SUMMARY LESSON PLAN ON MIDDLE SCHOOL SOIL TESTING FIELD DAY FOR A SOLAR ASSISTED COMMUNITY GARDEN

- **Location**: Little USA Community Solar Garden Site, Union Springs
- **Duration:** 1 Day (3–4 hours)
- **Participants:** STEM middle-school teachers and students from Tuskegee and other public schools

Summary:

The Soil Testing Field Day at Union Springs brings together middle school students to learn hands-on skills in soil science while preparing the site for a new community garden. Students collect and analyze soil samples, test pH and nutrient levels (NPK), and observe soil color and texture using simple field kits. Through teamwork and guided discussion, students discover how soil quality influences the potential for plant growth and learn practical ways to improve soil health through organic matter addition and balanced fertilization for future planting. The students will also learn about the benefits of planting under a solar canopy and learn about the solar farming practice known as Agrivoltaics. They can learn about Agrivoltaics in a short video from Jack's Solar Garden: https://www.jackssolargarden.com

Impact:

This program fosters environmental awareness and agricultural literacy among students and empowers them to make science-based decisions for sustainable gardening, and farming with the assistance of solar energy and the positive impact of periodic shade of the solar canopy. The project strengthens community engagement, inspires youth participation in local food production, and lays the foundation for a productive, educational community garden that promotes healthy eating and environmental stewardship.

Learning Objectives

By the end of this field activity, students will:

1. Collect and label soil samples correctly.
2. Test soil pH and nutrients (NPK) using simple test kits.
3. Identify soil color and texture.
4. Interpret test results to suggest how to improve the soil for planting.
5. Suggest potential crops that would do well in this soil environment planted beneath a solar array.

Materials & Tools

Item	Quantity
Simple Soil test kits (pH & NPK)	5
Plastic bags or containers for samples	20
Garden trowels or small shovels	10
Gloves (latex or garden)	4-sets
Distilled water (for testing)	2 gallons
Notebook and pencils	20 -packs
Soil color & texture reference charts	10
Plastic buckets for mixing samples	3
storage bag/container	4

Schedule and Detailed Activities

Time	Activity	What Students Will Do
9:00 – 9:15 AM	**Welcome & Introduction**	Teacher explains that students will test the soil to prepare for a community garden. Short talk on why good soil is important for plant growth. Students form small groups (4–5 per group) and receive materials.
9:15 – 9:45 AM	**Activity 1: Soil Sample Collection**	I. Each group selects 3–4 spots in the garden area (e.g., sunny, shady, wet, dry). II. Using trowels, students dig small holes (about 6 inches deep). III. Collect soil from each hole and place it in labeled plastic bags (e.g., "Spot A–Sunny corner") IV. Mix soil in a bucket to get a uniform sample. V. Record where each sample came from in their notebook.
9:45 – 10:30 AM	**Activity 2: Observing Soil Color and Texture**	I. Students spread a handful of soil from each sample on white paper. II. Compare the color using a printed soil color chart (light brown, dark brown, reddish, gray, etc.) III. Feel the soil: rub a small amount between fingers. IV. Describe it—gritty (sand), smooth (silt), sticky (clay).

Time	Activity	What Students Will Do
		V. Use water to make a “ribbon test” (try to roll soil into a ribbon—long = more clay, short = sandy). VI. Record color and texture observations in the data table.
10:30 – 11:15 AM	**Activity 3: Testing Soil pH and Nutrients (NPK)**	I. Students place a small amount of soil in the test kit container. Add distilled water and shake according to kit instructions. II. Use test kit color chart to read pH value (acidic, neutral, or basic). III. Repeat for **Nitrogen (N)**, **Phosphorus (P)**, and **Potassium (K)** tests. 5. Record results in a data table (e.g., Low, Medium, High).
11:15 – 11:45 AM	**Activity 4: Interpreting Results & Discussion**	I. Each group reviews results and answers: “Is our soil healthy?” “Do we need fertilizer or compost?” II. Groups share results with the class. III. Teacher helps interpret findings (e.g., low nitrogen → add compost or manure). IV. Students mark best spots for planting based on results.
11:45 – 12:00 PM	**Wrap-Up & Reflection**	I. Each student writes three things they learned and one idea to improve garden soil. II. Groups clean up tools and materials. III. Teacher summarizes main points: soil testing helps farmers and gardeners make better planting decisions.

Key Terms

- **pH:** How acidic or basic soil is (ideal range for gardens: 6–7).
- **NPK:** The three main nutrients for plant growth.
- **Texture:** The proportion of sand, silt, and clay.
- **Color:** Indicates organic matter and mineral content.