**Carbon Footprint and Carbon Sequestration in trees**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Carbon Sequestration** – how much carbon dioxide can trees remove from the atmosphere?

1. Outside, measure the circumference of at least three different trees at approximately 1.5m from the ground (about chest height for the average adult). Make a sketch or take a picture of the leaves/bark of each tree to help identify it later.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tree** | **1** | **2** | **3** | **4** |
| Circumference (cm) |  |  |  |  |
| Diameter (cm) |  |  |  |  |
| Leaves/bark |  |  |  |  |

1. Convert the circumference of the tree to diameter (assume it has a circular cross section, so divide by π)
2. Inside, go to my website (vanmathandscience.weebly.com) and follow the link to the tree biomass calculator.
3. You will need to enter the type of tree – there is a tree ID sheet on the website that might be helpful.

*Scientists and forest managers often need to calculate the biomass of a stand of*

*trees in a forest. The results can be used to determine the potential of the forest to*

*be used to make forest products. They are also used to make carbon and nutrient*

*budgets to evaluate environmental sustainability.*

*This biomass calculator was developed by Natural Resources Canada, part of the*

*Canadian government. It gives a statistical estimate based on thousands of sample*

*trees entered into a database.*

*Follow these steps to use the calculator.*

*1. Find the web page that has the calculator. Search for the key words “Canada*

*biomass calculator or go to the link http://bit.ly/2dKs4H6*

*2. Scroll down until you see the Tree-level biomass calculator*

*3. In the first field select a species.*

*4. In the second and third fields enter a diameter and height.*

*5. Click or tap on the Calculate button. This takes you to a results page.*

*You will see the biomass reported for each part of the tree: bark, branches, foliage*

*and wood in a graphic form.*

*Below that is a graph which repeats the biomass information and also displays an*

*estimate of the nutrient content for each part. This includes the content of nitrogen,*

*phosphorus, potassium, calcium and magnesium.*

*(Note that not every species has complete data for the nutrition information.)*

The explanation above is taken from the FNESC Science Secondary resource.

1. Fill in the table below with information from your trees:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Tree | Species | Biomass (kg) | | | | |
|  |  | Bark | Branches | Foliage | Wood | total |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |

1. For each of the trees you measured, total up the biomass (add together the masses of all parts) and then use this number to perform the following calculations (instructions from the FNESC resource)

*• Add to this figure the approximate biomass for the roots by multiplying by 1.26.*

*From the rough biomass calculation, students can determine the carbon that*

*might be stored in the tree.*

*• Multiply the approximate biomass by 0.5.*

*• Multiply the result by 3.7\* to give the approximate amount of carbon dioxide stored in the tree in kilograms.*

Record your data – show calculations.

1. Go back to the website and use the carbon footprint calculator that is linked there. After you finish answering all the questions you will be shown your carbon footprint compared to the average for your region and for the world.

Does any part of your carbon footprint surprise you? Why?

Why do you think the global average carbon footprint is so much lower than the average for our region?

How many trees would it take to store all the carbon dioxide that you contribute in one year?