



# School food gardens start-up guide



Region of Waterloo  
PUBLIC HEALTH AND  
EMERGENCY SERVICES

# Acknowledgements

School food gardens provide a means of enhancing academic success as well as a holistic way to cultivate the development of the whole student using the integrated Healthy Schools Framework. In Waterloo Region, a school food garden movement is developing. We wish to acknowledge key people and their contributions in building the momentum.

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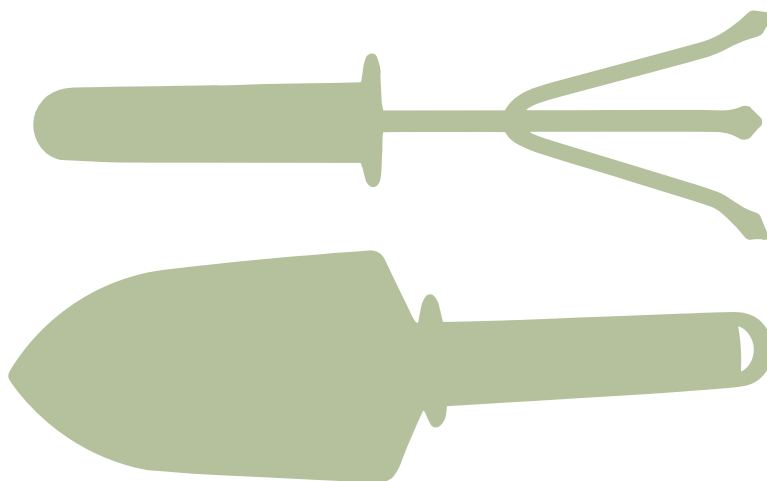
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## Part one: Introduction

School gardens are seen as a popular intervention to support student's wellbeing and academic success in schools across North America. They are also a tool that may be used to create a positive school space for students and staff. Teachers and parents of school-aged children may use this as a practical guide to installing a school garden and to enhance academic development by using school gardens as an experiential learning tool.

The Healthy Schools Framework<sup>19</sup> identifies school food gardens as resources for developing a healthy environment and supporting healthy eating. School gardens are mentioned throughout the framework as tools for student engagement integrating health, environmental sustainability, and other curricula. School gardens bring many benefits for students, schools, and communities. Evidence demonstrates

that school gardens can provide enhanced learning opportunities, improve academic performance and improve the health and wellbeing of students.

School gardens contribute to the Ontario Ministry of Education's renewed vision for education excellence and commitment to the well-being and success of every child ([www.edu.gov.on.ca/eng/about/excellent.html](http://www.edu.gov.on.ca/eng/about/excellent.html)).<sup>19</sup> Gardens assist schools in achieving the promotion of well-being and education goals where all students are to develop enhanced mental and physical health, a positive sense of self and belonging, and the skills to make positive choices. Gardens provide a means of enhancing academic success as well as a holistic way to cultivate the whole student – their cognitive, emotional, social, and physical development.



School gardens provide a safe place for students to learn and grow. The Sustainable Societies Consulting Group, on behalf of the Community Garden Council of Waterloo Region and Region of Waterloo Public Health and Emergency Services (Public Health), recently conducted a study of the benefits of school gardens in partnership with the Waterloo Region District School Board. The study, *Gardens for Healthy Schools: A Scan of School Gardens in Waterloo Region*, demonstrates positive benefits in school gardens by staff and students.

#### **Students:**

- Reported feeling better and refreshed.
- Discovered a passion for food related or environmental work.
- Were motivated to apply their school garden skills at home.
- Felt calmer and less stressed when working with plants or animals.
- Felt more motivated and connected with nature.
- Connected with other students they might not have met.
- Built a broader sense of pride in their school and community.

#### **Teachers:**

- Liked working with students rather than just teaching in front of a class.
- Felt revitalised in being able to go out in the fresh air.
- Reported the gardens contributed to student development by building:
  - student confidence and citizenship skills.
  - student ownership and pride in the garden and school community.
  - student consciousness in broader ecological and food systems.
  - student character, respect and engagement with broader communities.

Teachers are keen to see more school food gardens started but they lack time and resources which are significant barriers to implementing gardens. In 2017, the Ministry of Health and Long-Term Care, Healthy Kids Community Challenge provided an opportunity to address these barriers. Public Health, the Community Garden Council of Waterloo Region and Seeds of Diversity created a partnership to build seven elementary school gardens, develop inspiring video stories and practical school garden resources including a school garden website. Watch for more information on the school gardens website ([www.wrschoolfoodgardens.ca](http://www.wrschoolfoodgardens.ca)).

Staff in Waterloo schools shared experiences through focus groups, interviews and open ended surveys. They reported enjoying using the garden as an alternative learning format, and being able to work with students in different settings:

**“For me I like being able to work with the students rather than just being at the front teaching them.”**

Teachers enjoy the benefits of time spent outdoors and being in nature:

**“I love it as a teacher, going out there, even without these guys. It’s that fresh air during the day that just revitalizes you.”<sup>5</sup>**

(Community Garden Council..., Sustainable Societies Consulting Group, 2014)

The key to using school gardens as a means to achieve a positive school environment is to use an integrated approach with schools, parents and community. In alignment with the Ministry of Education's Foundations for a Healthy School<sup>19</sup> resource, Ontario Physical and Health Education (Ophea)'s Healthy Schools Certification<sup>20</sup> recognizes and celebrates school communities for promoting and enhancing the health and well-being of students, school staff, and the broader community. The goals of HS Certification are to support and increase the capacity of school communities across Ontario to effectively implement the Six-Step Healthy Schools Process, and to celebrate and formally recognize an individual school community's achievements related to the six-step process. Schools have access to an online reporting platform (HS Dashboard), the HS Certification Guidebook<sup>20</sup>, as well as a number of Healthy Schools support tools.

The Ministry of Education's Foundations for a Healthy School aligns with the K–12 School Effectiveness Framework<sup>19</sup> (K–12 SEF) by including five interconnected pillars which may be used to integrate a project like a school food garden into planning and implementation processes.

The five areas work together to build a comprehensive approach in healthy school programs like building a school food garden. The five interconnected areas are listed below and will be used for planning and implementing school food gardens:

1. Student engagement.
2. School and classroom leadership.
3. Curriculum, teaching and learning.
4. Social and physical environments.
5. Home, school and community partnerships.

Ophea's Healthy Schools Certification<sup>20</sup> is based on a year-long Six-Step Healthy Schools Process which guides a school community through the planning and implementation of activities or projects for a selected priority health topic. The six steps involve:

1. Establishing a school team.
2. Assessment of the school and broader community's needs and assets.
3. Identifying a priority health topic.
4. Developing a clear and realistic action plan.
5. Taking action and monitoring process.
6. Celebration of successes and evaluation of impacts.



An important part of Healthy Schools Certification and the six-step process is developing an action plan with activities and projects that will help schools address their priority health topic. A school food garden project is an excellent example of an activity or project that can be done within Healthy Schools Certification and that will help a school earn points towards obtaining Certification. At the end of the school year, schools can become recognised as a Gold, Silver or Bronze Healthy School partly based on the healthy schools activities implemented throughout the school year. Recognition as a certified Healthy School may be a great motivator for the school community and help develop a positive school environment where students, parents, staff, public health, and other community partners are all engaged.

This School Gardens Guide can be used as a planning tool and guide by any school wishing to start a school garden project; it is not dependant on participation in Healthy Schools Certification. The next few pages will provide practical examples on how to use the five pillars and an adapted Six-Step Healthy Schools Process to plan and start a food garden in your school.





## Five interconnected pillars<sup>19</sup> in building a school garden

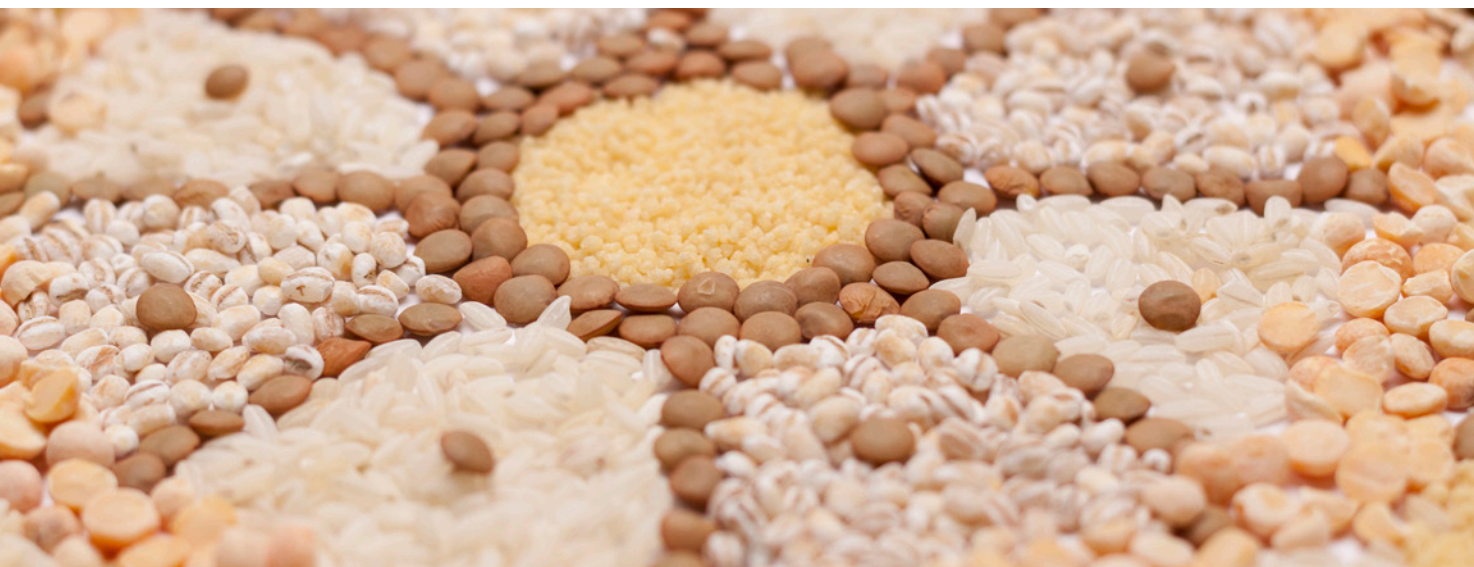
### Pillar one: Student engagement and ownership

The student engagement and ownership pillar is essential in student empowerment and engagement. When students are engaged and feel ownership, they identify with and value their learning, feel a sense of belonging at school; and are empowered to participate in and lead academic and non-academic activities.

Inclusion in the planning and development of the garden develops student problem solving and leadership skills, builds social skills, and skills in planning and negotiation.

**Many techniques<sup>29</sup> can be used to engage students:**

- **Crowd sourcing:** Students share an article in small groups and write as many facts as they can on a white board.
- **Four corners:** Students break into four corners of the room to discuss learning.
- **Tea party:** Each student has a piece of information about gardening that they share to as many individuals they can within five minutes.
- **Designs/prototypes:** Students build garden designs/prototypes (e.g., pizza gardens, square foot gardens, bonsai gardens, seed mandalas).
- **Videos:** Students use their cell phones or a school video camera to track their progress or tell a story.
- **Story telling:** Students tell a creative story from the garden.
- **Audits:** Students assess site for garden or monitor ecosystems in the garden.
- **Visual arts:** Students use a technique called "potager" to create design and colour in the garden by using different plants, or decorating with stepping stones and signage.





## Pillar two: School and classroom leadership

The school and classroom leadership pillar focuses on creating a positive classroom and school environment by identifying shared goals and priorities that are responsive to the needs of the school community.

**The garden is a positive space that can be used as a means of building community within the school by:**

- Inviting teachers to sign-up for space in the garden to augment their lessons.
- Providing student volunteer opportunities like a garden or environmental club.
- Engaging parents early in the year to help build the garden, organize fundraisers or organize summer care.
- Inviting community partners.

A Waterloo area school teacher talks about the garden's role in creating a positive space...

**"Character Development... Respect... when we respect our environment and respect our land around our building, it sets the stage for respect inside the building" — Teacher<sup>5</sup>**



## Pillar three: Teaching, curriculum and learning

The teaching, curriculum and learning pillar offers opportunities for students to learn, practice and promote positive and healthy behaviours. It encourages students to lead healthy, active lives.

### Use the garden as a means to achieve learning goals within the school curriculum:

- **Measurement:** Students may measure the garden site, plant growth, spacing of plants, and yield of produce.
- **Business:** Students may earn garden bucks to buy prizes or they may be involved in managing the funds for the garden, or in organizing fundraisers.
- **Ecosystems:** Students may learn about living soil, wind, beneficial bugs and pollinators.
- **Environment:** Students may learn about sustainable living, compost and water harvesting.
- **Art:** Students may learn garden art by creating plant markers, signage, potager garden design.
- **Science:** Students may learn about photosynthesis, soil composition, acidity, macro and micronutrients and genetics.
- **Literacy:** Students may create stories about life in the garden.
- **Food and nutrition:** Students may learn about food systems, nutrition and safety.
- **Civic duty/culture/history:** Students may decide to donate produce to food programs, grow culturally different foods or learn about heritage or Indigenous gardens.





## Pillar four: Social and physical environments

The social and physical environments pillar contributes to the positive cognitive, emotional, social, and physical development of students.

**Consider how the garden can become a positive and inclusive space for all students and aid in their development.**

- Use the garden as a tool for therapeutic intervention for students needing a calming space.
- Provide incentives like a garden appreciation note for random acts of kindness, student leadership or student responsibility.
- Teach students patience and the value of nurturing and caring for living beings by caring for plants.
- Teach respect for the harmony of living organisms by examining the biodiversity of eco-systems in the garden.

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## Pillar five: Home, school and community partnerships

The home, school and community partnerships pillar looks for mutually beneficial ways to support, enhance and promote opportunities for learning and well-being.

**School gardens provide a practical project to build partnerships in schools and a mutual space for engagement. Consider involving partners in all steps of the project:**

- School staff (teachers, maintenance or environmental sustainability staff).
- Parent/child care providers, parent council, parents or extended family members.
- Community; Horticultural Society, Scouts/Girl Guides, community centres, neighborhood associations or local libraries.
- Students: environmental club, recreation clubs or church youth groups.

## Six step guide<sup>20</sup> in building a school food garden

### Step one: Build a school team

The first step is to bring together a school garden team of staff, students, parents, and community partners to create a food garden. Listed are a few tasks to consider:

- List the benefits of school gardens and how they can be a resource for teachers, students and community.
- Explore how the garden can help the students achieve academic, health and environmental goals.
- Identify roles and assign tasks to effectively manage the garden during the school year and summer time. For example, classroom scheduling of the garden, fundraising, and summer maintenance. See the chart below.
- List and address perceived challenges like expenses, staff time, contracts and policies, vandalism, ground and garden maintenance or community access to the garden (see Appendix A on page 32).
- Get approval and support from school administration.
- Consider recognition for your school project. Apply for Ontario EcoSchools<sup>17</sup> or Ophea's Healthy School Certification<sup>20</sup> programs ([www.ontarioecoschools.org](http://www.ontarioecoschools.org); [www.ophea.net/healthy-schools-certification](http://www.ophea.net/healthy-schools-certification)), or learn more at Region of Waterloo Public Health [www.regionofwaterloo.ca/en/health-and-wellness/supporting-healthy-schools.aspx](http://www.regionofwaterloo.ca/en/health-and-wellness/supporting-healthy-schools.aspx).

#### Sample roles and assignments chart

Person	Fundraising grants	Event planning	Classroom scheduling	Hands on gardening	Summer maintenance	Other
Dan	×	×				Carpentry
Karen			×			Instagram/ Twitter
Sonya				×	×	
Robert		×				Musician
Ryan						Environment Club

#### Community connections

- Promote in school or community newsletters.
- Host a garden workshop with community partners.
- Identify garden champions.
- Promote inspiring garden videos or stories.



## Step two: Assessment of the school and broader community

The second step is to gather information about the school and neighborhood to support your cause in applying for sponsorship or seeking approval from decision-makers to install a school garden.

### Types of information to consider for an assessment might include:

- What data is available to describe your neighborhood or school? What type of information is available about the school, students or neighborhood?
- Which school policies or contracts need to be addressed?
- Are there formal or informal community groups who can contribute knowledge, talents or strengths to the project?
- What resources do you need?

### Learn more on assessing your school and community environment by:

- Using the free Healthy School Planner tool by the Joint Consortium School Health [www.hsp.uwaterloo.ca](http://www.hsp.uwaterloo.ca).
- Visiting Region of Waterloo Public Health and Emergency Services website [www.regionofwaterloo.ca/en/doing-business/demographics.aspx](http://www.regionofwaterloo.ca/en/doing-business/demographics.aspx).



### Step three: Identify a priority health topic

The third step is to identify a priority health topic. Use the garden as a means to achieve a positive, healthy school environment for priority health topics\*.

- **Healthy eating:** Use the school garden to teach food literacy skills – growing, harvesting and preparing food grown in the garden.
- **Daily physical activity (DPA):** Using the school garden while teaching is a good way to meet the Ministry of Education's<sup>19</sup> requirement of 20 minutes of DPA during instructional time. It also helps students meet a third of the recommended DPA promoted by the Canadian Physical Activity Guideline<sup>24</sup> for children aged five to 11 years.
- **Positive mental health:** Local school boards<sup>11</sup> recognise the relationship between good mental health and learning. Gardens provide therapeutic qualities that contribute to positive mental health. They help reduce stress and are a calming force. One student in the Gardens for Healthy Schools Scan<sup>5</sup> enjoyed the garden for its stress reduction and calming effects:

**"I like just being around with the plants...it's kind of calming. It is. You don't feel stressed, because you've got heavy courses and whatever, but here it's nice and calm" —Student**

Gardening provides students a chance to meet other students they would not ordinarily connect with.

- Personal safety and injury prevention. Students learn how to safely use and store garden tools. Gardening provides hands on experience for students to learn about personal safety and preventing injury.

**"It makes you feel more connected. And like, the more and more you are in nature it makes you, I don't know, you feel better. That feeling you get because we're so deficient in it, the feeling you get when you're around it and you're working in it, that's what keeps you coming back. You crave it almost."**  
—Student<sup>5</sup>

\*See local research on health benefits<sup>5</sup>: (Gardens for Healthy Schools: A Scan of School Gardens in Waterloo Region)<sup>5</sup>

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### Step four: Develop a clear and realistic plan

The fourth step is to develop a clear and realistic action plan. You may wish to start with a vision statement (see Appendix B on page 34) and list concrete objectives for the garden.

#### Review the information gathered from the assessment:

- Create a vision for the school food garden.
- Define three to four main goals for the garden.
- Outline objectives that are specific, measurable, achievable, realistic and timely.
- Give team members roles and responsibilities.
- Determine learning goals with links to curriculum.



## Step five: Take action and monitor progress

The fifth step is to take action and monitor progress. Ongoing monitoring is important to find if you are reaching your goals; to identify successes or problem areas, to measure impacts on student health/learning goals, to inspire new ideas and to identify what needs changing.

### Health indicators for success, students:

- Are more willing to eat vegetables and fruits.
- Develop more food skills.
- Are physically active while learning.
- Develop a sense of belonging and connectedness.
- Report feeling less stressed or more relaxed.

### Are there other indicators you need for educational or school purposes?

- Number of experiential learning opportunities.
- Number of community partnerships.
- Number of staff, parents, and students engaged.
- Number of classes taught in the garden.

**“This is an area where I think the more exposure children have to how food is grown, plants are grown, the whole natural cycle takes place etc. – then the more we create a healthy interest about how and what we do and eat has effects on our health, body and mind – it would only serve to heighten this awareness and create healthier communities – not to mention more responsible and contributing citizens – the whole concept is such a community builder for both school and living area” —Teacher<sup>5</sup>**

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## Step six: Celebrate success

The sixth step is to celebrate your team’s hard work and success! Recognize the work of the school team, parent council or others who help out along the way.

- Host a celebration to open the garden season.
- Send thank-you notes to recognize efforts.
- Prepare a harvest feast with the gardeners.
- Showcase the garden during parent-teacher nights.
- Share success with other schools.
- Record successes in the school and community newsletter.
- Provide badges\* for levels of student achievement.

\*Example: Bright Bites (green thumb badge)

[www.brightbites.ca/badge/green-thumb](http://www.brightbites.ca/badge/green-thumb)





## Part two: Garden installation<sup>6,7,8,12,15,26,27,31</sup>

### Choosing a garden site

Gardens require a location that supports the basic elements for growth: good soil, adequate sunlight and water.

#### A suitable garden location:

- Has a clear sight line.
- Is close to a water source.
- Has good drainage.
- Has a moderate amount of space (nine by twelve meters for a moderate size).
- Has enough sunlight.
- Avoids sites that prevent growth (e.g., snow storage, shaded areas, compaction, or contaminated soil).
- Avoids underground lines.
- Is not too windy.

**Facilities or maintenance staff will need to be consulted at the beginning of the project.** They will be helpful in mapping out a site. Ontario One Call is a service that locates underground lines and must be notified before digging (see Finding local resources on page 29).

#### Sunlight and shade:

- Most vegetable plants need six to eight hours of sunlight to grow.
- Cool weather plants can grow in shaded areas with three to four hours of sunlight (e.g. green leafy vegetables).
- Warm weather plants need full sun (e.g., tomatoes or peppers).
- A south facing garden with the long axis of the garden bed running north/south maximizes light exposure.
- Some plants can grow in shade but still need about four hours of sunlight.

**Involve the students** in tracking the amount of sun by staking out potential sites and time tracking areas of shade with markers.

### Water access:

- Look for and get approval to use a source of school water close to the garden.
- Set-up a soaker or capillary hose system with a timer.
- Retain moisture by adding compost and mulch.
- Weed regularly to avoid competition for water.
- Harvest rain water.

### Good soil

- Healthy soil is the key to a great garden. Assess the soil for contamination, acidity, composition, and nutritional quality.
- Ask facilities staff about the quality of the soil and if the site is suitable for growing food.
- Ask about former land-use history. Was the school built in an industrial area or landfill site? Will snow storage or salt be an issue for the site chosen?
- Test soil if the history of land use is suspicious or is next to a busy highway, rail corridor or gas station. For more information, see the Guide for Soil Testing in Urban Gardens – City of Toronto<sup>26</sup>
- Test soil for acidic/alkaline balance. Most plants grow well in a slightly acidic soil (ph level of 6.5).
- Assess the composition of the soil. Most garden plants grow best in a loamy soil with an even mix of clay, sand and silt.
- Assess the nutritional quality of the soil. The key nutrients are Nitrate, Phosphate, Potash and Calcium.
- Inexpensive soil kits may be purchased at a garden or hardware store.
- Add soil amendments like organic fertilizers or school compost to improve the quality of the soil.

### Show students how to use the tests, record results and experiment by adding different soil amendments:

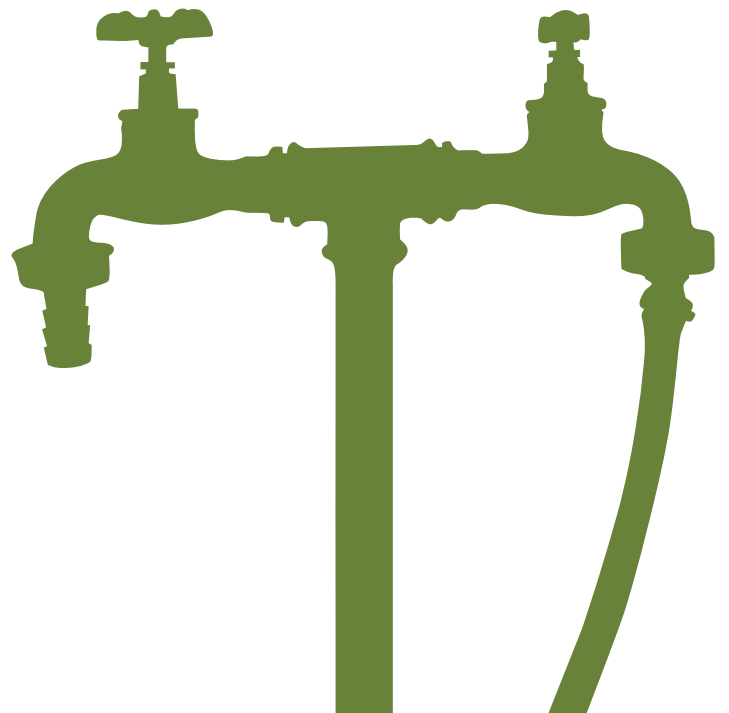
- Add bone meal or egg shells to neutralize acidity; pine needles or garden sulphur for alkalinity.
- Add wood ash, fish emulsion, coffee grounds or compost to observe changes in soil nutrients.

### Mason jar soil composition test

Students can use an experiment to test the soil:

1. Fill a glass jar with one third soil and two thirds water.
2. Close the jar and shake.
3. Let it settle overnight.
4. Observe, measure and record the levels of soil.
  - Sand sinks to the bottom.
  - Silt settles in the middle.
  - Clay settles on top.
  - Organics float.

**Size matters:** The size of the particles will determine where different types of soil settle. Clay particles are the smallest and stay on top; sand particles are the largest and sink to the bottom.



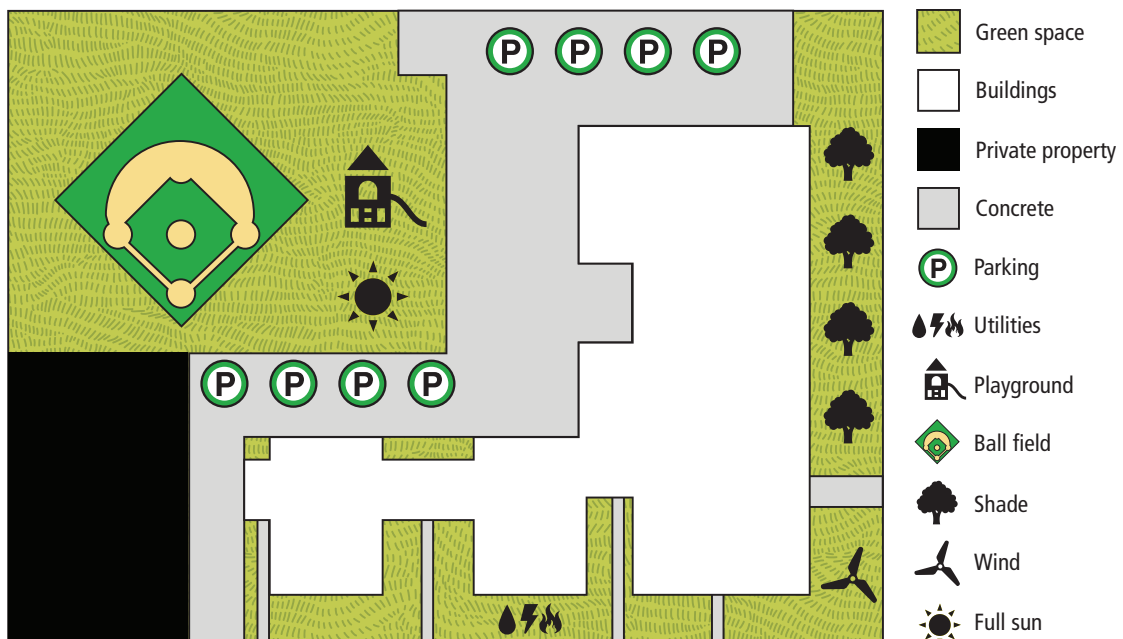


## Mapping the school grounds

Make a list of geographic features of your school grounds and involve your students in mapping the main features.

Utilities	Patterns of use	Built features	Natural features	Other
Hydro/gas lines	Entrances and exits	Work sheds	Hills and slopes	
Water pipes and taps	Dark or concealed areas	Portables	Ditches	
Hydrants	Recycling and waste	Parking	Windy areas	
Drains/sewers	Fire drill or maintenance routes	Bike racks	Adjacent park lands	
Overhead wiring	After-school activities or play areas	Benches	Trees and shaded areas	
Cable	Snow pile storage	Goal posts	Compass orientation	
Night lighting	Organized sports	Basketball hoops		

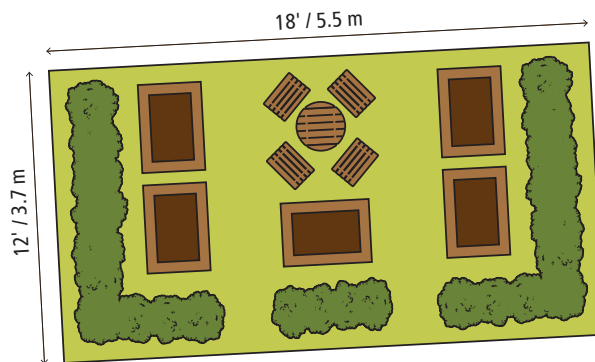
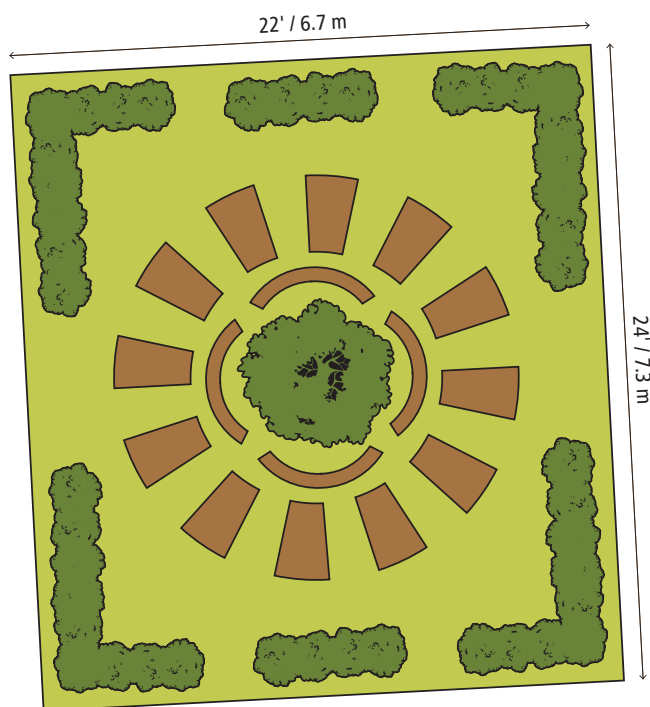
Create a layout of the school on a grid and have students measure and map the geographic features using symbols.



## Designing the garden

Design a garden that is attractive and fun to enhance learning and still be functional (e.g. pizza garden with a circular outline and triangular garden beds). Grow veggies and herbs used for making pizzas. Combine different elements to make the garden more diverse:

- Boundary hedges to show where the garden starts and ends.
- Pollinator hedgerow to attract pollinators.
- Bee, butterfly or bird houses to house pollinators.
- Compost or vermin-compost systems.
- Rain barrels to harvest water.
- Wheel chair accessible containers.
- Accessible pathways.
- Elements of play – garden gnomes, stones to sort or paint, crafts, story book element, insect treasure hunt, etc....
- Outdoor instruction space – under a tree canopy, cut logs or bales of hay/straw for seating.



## Finding resources and creating a budget

Brainstorm with the garden team the resources needed for the gardens and make a list.

### Plants

- seeds, seedlings, plants
- garden cages, weed barrier
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Soil

- soil, compost, mulch
- compost bin, wheel barrow
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Water

- water tank, watering cans
- hose, spray nozzle
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Tools

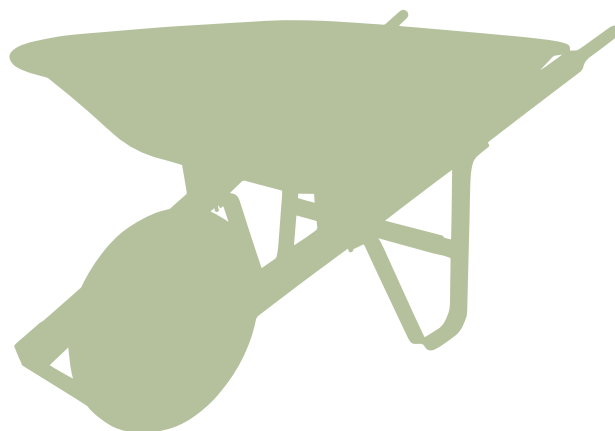
- shovels, spades, rakes, hoes
- hand tools, cultivator, pruning shears
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Other

- shed, lock, art supplies, promotion costs
- picnic table, supplies for raised beds
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Apply for funding:

1. Find foundations that fund youth or environmental projects or support agricultural opportunities (See Finding outside resources on page 30):
  - Municipalities may have a variety of different projects they fund. See which one applies to the school garden (e.g., community garden funds, neighborhood enhancement or environmental funds).
  - Toyota Evergreen.
  - Nutrients for Life.
  - Scotts Miracle Grow 1000.
  - Whole Kids Foundation.
  - Laidlaw Foundation.
2. If the school is restricted in applying for funds, ask a community partner to apply and administer the funds for the garden. They may ask for an administration fee which is built into the budget.
3. Use the data collected to paint a picture of the school community and partnerships.
4. Make a list of resources needed and create a budget (see sample budget on page 21).
5. Submit your proposal – most foundations have a two or three month approval time.





**Sample budget for a medium sized school garden** (based on hardware prices 2017)

Item	Per unit	Total tax	Total cost	Running total
4 cu yard triple mix (not including delivery)	\$36.00	\$18.62	\$162.62	\$162.62
1 wheel barrow	\$89.99	\$11.70	\$101.69	\$264.31
2 shovels	\$32.99	\$8.58	\$74.56	\$338.87
2 spades	\$26.99	\$7.02	\$61.00	\$399.87
2 rakes	\$32.99	\$8.58	\$74.54	\$474.41
2 hoes	\$26.99	\$7.02	\$61.00	\$535.41
1 cultivator	\$32.99	\$4.29	\$37.28	\$572.69
10 garden cages	\$5.99	\$7.79	\$67.69	\$640.38
3 watering cans	\$8.99	\$3.52	\$30.59	\$670.97
3 hand tool sets (trowel, cultivator and transplanter)	\$9.98	\$3.89	\$33.83	\$704.80
1 pruning/hedge shears	\$21.99	\$2.86	\$24.85	\$729.65
10 packages of seeds	\$3.45/5.45	\$7.09	\$61.59	\$791.24
1 shed	\$499.00	\$64.87	\$563.87	\$1355.11
1 cable lock	\$19.99	\$2.60	\$22.59	\$1377.70
1 adult picnic table	\$274.00	\$35.62	\$309.62	\$1687.32
Lumber for 6 bed frames – cedar decking: (2"×8"×8') @ \$20.70	\$62.10	\$48.44	\$421.04	\$2108.36
6 Packages of Wooden Stakes – 6 pack (2"×2"×24")	\$5.09	\$3.97	\$34.51	\$2142.87
1 package of hardware – deck screws (#10 3.5")	\$16.99	\$2.21	\$19.20	\$2162.07
1 water hose (\$89.98)/soft touch wand (\$24.99)	\$114.97	\$14.95	\$129.92	\$2291.99
1 stock tank (accessible beds)	\$179.99	\$23.40	\$203.39	\$2495.38
Weed barrier for 6 beds (3'×30')	\$29.99	\$15.60	\$135.56	\$2630.94
1 food grade water tank (\$120) plus wood box stand (Brubacher Drums)	\$250.00	\$32.50	\$282.50	\$2913.44
Artistic supplies (signs/garden markers)	\$50.00	\$0.00	\$50.00	\$2963.44
Garden promotion/events	\$200.00	\$0.00	\$200.0	\$3163.44
<b>Total</b>	–	–	–	<b>\$3163.44</b>

## Preparing the garden

- Gather the school team and set an installation date.
- Outline tasks and assign roles to make best use of everyone's time. Make sure to assign duties to students according to their interests and abilities.
- Measure, outline the beds with stakes and string or spray paint- leave about a metre (m) width for pathways.
- Place the open bottom raised garden box on the area marked and anchor with garden stakes – or create a mound if garden boxes are not available.
- Drill holes in closed bottom containers for drainage.
- Remove all tape, place a wet cardboard box in the beds.
- Fill boxes with two and a half to three decimetres (dm) of soil mix. Adding peat moss or coconut coir will help retain moisture in the soil.
- Use an online soil calculator to determine the amount of soil needed or use the soil calculator below.
- OR, lasagna layer the bed; place cardboard on the bottom of the bed and layer with brown material (paper, straw, dried grass clippings or leaves), compost, and green materials (food waste – no dairy or meat) finishing with a layer of compost on top. Water between layers. Ideally, do this in the fall or early spring to provide time for the compost to break down into great soil.
- Use a garden fork to mix the fill, break down any hard clumps and remove any root systems.
- To create a wheelchair accessible garden bed, use a raised container that is waist height of the person in the chair.
- Stock tanks are a great alternative to custom made beds and can be found in varying sizes. They are also a good alternative to building a raised garden bed. Be sure to drill drainage holes in the bottom of the tank.
- Soilless mix is recommended for container gardens.



**Soil mix**  
**one-half compost and**  
**one-half soil**  
**or**  
**one-third soil, one-third**  
**compost and one-third peat**  
**moss or coconut coir.**

### Soil calculator<sup>3</sup>

Multiply the length by width by the depth (e.g. a bed that is 1.2 metres × 1.2 metres – 25.5 centimetres deep [four feet long by four feet wide – 10 inches deep] will require about 0.7 cubic metres or 0.4 cubic yards of fill).

Use the Calculator Soup tool to determine how much soil you need: [www.calculatorsoup.com/calculators/construction/cubic-yards-calculator.php](http://www.calculatorsoup.com/calculators/construction/cubic-yards-calculator.php)

## Planting the garden

Some plants may be grown directly from seed following the instructions on the seed package, while other plants need to be started indoors due to needing a longer growing period. This region has a growing season of 160–170 days and a hardiness zone of five<sup>13</sup>. The hardiness zone tells which plants grow best in a geographic area. If a plant takes longer than 160 days, start it indoors or buy a seedling.

### Information on a seed package<sup>32</sup>:

- Heirloom seeds are open-pollinated plants that pass on traits from the parent plant. Saved seeds will produce the same type of plant year after year.
- Hybrid seeds are cross-pollinated from a variety of different plants. Saved seeds may or may not produce the same plant as the previous year.
- GMO seeds are genetically modified through gene splitting to produce desired characteristics. Seeds must be purchased each year (e.g. Bt-corn – genetically modified corn).

#### General rule of thumb

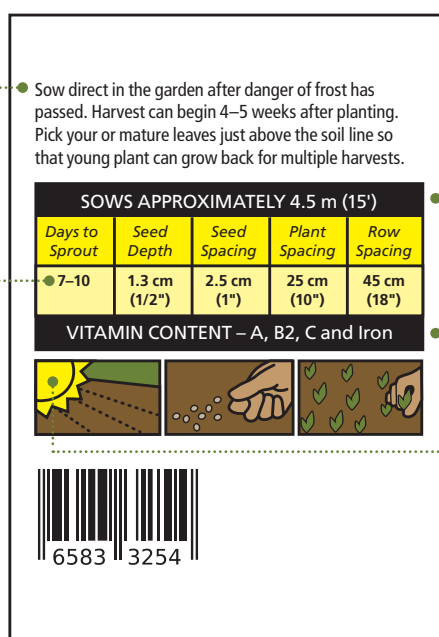
Plant warm season crops after the May long weekend.



#### Front label

This seed package is Swiss Chard. It costs \$2.99.

- It takes 60 days to grow from seed to full grown plant.
- It may be grown in a container.
- It is certified organic.



#### Back label

- These seeds should be sown 1.3 centimetres deep, 2.5 centimetres apart and will take seven to 10 days to sprout.
- The rows should be spaced 45 centimetres apart. They should be sown after the danger of frost. First harvest is within four to five weeks of planting. Cut plant greens and let regrow for a second crop. It likes partial sun.
- It is a good source of Vitamin A and Iron.
- It will yield 4.5 metres of Swiss Chard.



The Old Farmer's Almanac<sup>25</sup> has a planting date calculator guide for sowing seeds and harvesting plants. See [www.almanac.com/gardening/planting-dates/ON/Kitchener](http://www.almanac.com/gardening/planting-dates/ON/Kitchener). Generally, seeds from cool season or cold-hardy plants may be planted a couple of weeks before last frost date: cabbage, broccoli, lettuce, peas and spinach.

Warm season crops may die if planted before the last frost date (e.g., squash, cucumber and basil). A late frost may also kill warm season transplants such as tomatoes, peppers and eggplants, if planted too early.

**Plant for sunlight requirements:** Sow plants that require less light in shady areas and plants that require more light in partial or full sun.

### Amount of sunlight



#### Four hours

- Salad greens: leaf lettuce, arugula, endive, and cress.
- Broccoli, cauliflower.
- Peas, beets, beans.
- Brussel sprouts, radishes.
- Leafy greens: swiss chard, collards, mustard greens, spinach, and kale.

#### Six hours

- Borage, head lettuce.
- Carrots, peas.
- Herbs: chamomile, chives, cilantro, dill, mint, oregano, parsley, sage and thyme.
- Strawberries.

#### Eight hours

- Tomatoes, peppers, eggplants.
- Cucumbers, melons, and squash.



## Starting seedlings

Seedlings can be started indoors in containers<sup>6,7,31</sup> – they will require light, water, soilless potting mix and peat pellets or a clean container. If the plant requires more than 160 days to grow, calculate back from the last day of frost and plant accordingly.

### Student activity

1. Put soilless potting mix into a pail.
2. Add water until soil is moist.
3. Fill container with soil.
4. Indent soil with finger tip.
5. Add two to three seeds and cover with soil.
6. Label the plants.
7. Place on tray on a window sill or under a grow light (six to eight hours of light).
8. Use a spray bottle to water (just enough to keep the soil moist).
9. Add more soil once second set of leaves grow.
10. Place in a larger container as needed.

### Homemade nutrient growth test

Have students try these home remedies, applying to the soil every two weeks and compare growth.

### Compost tea

Scrunch green leaves and add to water. Let sit for a day and apply.

### Vegg-fregg water

Add peelings of fruit or vegetable, washed and crushed egg shells to water. Let sit for a day and apply.

### Epsom salt spritz

Add 15 to 30 millilitres of Epsom salt to four litres of water and apply.

Plants started indoors need to be hardened<sup>18</sup> which means they need to get used to outdoor conditions. Harden-off the plants two weeks before planting.

- Place the plants in the sun for two hours and then bring in to sheltered spot.
- Protect from strong wind, sun or hard rain.
- Increase the amount of time outside each day.
  - Bring plants in, if there is a risk of frost or if the temperature drops below 15 degrees Celsius (60 degrees Fahrenheit) for warm season plants.
  - Four degrees Celsius (40 degrees Fahrenheit) for cold-hardy plants.



## Growing the garden

**Planting:** Plant the seeds or seedlings according to instructions. Some plants will need less space than others. Intensive or square foot gardening techniques get more from a small space. The Ontario Ministry of Agriculture, Food and Rural Affairs Online Gardener's Handbook<sup>18</sup> provides these growing tips:

**Signage:** Teach visual arts by having students create signage to mark which plants have been planted where and when by including the date and name of the plant. Also create signs to communicate and promote the garden.

**Water:** Water is needed if there is less than two and a half centimetre of rain per 10–15 days. One heavy watering is better than frequent light watering. The best time to water is in the early morning. Water the soil not the leaves of the plant. Fill-up two litre pop bottles with water and insert into the soil upside down in between watering.

**Mulch:** Use a layer of dried grass clippings, straw or wood chips five to eight centimetres thick around the plants to keep in moisture.

**Weeds:** Remove unwanted plants that compete for nutrients and water. Snip them at soil level. Have students create a weed chart to recognize and remove weeds. Clearly mark garden plants to avoid removing the wrong plant.

**Thinning:** Some plants will need to be thinned out to allow growth. Once the plants have grown over five centimetres tall, pull the more spindly plants out so that the healthier plants are spaced about eight centimetres apart.

**Compost:** Compost may be added to the garden beds two weeks before planting or in the fall when the garden is put to bed. Place a bin of leaves or straw close to the garden and lasagna layer throughout the winter.

**Nutrients:**<sup>12,14</sup> Plants need primary nutrients: nitrogen (N), phosphorus (P) and potassium (K), and secondary nutrients: calcium (CA), sulphur (S) and magnesium (Mg) for good growth.

### Role of nutrients<sup>12,14</sup>

(N) – Plant, seed and flower growth.

(P) – Photosynthesis and energy transport – strong roots and blooming of flowers.

(K) – Photosynthesis, fruit growth and disease prevention.

(Ca) – Builds strong cell walls and helps carry other elements.

(Mg) – Absorption of light and use of nutrients.

**Students can measure and mark where the plants should go.**

Students can also create decorative plant labels and glue them on sticks to place in the ground.



## Trouble-shooting in the garden

Use this table to address some of the issues you may encounter in the garden<sup>2,10,12,18</sup>

Issue	Identification	Care
Plant not growing well	<ul style="list-style-type: none"> <li>Plants without proper sunlight, water, nutrients will not grow well.</li> <li>Discoloration or death of plant will occur if these elements are imbalanced.</li> </ul>	<ul style="list-style-type: none"> <li>Trim over hanging plants.</li> <li>Apply nutrients.</li> <li>Check the soil ph level.</li> <li>Water the soil not the plant.</li> <li>Avoid over-watering.</li> </ul>
Plant holes and ragged edges	<ul style="list-style-type: none"> <li>Insects lay eggs near a food source for their larvae.</li> </ul>	<ul style="list-style-type: none"> <li>Inspect and remove insects like white flies, spider mites or aphids.</li> <li>Keep beneficial insects like lady bugs, spiders, praying mantises.</li> <li>Handpick any eggs or larvae seen.</li> <li>Use organic sprays.</li> </ul>
Plant disease	<ul style="list-style-type: none"> <li>Look for brown spots or discoloration of leaves and stems or pinching of the stem.</li> <li>Bacteria show stunting, yellowing or browning.</li> <li>Fungi show brown spots, browning or a mildew appearance.</li> </ul>	<ul style="list-style-type: none"> <li>Prevent over wet conditions.</li> <li>Provide air circulation.</li> <li>Have good soil drainage.</li> <li>Remove and dispose of infected leaves.</li> <li>Practice good gardening hygiene.</li> <li>Rotate the plants yearly.</li> </ul>
Animals	<ul style="list-style-type: none"> <li>Identify the animal (e.g., moles, voles, rabbits, groundhogs, squirrels).</li> </ul>	<ul style="list-style-type: none"> <li>Use repellant sprays or plants (e.g., bee balm, catmint, lavender or oregano, garlic or basil).</li> <li>Remove birdfeeders, fallen produce.</li> <li>Keep compost and garbage tidy.</li> <li>Add fencing – build chicken wire cages to protect the plants.</li> </ul>

### Organic Wish<sup>21</sup> Natural Pesticide and Fungicide

- 4 l of water
- 30 ml baking soda
- 30 ml vegetable oil
- 5–10 ml dish soap



## Harvesting and enjoying the produce

Encouraging youth to eat healthy is important and nothing seems as tasty as garden fresh produce, making it tempting to eat straight from the garden. However, equally important is harvesting and preparing the produce safely before eating or selling.

When the produce is ready for harvest by students for the school market or for sampling, review with students the importance of harvesting and preparing food safely before it is sold or eaten.

**Consider a student assignment on invisible “bugs”; pathogens, their sources and how to stop them!**

### Harvest<sup>4</sup>

- Remove as much soil as possible.
- Wash garden tools and hands.
- Use clean containers with lids.
- Wash all containers, tools and scissors with warm soapy potable water, then rinse.
- Avoid harvesting or handling produce if sick.
- Students should wear gloves if they have any open sores.
- Review the importance of proper hygiene and hand washing when using the restrooms.

### Food preparation<sup>4,16</sup>

- Remind students to wash their hands, utensils and surfaces with soapy potable water.
- Wash all produce thoroughly before eating or cooking.
- Rinse or keep vegetables in cold potable water.
- Use a clean cutting board for chopping or slicing produce.
- Package the produce in clean containers.
- Handle gently to prevent damage to the produce.
- Stack containers with produce at least 15 cm off the floor.
- Cook food thoroughly and serve immediately.
- Refrigerate or freeze any perishables.



## Finding local resources

Use the list below to navigate your way locally.

### Bell, gas, water, sewer lines

Ontario One Call at 1-800-400-2255

- Call before you dig for underground lines. They will contact utilities.

### Community Garden Council/Network

519-575-4400

[www.community-gardens.ca/content/school-gardens](http://www.community-gardens.ca/content/school-gardens)

- Region of Waterloo Public Health and Emergency Services provides staff support to community gardens.

### Horticultural Societies

- Galt: 519- 623-7085
- Hespeler: 519-658-5074
- Preston: 519-653-4251
- Kitchener: 519 745-4669
- Waterloo: 519-747-1867

### Kitchener Master Gardeners

[info@kitchenermastergardeners.com](mailto:info@kitchenermastergardeners.com)

519 745-4669 c/o Rockway Gardens

[www.kitchenermastergardeners.com](http://www.kitchenermastergardeners.com)

### Municipalities

- Cambridge: 519-623-1340
- Kitchener: 519-741-2345
- North Dumfries: 519-632-8800
- Waterloo: 519-886-1550
- Wellesley: 519-699-4611
- Wilmot: 519-634-8444
- Woolwich: 519-664-2613
- Region of Waterloo: 519-575-4400

The Regional Official Plan includes community gardens. Enquire at your municipal office to find what support is available (Land, wood chips, grants, etc.) Each office has a different level of support. Call the ward councillor for your school to find out more.

### Rare Charitable Research Reserve

519-650-9336

[rare@raresites.org](mailto:rare@raresites.org)

- Elementary and secondary school modules at rare and ECO Camps.

### Region of Waterloo Landfill

Contact Public Health to arrange 519-575-4400

- Free compost: self load – bring own shovels and containers. Pre-load – only available for large trucks.

### Rogers Cable

1-800-738-7893

- Call for underground cable lines.

### Seeds of Diversity

519-954-7588

[www.seeds.ca](http://www.seeds.ca)

### Steckle Heritage Farms

519-748-4690

[info@stecklehomestead.ca](mailto:info@stecklehomestead.ca)

- Tour and school programs.

### Waterloo Region School Food Gardens

[www.wrschoolfoodgardens.ca](http://www.wrschoolfoodgardens.ca)





## Finding outside resources

This list provides some of the resources available for grants, network building and education.  
Region of Waterloo Public Health and Emergency Services does not endorse any specific listed funders.

### Funding

**Farm to School Canada**

[www.farmtocafeteriacanada.ca/resources/funding/](http://www.farmtocafeteriacanada.ca/resources/funding/)

**Laidlaw Foundation**

[www.laidlawfdn.org](http://www.laidlawfdn.org)

**Nutrients for Life**

[www.nutrientsforlife.ca/learning-gardens](http://www.nutrientsforlife.ca/learning-gardens)

**Communities in Bloom**

[www.communitiesinbloom.ca/grants-contests-promos/](http://www.communitiesinbloom.ca/grants-contests-promos/)

**Toyota Evergreen**

[www.evergreen.ca/get-involved/funding-opportunities/school-ground-grants](http://www.evergreen.ca/get-involved/funding-opportunities/school-ground-grants)

**Whole Kids Foundation**

[www.wholekidsfoundation.org/programs](http://www.wholekidsfoundation.org/programs)

### Networks

**Farm to Cafeteria Canada News**

[www.farmtocafeteriacanada.ca/news/newsletters-2](http://www.farmtocafeteriacanada.ca/news/newsletters-2)

**Kids Garden News (American)**

[www.kidsgardening.org](http://www.kidsgardening.org)

**Ontario Edible Education Network**

[www.sustainontario.com/work/edible-education](http://www.sustainontario.com/work/edible-education)

### Education resources

**KidsGardening.org**

[www.kidsgardening.org](http://www.kidsgardening.org)

**Nourish Nova Scotia Edible School Gardens**

[www.nourishns.ca/edible-school-gardens](http://www.nourishns.ca/edible-school-gardens)

**Whole Kids Foundation Resource Centre**

[www.wholekidsfoundation.org/school-gardens](http://www.wholekidsfoundation.org/school-gardens)





## Conclusion

School food gardens provide a means of enhancing academic success as well as a holistic way to develop the whole student using an integrated approach. In the Gardens for Healthy Schools: A Scan of School Gardens in Waterloo Region<sup>5</sup>, teachers identified the many benefits they saw as a result of involving students in a school garden, however, time constraints and lack of resources were two of the barriers identified as hindering factors in starting and maintaining school gardens.

This guide uses the Ministry of Education's Foundations for a Healthy School resource ([www.edu.gov.on.ca/eng/healthyschools/foundations.html](http://www.edu.gov.on.ca/eng/healthyschools/foundations.html)), Ophea's Healthy Schools Certification ([www.ophea.net/healthy-schools-certification](http://www.ophea.net/healthy-schools-certification)) to assist school staff to save time in planning and installing food based school gardens, provides resources, as well as a tool to recognize and celebrate school communities.

The practical advice for garden installation provides a step by step guide in starting a school vegetable garden resulting in a school resource that will promote and enhance the health and well-being of students, school staff, and the broader community.

## Appendix A: Sample list of school garden challenges

### Meeting the challenges

#### Time constraints

A team action plan will break the work into doable parts and shared responsibilities.

#### Lack of space

School gardens do not need to take a lot of space but location is important. Other alternatives to consider are raised beds or container gardening.

#### Lack of funding

Several foundations fund school gardens (e.g., TD Friends of the Environment, Evergreen, Nutrients for Life, Scott's Canada Grow 1000, Whole Kids Foundation).

#### Lack of interest from staff

Explore reasons why staff are not interested. Staff may be more interested if they had time, adequate resources, or confidence in their gardening skills. Identify school garden champions among teachers and students and ignite interest and excitement about school gardening. Make it your Healthy School Initiative!

#### Infrastructure challenges such as space or water access

Gardens do not need a lot of space, in fact, start small and build on your successes. Gardens do need adequate light, water and soil.

Locate the garden near an outside faucet, a rain water barrel, or a classroom with a sink and windows that open to fill the water tanks.

#### Lack of educational resources, curriculum materials and garden toolkits

As school gardening becomes popular as an experiential learning tool, more teacher supports are being developed. Here are a few resources:

- Waterloo Region School Food Gardens  
[www.wrschoolfoodgardens.ca](http://www.wrschoolfoodgardens.ca)
- Community Garden Council Waterloo Region  
[www.community-gardens.ca/content/school-gardens](http://www.community-gardens.ca/content/school-gardens).
- Ontario Edible Education Network  
<http://sustainontario.com/work/edible-education>.
- Farm to Cafeteria Canada  
[www.farmtocafeteriacanada.ca](http://www.farmtocafeteriacanada.ca).
- BC Making it Happen: Healthy Eating at School  
[www.healthyeatingatschool.ca/in-the-garden](http://www.healthyeatingatschool.ca/in-the-garden).

Teachers can work with community partners and other schools to pool and develop resources and look for ways to share the information.

#### Summer maintenance

Brainstorm creative solutions like youth leadership employment programs, child day camps or a seniors' gardening club or consider converting the school garden into a community garden during the summer. Community partnerships, school families and high school volunteer hours are resources that could be mobilized.



### **Vandalism and safety**<sup>28,30</sup>

Vandalism may happen and can be demoralizing. People vandalize for a variety of reasons; playfulness and self expression (prank, graffiti) or to express negative feelings (anger, revenge) without personal confrontation. Suggestions to prevent vandalism may include:

- Gardeners present during the summer.
- Include youth and surrounding neighbors in gardening activities and vandalism prevention – turn graffiti into garden art. Turn the negative into a positive!
- Lighting and signage with a number to call.
- Strategic planting of a thorny border hedge to set garden boundaries. Consider planting a “fedge” (food hedge with raspberries) or a pollinator hedge with roses.
- Clean up damages as soon as possible and keep the garden site beautiful and inviting!
- Plant sacrificial veggies (e.g., cherry tomatoes in containers outside the garden for public sampling – with a notice to not eat the produce grown in the garden).

### **Seasonal limitations**

- Indoor grow boxes. Contact Steckle Heritage Farm for information about their Growing Classroom Outreach Program. [www.stecklehomestead.ca](http://www.stecklehomestead.ca).
- Start cool weather plants in April for students to harvest in June (e.g. lettuce) or plants to harvest in fall when students return to school (e.g., carrots, brussel sprouts).
- Look at ways to extend the growing season with the use of protective covers or cold frames.

### **Tool storage**

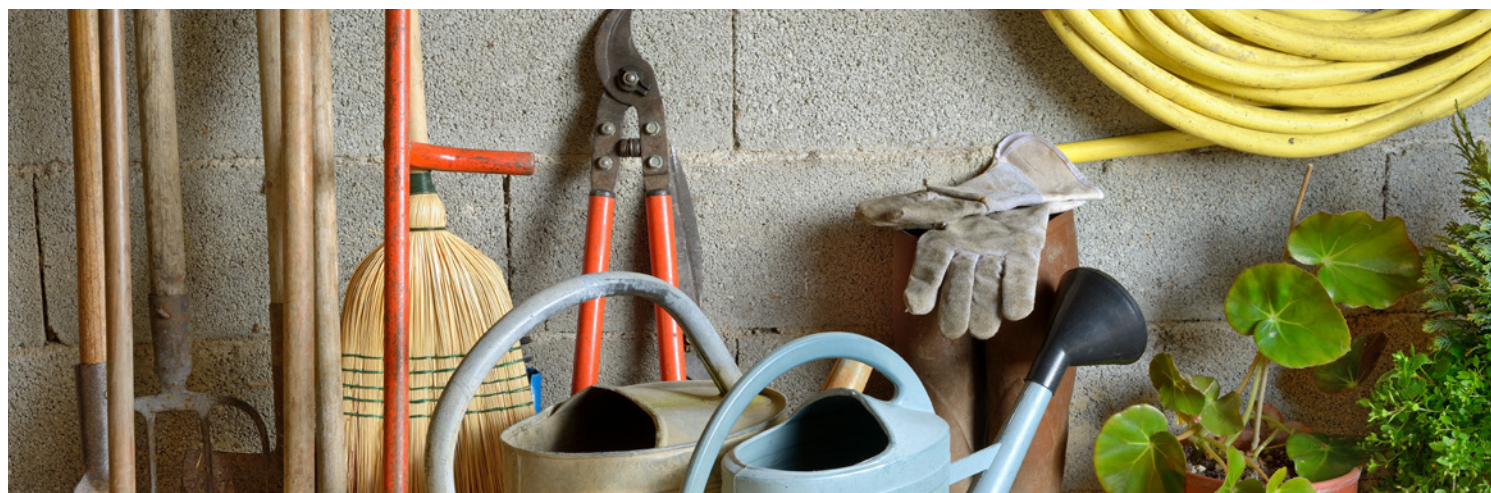
Tools will need to be cleaned and stored.

- Is there a closet in the school that could be used?
- Will you need a tool shed? Where can you place it?

### **Access after school hours**

Brainstorm what type of access is needed for community partners.

- Will legal agreements or a police check be needed?



## Appendix B: Sample vision statement

### **Vision:**

The school garden will provide a safe and inclusive place to support healthy development of students.

### **Mission:**

The committee will support the creation and long term sustainability of the school garden.

### **Goals:**

1. Promote a positive school environment.
2. Achieve academic learning.
3. Support health, growth, and development of students.
4. Foster community collaboration and partnerships.

### **Objectives:**

- To foster community collaboration and partnerships:
  - Students will conduct a neighborhood inventory for partnerships by October.
  - A community partnership meeting will be held to discuss possible roles and resources by November.
  - Teachers will develop a communication and liaison plan for student and partners by November.
- To achieve academic learning over the school term:
  - Teachers will choose lessons from the garden curriculum guide by December.
  - Teachers will assign learning goals and lesson plans for indoor growing by February.
  - Teachers will create a classroom schedule/ student tasks for the outdoor garden by April.
- To support the health, growth and development of students throughout the school term:
  - Students will plan the design of the garden and decide what they will grow by February.
  - Students will take leadership in assigned tasks in keeping with curriculum and school goals throughout the project.
- To create a welcoming safe space:
  - Students will create inclusive signage as a part of the art curriculum to welcome people of all races, gender orientation and abilities by April.
  - Students will create gardening agreements about welcoming all people in the garden by April.



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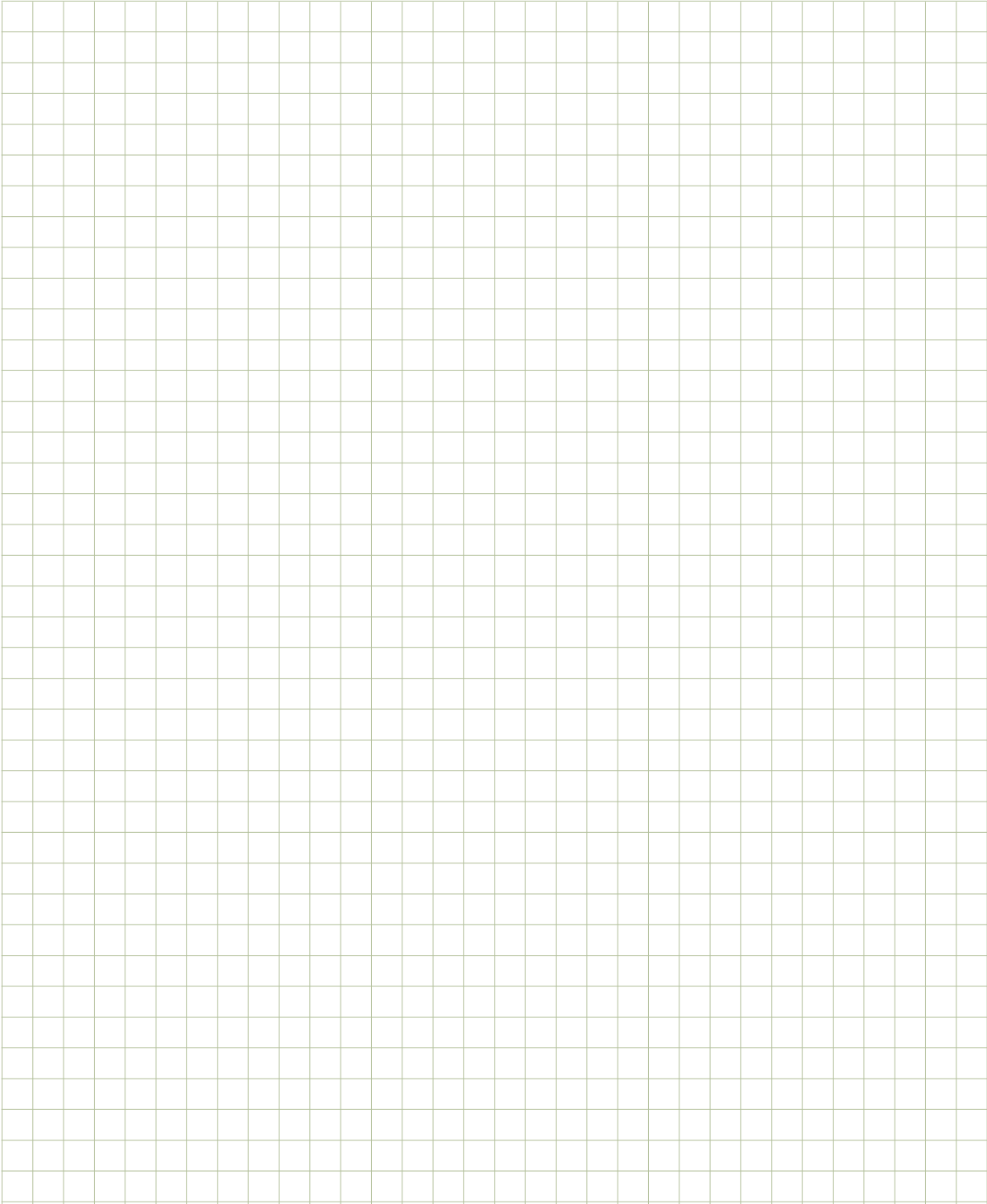
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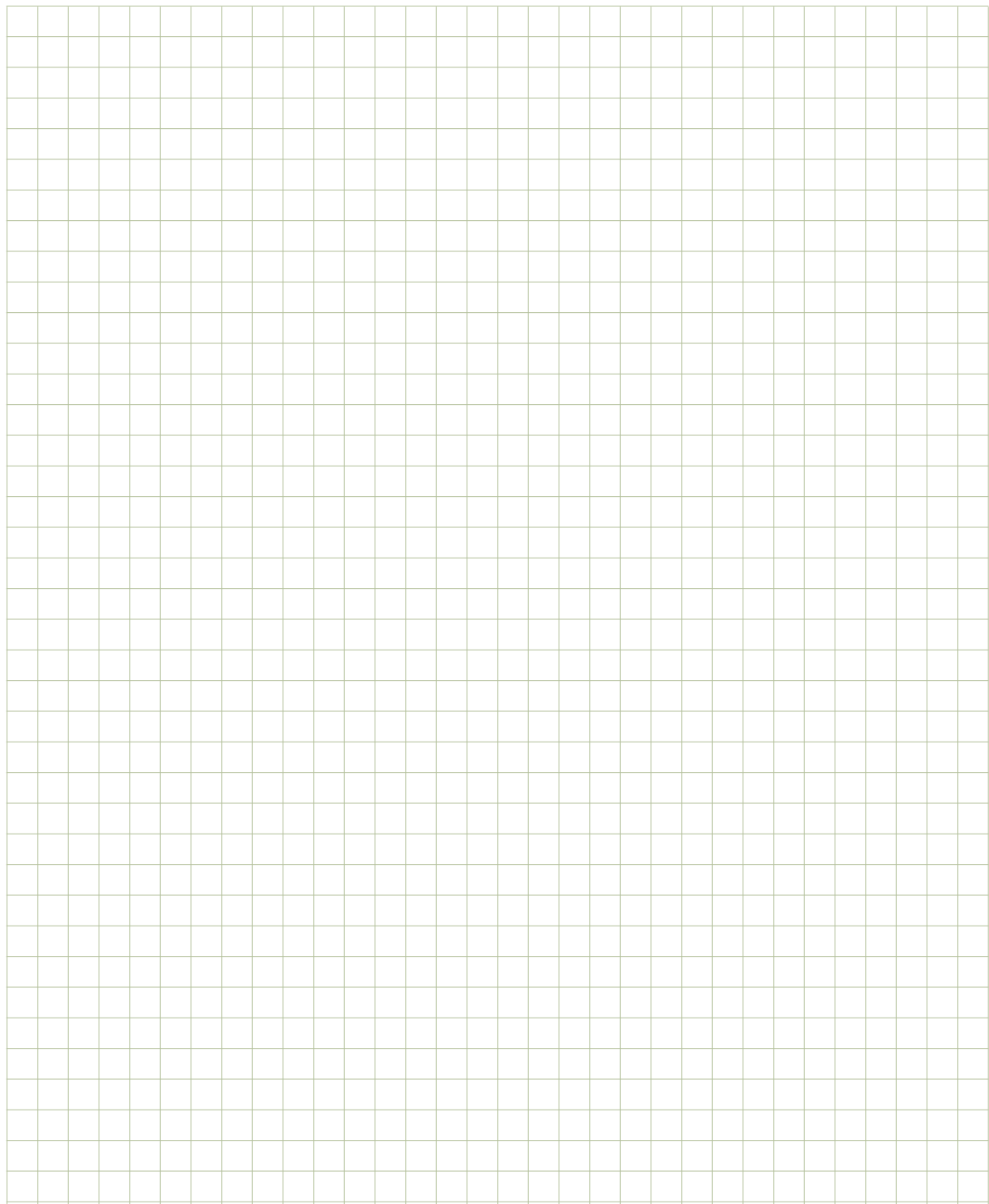
## Notes

# Sketches





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