Designing Educational Food Landscapes for Schools

Guidelines

Elizabeth Nowatschin*

This document outlines a set of guidelines that were developed to aid landscape architects and school garden stakeholders in designing multipurpose, inclusive, community-engaged school food gardens that meet the needs of the primary users as well as the greater community. It is the result of a University of Guelph Master of Landscape Architecture research project by Elizabeth Nowatschin, with the assistance of Drs. Karen Landman and Erin Nelson.

School gardens range from simple to complex and require numerous considerations in their planning, design, and on-going maintenance. The guidelines were developed based on findings from interviews with school garden leaders across Canada and from reviewing existing literature and school garden resources. The guidelines are presented in seven categories: visioning, planning and design; practical considerations, users and accessibility; garden features; plant selection; management and maintenance; and evolution and longevity. There are 53 guidelines in all.

Contents
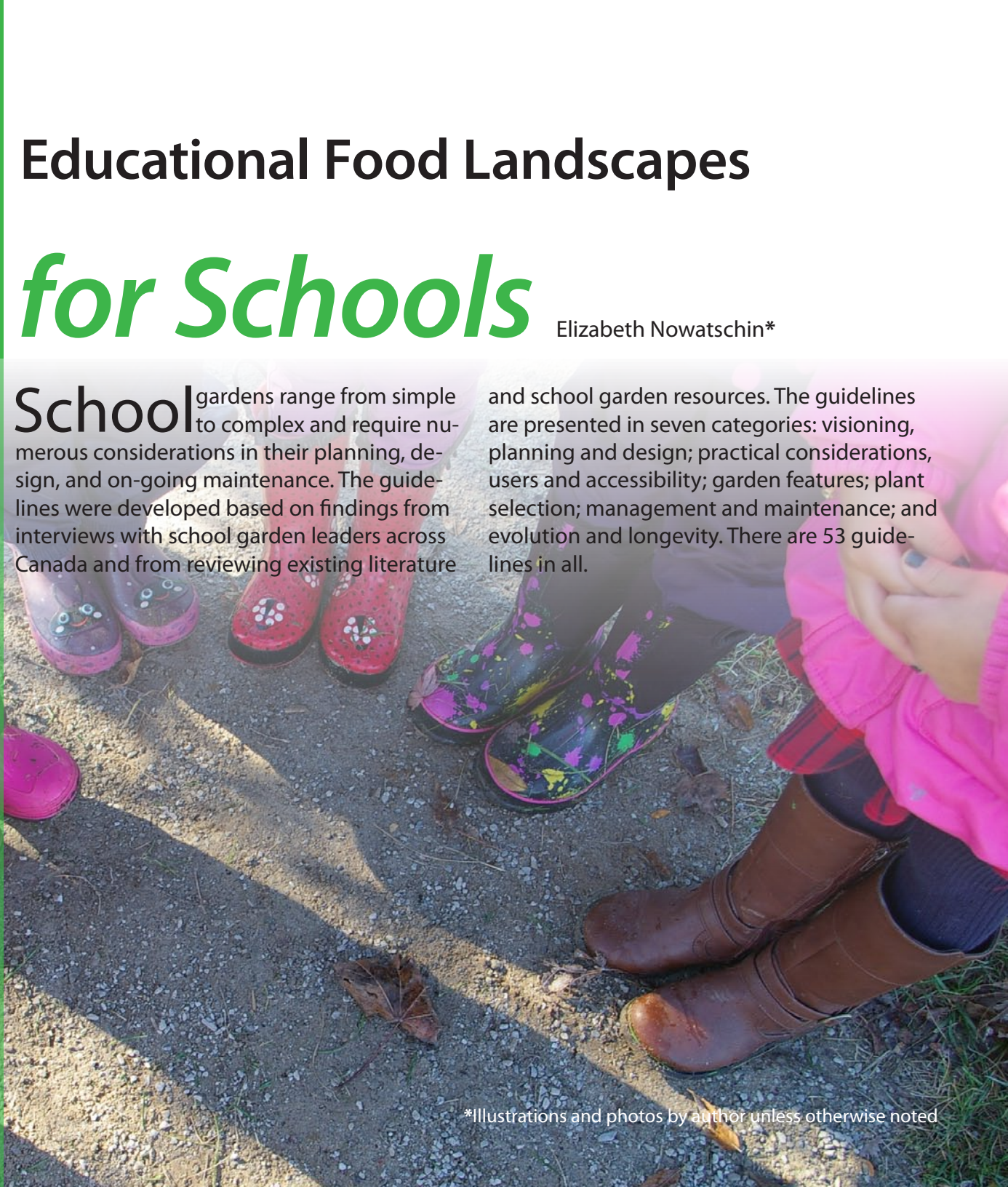
Summary of Motivations and Benefits

In addition to educational motivations, school gardening is being driven by public health concerns about rising rates of obesity and diabetes in children; the local food and sustainable agriculture movements; increased interest in children's environmental awareness; and social and community development goals. School food gardens have been shown to provide community building and engagement; social development for the students who work and play in these gardens; curriculum and learning that is relevant and integrated; an awareness of the environment, linked to place; increased food literacy and health of the garden participants; and an effective means to link to local food and sustainable agriculture.

MOTIVATION	BENEFITS	REFERENCES
Curriculum To enhance academic achievement, the curriculum and pedagogical value of schoolyards	Increase learning opportunities	1
	Academic Instruction in science, environmental studies, nutrition, agricultural studies, math, social studies, physical education, and community service	10, 13, 29
	Enrichment of language arts	10
	Varied extracurricular activities	13
	Improved academic performance	34
Environment To instill a connection with nature and an environmental stewardship ethic and enhance ecological value of schoolyard	Increase schoolyard plant diversity	11
	Increase contact and connection with natural environment	2, 18, 21, 22, 23
	Develop ecological literacy including ecological systems, environmental stewardship, environmental ethics, awareness of global environmental issues	5, 6, 10, 15, 24, 25
	Develop increased respect for nature	29
Local Food To provide education and practice of sustainable agriculture, food systems, and food literacy in connection with the local food movement	Increase food literacy	5, 7, 17, 26, 29, 33
	Increase food system awareness	4, 8, 14
	Link food consumption to sustainable agriculture	25
	Highlight concerns about food security and the importance of domestic food production	29
	Learn about and practicing sustainable agriculture	3
	Develop positive attitudes toward farming	29
Health To promote healthy life styles and nutrition	Positively influence healthy eating habits and nutrition	5, 6, 12, 13, 19, 28, 25
	Increase physical activity	16, 20

Summary of Motivations and Benefits

Every school is different, each having a unique geographic location, school yard, student population and community makeup. Due to these differences, each school with a garden or planning on establishing a garden will have different needs. Thus, the following guidelines are not presented as a step-by-step list of instructions but rather as a collection of ideas and suggestions to help inform the process of school gardening. Not all of the guidelines will be applicable or useful in every situation, but each can provide useful perspectives and points of consideration. Use this guide along with other available resources, some of which can be found at the end of this document.

MOTIVATION	BENEFITS	REFERENCES
Practical Skills To apply theory and teach practical skills	Learning new practical skills and technical competencies	32, 27
	Improving practical skills	31
Social Development To encourage social development and enhance social value of schoolyard	Promotion of social inclusion and positive social interaction	12, 20
	Positive impacts on attitudes and behaviour, decreased disruptive behaviour	11, 31, 34
	Enhanced interactions between students and teachers	11
	Improved cooperation, teamwork and communication; Collective responsibility; Conducive to students who may have difficulty interacting with others while learning indoors	1, 10, 11, 29, 30, 31, 32
	Service learning and volunteerism	30
	Improved self esteem, self understanding, and self empowerment	1, 10, 27, 30, 31
	Enthusiasm/anticipation, motivation, pride in activities, delayed gratification	1
	Exposure to role models from different walks of life	1
	Independence, leadership, decision making	1, 30, 32
Community Engagement To enhance community engagement and development both within the school and broader community	Cultural heritage	29
	Fostering community connections and building social capital	11, 16
	Reintegration of people and place; Grounding people in a common purpose	9
	Sense of belonging, bond with place, ownership	5, 9

Visioning, Planning and Design

1 **Use goals and objectives** to guide the design.

2 **Use a participatory and inclusive design process.** Involve all future users of the site, especially the students, to develop outdoor-classroom design principles with stakeholders.

3 **Start small, but not too small.** The project needs to generate momentum, so build it in stages.

4 **Cultivate a spirit of learning.** Every step of the project is a learning opportunity.

5 **Design it to be a teaching environment.** Growing food to donate or for the cafeteria may be a goal of the project; however, do not lose sight of the most important objective – school gardens are teaching tools and educating students should be the top priority. It should be noted that the secondary goals, mentioned above, may be integrated into the learning outcomes especially in a high school setting where students may be learning production and management processes.

6 **Create a special sense of place.** The garden is a unique classroom for the school and community.

7 **Reflect local conditions.** The garden design should be an expression of the local built, natural, historic and cultural conditions, and reflect the interests of its participants.
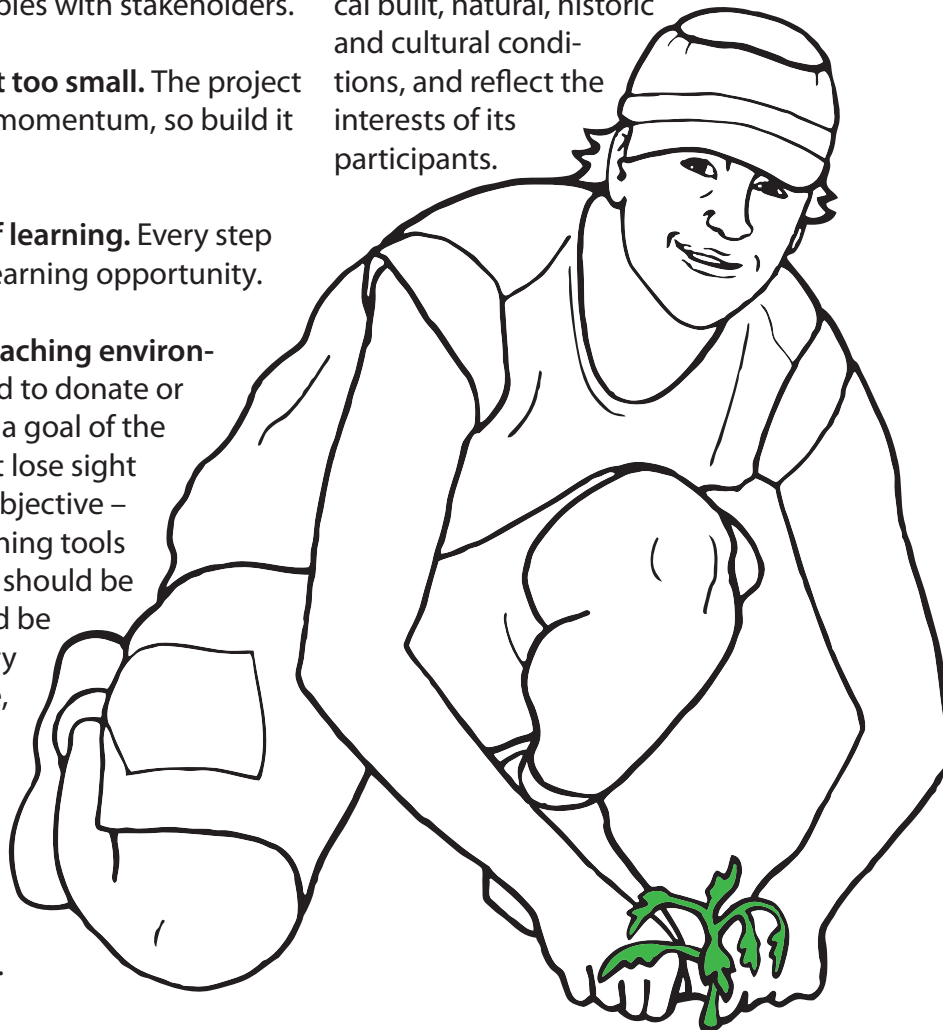

Photo: Pattrick Rittinger

This might mean growing heirloom varieties of vegetables at a 100 year-old school site; planting culturally-appropriate food plants; using a fence style that matches the surrounding residential neighbourhood; or using plants that are native to the region.

8 **Employ a responsive design strategy** so that the project can adapt and change with shifting conditions, particularly through phasing. This means building the garden in stages.

9 **Develop a master plan drawing** to use as a communication tool.

Practical Considerations
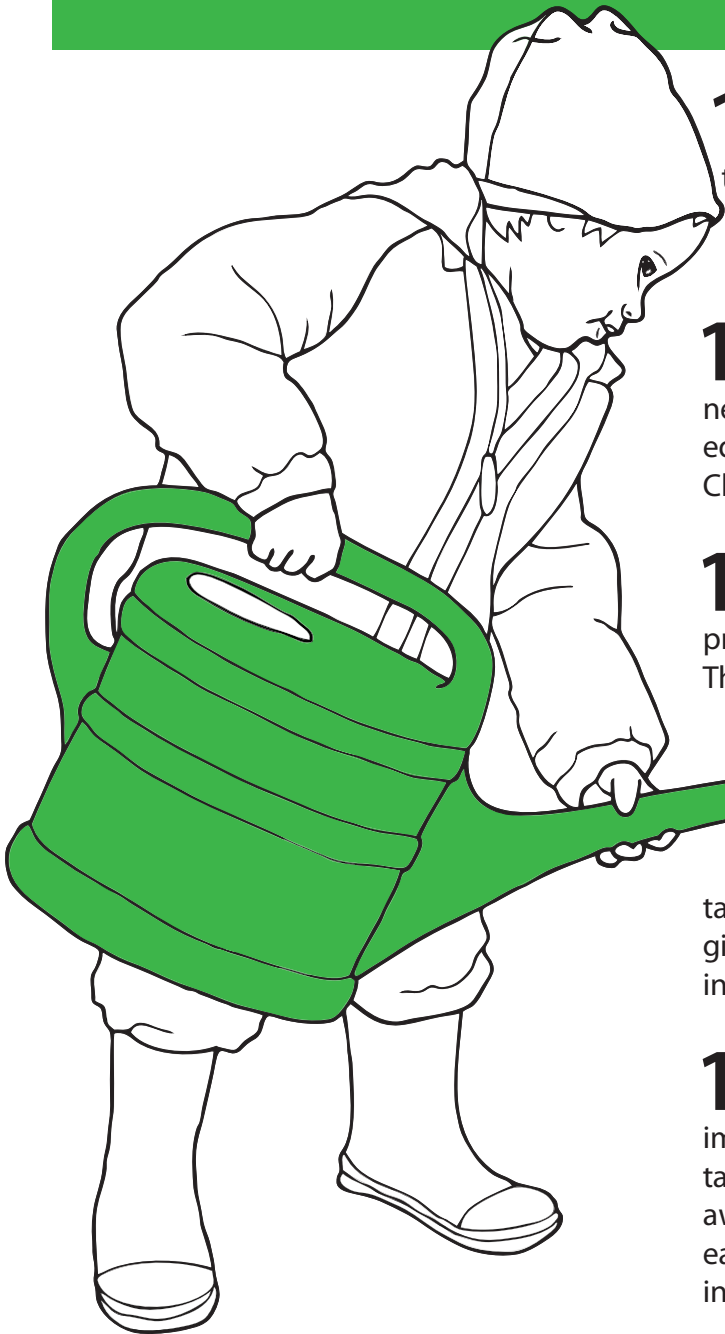
10 **Confirm water access.** Water access is essential for irrigation, so it is important to ensure the garden is located close to a water source and to confirm ongoing access with the owner.

11 **Conduct a shade study and test the soil.** Sunlight and soil are absolutely necessary requirements. Soil can be amended or imported; however, sunlight cannot. Choose a site with 6-8 hours of direct sunlight.

12 **Do not be deterred by the fear of vandalism.** Even if vandalism is an existing problem at the site, it need not be a barrier. There are multiple ways of addressing the issue; animating and using the space are the most effective. Developing a sense of ownership amongst the students and greater community is also important. Painting murals on walls will deter tagging. Signage (e.g. a welcome sign) and fencing are other strategies.

13 **Select location for visibility and accessibility.** Site selection is one of the most important design decisions. Visibility is important for both safety reasons and community awareness, and accessibility is important for ease of use and for maximizing and diversifying users.

14 **Think about wildlife.** Existing wildlife may contribute to learning opportunities, but may also cause damage to the garden; develop ways to attract beneficial wildlife and deter pests. Fences may need to be used in the case of deer and rabbits.

15 **Consider other existing conditions.** Additional considerations include wind protection, drainage, traffic, existing vegetation, and built structures.
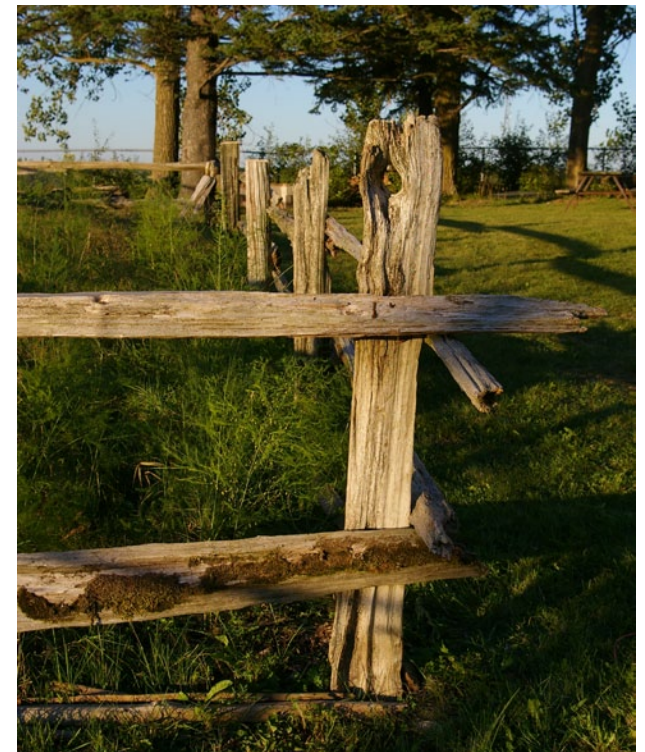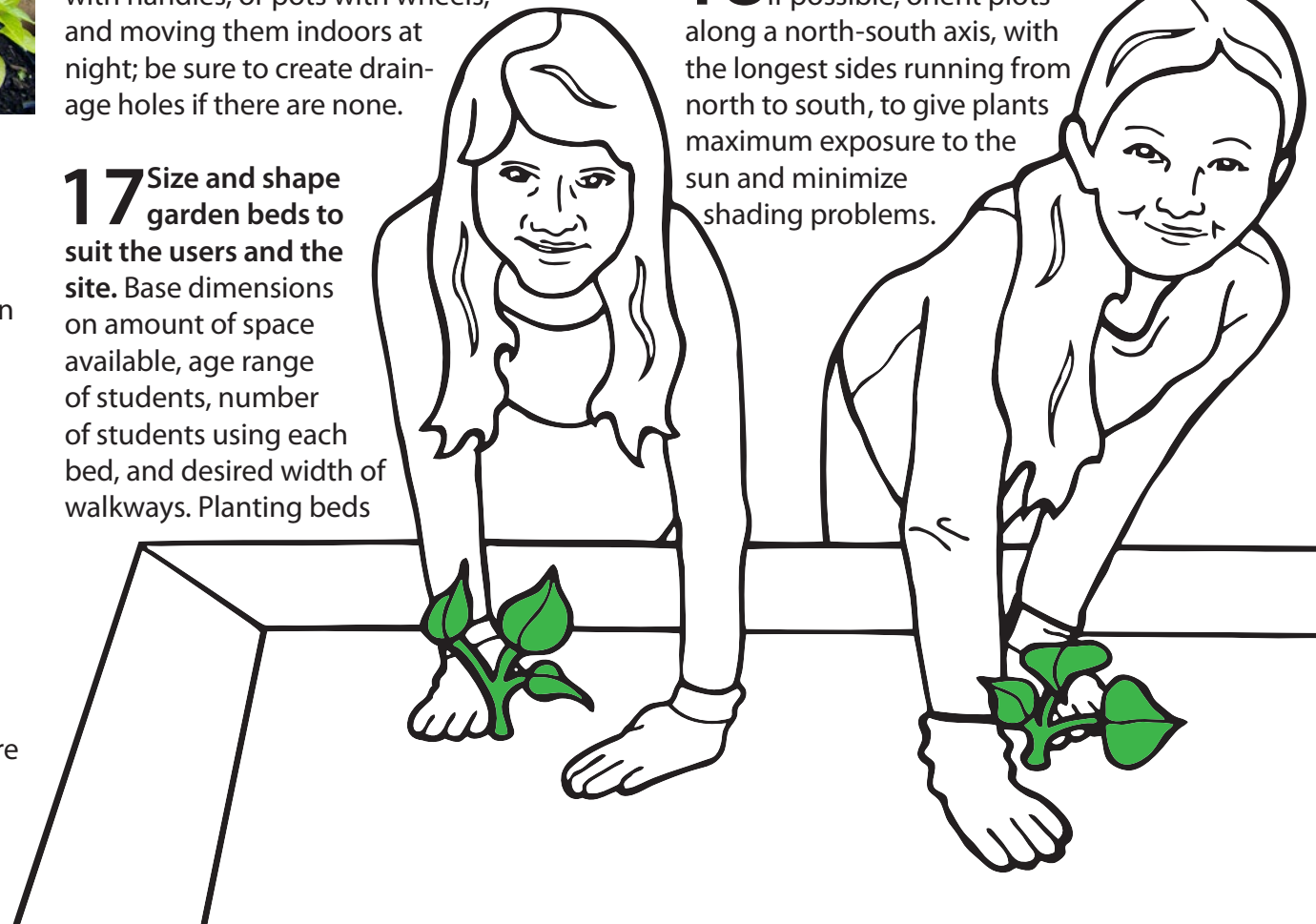
Garden Elements

16 **Select the garden bed style best suited for the site.** This might include in-ground, framed raised-beds, planters and containers or a combination of garden bed styles. In-ground gardens are an option when soil conditions are good. Choose framed raised-beds when existing soil is poor or the only space available is paved with asphalt or concrete. Other reasons to use framed raised-beds include: to improve soil fertility and/or drainage, to raise the soil and plants to a comfortable reach for people who cannot garden easily at ground level, to create a neat and aesthetic garden, to communicate a clear sense of where the garden starts and stops, and, in regions with cool wet spring weather, to allow soil to drain and warm more quickly allowing for earlier planting. The size and height of the beds should be based on

the needs of the users. Use containers to pilot a gardening program or if there is little to no garden space. Containers may also be used to demonstrate gardening in small spaces or for experiments. Common containers are clay and plastic pots, and large wooden or plastic barrels. Buckets can be used to create an indoor/outdoor garden by growing plants in buckets with handles, or pots with wheels, and moving them indoors at night; be sure to create drainage holes if there are none.

17 **Size and shape garden beds to suit the users and the site.** Base dimensions on amount of space available, age range of students, number of students using each bed, and desired width of walkways. Planting beds

should be 3-feet wide for young children and up to 4-feet wide for older children. This allows them to be worked from both sides without students needing to step into the growing area where plants may get damaged and soil compacted.

18 **Orient garden beds for maximum sun.** If possible, orient plots along a north-south axis, with the longest sides running from north to south, to give plants maximum exposure to the sun and minimize shading problems.

Garden Elements

Photo: Elin Marley

19 **Delineate the garden beds.** Edge treatments around in-ground beds are important for younger and new gardeners; these treatments delineate the beds and clearly mark where the pathways are so that users know where to walk and where not to step.

20 **Have a demonstration garden bed** such as a tiered raised-bed that the entire class can gather around for instruction and discussion.

21 **Consider a hybrid garden model.** Community member plots on the site help to animate the space and engage the greater community. Before adopting this model, make sure that there is interest from a population of residents who want to garden but do not have a place to do so.

22 **Design a hierarchical pathway system.** Pathways to and from the garden and around the garden features help communicate where to walk and shape the space. In a learning garden, pathways should be wide enough to accommodate groups of students. A width of 6 feet for centre paths and 3 to 4 feet for lateral ones is a good guideline.
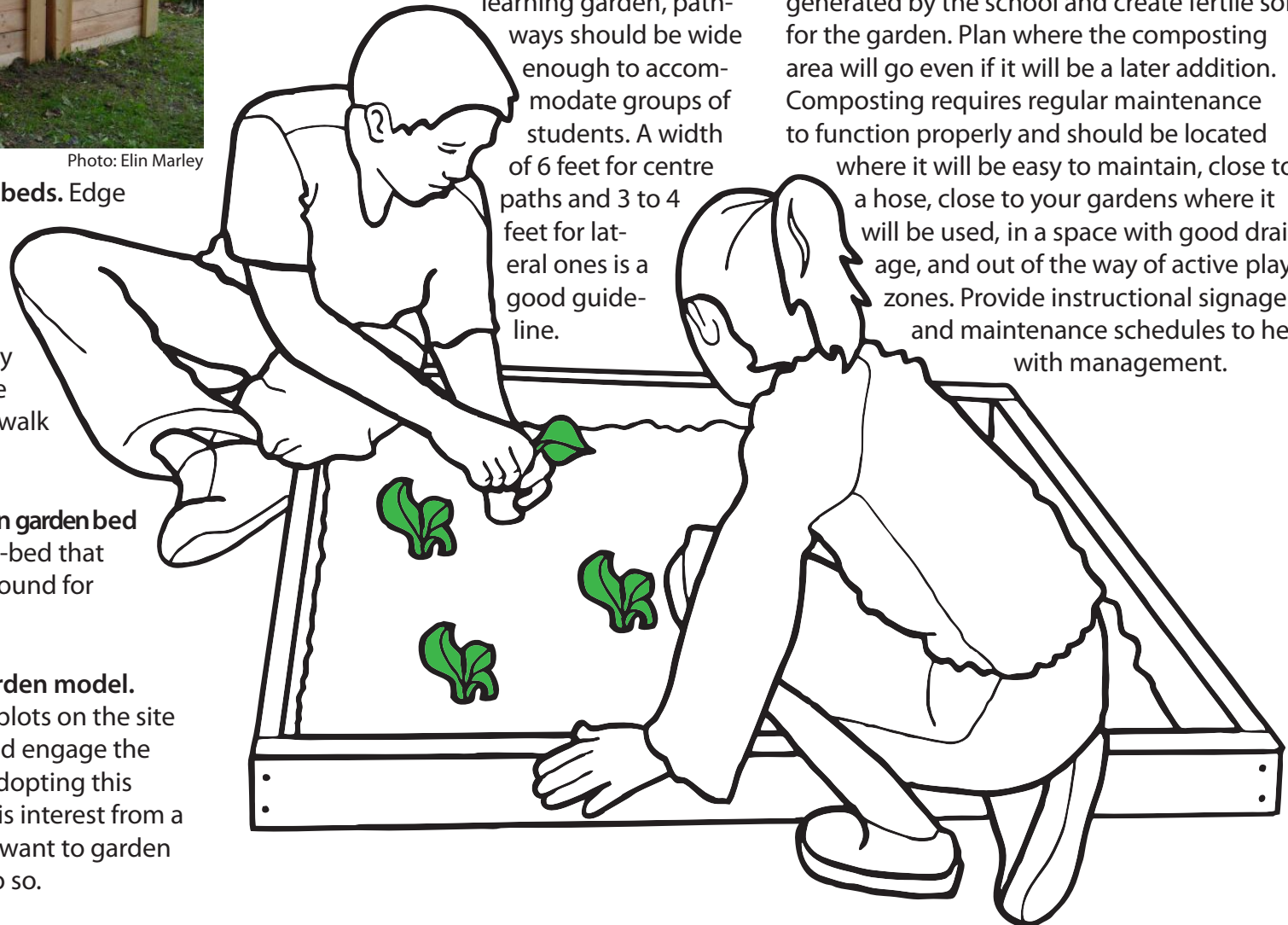
23 **Include space for composting.** Making and using compost is an excellent way to demonstrate the cycle of growth and decay found in nature and to both reduce waste generated by the school and create fertile soil for the garden. Plan where the composting area will go even if it will be a later addition. Composting requires regular maintenance to function properly and should be located where it will be easy to maintain, close to a hose, close to your gardens where it will be used, in a space with good drainage, and out of the way of active play zones. Provide instructional signage and maintenance schedules to help with management.
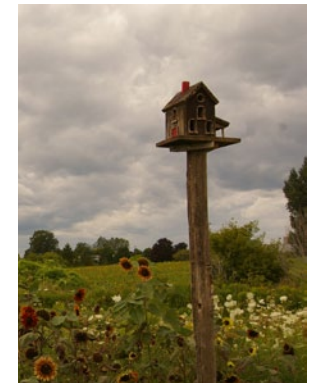
Garden Elements

24 **Consider vermiculture.** An alternative to an outdoor composting system is vermiculture. Having a well-managed worm bin can create great compost, can be done indoors year-round, requires little space, and is more accessible for those without access to an outside composter.

25 **Think about sun and rain protection.** A shade structure or shelter where classes can meet is important, depending on available resources. Existing mature deciduous trees can provide excellent shade, so a structure may not be required. However, a tree should not be considered shelter from rain or lightning.

26 **Plan for tool storage.** Tool storage, often in the form of a garden shed, is an important feature to include in a garden plan. It provides a safe place to keep tools and supplies, and allows easy access to tools and equipment for volunteers and other groups using the site over the summer. The garden shed can be easily made into a multifunctional structure, as the roof can be used to demonstrate rain harvesting or green roofs, and walls can house murals, signs, or white boards for class instruction.

27 **Collect rainwater.** Rainwater harvesting is a beneficial addition to the garden and a great learning opportunity; put systems in place to make sure it is cared for, such as instructional signage.

28 **Collaborate with technical classes.** Technical classes can help design and build sheds, benches, wildlife houses, trellising and other garden features.

Garden Elements

Photo: Barry Tysdal

Photo: Candace Varjassy

29 **Allow space for art projects.** Art in the form of sculpture, murals, and mosaics add colour and beauty to the garden and contribute a sense of engagement/ownership.

30 **Include space for gathering.** It is important to have a gathering area. This may be a formal outdoor classroom or an informal open space. Having both a sheltered space and an open sunny space would be ideal with either permanent or moveable seating. This can also be used as flex space where folded tables can be set up for workshops, celebrations, and other events.
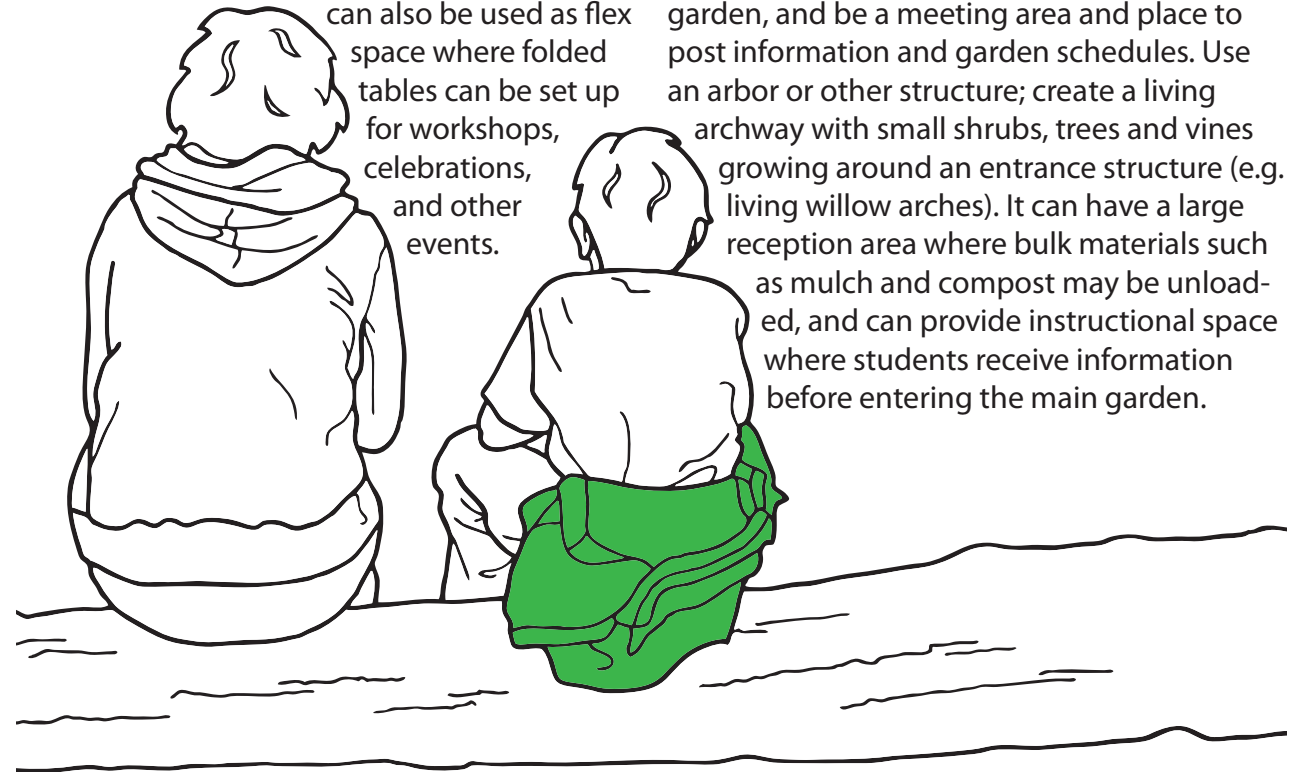
31 **Provide seating.** A grassy area near the garden, logs, large stones, straw bales, benches, picnic tables and wide garden-frame edges are all great options. Moveable seating that can be put away after use is an alternative if vandalism is an issue and for flexibility.

32 **Create an entrance feature.** Even if the garden is not fenced it can still have an entrance feature. An aesthetic and eye-catching entrance can attract people to the garden, and be a meeting area and place to post information and garden schedules. Use an arbor or other structure; create a living archway with small shrubs, trees and vines growing around an entrance structure (e.g. living willow arches). It can have a large reception area where bulk materials such as mulch and compost may be unloaded, and can provide instructional space where students receive information before entering the main garden.

Garden Elements

33 **Use signage to communicate.** Signage can give the site an identity within the school; inform neighbours about the new addition to the schoolyard; identify the garden as an outdoor learning area; announce times the garden is open; provide rules and guidelines for using the space; and display a contact number to call with questions and concerns or to report vandalism.
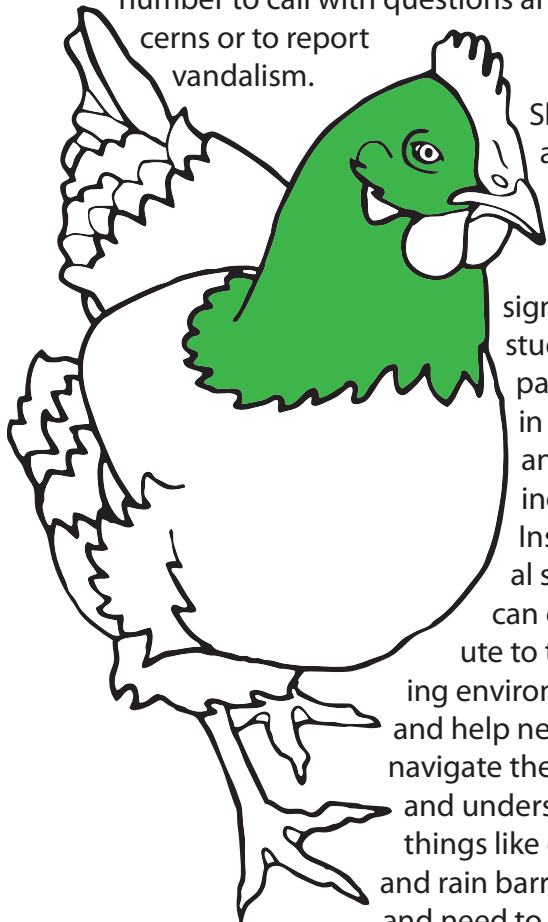
Shed walls and fences can be used to post signs and students can participate in making and painting them. Instructional signage can contribute to the learning environment and help new users navigate the space and understand how things like compost and rain barrels work and need to be main-

tained. A useful method is to have permanent wooden posts with laminated signs affixed with Velcro.

34 **Consider the addition of livestock carefully.** Animals are a great addition to a school garden, but need full-time care. For many students in urban areas, having animals on school grounds may be their only interaction with animals typically found on a farm. Animals can provide a number of natural learning experiences, but their health and wellbeing should be paramount.

35 **Use fencing strategically.** The use of fencing to demarcate the garden need not look prison-like nor be fully enclosed. Use new or existing fences as trellising for plants or as a venue for displaying artwork, to create a sense of enclosure, to mitigate views of and/or noise from traffic or parking areas, and to keep out unwanted dogs, wildlife, or stray balls.

36 **Leave room for future additions and projects.** Additional garden features that can enhance the food garden include an edible native plant garden, a food forest, a sensory garden, habitat gardens, pollinator gardens, butterfly gardens, and cut- flowers. Other learning features to consider include a human sundial, weather station, harvest area, and outdoor kitchen and dining area.

37 **Create a balance between permanent and temporary features.** Permanent structures such as raised-garden beds, gazebos, pergolas and greenhouses need to be thoughtfully placed, whereas moveable features can be more easily relocated or removed. Moveable and temporary features allow for flexibility and change; this also leaves space for experimentation and innovation. Annual vegetable beds are an example of flexible space; every year they can be planted differently, thereby giving new students the opportunity to help design them. Other examples include creating a living tunnel or tripod out of climbing plants like pole beans, or an enclosure with giant sunflowers. Seasonal features such as these may be recreated every year with a new group of students.

Photo: Dan Schulbeck

Users and Accessibility

38 **Enable access.** Consider enabling features, such as the height of garden beds, wheelchair and scooter access, pathway width and treatment, and seating to accommodate students with mobility challenges. Promote gardening with elders, grandparents, and local seniors. Pathways that are wheelchair accessible will also accommodate wheelbarrows, garden carts, and strollers. Pathways that are level or have less than a 5% slope and are paved or made out of crushed stone screenings will be more accessible to wheelchairs.
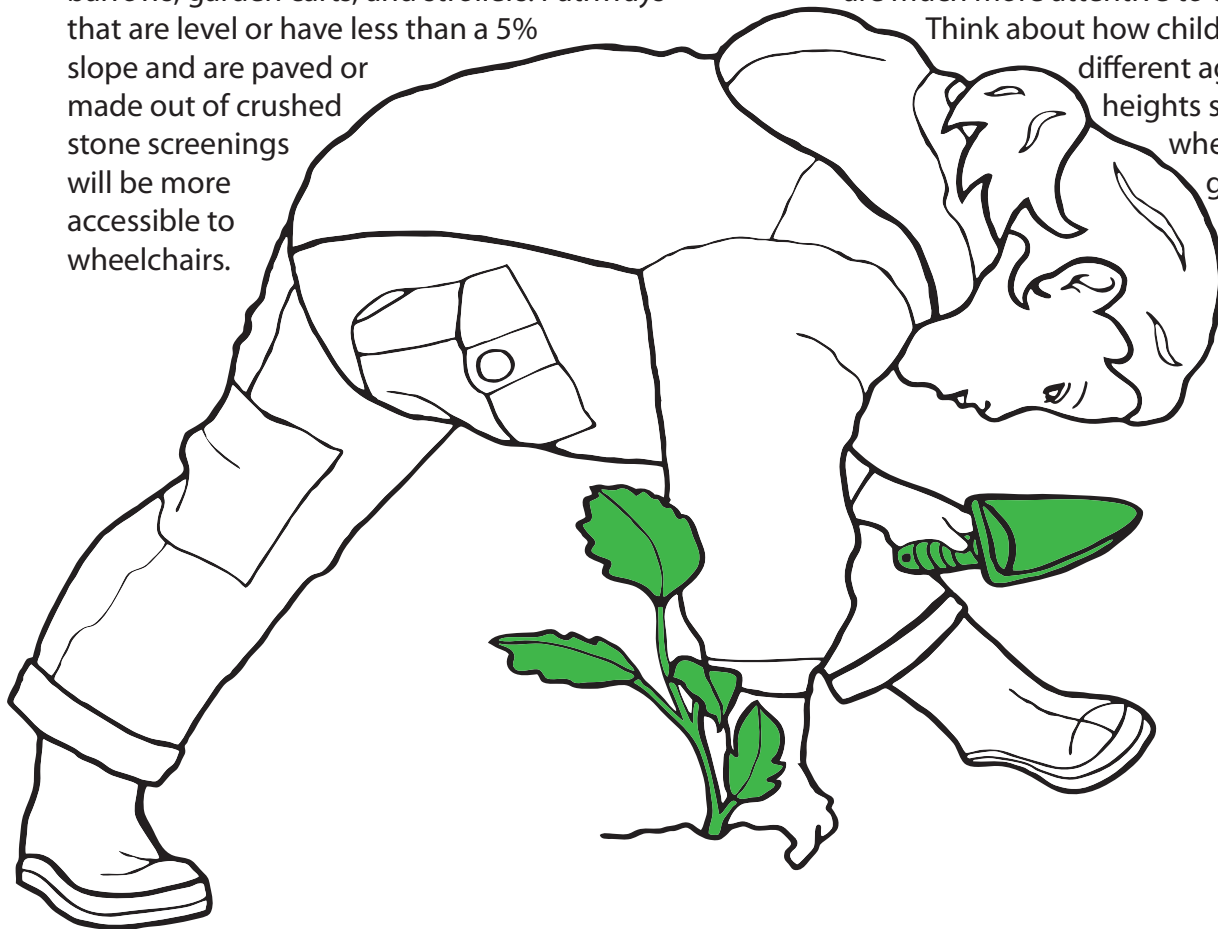
39 **Provide space.** Make sure there is enough room for all the students in a class to gather around at least one of the garden beds for instructional purposes.

40 **Think about scale.** Adults and children tend to see the world differently; adults often see the big picture, while children are much more attentive to details. Think about how children of different ages and heights see and where their gaze falls.

Plant Selection

Photo: Stephanie Captein

lessons learned from previous seasons; experimenting with new and unusual varieties (to the students and community); choosing food plants linked to the cultural cuisines of users; choosing vegetables not readily available at the grocery store; growing heritage varieties; and based on the needs of cooking classes or cafeterias.

41 Choose plants based on the goals of the project. Depending on the climate and on site conditions these may include common annual vegetables, heritage varieties, culturally-appropriate vegetables, herbs, annual flowers, edible flowers, perennial vegetables, berry shrubs and vines, fruit trees, grains, native plants, pollinator and habitat plantings, and sensory gardens. Vegetable selection may also be based on how the garden will be managed over the summer; what grows well in that particular garden; what students like;

42 Consult local resources. Research plants that grow in the region and contact local horticultural clubs, nurseries, conservation authorities or other resources for more information (e.g. Evergreen provides databases of native plants).

43 Consider other edible plants. For example, perennials such as asparagus, rhubarb, and strawberries, or fruit bearing plants such as blueberries, raspberries, currants, or haskap berries, or fruit trees such as apple and pear trees. Develop a management plan to ensure they become well-established and properly cared for over the years.

44 Experiment. Planting annual vegetables and flowers every year is a chance to apply lessons learned from previous seasons and also to try new things.

Management and Maintenance

45 **Design with a feasible management plan in mind.** Management of the garden is a consideration that needs to be addressed during the design process; the success of the garden will depend on good design and appropriate maintenance. Design decisions that may help to ease garden maintenance and management include site and plant selection, materials used, how the garden will be watered, and signage. Ways to manage the garden include scheduling class use of the garden and other spaces such as outdoor classrooms; posting garden maintenance tasks; creating a day-by-day garden calendar to record gardening responsibilities; developing a work schedule for volunteers; scheduling gardening days; planning a holiday and summer maintenance program; and creating a supply-ordering system.

46 **Include a kiosk or bulletin board** in the design of the garden to post schedules, garden tasks and other information.

47 **Design based on capacity and resources.** Think about how the garden will be tended and maintained before it is built. Make sure there are available resources for it to be properly managed. This includes consideration of seasonality, funding, equipment and labour. Base the design on how many people are available to help with maintenance and what their skills are.

48 **Build systems that will help with maintenance.** For example, it may be easier to get funding for physical items than for wages, and it can be easier to get volunteers to help with building than weekly hand watering, so installing an irrigation system could be a good option. While the task of watering can provide an educational opportunity for students, the challenges with dependable irrigation, at the right time and in the right amount, override this opportunity. An irrigation system is a vital addition that allows for consistent and efficient watering when no volunteers are available. It can be turned off if teachers or facilitators want to use watering as an activity.

49 **Have a summer management strategy and a back-up.** Some examples of successful summer management strategies include having summer programs, gardening clubs, and/or other community groups take over garden maintenance and programming; having a designated garden coordinator to organize volunteers and scheduling; having community members oversee the school plots in a hybrid garden; and hiring summer students to maintain the garden.
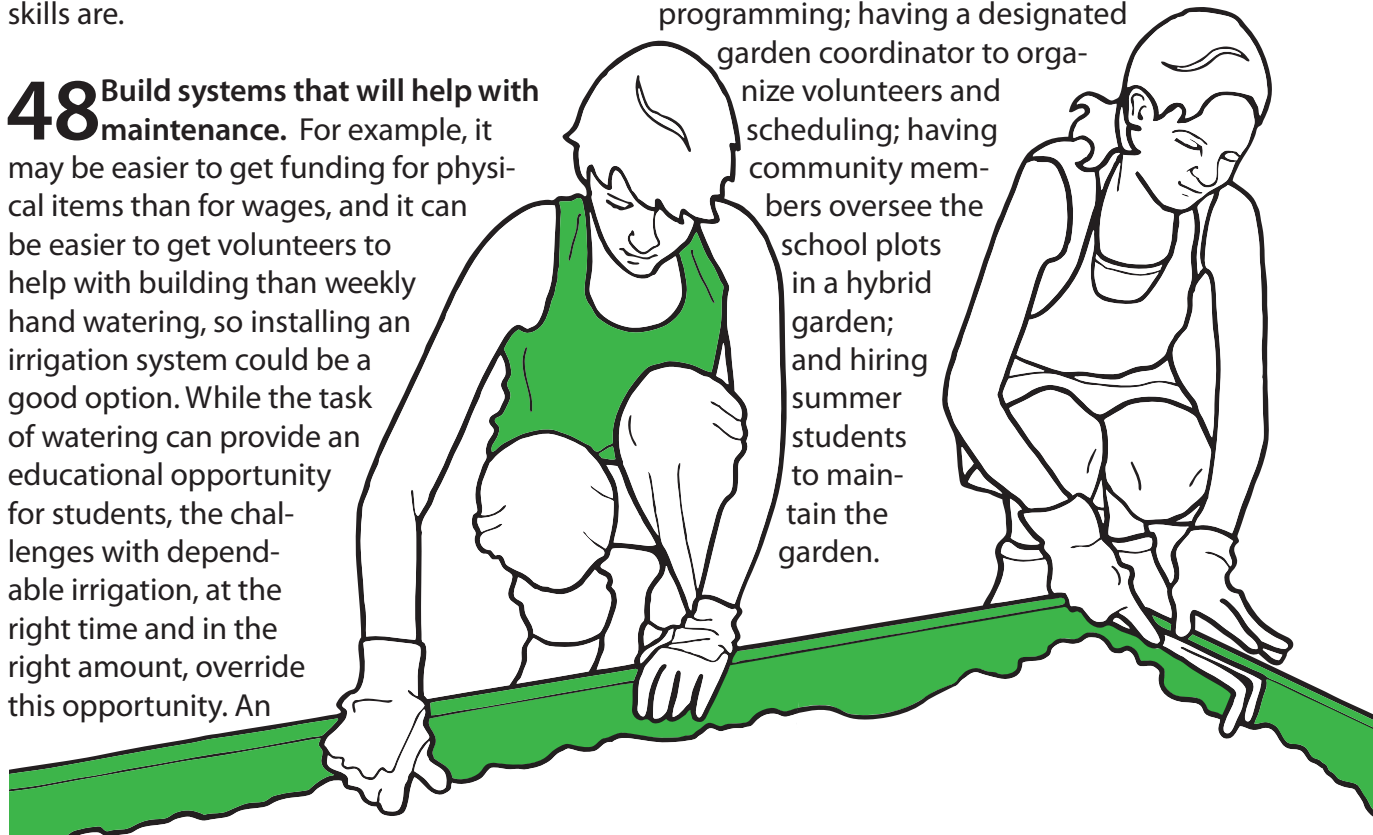
Evolution and Longevity
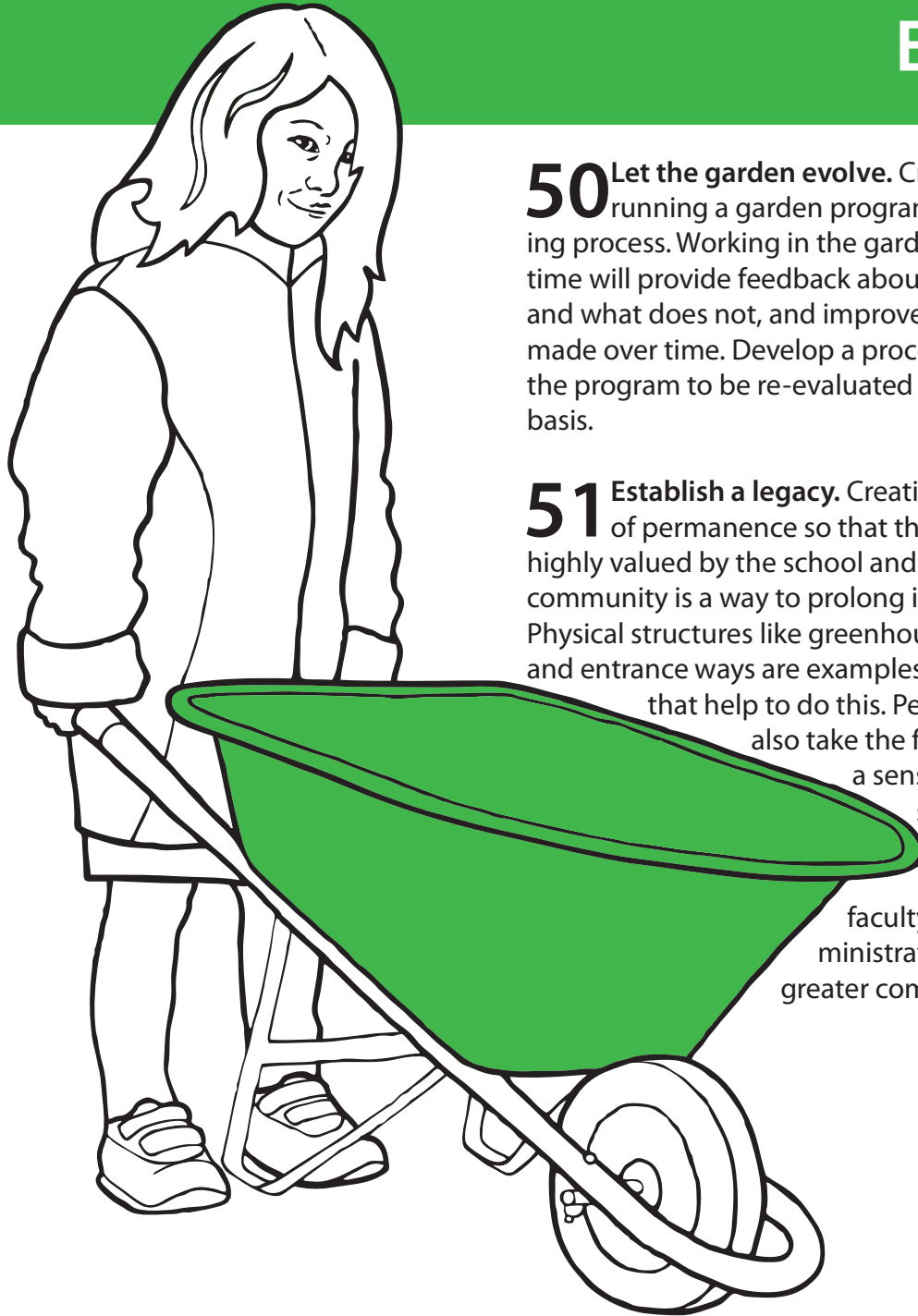
50 **Let the garden evolve.** Creating and running a garden program is an evolving process. Working in the garden space over time will provide feedback about what works and what does not, and improvements can be made over time. Develop a process that allows the program to be re-evaluated on a regular basis.

51 **Establish a legacy.** Creating a sense of permanence so that the program is highly valued by the school and the greater community is a way to prolong its life span. Physical structures like greenhouses, pergolas, and entrance ways are examples of landmarks that help to do this. Permanence can also take the form of buy-in, a sense of ownership, and pride among students, faculty, parents, administration and the greater community.

52 **Consider a hybrid garden model.** Community member plots on the site help to animate the space and engage the greater community. Before adopting this model, make sure that there is interest from a population of residents who want to garden but do not have a place to do so.

53 **Keep it fresh.** To maintain engagement, each new group of students needs to be involved in contributing in a meaningful way.

Design Guideline Checklist

CATEGORY	#	GUIDELINE	
Visioning, Planning and Design	1	Use the goals and objectives of the project to guide the design	
	2	Use a participatory and inclusive design process	
	3	Start small, but not too small	
	4	Cultivate a spirit of learning	
	5	Design it to be a teaching environment	
	6	Create a special sense of place	
	7	Reflect local conditions	
	8	Employ a responsive design strategy	
	9	Develop a master plan drawing	
Practical Considerations	10	Confirm water access	
	11	Conduct a shade study and test the soil	
	12	Do not be deterred by the fear of vandalism	
	13	Select location for visibility and accessibility	
	14	Think about wildlife	
	15	Consider other existing conditions	
Garden Elements	16	Select the garden bed style best suited for the site	
	17	Size and shape garden beds to suit the users and the site	
	18	Orient garden beds for maximum sun	
	19	Delineate the garden beds	
	20	Have a demonstration garden bed	
	21	Consider a hybrid garden model	
	22	Design a hierarchical pathway system	
	23	Include space for composting	
	24	Consider vermiculture	
	25	Plan for tool storage	
	26	Think about sun and rain protection	
	27	Collect rainwater	

Design Guideline Checklist
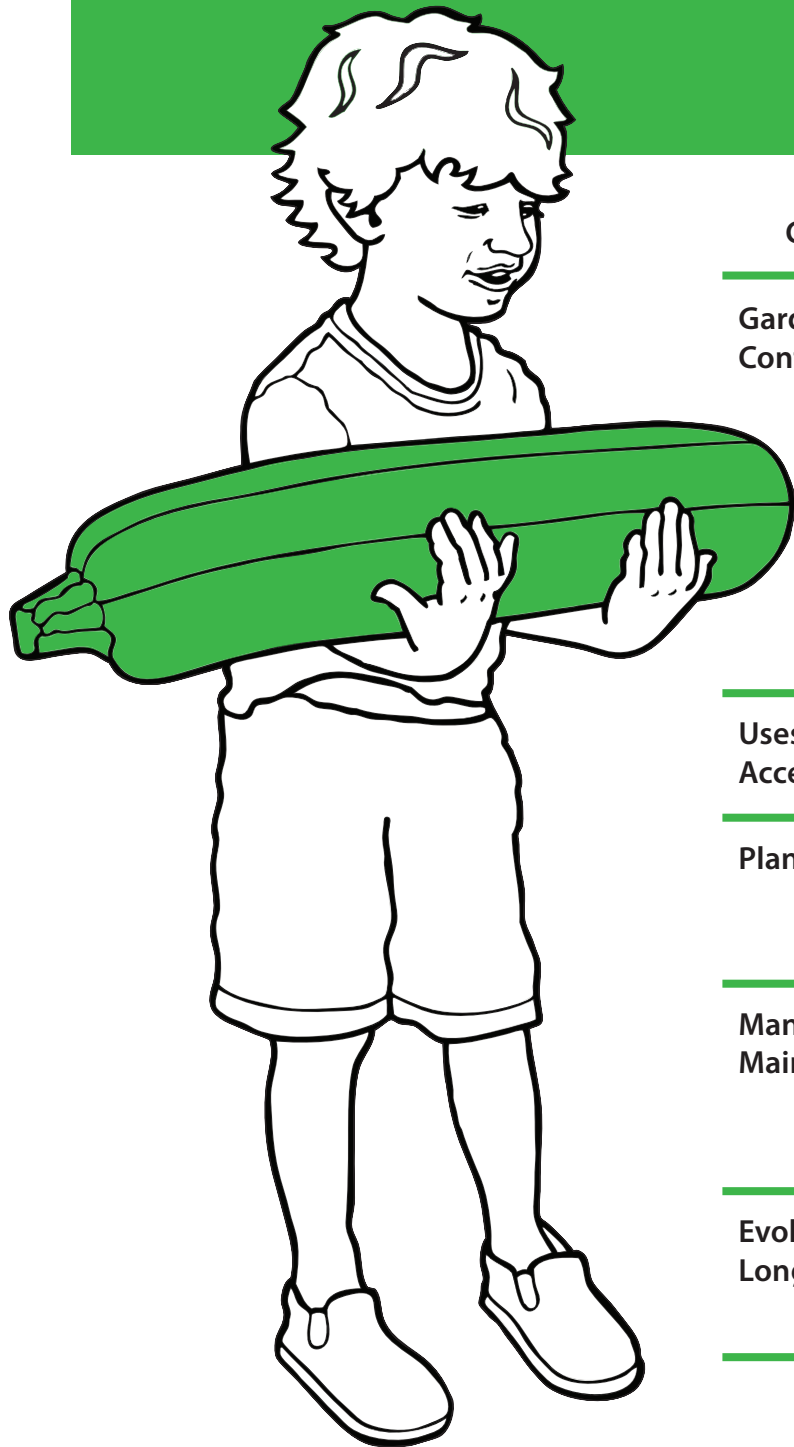
CATEGORY	#	GUIDELINE
Garden Elements Cont'd	28	Collaborate with technical classes
	29	Allow space for art projects
	30	Include space for gathering
	31	Provide seating
	32	Create an entrance feature
	33	Use signage to communicate
	34	Consider the addition of livestock carefully
	35	Use fencing strategically
	36	Leave room for future additions and projects
	37	Create a balance between permanent and temporary features
Uses, Users and Accessibility	38	Enable access
	39	Provide space
	40	Think about scale
Plant Selection	41	Consult local resources
	42	Choose plants based on the goals of the project
	43	Consider other edible plants
	44	Experiment
Management and Maintenance	45	Design with a feasible management plan in mind
	46	Include a kiosk or bulletin board
	47	Design based on capacity and resources
	48	Build systems that will help with maintenance
	49	Have a summer management strategy and a back-up
Evolution and Longevity	50	Let the garden evolve
	51	Establish a legacy
	52	Consider a hybrid garden model
	53	Keep it fresh

School Gardening Resources

WEBSITES

Click on organization name to access home page or directly access garden resources through secondary hyperlink.

A Garden in Every School

The Imagine a Garden in Every School Campaign is working to link groups across Ontario that focus on connecting children and youth to healthy living and the natural environment. To see their interactive map of school gardens in Ontario **click here**.

Cornell Garden-Based Learning

As part of the Department of Horticulture and Co-operative Extension at Cornell University, Cornell Garden-Based Learning aims to provide educators with inspiring, research-based gardening resources and professional development to support learning experiences for children, youth, adults, and communities. **Click here** to access the Garden Guidance section for information ranging from insects in the garden to soil testing.

Evergreen

Evergreen is a Canadian organization dedicated to creating greener, more sustainable cities. The website includes a great section on food growing with downloadable guidebooks and fact sheets. **Click here** to check out resources on schoolground greening, as well as resources specifically for educators, case studies, and a native plant data base.

FoodShare

Since 1985, FoodShare has been working with Toronto communities and schools to deliver healthy food and food education. **Click here** to learn more about Food-Share's school programs such as a their schoolyard farming program, information on school food gardens, and great tools for educators.

Learning through Landscapes

Learning through Landscapes is a UK charity dedicated to enhancing outdoor learning and play for children. **Click here** to check out some case studies.

Life Lab Science Program

Life Lab is a U.S. leader in the garden-based learning movement. **Click here** to check out a series of photo albums containing school garden elements with many great examples and get ideas for your garden project.

Ontario Edible Education Network

The Ontario Edible Education Network aims to bring together groups in Ontario that are connecting children and youth with healthy food systems by sharing resources, ideas, and experience, working together on advocacy, and facilitating efforts across the province to get children and youth eating, growing, cooking, celebrating, and learning about healthy, local and sustainably produced food. **Click here** to check out their monthly newsletter.

School Gardening Resources

DOWNLOADABLE RESOURCES

The following is a list of documents available in PDF form for download from various school gardening advocacy groups. Click on the document title to access each PDF.

Creating an Outdoor Classroom
Available from the Life Cycles Project Society in exchange for feedback on the guide.

Creating Gardens of Goodness
Produced for Annie's Homegrown by the Center for Ecoliteracy.

Cultivating Healthy Communities through School Gardens
Available from the Seeds of Solidarity Education Center

Gardens for Learning: Creating and Sustaining your School Garden
Available from the California School Gardening Network.

Getting Started: A Guide for Creating School Gardens as Outdoor Classrooms
Available from the Life Labs Science Program

Nova Scotia School Garden Resource Guide
Available from the Nova Scotia Department of Agriculture

Plant a Seed and Watch it Grow: Web Guide
An online resource available on the Master Gardeners San Diego website that contains information on a variety of school garden topics which can be viewed online or in PDF form.

School Year Gardens: A Toolkit for High Schools to Grow Foods from September
Produced through the Richmond Fruit Tree Sharing Project Society.

SPEC's School Gardens Start-Up Guide
Produced through the Society Promoting Environmental Conservation

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