About the Garden Lessons

Over the course of the Garden Lessons, we will walk educators and young gardeners through the process of starting a garden from planning to harvest to putting the garden to bed for the winter. **Inside, you will find activity guides, curriculum connections, and tips and strategies for successful school gardening.** This hands-on series of Garden Lessons will support educators, youth leaders and students to start and tend to a garden project. These lessons were originally adapted from the Nova Scotia School Garden Resource Guide (2014).

This series is ideal for the integrated learning nature of Nova Scotia elementary curriculum; however, these activities can engage an all ages audience. Throughout the series that spans a full growing season, participants will keep a garden journal for planning, observation, and creative expression. Each student can have their own journal, or a group can keep one together.

Getting youth in the garden offers them opportunities to shape their food system, learn healthy food choices and connect with nature, all while building resiliency in a changing climate and having fun along the way.

Lesson Goals

- Engage in hands-on learning
- Gain food literacy skills
- Learn climate action connections
- Support emotional well-being and connection to the non-human world

Gardening and Climate Action

Look for these climate action icons in Grow Eat Learn resources to make connections between gardening and the climate!

Habitat Creation & Biodiversity

Waste Reduction & Circular Systems

Soil Stewardship

Water Stewardship

Food Security & Sovereignty

Adapting to climate change is critical for our food system. By engaging in the garden, students can learn about food production and its interdependence with plants, animals and weather.

Garden Lesson 5

The Dirt on Soil

Introduction

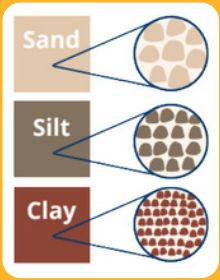
Complete this lesson between May and November.

The word soil refers to the mixture of air, water, minerals, organic matter, and living creatures such as bugs and worms that sustains plant life. Healthy soil is one of the key elements of a thriving and sustainable garden. While there are a few ways to increase soil health, one of the easiest and most accessible is to use compost.

Lesson 5 will walk through some at-home methods of testing garden soil composition to determine what it's made of, and identify which items can and cannot be composted for use in the garden.

Terms to Know

Soil contains three main types of minerals: **Sand, Silt and Clay.**



- Soil containing more *Sand* is light and dry, which allows for easier growth underground and is preferred by many root vegetables.
- Soil containing more *Silt* retains water and tends to be quite fertile, which is preferred by most plants.
- Soil containing more *Clay* is heavy and retains water, but can be challenging to grow in.

Soil containing a balanced mixture of sand, silt and clay is referred to as Loam.

Organic matter provides nutrients to soil. It can be added to a garden through compost, which has the appearance of soil and is made by mixing carbohydrate-rich "browns" and nitrogen-rich "greens" with water, air and soil.

Learning Connections

Science

Observe, Investigate, Identify, Test, Question

Food & Nutrition

Prepare Healthy Food, Plan a Meal

Language Arts

Comprehend, Read, Write

Visual Arts

Design, Draw, Create, Colour

Climate

Habitat Creation & Biodiversity

Soil Stewardship

Waste Reduction & Circular Systems

5.1 Soil composition text #1

1. In your garden journal, write "Soil Tests" at the top of the next blank page with a sub-header "Test #1" underneath. The following activity will be completed under this header.

2. Take a handful of soil and add just enough water so it can easily form into a ball. Press a finger into the centre. Did the ball a) break apart or b) stick together? Record the result.

3. Press the ball between your thumb and forefinger to make a long, flat shape like a ribbon. Did it fall apart, a) between 2.5-5 cm in length, or b) over 5 cm? Record the result.

4. Repeat these tests with soil from a different spot in the garden and the yard around your school as many times as desired to get an accurate picture of the soil across the entire garden. Compare the results.

5. Based on the activity above, record whether your soil contains more sand, more clay, or a balance of both. Proceed to the next test once complete.

5.2 Soil composition text #2

1. On the same page as Activity 5.1, create another sub-header: "Test 2". The following activity will be completed under this header.

2. Using a sieve or colander, sift a few handfuls of soil to remove rocks, sticks, or other large debris. Fill an empty jar halfway with the sifted soil. Fill the rest of the jar with water, leaving about 3 cm of air space at the top.

3. Close the lid tight. Shake until soil and water are completely mixed. Set the jar aside somewhere it will not be moved or disturbed.

4. Check the jar after 24 hours. The minerals in the soil vary in weight, so they will settle in a specific order: sand at the bottom, silt in the middle, and clay at the top.

5. Using a ruler or other measuring device, record the height of each of the three layers and the height of all three layers combined. If helpful, draw a sketch of the jar layers. On the same page, calculate the percent of each mineral contained in the jar (see examples 5.2.1 and 5.2.2 below).

Tips and Tools

Nitrogen-rich materials can include grass clippings, coffee grounds & paper filters. Browns are plant stalks and twigs, shredded paper, that is non-glossy and not colored, or shredded brown bags. The usual ratio is 3 or 4 part browns, to 1 part greens.

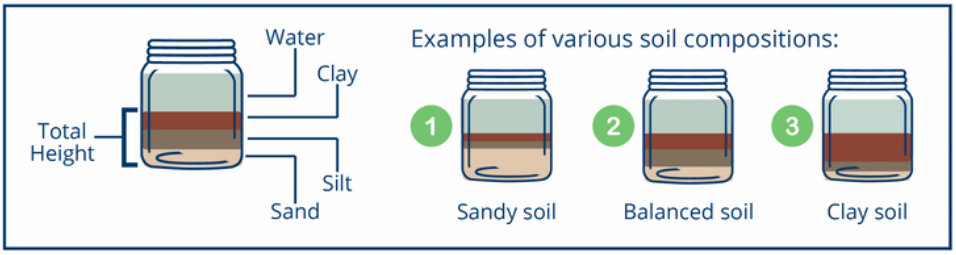
5.1 Materials:

- Greens & Browns
- Garden journal
- Pen or pencil
- Soil or dirt
- Water
- Ruler or measuring tape
- Gloves (optional)

5.2 Materials:

- Mesh sieve or colander
- Soil or dirt
- Mason jar (or upcycled jar, such as an old jam jar)
- Water
- Ruler or measuring tape
- Garden journal
- Pen or pencil
- Calculator

5.2.1 Example (Measuring Layers)



5.2.2 Example (Calculating Percentages)

Layer:	Sand	Silt	Clay	TOTAL
Height:	32 mm	32 mm	16 mm	80 mm

$$\% \text{ Sand} = \frac{\text{Height of sand}}{\text{Total height}} = \frac{32 \text{ mm}}{80 \text{ mm}} = 40\%$$

$$\% \text{ Silt} = \frac{\text{Height of silt}}{\text{Total height}} = \frac{32 \text{ mm}}{80 \text{ mm}} = 40\%$$

$$\% \text{ Clay} = \frac{\text{Height of clay}}{\text{Total height}} = \frac{16 \text{ mm}}{80 \text{ mm}} = 20\%$$

5.3 Garden composting 101

1. Using the chart below (see 5.3.1) as a guide, decide which items below should be put into the garden compost bin. Colour each one and draw a line to connect it to the bin. Put an "X" over the items that should not go into the garden compost bin.

5.3.1 Garden Compost Bin: What can go in it?

Yes		No	
• Fruit scraps	• Tea bags	• Meat or fish	• Pet waste
• Vegetable scraps	• Dryer lint	• Dairy	• Weeds
• Plant parts	• Cardboard	• Eggs	• Large branches
• Eggshells	• Paper	• Bones	• Wood logs
• Coffee grounds	• Small twigs	• Fatty/oily foods	• Diseased plants
	• Tree bark		• Pesticides

Adapted from the NS School Garden Resource Guide

Tips and Tools

Healthy soil is essential for food growing and for a thriving garden ecosystem. This lesson explores some strategies for good soil stewardship. Other strategies include amendments. Consider having students research what amendments do what to improve soil.

Healthy soil helps mitigate the effects of climate change by storing carbon in the ground, growing healthy plants and holding onto water.

Worms are great for gardens! They create small tunnels that aerate roots and improve water flow through soil. They also increase the nutrients in the soil by digesting dead plant debris
and expelling it as nutrient-packed "castings". Research vermicomposting for ideas to incorporate this into your garden.

Although many things can go into the green bin or kitchen compost, only certain items should be added to a **garden compost** (see examples on 5.3.1).

Click for next lesson:

Garden Lesson 6: What About Weeds?