TEACHER VERSION

(Suggested student responses included)

Field Unit Assessment

1. *Show, draw or describe all of the steps in the process you used to find carbon storage at your Carbon Cycle Site.*

TREES:

Tree Circumference → Diameter at Breast Height
Process: $D = C/\pi$

Diameter at Breast Height → Tree Biomass
Process: Allometric Equations by species group

Tree Biomass → Biomass (g/m^2)
Process: Add individual tree biomass for all measured trees to get total plot biomass in kg/plot. Kg/plot x 1000g/kg ÷ area of plot in m^2

Biomass (g/m^2) → Carbon Storage (gC/m^2)
Process: Biomass x 50%

Carbon Storage (gC/m^2) → Carbon Storage gC
Process: gC/m^2 x total forested area around the school

SHRUB/SAPLING:

Shrub/sapling average height and percent cover → Shrub/Sapling Biomass
Process: Allometric Equations, evergreen and deciduous

Shrub/Sapling Biomass → Biomass (g/m^2)
Process: ÷ area of plot in m^2

Biomass (g/m^2) → Carbon Storage (gC/m^2)
Process: Biomass x 50%

HERBACEOUS

Vegetation and sample bag weight (g)→ Biomass (g)
Process: Mass (g) of Sample and Bag – Mass (g) of Empty Bag

Biomass (g)→ Biomass (g/m^2)
Process: Biomass ÷ area of plot in m^2

Biomass (g/m^2) → Carbon Storage (gC/m^2)
Process: Biomass x 50%

2. Using your knowledge of the global carbon cycle, name the carbon fluxes into and out of the plant pool. Hint: The fluxes are common biological processes.

   In: photosynthesis

   Out: respiration and litterfall

3. Describe how carbon is stored in vegetation.

   Carbon dioxide is taken in through the leaves and converted to glucose by the process of photosynthesis. Glucose is a building block of cellulose a major structural component of trees (both leaves and wood).

4. Where and how carbon is stored and cycled in ecosystems? Give qualitative answers (not actual numbers). Provide evidence that supports your explanations and your reasoning (see the Global Carbon Cycle Diagram).

   You may want to provide students with the global carbon cycle diagram.

5. How might carbon storage at your field site change if…

   a. Vegetation (trees, shrubs and/or herbaceous) was cleared to put in a parking lot?

      Carbon storage decreases. If vegetation is cut down for a parking lot it is no longer storing carbon.

   b. Vegetation was cleared to make a new sports field?

      Carbon storage decreases but not as much as in the parking lot example. The grass and upper soil layers continue to store and cycle carbon.

   c. Vegetation was cleared and allowed to re-grow?

      *Carbon storage would decrease when cleared and then increase as the vegetation grows back. Extension: Carbon storage would increase quickly at first because young plants grow fast, but as plants and trees get bigger the **rate** of storage (accumulation) decreases.*

   d. The cleared vegetations was left on the ground to decompose?

      Some carbon would go back to the atmosphere via soil respiration and some carbon would be incorporated into the soil.

   e. Cleared trees were used to make several sports equipment sheds for the school?

      Carbon would continue to be stored in the wood used to build the shed until eventually the wood starts to decompose and the shed falls down.

6. What are some ways you could increase carbon storage on the school property?

   Plant trees around sports fields, parking lots and playgrounds. After any clearing, use trees to build local structures, e.g. sheds, tables, buildings.

Name: Date:

Field Unit Assessment

1. Show, draw or describe all of the steps in the process you used to find carbon storage at your Carbon Cycle Site.

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3. Describe how carbon is stored in vegetation.

4. Where and how carbon is stored and cycled in ecosystems? Give qualitative answers (not actual numbers). Provide evidence that supports your explanations and your reasoning (see the Global Carbon Cycle Diagram).

5. How might carbon storage at your field site change if…
    a. Vegetation (trees, shrubs and/or herbaceous) was cleared to put in a parking lot?

    b. Vegetation was cleared to make a new sports field?

    c. Vegetation was cleared and allowed to re-grow?

    d. The cleared vegetation was left on the ground to decompose?

    e. Cleared trees were used to make several sports equipment sheds for the school?

5. What are some ways you could increase carbon storage on the school property?