Nourish
Nova Scotia

Grow Eat Learn
Nourish Nova Scotia

Garden Lessons

1-8

Table of Contents

Introduction

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, learning 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

Click on our *flork* icon to come back to this page!

Climate Change Connections

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 (including humans!), weather and our neighbourhoods. Stewarding a garden can nurture the planet as well ourselves. Offering climate action opportunities like youth-centered gardening can inspire hope and promote student well-being. Check out the following climate action themes connected to gardening that are highlighted in each lesson.

Gardening and Climate Action Themes

Habitat Creation & Biodiversity: Gardens support pollinators, soil organisms, and wildlife, emphasizing the role of biodiversity in climate resilience.

Waste Reduction & Circular Systems: In the garden we can compost, reduce food waste, and create closed-loop garden systems.

Water Stewardship: Exploring elements like rainwater collection and soil moisture retention connects students to how climate change affects precipitation patterns.

Soil Stewardship: Techniques like regenerative composting and no-till gardening support soil health as methods to sequester carbon, reduce erosion, and restore biodiverse ecosystems.

Food Security & Sovereignty: Growing food locally reduces reliance on imported food, lowers carbon footprints, and builds community health.

Critical Thinking Questions:

How does supporting biodiversity and habitat creation through gardening and land stewardship help our environment adapt to climate change?

Who is most affected by climate change and how can community gardening be a tool for food justice and climate action?

Garden Lesson 1

Planning a Garden

Introduction

Complete this lesson between February and April.

Anyone can grow a garden! As long as the essential components are present (sun, water, soil, and nutrients), any garden space can be successful. This lesson outlines how to effectively plan and map out a garden and involves a visit to the garden site and tracking the growth of the garden in a journal.

1.1 Common Garden Types

Container gardens, ground plots and raised planter boxes are all effective ways to grow a garden, so it is up to the gardener to choose the best method for them and their site.

Pots

Benefits

- Mobile
- Less risk of weeds/pests/diseases
- Eco-friendly if using recycled containers
- Can be placed on any type of soil or surface

Drawbacks

- Soil dries out quickly
- Garden is limited by size/number of containers
- Expense of soil, amendments & pots

Plots

Benefits

- Better retention of water & nutrients
- Makes use of what is there & may be less expensive
- Can provide more space

Drawbacks

- Potential lack of nutrients in soil or contamination
- Risk of stepping on plants/compacting soil
- Potential risk of weeds/pests/diseases

Learning Connections

Science

Question, Observe, Plan, Investigate

Mathematics

Measure, Map, Estimate

Language Arts

Comprehend, Read, Write, Describe

Visual Arts

Design, Draw

Climate

Habitat Creation & Biodiversity

Soil Stewardship

Food Security & Sovereignty

Look for these climate action icons in Grow Eat Learn resources to make connections between gardening and the climate! See Page 2 for details.

Planters

Benefits

- Less risk of stepping on plants & compacting soil
- Easier on the body, accessible design possibilities
- More space/depth for plants to grow, less rocks

Drawbacks

- Takes work to build planter boxes
- Expense of building materials/soil
- Difficult to move once in place

1.2 Start a garden journal

Starting with a blank notebook, write "My Garden Journal" or "[Your Name]'s Garden Journal" on either the front cover or the first page. Decorate the cover and use the first page to draw your dream garden with plants you'd like to grow and pollinators you might like to see. Get creative!

1.3 Research plant requirements

1. In your garden journal, write "Planting Map" at the top of the next blank page. The following activity will be completed on this page.

2. Research the space, soil and temperature needs of the plants that will be planted in the garden, using seed packages, online videos and books, etc. Find at least one native pollinator plant to add to your garden map.

3. Create a chart that includes:

   a. What is being planted?
   b. How much space is needed between each individual plant?
   c. If planting in containers, what size container is needed?
   d. Will the plant require support from a trellis?

1.3 Example

Vegetable	How much space between plants?	What size container?
Tomato	45–90 cm on all sides	60 cm deep and wide

1.4 Create a garden map

1. Measure your garden area from one end to the other (width, length). If using containers, how big is each container? If building a raised bed, what will the dimensions be?

Tips and Tools

Think outside the box! Beyond the three common garden types that we've listed, other possibilities could include edible landscaping with perennial plants and trees (for example, rhubarb, berry bushes and fruit treats) and pollinator gardens.

1.2 Materials:

- Blank Garden journal
- Pencil or pen
- Coloured pencils or crayons

1.4 Materials:

- Measuring Tape or meter stick to measure space

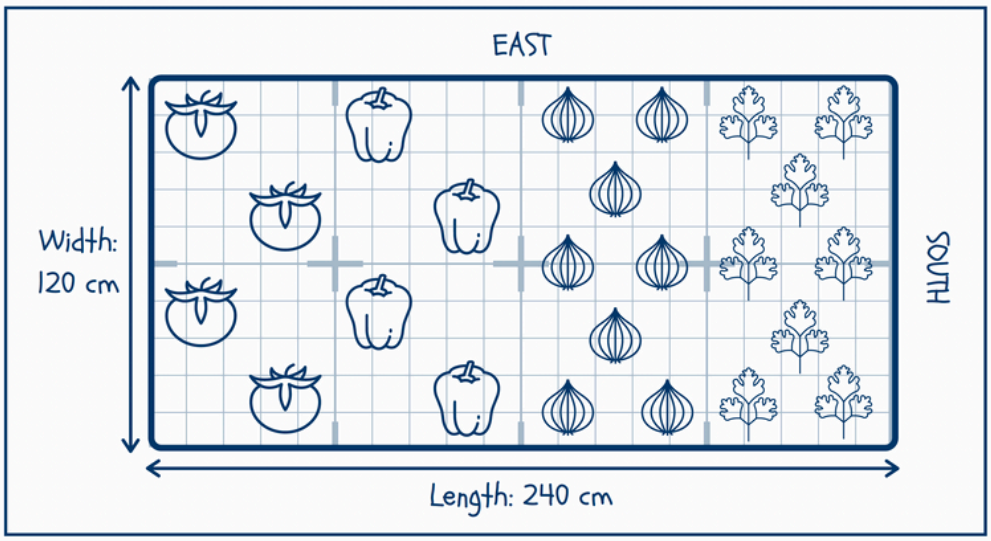
Optional:

- Seed packets
- Ruler or other straight edge for drawing grids/charts
- Graph paper
- Tape or glue

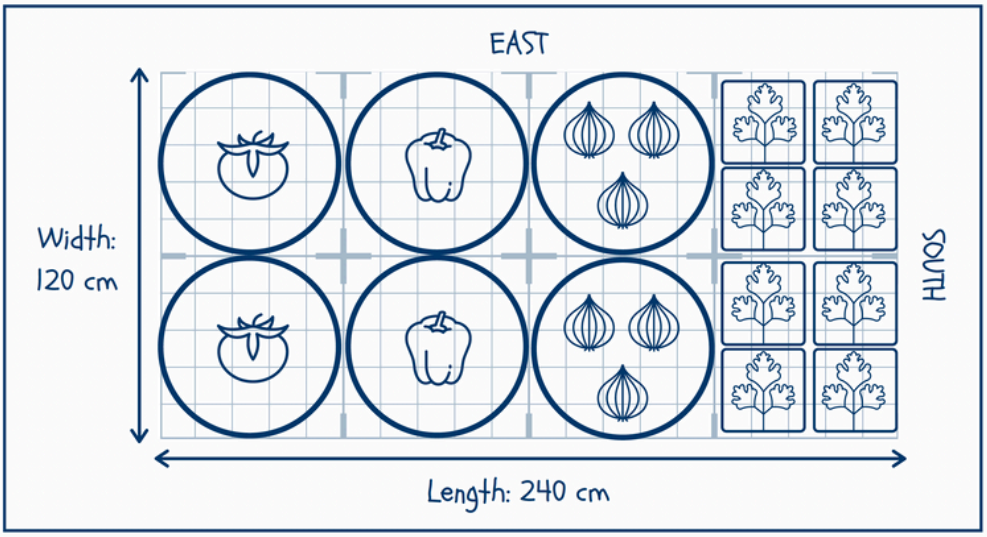
2. Draw a grid (see example below). Alternatively, tape or glue a small piece of graph paper into your journal.

3. Using these measurements and the space requirements for each plant, map the garden space. Indicate which direction each side of the garden is facing (i.e. east, west, north or south). If possible, plan to plant the tallest crops on the east or north side of the garden and shortest plants on the west or south side to maximize sunlight.

1.4.1 Example (In-ground plot or raised garden bed)



1.4.2 Example (Container Garden)



4. If you don't already have seeds to start that students have mapped out, make sure to have them ready for seeding day. Consider sourcing local seeds and have students research or share information about the benefits of local seeds, such as being already climate-adapted.

Tips and Tools

Garden location considerations:

- 6 hours of full sun
- Near a water supply
- Visible to community
- Protected from wind, wildlife, snow plows & other foot & vehicle traffic

Garden plant example:

Choose a favourite veggie-filled recipe (such as salsa) & plant a garden based on the ingredients. For a salsa garden, try planting peppers, tomatoes, onions & cilantro. See Activity 1.4 for an example of a salsa garden.

Incorporating pollinator plants:

Planting pollinator-friendly plants in and around your garden can bring beauty and provides a pollinator habitat in your garden. Have students research why pollination also boosts plant productivity.

Garden Lesson 2

Starting Seeds Indoors

Introduction

Complete this activity between March and May.

Gardens provide a diverse, hands-on teaching environment. One of the benefits of gardening, whether at home or in a school setting, is the opportunity to foster a child's connection with their natural environment. Gardens also provide an engaging place to teach and practice healthy food choices.

Lesson 2 will guide youth to create an indoor nursery to start and care for seedlings. Ahead of planting the seeds, create an indoor sun map to help you choose where to place your seeds once they sprout and whether or not a grow light would be helpful. In this lesson, we also explore the nature of seeds and how to plant and care for them.

2.1 Create an indoor sun map

1. In the garden journal, write "Garden Sun Map" at the top of the next blank page. The following activity will be completed on this page.

2. For now, these plants are too small and delicate to go outside. We will start by choosing an indoor space for the seedlings to grow. Plants need a lot of sun, so in order to pick a good spot for them to live indoors, we will create a Sun Map.

3. Observe this space for an entire day. Make note of:

   a. Which spots are sunny in the morning? Afternoon?
   b. Which spots feel warm?
   c. Which spots have good air flow from a nearby window or door?

4. Draw a map of this space, including any relevant details (like furniture and windows). Using a ruler can make it easier to keep your map looking neat and tidy.

5. Based on the observations from Step 3, fill in the sunny and shady spots on the map with colours, pictures or shading. Add as many details as would be helpful.

Learning Connections

Science

Question, Observe, Record, Identify, Monitor

Mathematics

Measure, Model, Compare, Calculate

Language Arts

Comprehend, Read, Write, Describe

Visual Arts

Design, Create, Draw

Climate

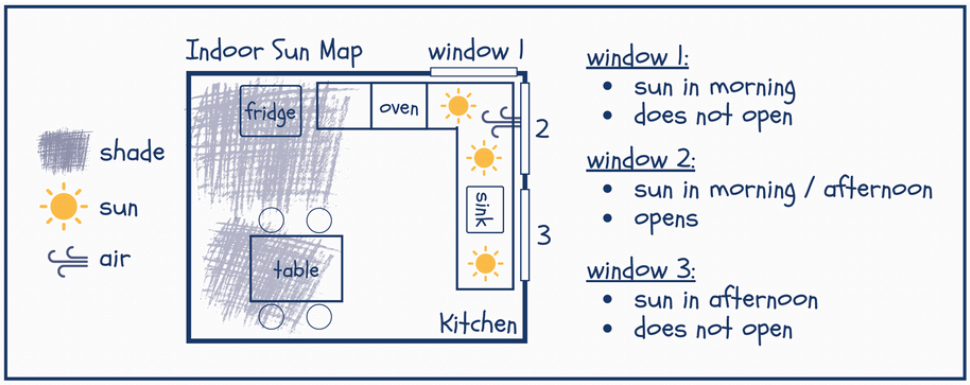
Water Stewardship

Food Security & Sovereignty

Soil Stewardship

6. Using this Sun Map, decide where the seedlings will grow. Most plants need at least six hours of direct sunlight, so consider that as well when choosing the perfect spot. In the example below, the counter-top in front of "Window 2" appears to be the best spot. This spot is sunny all day and the window can be opened to allow air to flow through.

2.1 Example



2.2 Garden journal seed exploration

1. Write the word "Seeds" at the top of the next blank page in your garden journal. The following activities will be completed on this page.

2. Open a seed package and look at the seeds.

   a. What do the seeds look like? Think about the colour, shape and size.
   b. What do the seeds feel like? Think about the texture.
   c. If using multiple seed varieties, do the different types of seeds share any characteristics with each other or are they very different?

3. For each type of seed:

   a. Draw a picture of the seed and a picture of what the seed will grow into.
   b. Write a list of 3-4 characteristics of each seed, including any listed above (colour, shape, size, texture) or any others you can think of.

4. Read the back of each seed package. For each type of seed, also write down:

   a. How many days until a sprout should appear ("days to sprout")?
   b. How many days until the vegetables can be harvested ("days until first harvest")?

Tips and Tools

2.1 Materials:
- Garden journal
- Pencil or pen

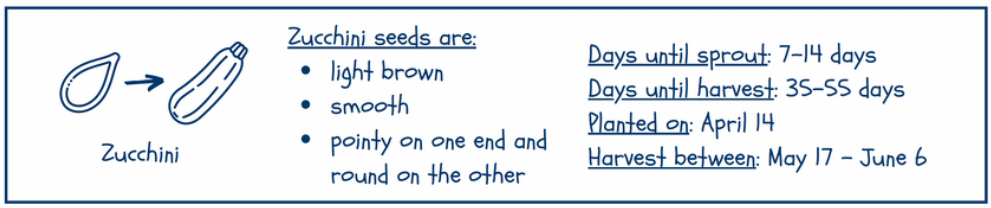
Optional:
- Coloured pencils or markers
- Ruler

Plants need sunlight, water, nutrients, room to grow, and air. They need to breathe for the same reasons we do. Wherever the seedlings are grown, they should ideally get a little bit of airflow from an open door or window.

2.2 Materials:
- Seed package(s)
  - Beans, peppers, tomatoes and zucchini are good for beginners. For variety, choose two or three vegetables.
- Garden Journal
- Pencil or pen

5. Using a calendar to count the days, determine the date you can harvest your vegetables by adding the number of "days until first harvest" to your planting date (today).

2.2 Example



2.3 Plant seeds

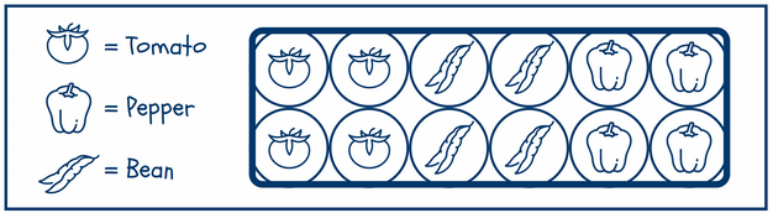
1. Add soil to a container big enough to add and mix in water. Moderately water the soil, mixing it in as you go until the soil is moist to the touch.

Optional: Mix some coffee grounds or compost with the soil. This will provide nutrients that will help the seeds grow.

2. Fill the seed trays with moist soil and bury multiple seeds per plug. Try to have at least 2-4 plugs for each type of seed. Check the back of each seed package to find out how deep to bury the seeds.

3. On the "Seeds" page of the garden journal, draw a diagram of the seed tray and label where each seed is growing using words, numbers or drawings.

2.3 Example



4. Check moisture daily by gently touching the soil and observing the seedlings. Water if it looks and feels dry times per day until the soil is moist but not soaked.

Optional: Use a spray bottle to water seeds evenly and prevent over-watering or see activity 2.5 to create a self-watering tray.

Tips and Tools

For most annual flowers and vegetables, plant seeds at a depth of about 1/4 to 1/2 inch below the soil surface. Larger seeds should be planted at a depth of **2 times** their diameter.
Smaller seeds should be planted closer to the surface.

Some seeds never sprout, and that's okay! There are many reasons why this can happen, so don't be discouraged if there are fewer successful sprouts than expected.

Most seeds need darkness to sprout. To save space before they sprout, you can stack the plug sets. When you water, it trickles down to the bottom. Take a peek daily. Once you see the beginning of a sprout, remove it from the stack.

2.3 Materials:

- Seed starting plugs and waterproof tray
- Seed package(s)
- Potting soil
- Garden journal
- Clear plastic covering
  - ex. Cling wrap, clear plastic bag or a plastic seed tray dome.

5. Cover the seed tray loosely with a clear plastic covering to act as a mini-greenhouse. Remove the cover for an hour per day to allow air circulation and prevent mold growth. A plastic seed tray dome is optimal and can deter rodents.

6. Once sprouted, keep the seed tray on a sunny windowsill. Try to find a window where the seeds will enjoy 6-8 hours of direct sunlight. Activity 2.1 will help determine if the window is sunny enough or if a grow light may be necessary.

Optional:

- Try using recycled containers, such as takeout containers, in place of a store-bought tray.
- Coffee grounds or compost
- Spray bottle for watering

2.4 Track sprout growth

1. Write the word "Sprouts" at the top of the next blank page in the garden journal. The following activities will be completed on this page.

2. For each plant, record the day that it sprouts (when the plant emerges from the soil). Dispose of the plastic covering once the first sprout appears to allow room to grow.

3. Measure sprouts with a ruler or measuring tape twice per week, about every 3-4 days, and record the height of the plants as they grow.

4. When the seedlings are 2-3 weeks old, they can be ready to transplant into larger individual pots. Refer to Garden Lesson 3 for full instructions and activities. If planning to pot up seedlings, consider using recycled containers instead of plant pots (such as ice cream tubs, pop bottles or old toys), be sure to save them in advance.

2.4 Materials:

- Garden journal
- Pencil or pen
- Ruler or measuring tape

2.4 Example

	Zucchini 1		Pepper 1		Pepper 2	
Sprout Date	April 23					
	Height	Date	Height	Date	Height	Date
	3 mm	April 27				
	7 mm	April 30				

2.5 Create self-watering seed tray (optional)

1. To create a self-watering (wicking) tray for seedlings, you will need to source a rigid material you can cut to create an insert that will fit inside your bottom tray. If using a standard seed tray, you can just use a modified second tray as the insert.

2. If using a second seed tray, cut a slit (approximately 2-4 mm wide) for the towel to slip down through along the short sides (both ends) of the tray. If using a rigid plastic (like a corrugated plastic sheet), cut it to fit inside your bottom tray with room for the fabric to hang over at each short side.

3. Measure the height of the mason jar rings (or alternative water proof riser). Cut the towel or fabric the width of the seed tray and cut the length of the seed tray plus the height of the risers (mason jar rings or other material).

4. Fill the bottom tray (now the water reservoir) with water up to the top of the risers.

5. Lay the towel in the tray with the cut ends or over top of the rigid plastic material. Make sure the excess ends of fabric are pushed through the slit or over the edge of the rigid plastic material so that they hang straight down into the water reservoir.

6. Place the smaller seed plug inserts (where your seeds are planted) directly on top of the soaked fabric ensuring that the holes in the bottom of the seed plugs are making contact with the wet fabric.

7. You can use this self-watering tray all the time or just on weekends or periods when seedlings cannot be tended to daily. Check water reservoir daily to ensure it isn't dry.

Tips and Tools

Place soaked seeds in a small ziplock bag and watch them sprout as a parallel experiment to seeding in soil.

2.5 Materials:

- An extra seed tray or a rigid, waterproof material cut to fit inside the seed tray
- Towel or cotton fabric, slightly larger than the seed tray (used is great)
- 5 mason jar rings or 5 waterproof risers at least 1.5 cm and up to 4 cm tall

Garden Lesson 3

Planting a Garden

Introduction

Complete this lesson between Mid-May and June.

Lesson 3 will guide young gardeners through the process of transplanting seedlings into the garden or into larger pots to make room for growing roots, as well as how to gently transition seedlings to living outside. Gardeners will need their Sun Map to assist in planting.

When a seed begins to sprout, it grows tiny "seed leaves" (cotyledons) which will eventually wither and fall off to make room for the "true" or adult leaves. Depending on how fast your seedlings grow and the space you have, youth may transplant or “Pot Up” the seedlings into an intermediate container, like a used plastic cup or small pot. This is optional. If your seedlings will stay in their original plugs, go to section 3.2: “Harden Off” Seedlings.

3.1 Potting up seedlings (optional)

1. Prepare each plant container by filling it about ¾ of the way with pre-moistened soil.

2. Pop or tilt the seedling out of the plug, gently pulling, removing it without pulling on the plant stem. If there is more than one seedling in a single cup, have a container prepared for each seedling (or simply choose the tallest/healthiest seedling to keep and discard the others).

3. Gently scoop the seedling and attached soil into your hand. Be careful with the roots!

4. Place both the plant and soil into the prepared pot and add more soil to fill the remaining space around the seedling. Gently pat the soil down to get rid of trapped air.

5. Repeat as necessary for each seedling.

6. Put the pots in the place chosen for them in the previous activity. Keep the pots in a waterproof tray to catch excess water.

Learning Connections

Science

Question, Observe, Monitor

Mathematics

Collect Data, Model

Language Arts

Comprehend, Read, Write

Visual Arts

Design, Create, Draw, Colour

Climate


Water Stewardship


Habitat Creation & Biodiversity


Soil Stewardship

3.1 Materials:

- Plant pots
  - If using recycled containers, poke a few small holes in the bottom.
- Potting soil
  - You can also use dirt from outside mixed with compost.
- Waterproof tray
- Seedlings

7. Transplanting can be stressful for seedlings, so water generously. As they grow, keep the soil moist but not soaking wet. Wait until the seedlings are 7-10 cm tall before completing the following activity (3.2).

3.2 'Harden off" seedlings

1. Plants can be transitioned outside as soon as after the last frost date. Research online or using a farmer's almanac to find out the last frost date is in your area. Start the hardening off process a week before the intended planting day.

2. The transitioning process the plants will need to undergo to live outside is known as "hardening off." This will make them strong enough to survive in changing weather. There are three factors/ steps to consider when hardening off:

Sunlight: Start putting the plants outside on mild days. Place them in partial shade to avoid sunburn. Move them back inside in the evenings when it gets cold.

Temperature: Check the upcoming temperature online every night. When the nights are consistently warm enough (over 10°C), plants can safely stay outside overnight.

Water: Begin to water plants less frequently (about every few days), unless there is a heat wave. Forcing them to search for water with their roots allows them to strengthen their root system.

3.3 Planting out the seedlings

1. Once the process of hardening off is complete, the plants should begin to thrive outdoors. It's now time to consult your pre-season Garden Map from Lesson 1 and plant the seedlings outside where they can continue to live comfortably.

2. Before planting, you must prepare the beds. This means removing weeds, adding compost or other soil enhancements, and turning over the soil to loosen it. You may even need to add some garden soil if the raised bed is depleted.

Tips and Tools

Consider planting on a Friday so that you can harden off plants during one school week and plant at the end of that week. Just make sure to thoroughly water and check on them first thing the next Monday morning.

When "hardening off" plants, start by putting them outside for only a few hours at a time. Gradually increase the time outside every day. This allows them the time they need to adjust to varying temperatures.

3.3 Materials:

- Shovel
- Garden fork or rake
- Compost
- Soil
- Planting bed or pots
- Sticks
- Measuring tape
- Trowel

Optional:

- Seaweed, chicken manure.
- Mulch (ex: straw)
- Black plastic weed barrier
- Supportive sticks
- Peat or Coco Coir
- Fencing

3. Water the prepared soil unless it has just rained. Use garden tools to mix the water into the soil before making holes for your plants.

4. Refer to the Garden Map to see the layout you planned before planting. Perhaps some seedlings have not made it and adjustments must be made to the plan. Make sure to measure out the spacing your seedlings require and use sticks to plot out exactly where plants will go before making any holes.

5. With a trowel, have youth each dig a hole that is the same depth as the length of the plug. The goal is for the top of the seedling's soil to be level with the garden bed soil.

6. Carefully remove the plug from the seed tray. If the plant roots are tangled or dense, gently massage and pull apart the roots. This helps them reach out and down into the soil as sometimes the roots curve up in the seed tray.

7. Have the youth place the plugs in their prepared holes. Gently fill in the soil around the plug once it is placed. Press gently on the soil around the plant to get rid of any air pockets.

8. Gently water the newly planted seedlings.

9. Cover the ground with mulch, if using, so that bare soil disappears. Be careful around the plant as mulch is laid.

Tips and Tools

Mulching the garden helps keep weeds down and also helps the soil hold water better. The garden can thrive with less effort if you mulch.

Garden Lesson 4

Critters in the Garden

Introduction

Complete this lesson between June and October.

Gardens can become a diverse ecosystem with an abundance of life. Knowing which critters are beneficial and which to discourage can be helpful. Some critters, such as pollinators, increase plant health and help with seed production; others can destroy plants or spread disease.

Lesson 4 will explore how to recognize some of the most common garden critters and determine whether they are helpful or harmful to your garden, as well as some ways to attract more pollinators.

4.1 Keeping track of garden visitors

1. In your garden journal, write "Critters in the Garden" at the top of the next blank page. The following activity will be completed on this page.

2. Visit or observe your garden at different times of the day. Look for visitors, such as birds, bugs or other small critters.

3. Choose two or three visitors and draw a picture of each. Use a magnifying glass if necessary to see them close up.

4. Research the visitors you've drawn using the internet, the library or a local gardener to learn more about them. Find out whether the visitors are beneficial or creating an imbalance in the ecosystem. Indicate this underneath each drawing, along with the name of the critter.

Optional: Write short notes beside the picture as a reminder. For example:

- If critter is helpful, how? How can the garden attract more of them?
- If critter is harmful, how? What is the best way to discourage them?

Learning Connections

Science

Observe, Identify, Match, Build, Research

Mathematics

Measure

Language Arts

Comprehend, Read, Write, Describe

Visual Arts

Design, Draw, Create, Colour

Climate

Habitat Creation & Biodiversity

Soil Stewardship

Food Security & Sovereignty

4.1 Example

Aphid | Slug | Lacewing | Earwig | Snail

4.1 Creating habitat for critters

1. While observing critters in the garden, have students gather some natural materials that will promote bug habitat on the surface of the garden.

2. If you haven't mulched the garden yet, use this as an opportunity to introduce mulch to protect the soil from the sun and to encourage diverse habitat within the garden. Mulching also lessens the watering needs of plants.

3. Have youth name the items they have selected before they place them. Ask students to explain why they believe it will help create a good environment for critters to thrive.

Tips and Tools

You can download and use free Identifier apps for critters or plants, to help with identifying.

There are many ways to discourage common garden pests. Monitor the critters, where they're hanging out and when, and research options for best traps or natural deterrents depending on your situation.

Attract birds to the garden with birdhouses, feeders, and birdbaths. Birds eat many insects, including beetles, caterpillars, earwigs, snails, and slugs.

4.1 Materials:

- Mulch (can be straw, or leaves/ other natural material
- hollow sticks and dried plant stalks

4.3 Garden visitor matching game

Can you tell the difference between harmful and helpful garden visitors? Draw a line to match each visitor to its description. Answers at the bottom of the page.

Butterfly

Earwig

Aphid

Ladybug

Slug

Lacewing

Bee

Snail

1. I'm a great climber, and will climb up plants to eat their leaves.
2. I'm a pollinator. Some gardeners might mistake me for a flower.
3. I eat everything in a garden from roots to tips. I leave trails of slime.
4. I look small and delicate, but I protect your garden from pests.
5. I attach myself to leaves and stems to steal nutrients.
6. I am a helpful pollinator. Don't mistake me for a wasp!
7. I can give a nasty pinch. I can eat both plants and other pests.
8. I stand out due to my bright colour. I eat harmful pests.

Answers: 1-Snail 2-Butterfly 3-Slug 4-Lacewing 5-Aphid 6-Bee 7-Earwig 8-Ladybug

Tips and Tools

Did you know that some pollinators have favourite colours? Growing plants in a pollinator's favourite colours may attract more of them to the garden. Bees love purple, blue, violet, white and yellow. Butterflies love pink, purple, red, yellow and orange.

Have students explore the question: Why do pollinators help plants produce more food?

For an older group next ask: What does this mean for our food system?

Garden Lesson 5

The Dirt on Soil

Introduction

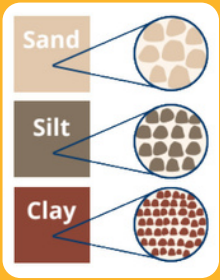
Complete this lesson between May and November.

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.

Greens

Browns

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.

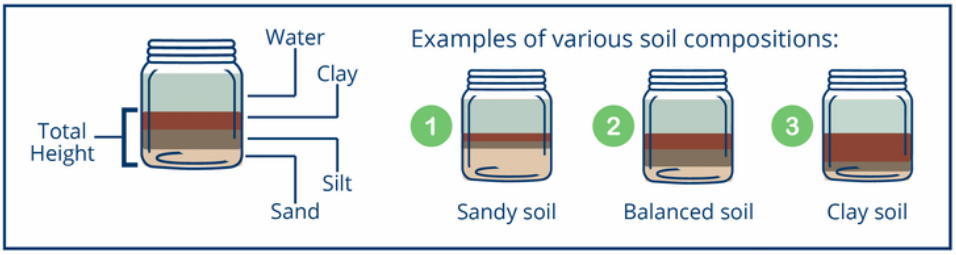
5.1 Materials:

- 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).

Note: Anything added to the garden compost should be cut or broken into small pieces first.

Garden Lesson 6

What About Weeds?

Introduction

Complete this lesson in May or June.

Other than critters, weeds are inevitable in gardens. They share with garden plants the same water, sun, and nutrients in the soil and sometimes overgrow. Removing weeds from the garden can be a great time to spend nurturing your plants.

Lesson 6 will identify some of the most common garden weeds found in Mi'kma'ki/ Nova Scotia and how to get rid of them safely. We will also go over one of the benefits of weeds: many are edible and can make a tasty addition to a salad.

Common Garden Weeds

Oxalis / Wood Sorrel

Broadleaf Plantain

Dandelion

Oxeye Daisy

Purslane

Bull Thistle

Red Clover

Coltsfoot

Safety Tips

- Edible weeds should always be identified by someone who knows the shape of the leaves, the plant size and details of the flower.
- Dandelion greens should be washed thoroughly beforehand and eaten in moderation!
- Do not consume weeds that have been exposed to pesticides.

Learning Connections

Science

Observe, Question, Identify

Mathematics

Comprehend, Read, Write

Language Arts

Draw, Colour

Visual Arts

Prepare Healthy Food, Plan a Meal

Food & Nutrition

Prepare Healthy Food

Climate

Habitat Creation & Biodiversity

Food Security & Sovereignty

Waste Reduction & Circular Systems

6.1 Dandelion salad in a jar

Did you know that dandelions are completely edible, from the roots to the flowers? Instead of throwing dandelions away when they're plucked out of the garden, try making them into the perfect packed lunch with this recipe for dandelion salad in a jar.

1. Wash, dry and chop all produce and dandelion greens before assembling salad.

2. Add 1 Tbsp of your favourite healthy salad dressing to the bottom of the jar.

3. Add the fruits or veggies that are high in moisture.

4. Add the veggies that are lower in moisture.

5. Add a source of protein, such as chicken, salmon, tuna, chickpeas, quinoa, seeds or nuts.

6. Add dandelion greens on top.

   Optional: Add other salad greens for variety, such as lettuce, spinach or arugula.

7. Store in the fridge for up to 2 days. When ready to eat, shake the jar until all ingredients are mixed together and enjoy!

6.2 Dandelion life cycle

1. Seek out a young dandelion from the garden, backyard or an outdoor community space. Young dandelions will often have a few thin, toothed leaves but no bud or flower yet.

2. Using a trowel or small cultivator, dig up the entire dandelion. Make sure you dig deep enough to remove the entire taproot, which is the large central root.

3. Fill three-quarters of a small pot or recycled container with soil. Place the young dandelion on top and add enough soil to cover the roots. Gently pat down the soil.

4. Place on a sunny windowsill and water regularly. Watch your dandelion grow!

Tips and Tools

Vegetable Suggestions:

High moisture: Tomatoes, cucumbers, oranges, clementines, apples, pineapple or berries.

Low moisture: Carrots, broccoli, cauliflower, peppers, onions, avocado, cabbage or snap peas.

6.1 Materials:

- Mason jar (or a clean recycled glass jar)
- Salad dressing of choice
- Fruits and/or veggies*
- Protein of choice
- Dandelion greens

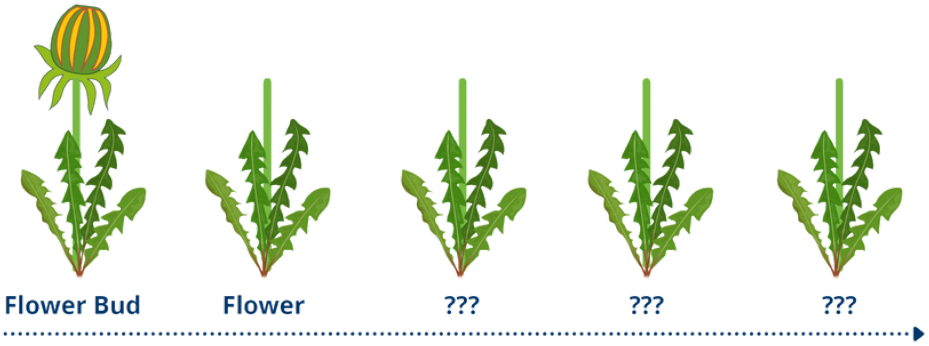
Optional:

- Other salad greens

6.2 Materials:

- Garden tool (i.e. trowel or cultivator)
- Small plant pot or recycled container
- Soil or potting mix
- Coloured pencils, pens or markers

5. On the diagram below, draw different stages of growth starting from a flower bud. Can you determine what the other stages are?



6.3 Colouring activity

1. Colour the following pictures of common garden weeds and write the name of each one in the box provided. Hint: Refer to the images on the introduction page for help identifying the weeds.

2. While students are colouring, prompt a discussion about how weeds also serve as pollinators for bugs and contribute to the biodiversity of the garden. Ask what bugs might visit these weeds in bloom, referring to Lesson 5.

Tips and Tools

Weeds like clover, dandelions and daisies are a main food source for pollinators, so consider letting them be if they're not interfering with the garden.

Tips for controlling weeds in the garden:

- **Remove weeds by hand:** Use hands or a garden tool (such as a trowel or claw-weeder) to remove weeds. Ensure that the whole weed is removed, including all the roots.
- **Remove flowers and seeds:** Cut off the flowers as soon as they appear or remove seeds before they can spread.
- **Use mulch:** Mulch is a layer of grass clippings, tree bark, moss or another cover that improves soil health, retains moisture and helps to prevent weeds. Water the garden before-hand and ensure that all weeds are removed.
- **Cover and starve:** For stubborn weeds, cover the area with cardboard, plastic weed fabric, or a tarp to starve the weed roots. This can sometimes take over a year to be effective, but can be used as a last resort.

Garden Lesson 7

Harvest & Reflection

Introduction

Complete this lesson between August and October.

After all that hard work, the garden is finally ready for harvest. Almost every vegetable has a different way to indicate when it is ready for harvest. For some, it might be the texture or firmness. For others, it may be the size, shape or colour. To know when vegetables are ready to harvest, check your garden journal Seed entry, ask a local gardener, visit the library, or research on the internet.

Lesson 7 will cover when and how to harvest, as well as some fun activities to reflect on this past growing season and the future of the garden.

Common Harvesting Methods

Cut

Harvest by cutting parts of the plant with scissors or pruning shears.

Use for:
- Herbs
- Leafy greens

Pick

Harvest produce gently with two hand.

Use for:
- Plants with "fruits" (ex. beans, zucchini, peppers, tomatoes)

Pull

Harvest by pulling up the whole plant by hand. Soil may need to be loosened.

Use for:
- Root vegetables (ex. carrots, turnips, beets, radishes)

Learning Connections

Science

Observe, Question, Identify, Investigate, Research

Mathematics

Calculate

Language Arts

Comprehend, Read, Write

Visual Arts

Draw, Colour, Design, Create

Food & Nutrition

Prepare Healthy Food

Climate

Food Security & Sovereignty

Waste Reduction & Circular Systems

Soil Stewardship

Water Stewardship

7.1 Harvest time!

1. Different vegetables need to be harvested at different times. Refer to the "Seeds" page in the garden journal and check two things we recorded for each plant on seeding day:
    a. Sprout Date
    b. Days Until Harvest

2. Additional factors can impact harvest time, like weather and garden location. If you're still not sure if the plant is ready for harvest? Taste it! If the plant is not ready, you will be able to tell by the taste or texture.

3. Harvest using one of the methods described above (cut, pick or pull). Choose the best method for each plant. For example, you should cut spinach but pull carrots.

4. Inspect and rinse the produce well to remove any insects or dirt.

5. Time to enjoy the harvest! How does the produce smell? Feel? Look? Taste? Explore some fun ways to prepare and share your harvest with community.

Optional: The Nourish Recipes page may help get you started.

7.2 Reflecting and creatively recording

1. In your garden journal, write "Reflection" at the top of the next blank page. The following activity will be completed on this page.

2. Look back at everything written in your garden journal up to this point, and look at the garden itself. Whether it is planted in containers, planters or directly in the ground, walk through or sit by the garden and use your senses to experience it. Take this opportunity to practice mindfulness. What do you see? Hear? Smell? Touch?

3. Using coloured pencils, pens, markers, coloured paper, crayons or whatever craft supplies you have on hand, create a picture of the garden inspired by your experience. If you prefer photography, make a slideshow to share. Take some pictures close up and some far away. Choose a few different subjects for your photos, including whatever garden visitors you may have (such as birds or bugs) or any decorations you have created.

Tips and Tools

Eating from the garden means there were no carbon emissions from food transportation. Engaging with this local food systems helps young people understand where their food comes from while learning about sustainable growing methods.

7.1 Materials:

- Garden journal

Optional:

Garden tools, such as gloves and scissors

7.2 Materials:

- Garden journal
- Pen or pencil
- Coloured pencils, crayons, markers or other craft supplies for drawing or colouring

Optional:

Smart phone or camera for taking photos

7.2.1 Example

"SQUASH" – A Haiku

by Nourish Nova Scotia

Yesterday a seed
Today a butternut squash
And tomorrow, soup

7.3 Writing about the garden

Choose one or more of the following activities to complete on the "Reflection" page (or the next pages, if more space is needed).

a. Write a poem or haiku about your garden. Draw a fancy border around your poem (such as a leafy vine, or colourful vegetables). Write the title of your poem at the top. Suggestions for topics:

- Your favourite part of planning a garden
- An ode to your favourite vegetable or plant
- What you experience when you explore your garden with all senses
- How your garden might look in a different season - How do you think it will look later in the fall? In the winter? Next spring?

b. Find a recipe containing one or more of the vegetables you're growing, that you're excited to try. Write this recipe down in your notebook with a sentence or two about why you chose this recipe. Cook this recipe with the help of a friend or family member, and taste it together when it is finished. Draw or take a picture of the completed dish and glue it into your garden journal. Record your thoughts and your friend or family member's thoughts, about the recipe. How does it taste? Would you make it again in the future?

c. Write a pretend news story about your garden. Use your imagination! You could write about how your garden grew the biggest tomato in the world or how you discovered that a garden gnome was stealing your veggies - the possibilities are endless! Give your news story a fun headline and illustrate it with pictures or even photos of your garden.

Tips and Tools

Harvesting more produce than you can use yourself? Consider sharing the abundance with friends, family, the food bank or a local food-based charity or organization.

Make the garden journal your own! Decorate the pages with coloured pencils, pens, markers or even photos if you haven't already done so.

Your gardening journal is a valuable tool. It can help you learn from your challenges and celebrate your successes!

7.3 Materials:

- Garden journal
- Pencil or pen

Optional:

Craft supplies, such as tape or glue, for decorating this activity page

Garden Lesson 8

Putting the Garden to Bed

Introduction

Complete this lesson in late October or November.

When the garden has been harvested, it is time to wrap up for the season. This is known as "putting the garden to bed," and includes removing or covering the plants that are left over and packing away tools and supplies. Putting the garden to bed reduces the amount of work that needs to be done at the beginning of the next growing season. It is also an important step in taking care of the garden soil. The tasks can be completed over multiple days or weeks. It is best to finish putting the garden to bed before the weather is too cold and the ground freezes completely.

Lesson 8 will cover the process of closing your garden and planning for next year, including a brief lesson about crop rotation.

8.1 "Tucking In" the garden

1. Harvest as long as possible before putting the garden to bed! Pay attention to the weather forecast; if there is a frost warning, spread old sheets over plants to protect from frost. Container gardens can also be covered or you can bring the plants in overnight (e.g., garage or shed).

2. When harvest time is over, start cleaning up by removing any plants that are diseased or damaged by insects. Dispose of these in the green bin, not garden compost. Next, tidy up the bed by cutting the remaining annual plants at their base, leaving roots in the soil to decompose. The plant parts can be left on the surface as mulch and bug habitat or disposed of in the garden compost. Tuck the garden in for winter with additional mulch to prevent weeds from sprouting and keep the soil healthy.

Annual plants produce fruit/vegetables and die within one year.

Examples: 

Learning Connections

Science

Observe, Question, Identify, Investigate, Research

Language Arts

Comprehend, Read, Write

Visual Arts

Draw, Colour, Design, Create

Food & Nutrition

Prepare Healthy Food

Climate


Habitat Creation & Biodiversity


Waste Reduction & Circular Systems


Soil Stewardship


Water Stewardship

3. Trim any perennial plants back so that there is only 15-20cm of stem left above the ground. Spreading a layer of compost and mulch would keep them warm and happy. For a container garden, perennials can be stored in a bright place indoors for the winter.

Perennial plants produce fruit/vegetables and appear to die in fall, but they will continue growing back for many years.

Example:

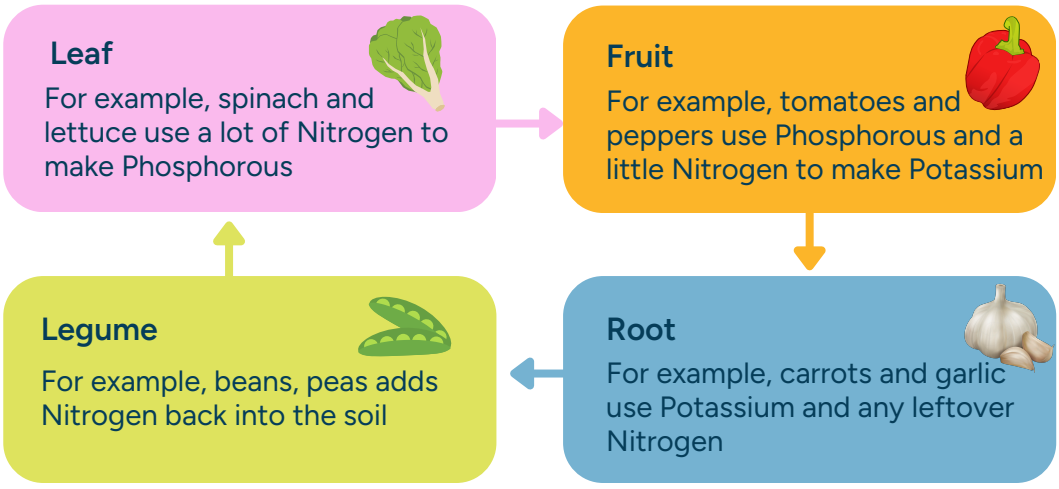
4. Clean and sanitize gardening tools and put them away. Don't forget to safely store away any bags of soil or other supplies.

8.2 Planting for next year

There's one last step that you may want to consider before you're finished for the season: planning next year's garden!

There are many plant "families" that react differently with the soil and add or use up different nutrients. Rotating a new "family" into the soil each growing season can make the garden grow stronger and healthier. This is called crop rotation.

Here is an example of a **common rotation** between four plant "families" (leaf, fruit, legume and root) and which nutrients they add or use up:



1. Check the garden map you made in your garden journal during Lesson 1. This can act as a guide to show what was planted and where so you can create a crop rotation plan.

Tips and Tools

If the garden is planted directly in the ground, consider planting a "cover crop" to protect the soil and keep it healthy, such as winter rye or winter. Search cover crops or green manure to learn more.

8.1 Materials:

- Garden tools, such as
- gloves and a spade
- Mulch (like straw or raked leaves)

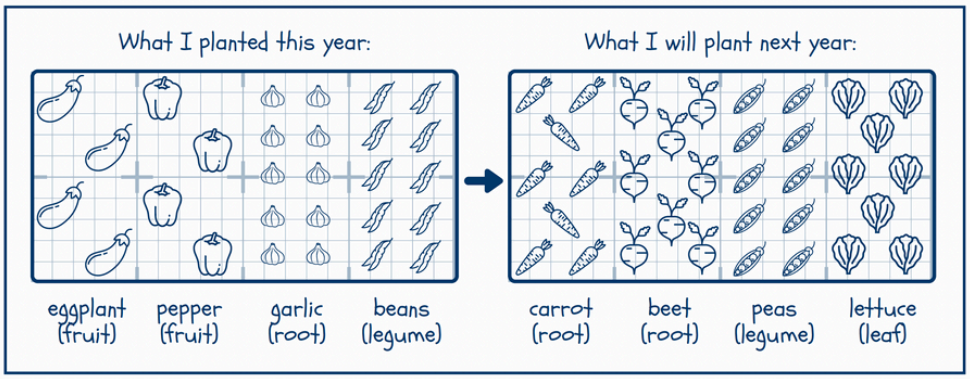
Crop rotation ensures essential nutrients are replenished by plants themselves. Three of the most important nutrients for healthy plants are Nitrogen (N), Phosphorous (P), and Potassium (K). Each nutrient has a different function.

- **Nitrogen (N)** is important for plants because it helps grow strong green leaves.
- **Phosphorous (P)** is important for plants because it helps grow seeds, flowers and fruit.
- **Potassium (K)** is important for plants because it helps grow deep, healthy roots.

2. The next blank page in your garden journal should be named "Plan for Next Year." On this page, draw a map of what you planted this year to match the one you drew in Lesson 1.

3. Using the chart above, follow the arrows to find out what plant "family" you should plant next year. For example, if you planted a "fruit", plant a "root" in that spot next year. Draw another map that shows the new plants you have chosen. Make sure to clearly label both maps with the name and family of each plant.

8.2.1 Example



It's time to celebrate all that you've grown, eaten, and learned!

Congratulations on planning and planting the garden, observing and interacting with the ecosystem, harvesting and enjoying the food, and putting your garden to bed for the season.

As your growing space hibernates for winter, you've already begun planning for fertile soil and abundance next year.

Well done!

Tips and Tools

Keep this year's garden map along with a crop rotation plan for next year so that you can refer back to them over the winter. This becomes a helpful resource when you when you start making next year's garden plans.

Putting the garden to bed properly promotes soil health through carbon sequestration and preventing erosion, and by creating habitat for pollinators to overwinter in.