Nourish
Nova Scotia

Grow Eat Learn
Nourish Nova Scotia

Garden Infrastructure Design Library

This resource provides open source designs for essential garden infrastructure. You will find examples of how to increase your garden's capacity with: Garden Beds, Cold Frames, Compost Systems, and Water Catchment & Storage.

Table of Contents

Climate Connections

Adapting to climate change is critical for our food system. Building capacity at your garden site creates opportunities for students to learn about food production and its interdependence with soil, plants, animals and weather. Through the garden, students become stewards of a biodiverse ecosystem that sequesters carbon, retains water, produces food and requires less and less input over time. **Check out these climate actions that youth participate in through gardening!**

- Soil Stewardship
- Habitat Creation & Biodiversity
- Waste Reduction & Circular Systems
- Food Security & Sovereignty
- Water Stewardship

This design library highlights how the internet enables knowledge sharing.

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

Garden Beds

Raised garden beds can help minimize weeding and make gardens more accessible. The right garden bed can open up new school spaces for growing.

Tips & Considerations

- Keep accessibility for all in mind:
  - Designing Gardens Accessible to All
  - Universal Design: Gardens
- Consider laying weeds/grass-suppressing corrugated cardboard down before building your beds.
- Adding decaying organic matter, such as logs and rotting leaves as a base layer underneath several inches of topsoil and compost can help fill garden bed space while building healthy soil and saving costs.
- Incorporate pollinator-attracting flowers to increase biodiversity and boost food production in your garden.
- Make sure to closely observe the proposed location (e.g., elements, wildlife, snow removal, etc.) and check in with your principal.

Garden Bed Design Options

On the following page, you'll find more information about these 4 garden bed options.

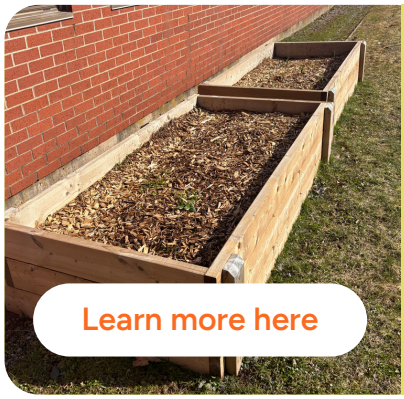
- Wooden Raised Bed
- Herb Spiral
- Hugelkulture Mound Garden
- Keyhole Garden

Garden Climate Actions

Soil Stewardship: Techniques like regenerative composting 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.

Garden Bed Design Options



Learn more here

Wooden Raised Bed

- Build your own using rot-resistant wood like hemlock or larch from a local mill, or search places like Facebook Marketplace for pre-made.
- If installing multiple beds, consider spacing between them to accommodate wheelbarrows and lay cardboard down in pathways topped with bark mulch to suppress weeds/grass.

Learn more here

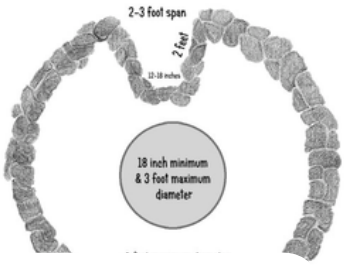
Herb Spiral

- Ecological design element that adds beauty and biodiversity.
- Creates microclimates that suit a variety of plants' requirements.
- Can be adapted to fit the site and accessibility needs.
- Makes use of available materials like stones, bricks, and cinderblocks.

Learn more here

Hugelkulture

- Also referred to as “mound gardening”.
- An alternative to raised beds that will eliminate sod underneath.
- A way to use school yard "waste" or to compost old garden beds.
- Best to plant a quick cover crop (like buckwheat) to allow the soil to settle while keeping away weeds.
- They are great for hot-weather crops in early years.



Learn more here

Keyhole Bed

Design by Backwoods Home Magazine.

- Curving lines modelled from nature.
- With an opening to the south and tall plants on the north, the bed creates a U-shaped "sun catch" that gathers warmth.
- Efficient use of growing space - can be densely planted with annuals and perennials or a mix.

Cold Frames

Cold frames extend the growing seasons by 2-3 months as they capture the sun's thermal energy and warmth, increasing humidity, all while protecting plants from the elements. **Plants can grow as early as February and as late as December**. Gardening in the cold seasons also means fewer bugs!

Tips & Considerations

- Choose rot-resistant wood or materials when building cold frames.
- Direct angled cold-frames to the south.
- Ensure the structure is pegged or weighed down to avoid blowing away in strong winds.
- Plants that thrive in cold weather are best for cold frames, like herbs, greens, and root crops.

Cold Frame Design Options

On the following page, you'll find more information about these 4 cold frame options.

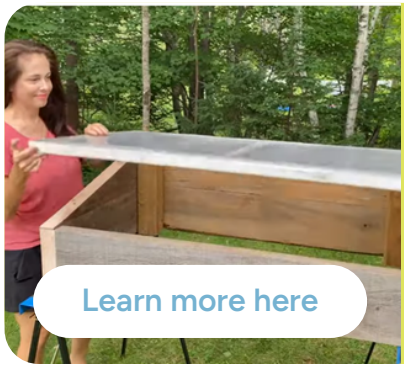
- DIY Hinged Window Cold Frame
- DIY Mini-Greenhouse
- Sunken cold frame
- Mini Tunnel Greenhouse Structure

Garden Climate Actions

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

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

Cold Frame Design Options



DIY Hinged Window Cold Frame

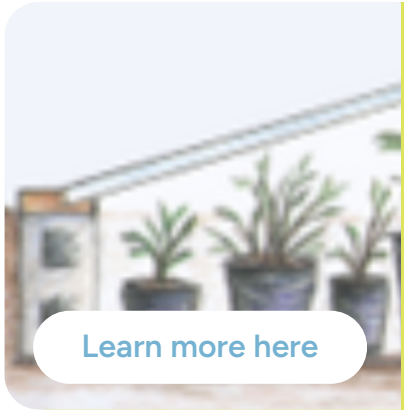
Lightweight & portable design by Nikki Jabour.

- Uses rot-resistant wood.
- Needs to be mindfully located to avoid extra snow load, plowing, students playing on it, etc.
- Versatile & scalable to your growing needs.

DIY Mini-Greenhouse

Wooden box with a hinged plastic sheet designed by Nicole Burke.

- This style accommodates larger plants, making it better suited for summer crop growth.
- Basic carpentry skills & tool knowledge are required to build this design.
- It can be built using recycled materials!



Sunken Cold Frame

In ground design by the Benson Institute.

- Best for overwintering tender plants and hardening-off seedlings.
- Geothermal heat reduces the need for electrical systems, which can be costly.
- Only suitable for smaller plants.
- **Warning:** Glass versions can break and be dangerous.

Mini Tunnel Greenhouse Structure

- Pre-made, ready to buy and easy to set up structures that can be positioned on the ground or even directly over a garden bed.
- Different sizes available.
- This option might be easiest for schools with low capacity for building something new to extend their growing season.

Compost Systems

Composting is a great way to teach students about life cycles, demonstrating how nature recycles! In the school yard, focus on yard waste to create a fertile amendment for your garden beds.

Tips & Considerations

- Consider adding a labelled container with a lid to the staff room to collect coffee grounds for your compost. They are nitrogen-rich help with decomposition.
- To deter pests and odours, avoid food scraps and focus on garden waste, grass clippings, raked leaves, etc. Food scraps can be composted in a classroom vermihut. Or use an enclosed, raised rotating bin compost bin to deter critters.
- Balance greens (nitrogen sources: coffee grounds, grass clippings) with browns (carbon sources: dried leaves, shredded paper) in a ratio of approximately 1:2.
- A Teacher's Guide to Compost Activities is also great resource (Central Vermont Solid Waste Management District).

Compost System Design Options

On the following page, you'll find more information about these compost systems.

- 3 Bin Compost
- Rotating Bin
- Vermihut: Worm Composting Bin
- DIY Worm Bin

Garden Climate Actions

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

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

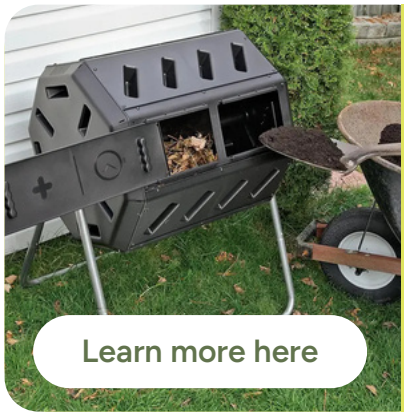
Regular Compost System Design Options

Learn more here

3 Bin Compost

Design by Central Vermont Solid Waste (another version can be found here).

- Great for large batch, hot composting where the pile is reaching high temperatures and is being turned to accelerate decomposition.
- Can use reclaimed pallets to cut costs, but a rot-resistant wood like hemlock (found at small local mills) will last longer. Avoid pressure-treated wood or finishes that can leech toxins into compost.


Learn more here

Rotating Bin

- Deters pests by being enclosed and off the ground.
- Great for initial breakdown of food scraps.
- Good for small batches and not typically large enough for yard waste.
- There are single and dual chamber designs, with one chamber of new material and for older compost.


Learn more here

Two-pallet Compost Bin

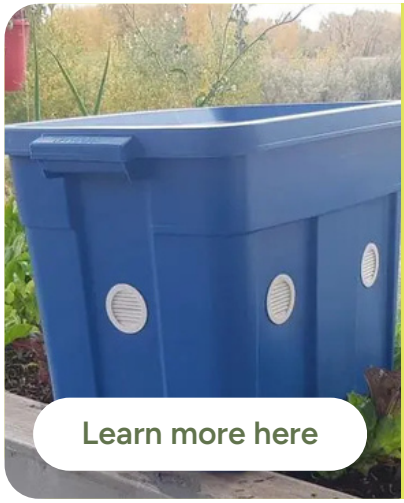
- Rodent-resistant design is ideal for secure school ground composting.
- Uses pallets, a readily available, free material.
- Sturdy design to extend the life and quality of the compost bin.
- Uses two sizes of hardware cloth to keep vermin out.

DIY Bokashi Bucket

By Nick Johnson at Eat My Shrubs.

- Affordable and can be made with recycled buckets.
- Requires a drill, screen, and silicone to seal the spigot.
- Creates an anaerobic (no air) environment.
- A guide to setting up your bokashi bin and what you'll need.
- You can use bran to accelerate the composting process.

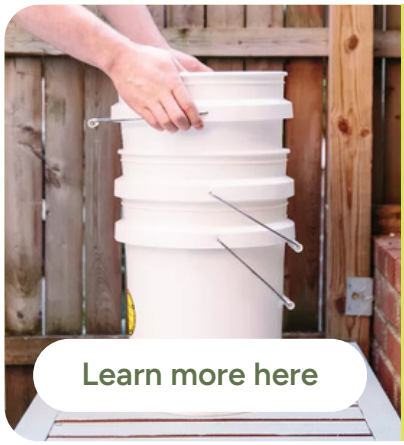
Worm Compost System Design Options



DIY Worm Composting- Rubbermaid Totes

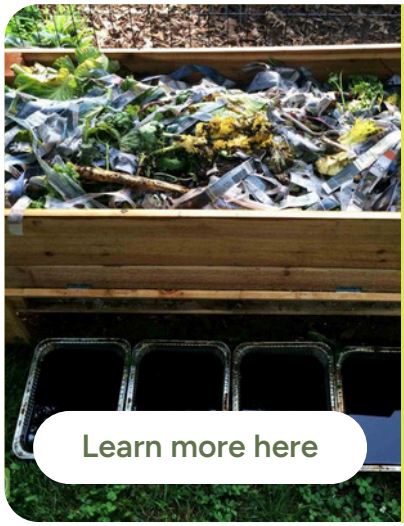
Design by Nick Johnson at Eat My Shrubs.

- This guide features a design for 75L and 55L totes, but you can use whichever size meets your needs.
- Cost-effective & takes up minimal space. Option to stack multiple totes.
- Involves drilling holes into a tote for aeration and drainage. A second and sometimes third bin sits under the worm bin to collect drippings.



DIY Worm Composting- Buckets

- There are many resources online to help build and maintain a worm bin to create a nutrient-rich garden amendment.
- Involves drilling holes into a tote or buckets for aeration and drainage. A second and sometimes third bin sits under the worm bin to collect drippings.
- Affordable, takes up minimal space & recycled buckets can be used (ask your cafeteria if they have any to get rid of).



DIY Custom Vermicompost Bin

By Joe Lamp'l from Growing A Greener World.

- This design can be modified in many ways to suit your needs or the materials you are composting.
- It can be built using purchased or scrap wood you already have. Cedar is ideal for weather-proofing.
- The bottom tray gathers drippings, which creates a concentrated liquid organic fertilizer that you can add to your watering can!

Vermihut: Worm Composting Bin

- Purchase a ready-to-go vermihut, like this one from Vesey's.
- A convenient way of keeping worms and harvesting their castings as worm compost.
- It can be done in the classroom with food scraps and coffee grounds. For more information, including a list of food scraps that work well and ones to avoid, click here.

Worm Compost Tips

- Red wiggler worms are recommended and can be sourced online or from a community member.
- Maintain moisture levels in the system.
- Be careful not to overfeed the worms.
- Make a plan for the beautiful compost that is created.

Water Container & Catchment

Having an independent system, like a water container & catchment, reduces reliance on school water when school is out for summer. Collecting rainwater reduces pollution, helps conserve treated water usage, helps reduce erosion, and is free!

Tips & Considerations

- Some schools get regular water fill ups from local fire stations. This could be a great community connection if the school has no gutters.
- If buying a used 1000L tote, make sure to ask what was previously stored in it.
- Monitoring pH can help you monitor water health and contaminants.
- Make sure to drain and rinse the containers at the end of the season. Leave spigots open for the winter.
- Check out the Mulch Basin design option for landscaping rather than a plastic storage solution.

Water Container & Catchment Design Options

On the following page, you'll find more information about these 4 design options.

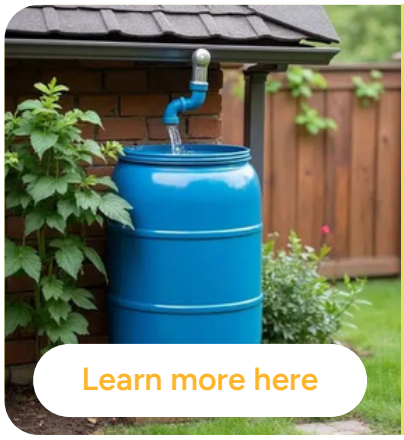
- Gutter and Rain Barrels
- Rain Saucer & Barrel
- IBC Water Tote & Storage Stand
- Mulch Basin

Garden Climate Actions

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

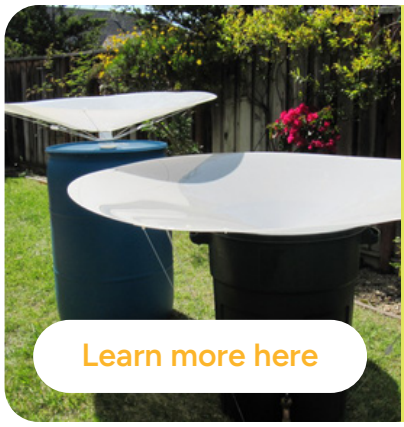
Waste Reduction & Circular Systems: In the garden we can compost, reduce food waste, and create closed-loop garden systems.

Water Container & Catchment Design Options



Gutter and Rain Barrels

- A 55-gallon barrel is ideal as a starting point and can be found at hardware stores, used online and also check out this fundraiser.
- Overflow pipe prevents spillage during heavy rain
- Must be connected to a gutter/downspout.
- Should have a fine mesh cover to block debris and bugs/mosquitoes/birds.
- Water tank needs ventilation and monitoring to avoid bacteria growth.



Rain Saucer and Barrel

- A rain saucer system reduces the contamination of rainwater because it avoids coming into contact with your roof, gutter, or any other foreign objects.
- Will require maintenance to ensure water is free of debris & contaminants.
- Be sure to pay attention to how the saucer is secured to the tank, take down during strong winds and hurricanes.

IBC Tote & Storage Stand

- IBCs (aka 1000L water tanks) can sustain a garden for longer than a rain barrel.
- These can be sourced used from Kijiji etc.
- Some fire stations will fill these for schools.
- These tanks also work with rain saucers or can capture gutters water.

Mulch Basin

- Ecological design feature that helps retain moisture in the garden by collecting rainwater and run-off while building soil fertility.
- Basin is dug out to create a lowered area that is then filled in with wood chips.
- Can double as a pathway.
- Water gets wicked into neighbouring garden over time.