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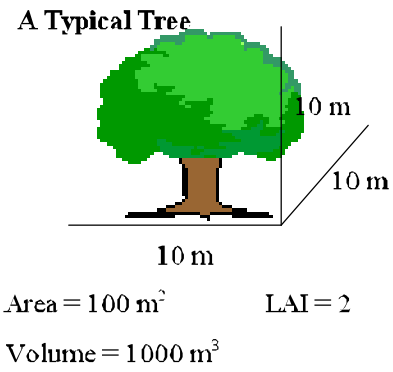
PRISM Folks: A "workshop" is a device I use to break up the monotony of lecture every day, and look at class topics in a wider and more entertaining context. This one comes on the heels of several lectures on photosynthesis, and precedes a unit on global climate change and agriculture. I do 6 or 7 of these throughout the semester in my plant physiology class. Students work in groups, and I circulate around giving them clues and such. A small prize is offered for the first ones finished, or to the person(s) willing to come before the class and explain how they solved it. [For the curious science types: answer = about 3 trees per gallon of gas burned per day].

HORT 4440: Workshop 4

Calculate how many trees would be required to offset the CO_2 emissions from your car on a typical day. Use the assumptions and parameters listed below. First, get an estimate of miles per gallon for your car, and then average # miles per day you drive. If you don't have a car, use the following stats for the typical Atlanta commuter in their SUV:



14 mpg highway
33 miles *one way* commute

1. Tree photosynthesis
   - peak rate = 54 mmol CO_2 /m^2 hr
   - hours of peak photosynthesis per day = 6

2. Gasoline:
   - octane - C_8H_{18}
   - assume complete combustion:
     $2\ C_8H_{18} + 25\ O_2$ ------> $16\ CO_2 + 18\ H_2O$
   - gram molecular weight of octane = 114 g/mol
   - octane density = 0.7025 g/cm^3