,000 x .1892 m³ = 5,676,000 m³ a day

5,676,000 m³ x 365 days =2,071,740,000 m³ a year

Reflection Questions

1. Do these numbers surprise you? Why or Why not?

> *Answers will vary*

2. How would the national scale change if everyone at the individual scale produced less garbage?

> *If everyone at the individual scale produced less garbage than there would be less garbage produced at the national scale too.*

3. List 3 things you could easily do to reduce the amount of waste you produce in a day.

> *Answers may vary. Examples may fall under the categories: Recycling, Composting, and Reusing.*