



Module 3 – Soil Science & Soil Health

Differentiated Content Lecture & Speaker Notes - Activity Worksheet

Carbon Detective Lab Extension

Grouping: Pairs or small groups (3–4)

Time: 25-30 minutes

Materials:

- Printed worksheet with soil datasets (SOM %, respiration, infiltration)
- Calculators or laptops (optional)
- Access to prior lesson notes/slides on Build–Maintain–Consume triad
- Colored pencils/markers for diagramming

Objective:

To apply soil carbon concepts by analyzing simple datasets. Students will practice distinguishing carbon storage vs. sequestration, classify practices with the Build–Maintain–Consume triad, and design a “carbon action plan” that maps soil practices to ecosystem services and SDGs.

Instructions:

1. Work with your group to analyze the dataset provided.
2. Decide if the soil is likely gaining or losing carbon.
3. Select two management practices (Build + Maintain) that could tip the balance toward sequestration.
4. Predict the effect of your practices on at least one soil health indicator.
5. Map your practices to at least one SDG (2, 6, 12, 13, 15).
6. Summarize your findings in a short action memo.

Your Task:

In this activity, you will become a carbon detective. Using soil data (SOM, respiration, infiltration), you'll decide whether the soil is gaining or losing carbon. Then, you'll choose a bundle of management practices to tip the balance toward sequestration, predict the outcome on soil health, and connect your plan to the UN Sustainable Development Goals.

Step 1: Carbon Basics

What is the difference between carbon storage and carbon sequestration in your own words?

Step 2: Read the Dataset

Sample dataset:

- Soil Organic Matter (SOM): 1.8%
- Respiration: High fizz reaction
- Infiltration: Moderate

Question: Is this soil gaining or losing carbon? Why?

Step 3: Practice Classification

Circle or write the Build–Maintain–Consume category for each practice below:

- Cover crops → _____
- Reduced tillage → _____
- Purchased compost → _____
- Turning compost pile → _____

Step 4: Design Your Practice Bundle

Pick 2 practices (Build + Maintain) and explain:

Why you chose them

Which soil indicator they will change (SOM, respiration, infiltration)

Whether your plan increases **storage** or **sequestration**

Step 5: Connect to SDGs

Which SDG(s) does your plan support? Write the number(s) and explain:

- **SDG 2 (Zero Hunger)**
- **SDG 6 (Clean Water)**
- **SDG 12 (Responsible Production)**
- **SDG 13 (Climate Action)**
- **SDG 15 (Life on Land)**

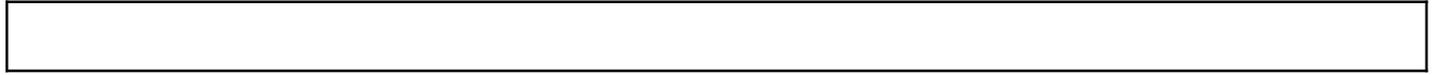
Step 6: Draft Your Carbon Action Memo

In 4–5 sentences, write a short recommendation:

- State the soil's current condition (gaining/losing carbon).
- Recommend your two practices.
- Predict at least one measurable outcome.
- Connect to at least one SDG.

Reflection Prompt:

How does analyzing real data change the way you think about soil carbon and climate action?



Skills You'll Use:

- Data analysis
- Systems thinking
- Critical reasoning
- Communication of sustainability solutions