



## Module 3: Soil Science and Soil Health

### Lesson B Quiz: Carbon in Soil

#### QUIZ LINKS:

[Module 3 Lesson B Quiz - Responder Link](#)

#### Multiple Choice

From the Build-Maintain-Consume triad for soil carbon, explain “maintain”:

- A. Add fresh plant material to soil every season.
- B. Stop microbes from decomposing organic matter.
- C. Rotate crops to keep soil nutrients balanced.
- D. Protect carbon in aggregates and on minerals

What happens to the carbon in the soil-carbon cycle?

- A. All of it is locked permanently into rocks and minerals.
- B. It dissolves into groundwater and is carried to the ocean.
- C. Some C is respired as CO<sub>2</sub>, or stabilized as soil organic matter
- D. It evaporates into the atmosphere as methane.

What is sequestration in the soil-carbon cycle?

- A. The increase in stock per year (e.g., CO<sub>2</sub>e/ha/yr)
- B. The temporary storage of carbon in leaves during photosynthesis.
- C. The process of removing nitrogen from the soil and storing it in plants.
- D. The ability of plants to use water more efficiently when carbon is stored.

When does soil sequestration of carbon occur? Hint: Recall the build-maintain-consume triad.

- A. When build > consume for a long period of time.
- B. When consume is greater than build for several seasons.
- C. When all microbial activity in soil slows down completely.
- D. When soil nutrients run out and decomposition stops.

Which of the following is NOT one of the four soil health principles?

- A. Maximize continuous living roots
- B. Maximize biodiversity
- C. Maximize chemical fertilizer inputs
- D. Minimize disturbance

\_\_\_ soil organic matter = \_\_\_ resilience.

- A. Less, more
- B. More, less
- C. Same, same
- D. More, more

Why are soils that are too wet not ideal?

- A. They prevent any carbon from entering the soil system.
- B. They increase N<sub>2</sub>O emissions.
- C. They cause plants to absorb too much oxygen through roots.
- D. They reduce the soil’s ability to store phosphorus long-term.

#### True or False

Soil is the largest land carbon pool.

### **Short Answer**

How does healthy soil help with carbon sequestration, and what conditions are needed for it to happen?

Answer should:

- Explain what carbon sequestration means in soils.
- Describe how soil carbon can be stabilized (e.g., in aggregates, minerals, or soil organic matter).
- Mention that sequestration occurs when carbon building is greater than carbon consumption over time.
- Be at least 3 sentences.

### **Short Essay**

Explain the role of soils in the carbon cycle. In your answer, describe how the build-maintain-consume triad affects carbon storage, and why healthy soils are important for reducing greenhouse gas emissions.

Answer should:

- Define soil carbon sequestration as the storage of carbon in soils as organic matter instead of being released as CO<sub>2</sub>.
- Explain the build-maintain-consume triad:
  - Build = adding organic matter (roots, residues).
  - Maintain = protecting carbon in aggregates and on minerals.
  - Consume = loss of carbon through respiration and decomposition.
- Connect soil health practices (e.g., minimizing disturbance, keeping living roots, maximizing biodiversity) to improved carbon storage and reduced greenhouse gas emissions.
- Be at least 5-7 sentences minimum with clear examples.