



Carbon in Pines

Complete the calculations below, where d = diameter; h = height; GW = green weight; and DW = dry weight.

1. Green Weight (GW) = $0.0577 \times d^2 \times h$

GW = 1239 kg/tree

2. Dry Weight (DW) = $GW \times 0.5$

DW = 619.5 kg/tree

3. Carbon (C) = $DW \times 0.5$

Carbon content = 310 kg C/tree

4. Total carbon content of plot = carbon content per tree $\times$ 10 trees

Total carbon content of plot = 3100 kg C in 1/40th hectare plot

5. Total carbon content of 1 hectare = total carbon in plot $\times$ 40

Total carbon in 1 hectare = 124,000 kg C/hectare

This final number illustrates the total carbon stored in one hectare of pine plantation where the students took measurements. However, this is not the same as the amount of carbon that the trees sequestered in one year of growth. Carbon sequestration is the net intake of carbon by the tree over a period of time. In this case, the forest where students sampled is 25 years old. Assume that trees sequestered carbon at the same rate during each year it lived, and use the equation below to determine what rate carbon is sequestered by the forest annually.

Total carbon in 1 hectare $\div$ 25 years = Carbon sequestration rate

6. Carbon sequestration rate = 4960 kg C/ hectare /year