

How much Carbon does one Tree absorb?

A tree absorbs anywhere between 13 and 48 lbs of CO₂ per year on average, depending on a whole host of factors. And it's all those complex variables that make working out how much CO₂ a tree absorbs so interesting.

Here is how it works:

To keep it simple a tree is comprised of its leaves, stems, trunk and its roots. When you look at a tree, note that about five percent of the tree is comprised of its leaves, 15 percent its stems, 60 percent goes into its trunk and 20 percent is devoted to its roots.

Through photosynthesis, leaves pull in carbon dioxide and water and use the energy of the sun to convert this into chemical compounds such as sugars that feed the tree. But as a by-product of that chemical reaction oxygen is produced and released by the tree. It is proposed that one large tree can provide a day's supply of oxygen for up to four people.

Trees also store carbon dioxide in their fibers helping to clean the air and reduce the negative effects that this CO₂ could have had on our environment. According to the [Arbor Day Foundation](#), in one year a mature tree will absorb more than 48 pounds of carbon dioxide from the atmosphere and release oxygen in exchange.

The amount of carbon dioxide a tree absorbs varies tremendously, depending on:

- The age of the tree
- The amount of foliage it has
- The lifetime of the tree
- The size of the tree
- The health of the tree
- The species of the tree

While all living plant matter absorbs CO₂ as part of photosynthesis, trees process significantly more than smaller plants due to their large size and extensive root structures. Trees, as kings of the plant world, have much more "woody biomass" in which to store CO₂ than smaller plants. As a result, trees are considered nature's most efficient "carbon sinks."

Larger trees absorb more CO₂ than smaller trees. An oak tree for example will absorb more than a cactus or a palm tree because it has a large canopy and larger diameter. In addition, older trees absorb more CO₂ than younger trees for example a sapling oak tree would absorb approx. 13 lbs of CO₂ whereas a 15 year-old oak tree would absorb 48 lbs/year.

Best Trees to Capture Carbon

Dave Nowak, a researcher at the U.S. Forest Service's Northern Research Station in Syracuse, New York, has studied the use of trees for carbon sequestration in urban settings across the United States. A 2001 study he co-authored lists the following species as trees that are especially good at storing and absorbing CO₂: the common horse-chestnut, black walnut, American sweetgum, ponderosa pine, red pine, white pine, London plane, Hispaniolan pine, Douglas fir, scarlet oak, red oak, Virginia live oak, and bald cypress.

Trees do more!

But trees do even more than absorbing CO₂. They actually help regulate the climate in their surroundings. On hot days they help to cool down the temperature. By planting trees in smart places, we can reduce the amount of cooling in buildings up to 30%. This means less electricity is needed, while it's just as comfortable inside. Trees improve the air temperature around them and make walking and biking much more appealing.

Case for preserving older trees

According to a new study published in *Nature*, it turns out that the oldest trees are actually still growing rapidly, and storing increasing amounts of carbon as they age. An international research group led by Nate Stephenson of the U.S. Geological Survey Western Ecological Research Center reviewed records from forest studies on six continents, involving 673,046 individual trees and more than 400 species, going back as far as 80 years ago. For 97% of the species surveyed, the mass growth rate—literally, the amount of tree in the tree—kept increasing even as the individual tree got older and taller. Even though trees tended to lose leaf density as they aged—the total amount of leaf cover kept increasing as the tree itself got bigger and older. In other words, the number of leaves per cubic foot fell off but the leafy surface area grew and grew. That enabled the tree to keep absorbing an increasing amount of carbon as it aged.