

## Calculating Carbon

Once you have the height and circumference of your trees you can estimate how much carbon is stored in each tree. Use the chart below to find the equivalent weight in kilograms (kg) of CO<sub>2</sub> that is stored in your trees<sup>1</sup>. If the height/circumference of your tree is in between the numbers on the table either round up/down or use a range. For example, if your tree has a circumference of 0.9 metres and a height of 11 metres your tree would have a range from 181 to 338 kg of CO<sub>2</sub> stored in its body.

		Circumference of tree at chest height (m)								
		0.25	0.5	0.8	1	1.2	1.5	1.75	2	2.5
Tree Height (m)	2	3.54	14.15	36.22	56.60	81.50	127.34	173.32	226.38	353.72
	4	7.07	28.30	72.44	113.19	162.99	254.68	346.65	452.76	707.44
	6	10.61	42.45	108.66	169.79	244.49	382.02	519.97	679.14	1061.16
	8	14.15	56.60	144.88	226.38	325.99	509.36	693.29	905.53	1414.88
	10	17.69	70.74	181.11	282.98	407.49	636.70	866.62	1131.91	1768.61
	12	21.22	84.89	217.33	339.57	488.98	764.04	1039.94	1358.29	2122.33
	14	24.76	99.04	253.55	396.17	570.48	891.38	1213.26	1584.67	2476.05
	16	28.30	113.19	289.77	452.76	651.98	1018.72	1386.59	1811.05	2829.77
	18	31.83	127.34	325.99	509.36	733.48	1146.06	1559.91	2037.43	3183.49
	20	35.37	141.49	362.21	565.95	814.97	1273.40	1733.23	2263.82	3537.21

<sup>1</sup>These values are calculated with the following formula  $M_{CO_2} = 3.67(0.5(0.55(1.2(a(D^2h)))))$ .  $M_{CO_2}$  is the mass of CO<sub>2</sub> sequestered by the tree. 3.67 represents the ratio of atomic mass for carbon and CO<sub>2</sub>. 0.5 represents the knowledge that approximately 50% of the biomass of a tree is carbon atoms. 0.55 represents an assumption that 45% of the mass of the tree is water. 1.2 represents an assumption that the roots make up 20% of the mass of a tree.  $a$  is a coefficient that varies on growing conditions and tree species, a value of 0.1 was chosen based on a comparison of results with values of known trees.  $D$  represents diameter (in inches) and  $h$  represents the height in feet.  $M_{CO_2}$  converted from lbs to kg.

Sources:

[http://www.unm.edu/~jbrink/365/Documents/Calculating\\_tree\\_carbon.pdf](http://www.unm.edu/~jbrink/365/Documents/Calculating_tree_carbon.pdf)

<https://serc.carleton.edu/eslabs/carbon/1b.html>

[https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oe/pdf/transportation/fuel-efficient-technologies/autosmart\\_factsheet\\_6\\_e.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oe/pdf/transportation/fuel-efficient-technologies/autosmart_factsheet_6_e.pdf)

<https://maps.calgary.ca/TreeSchedule/>