

## SCHOOL GARDEN DESIGN: PLANNING TO GROW



# SCHOOL GARDEN DESIGN

## PLANNING TO GROW IN RURAL MANITOBA

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## **Abstract**

In the face of sweeping climate change and educational reform, schools need to shift towards hands-on education for sustainability to give future students the skills and attitudes they will require. The necessary shift aligns with the motivations behind school garden-based learning: cross-curricular learning, environmental learning, local food, health, practical skills, social development and community engagement. (Nowatschin, 2014) This study sets out to build a planning strategy for school gardens that includes all members of the local school community. Considering local experiences, local expert advice, and previous literature, the study found that developing a school garden committee, setting goals, designing for local situations, planning for maintenance, and choosing plants should be completed through an inclusive approach. It provides school communities with the information necessary to plan a garden regardless of local conditions.

## Introduction

This study is a qualitative exploratory inquiry into school gardens and how they can be planned by using a design approach that includes all members of a school community, specifically in rural Manitoba, Canada. School gardens benefit communities through environmental learning, cross-curricular learning, food production, community connections, as well as personal benefits. The purpose of the study is to create an outline for school garden planning that can be used to design and maintain a garden that is sustainable and includes all members of a school community.

### Guiding Research Question

*How might we design a beautiful space for food production in Manitoba that includes all members of a school community in the opportunity to learn about gardening, food choices, and well-being?"*

### Project Goals

The goal is to plan a design for a school garden based on previous literature, the knowledge of experts, and the knowledge of all school community members. This project ends with planning for the design of a school garden, but I can envision goals that will be relevant once the garden is created and being used by the school community. The three goals for the future of this project are: integrating nature-based learning for all, linking the school community through gardening, food production and preparation, and using sustainability education to promote well-being for all.

### Objectives

For this project to meet its largest goal, there are four objectives that must be met. The first is investigating research-based principles for successful school and community garden design. This research will be placed into a literature review that looks for a deeper understanding of school garden design principles including: types of plants, watering, bed sizes, lighting, greenhouses, as well as other factors influencing the design. It also looks at how to involve community members in the design process. The first objective will also inform the second and third objectives.

The second objective is gathering information about gardening experiences, hopes, and knowledge from the local community, staff, parents, and students. This will be done through a survey whose questions will be created based on key themes of the literature review. Getting the input of the local and school community is a monumental step in the future success of the garden. When searching for best practices, Hazzard et al. (2011) found that “a committee committed to instructional school gardens is the most important step towards success.” Getting other members besides myself interested in the garden at the ground level is imperative to involve the most human capital and avoid burn-out (Hazzard, et al., 2011).

The third objective is consulting with local Manitoban garden design experts about the best practices for school and community garden design. This consultation will take place in an interview to allow for a more dynamic conversation about the needs and intricacies of our space. Questions for the interviewee will be created based on key themes of the literature review and specific concerns of our school gardening area. Hazzard, et al. (2011) advocate for the importance of a master gardener that can work with a school garden. Since our school community does not have a master gardener as part of the staff, it will be vital that the input of gardening experts is thoroughly integrated into the garden design and implementation.



The fourth and final objective is the creation and sharing of a school garden planning outline that is based on the findings in the first three objectives. Considering the information shared by gardening experts and the school community as well as the literature, I will design an outline for garden planning that serves the needs of the community and give recommendations for the implementation of the garden in the future. Once created, the garden planning must be shared with the school community. I plan to do this through my personal website, leaving space for comments from the community about the design that could inform future changes to the garden. A garden is a naturally dynamic project that should always be open to change.

### **Personal Gardening History**

#### **Early Years**

I grew up on a family grain and bison farm near Ridgeville, Manitoba. The town has a population that hovers around 30 people with other farms scattered around it. I am the oldest of my parents' three children. The farm is an island of trees and grain bins in the middle of miles of corn, wheat, soybeans and canola. Between the age of two and ten I was pretty sure I wanted to be a farmer. I wasn't interested in the plants or animals. I was interested in driving the large machinery.

My mother was a reluctant gardener. She planted the garden for the kids. We loved picking beans and peas and putting them straight in our mouths. Carrots, we were told we had to wash first. I developed a taste for vegetables very early. My parents would hide them from me until I finished the rest of my meal, so vegetables were like a treat at the end. Looking back, much of my love for gardening was driven by my sense of taste.

We spent a lot of our time on the farm outside. I played in the garden, biked circles around the yard, drove a homemade go-cart and built forts in the snow or trees depending on the

season. I had very few friends that lived near us and my nearest classmate lived ten miles away, so I spent most of that time playing with my younger sister. We made up our own imaginary games in the woods behind the grain bins, always careful to stay out of the way of the tractors and trucks moving through the yard.

### **Teenage Years**

As I became a teenager, two important technological influences changed. In grade seven, our family purchased dial-up internet and satellite television. All of a sudden, indoors had something new and exciting and the outdoors was less appealing. My sister and I still harvested the garden, but now it was just one of the many chores that pulled us outside. By now I was driving the machinery and vehicles around the farm and quickly realizing it was not something I wanted to do with the rest of my life. I wanted to be around the people and saw the farm as a solitary place. Now the chores on the farm were a way to make some spending money that would help me get off the farm. Looking back, I wish I'd spent more time talking about the plants and animals and asked questions that interest me so much about plant disease, soil conditions, and crop rotations.

### **Adult Years**

After I graduated high school, I moved to Winnipeg into various apartments while I pursued my education degree. This limited my exposure to gardening but forced me to try types of gardening I had not previously considered. One of these was designing a homemade hydroponic window farm to grow herbs like mint, chamomile, and parsley. This was successful and when I moved out, I brought it with to set up in my first classroom. It was not until I moved back to the country near Saint Malo, Manitoba that I was able to create my own outdoor gardens for the first time. My partner and I both considered ourselves beginner gardeners, so we began

experimenting with different styles of gardening from raised beds, to indoor window farms, to inground beds and containers. This was the time that I found my love for gardening. It was the same time that the garden coordinator position at our school was left vacant and offered to me.

Over the last five years I've expanded the gardens at school and at home. I immersed myself in books, podcasts, and seminars about gardening. I am particularly interested in gardening for food security and growing species that are native to Manitoba. In 2018 I designed and built a northern greenhouse that is heated and cooled by a climate battery. I built this to extend the growing season by a few weeks on either end so I could spend more of my time gardening. Gardening has become more than a hobby for me as I know it does for many. I am very lucky that I can share my passion with students and community members. A motivation for this research is to build connections with the local community in hopes of growing the area's gardening culture.

### **History of Gardening at Roseau Valley School**

Dominion City is situated in southern Manitoba in the Red River Valley. The valley is known for rich soil, its great Red River and tributaries which all make the land perfect for seasonal agriculture. Roseau Valley School is located on the west side of Dominion City and named for the river that runs next to the school. It has under 250 students from grades kindergarten to 12. I have a unique relationship with the school because I attended it from kindergarten through grade 12, graduating in 2007. I enrolled at the University of Winnipeg in their education program and spent six years there, away from Roseau Valley School. Each December and June I would return after my exams were finished to guest teach at the school. In June of 2013 I was hired as a full-time teacher and I am currently teaching the kindergarten and grade 1 class as well as outdoor education.

In my nearly 25 years spent at the school, I have been aware of all gardening during that time. As a student, we had a small flowerbed in front of the school, filled with annuals that were planted and tended by the staff there. Students were never involved in the small flower garden and no teaching was done with it. In the years I was away at university, the school began offering an outdoor education program. During the Manitoba growing season, the two 4 by 8-foot raised beds were planted with vegetables by the grade 6 class each year. They learned to take care of the plants and were involved in choosing which plants to grow. I continued this practice when I started teaching outdoor education in 2014.

Students choose plants based on which ones will be ready to harvest when school is in. Pumpkins are grown for grade 1 jack-o-lanterns and counting seeds. Potatoes are grown for students to make fries and mashed potatoes in home economics. Zucchini is a favourite that is shredded up, frozen, and used throughout the year to make chocolate zucchini bread for our breakfast program.

In 2015 we added on-site composting with a three-compartment bin made of used pallets. It is one class's responsibility to collect small indoor bins every Friday and empty them into the larger outdoor bins. Younger students head to the forest to collect dead leaves and grasses to add to our compost and mix it together. Composting was taught to students and staff by the grade 1 class. They made a video explaining how composting works and what can and cannot be composted in our bins. 2017 was the first year we used our compost in the garden beds and we used another batch in 2019.

In 2017 we built yet another garden on the school grounds. Next to the play structure we constructed a paving stone seating area in the shape and colours of a medicine wheel.

Surrounding the medicine wheel are four L-shaped raised beds that are home to our native species, pollinator garden. The garden is filled with wild ginger, swamp milkweed, evening primrose, cone flowers, fever flow Joe Pye weed, and Culver's root. The space is regularly used by students and staff to eat their lunch or study on warm days. Although many people visit the garden to sit, they rarely interact with the plants in it and I am the only staff member that weeds and waters the garden with their class.

In June of 2018, we were fortunate enough to acquire a used 10 by 12-foot greenhouse from another school that no longer had a need for it. The greenhouse arrived in September of 2018 and was first used in May of 2019. Since the greenhouse was a surprise procurement, staff and students are still planning how to use it. There are many ideas, as well as some professional development for our staff but so far, I am the only staff member who has used the greenhouse with my classes.

### **Community Involvement at Roseau Valley School Gardens**

A large barrier for our school garden is the hot and dry summer months where there are no students or staff at the school to look after the gardens. Our two vegetable gardens are tended and watered by a small group of families that volunteer one week of their summer to come and check the gardens. There are about nine weeks in summer and finding families that are interested in coming to the school during those weeks can be difficult. I am often charged with filling in weeks that are unaccounted for. Each year seems harder and harder to find people to take care of the garden. There are a few factors that could attribute to this difficulty. Many of our staff, students and families live outside of Dominion City and rarely visit the community during the summer. Another is a lack of gardening experience among members who are unsure what is a

weed and what is not. Some families volunteer for a few years but then are burnt out or too busy to volunteer the next year. Lastly, our garden has never had a simple watering system. Gardeners need to walk to a far away tap, fill a watering can, and walk back four or five times to water both vegetable gardens sufficiently. When the summer is hot and dry, our garden has less to harvest when we come back in September than during wet years.

Roseau Valley School does have a history with gardening and many of the initiatives have left a lasting impression on the school and its culture but there is also lots of room for improvement. Vegetable gardening, planting for pollinators, and composting are present but yet to be imbedded as part of the school culture. The new greenhouse brings hope for the future and it is my intent that this project will help design a gardening program that is more sustainable and deeply embedded in the community.

## **Literature Review**

### **The Benefits of a School Garden**

Anecdotal evidence of the benefits of a school garden are abundant in literature that looks at school gardens but finding quantitative peer-reviewed research about those benefits involves a deeper look. Nutrition, science education, and environmental awareness are among the most popular benefits of school gardens. Student cross-curricular academic achievement, motivation for learning, engagement in school, and psychological development are also revealed throughout the research. (Pranis, 2004) The benefits are not just for students who participate; teachers, parents, and community members can also see positive changes. Community engagement through gardening is another way that gardens are beneficial. Simpson (2017) in her paper on school gardens in Manitoba created an exhaustive list of the benefits of school gardens and divided them into benefits for individual, interpersonal, community, curricular, and environmental education. If we look at these five categories, we see that they are inherently interconnected on many levels. For example, “multi-generational interactions” (Simpson, 2017, p.32) as a community benefit can also create “increased pro-social behaviour” (p.30) as an interpersonal benefit. When reading the following benefits, remember that each one is connected to the others and we cannot think of these benefits as completely separate entities.

### **Curricular Benefits**

#### **Nutrition**

Most of the Canadians’ food is grown in two places, either internationally or in Canada on a large industrial farm. These practices have changed a lot during the last century as farming moved from small, ecologically diverse farms to very large farms that specialize their production and are limited to very few food-crops. Orr (1991) explains that the movement of food

production is directly related to an ignorance among people about how ecological systems work and how our food production methods affect them. My own childhood experience, growing up on a rural Manitoba industrial farm may have given me plenty of time in the outdoors but very few of these experiences connected me with a natural space that was wild or unkept, and certainly didn't teach me about where my food came from or food literacy.

Nowatschin (2014) illustrates the connection between food literacy and school gardens best: "As a facet of the local food movement, school gardens also address sustainable agriculture and food systems education and can help support local food procurement by both supplying food and generating interest in local food."

In a cold northern climate like Manitoba, it is sometimes difficult to spark interest in locally grown food, especially for children whose tastes are being refined to enjoy foods that are not fatty, salty, sweet, and subtropical. (Blair, 1996) This is why it is significant that school gardens create a love for food beyond the just taste of it. "The act of growing food from seeds is exciting, even miraculous; the product is something special." (Blair, 2009) Enticing students to try and enjoy foods that are unfamiliar to them is done by forming an emotional connection with the plant that food comes from.

### Science Education

Scientific skills and concepts can be learned in many ways in a school garden program. Research on school-based gardens supports higher student achievement in science (Blair, 2009). Rye et al. (2012) found that gardening programs fostered opportunity to learn science as inquiry, unifying concepts and process in science, physical science, life science, earth and space science, technology, science in personal and social perspectives as well as history and nature science. A school garden can act as a scientific hub for inquiry and project-based learning, two approaches



that students are often drawn to and engaged in. Rye et al. (2012) share an example that sums up this approach to science learning in gardens: “Instead of telling students about the growth cycle, teachers become coaches by helping students explore and manipulate soil, worms, seeds, and plants. They have conversations with students as they observe seeds germinate and seedlings grow.” (p.59) There is a shift in student and teacher relationships when immersed in gardening activities that allows more student-centred learning to happen and it is in these lesser used modes of teaching that gardens facilitate scientific learning. Student-led inquiry (Ozer, 2007; Rahm, 2002; Wagner & Fones 1999), project-based learning (Herron, Magomo, & Gossard, 2008), experience-based (Ballantyne & Packer, 2009) as well problem-solving exercises (Lyon & Bragg, 2011) are used to create the type of multi-modal learning that allows all students to experience science education in different ways. Each of these modes is rooted in learning that is authentic, which is one of the greatest benefits of learning in a school garden. Science and nutrition are some of the greatest curricular benefits of school garden-based learning, but environmental learning is present in all garden activities.

### Environmental Education

The benefits of school gardens for environmental learning are well documented and becoming more and more accurate as humans become more disconnected from nature’s cycles and food production. This disconnect was described by Kellert (2002) as “the contemporary erosion of direct and spontaneous contact with relatively undisturbed nature, especially among urban and suburban children, and a corresponding substitution of more artificial and symbolic encounters.” (p.120) Even in a rural setting where opportunities for interactions with nature are more abundant than in urban and suburban centres, children are spending less time building connections with the land. Moore (1995) found that television, video games and organized sports

were limiting the time that students are spending in nature, especially in activities that allowed them to explore freely.

Being immersed in nature leads to a better understanding of the world around us. “Learning directly about nature while in nature is a powerful mode of environmental education” (Simpson, 2017, p.38). Students are missing the opportunity to witness and play a role in processes of nature when they are removed from nature. “Gardens ground children in growth and decay, predator–prey relations, pollination, carbon cycles, soil morphology, and microbial life: the simple and the complex simultaneously.” (Blair, 2009) Gardens inherently immerse students in the meaningful explorations necessary for creating a lasting bond with Earth.

A lasting bond with their local environment is imperative for a generation of students that are faced with human-made climate change, possibly the greatest threat to our environment and challenge for this generation. Since climate change is such an abstract idea for most students it is important to ground this learning in a hands-on way. Gardens can provide an outlet for students to not only learn about the effects of climate change on their environment but also a concrete way of combating climate change (Sellman & Bogner, 2013). It was found that students retained new knowledge of climate change when visiting an offsite botanical garden (Sellman & Bogner, 2013) but I would expect that an on-site garden of any kind, vegetable, medicinal, or botanical could serve as an excellent teaching resource for environmental education about climate change.

Gardens, when used to grow a variety of different plants that are both edible and non-edible, can engage students in environmental learning. Kirby (2008) describes a gardening project where students were challenged to learn about native plants that had an ethnobotanical use. Students researched and grew plants found in their area that could be used for food or medicinally. In doing so, students were able to identify the plants and their uses for humans

throughout history, creating a connection to the plants on a deep level. A deeper connection with nature was also observed in a gardening project in Vancouver, Canada where Aboriginal participants described growing traditional foods in a community garden as “being in nature and doing what we’ve always done.” (Mundel & Chapman, 2010, p.170) Learning in a garden unsurprisingly connects people to their local environment and moves them away from a general preconception of what nature is.

Another benefit for students of learning about the local environment is a positive change in their attitude towards the environment (Bradley, Waliczek, & Zajicek, 1999). “Attitudes are learned, and thus environmental education plays a great role in environmental attitude formation” (Johansson, 2012). One goal of environmental education is changing the students’ perspectives from anthropocentric to eco-centric [often referred to as biocentric]. An eco-centric perspective views all parts of an ecosystem as equally important and morally significant (Johansson, 2012). Wandersee & Schussler (2001) found that people are typically unaware of the plants that surround them in their daily lives, thus they do not recognize even the most abundant local plant-life. In garden-based learning, students begin to understand the importance of small parts of a micro-ecosystem such as plants, insects, fungi, and even microscopic organisms present in the soil. Furthermore, changes in attitudes are not limited to outdoor gardens. Students who worked with an indoor aquaponic garden showed pro-environmental attitudes and knowledge of environmental issues as the garden served as a space for conversations about consumerism and food systems (Jon Schneller, et al., 2015). Whether a garden is an outdoor space, or indoor, each type presents learning opportunities that change student attitudes for the better.

## Art

Gardens are the perfect space for teaching cross-curricular connections besides nutrition, science and environmental education. Literacy, mathematics, art, ICT, and social studies can all be learned within the context of the garden both implicitly and explicitly (Pascoe & Wyatt-Smith, 2013). Inspiration for creativity can be found in a garden. “A plethora of images is available in the garden year-round to inspire wonder and excitement in even the blindest of minds. Before they make any art, however, have students just look around” (Inwood, 2007,p.40) Gardens can be used to stir up ideas in students but they can also be the canvas for displaying student art. Gardens can also be used as a gallery to showcase such art as the creations begin to tell the story of the garden. (Inwood, 2007) Vines, leaves, fruits and flowers all provided students with natural beauty to be viewed and channeled into artwork.

## Mathematics

School gardens can be a tool for mathematics instruction as they present problem solving opportunities that are grounded in the real-world. Although more research is needed, Boynton (2010) showed that math instruction about coordinate grids in a garden setting provides different learning opportunities than in a traditional setting. A garden can provide real-world mathematics problems that encourage student learning of concepts like area and perimeter (Selmer et al., 2016) and statistics (Selmer et al., 2014). Throughout the mathematics curriculum, students and teachers can find connections to their work in the garden.

## Information, Communication and Technology (ICT)

Technology and nature are often viewed as opposite ends of a spectrum, but school gardens provide ample opportunity for technological learning along-side environmental education. Collecting cyber-physical data and using it to help inform garden design is one way

that students are bringing the digital world into the garden. Students collecting and interpreting data about the amount of sunlight and water that a garden is receiving and then using that data to plan future garden plots can be a powerful way to gain authority for and accountability to an ecosystem (Zuiker, & Wright, 2015).

## **Personal Benefits**

### **Motivation**

Students want to learn in the garden. There is something inherently exciting about learning through exploring and discovering in a nature setting. Blair (2009) found that kindergarten to grade six students showed heightened motivation and enthusiasm when working in a school garden. When motivation is measured empirically, garden-based learning has a strong correlation with intrinsic motivation in school, engagement in academics, and emotional engagement. Garden-based learning may be motivating for students because it meets their needs for relatedness, competence, and autonomy (Skinner et al., 2012). Each of these three motivating factors can be present in a garden setting. An example is planting a seed; it is relevant because it will grow into something that is necessary, it creates competency by teaching newly acquired skills, and it provides autonomy by giving individual ownership of the care for that plant. Not only are students motivated to learn in the garden, but garden-based learning is also connected to increased motivation to learn in other aspects of school. (Pranis, 2004) School gardens can be a space to motivate students in another way. Alexander et al. (1995) found that teachers could even use a gardening class as an extrinsic motivator at the end of a school day.

### **Inquiry and Risk-Taking**

The garden is a can be a place where students want to explore and discover. The natural environment is a place where children are invited to be curious, create and have a “desire to

investigate” (Nimmo & Hallet, 2008, p.3). Students need time in an experience-rich area to develop these skills, but they need to feel comfortable too. (Nimmo & Hallet, 2008) New, Mardell and Robinson argue that increasing openness to risk-taking that is purposeful and collaborative in early childhood is beneficial for student development. (2005) A school garden can provide a space for safe risk-taking, where students feel curious and ready to try something new. It is clear that most students want to be part of a school gardening community and are motivated by many factors including curiosity, relatedness, competency, and autonomy.

### **Community Engagement**

#### **Place**

A school garden does not necessarily include only members of a school community. Often outside members of the larger community such as local businesses, elders, and daycares become integral contributors to a school garden. Ozer (2007) found that people from outside the school community were willing to help with a school garden because they wanted to share their own personal gardening knowledge and skills with the rest of their community. A goal of community gardens is to build social capital as defined by Putman (2000) as “features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.” (p.2) It was shown in Kingsley and Townsend’s (2006) paper *‘Dig in’ to Social Capital: Community Gardens as Mechanisms for Growing Urban Social Connectedness* that community gardens encourage positive social interaction in a shared space. Community gardens can simply provide a space away from home or work for people to gather and interact with one another, thus supporting positive well-being of the community they serve (Nowatschin, 2014). Kinsley and Townsend (2006) observed that members of the community garden who previously felt isolated from the rest of the people in their neighborhood felt a

greater sense of belonging after only a year in the garden. Members feel more connected to the people in their garden but also to the actual place where they live. Armstrong (2000) found that participants who were part of a community garden had a more positive outlook on their neighborhood in general. Building social connections through place is one way that community gardens promote engagement in the community.

### Food

Food is a basic human need, one that all people across demographics have experience with. It is no wonder that food can bring people together in a way that not many other things can. Gardner et al. (2017) explains that one of the greatest factors for student engagement in their study of New York school gardens was tasting. Students who have the chance to experience the garden with all their senses including taste can build an even stronger connection with their food. “Food production connected students to sensual pleasures, sustenance, and the agri-systems of daily life in and beyond the school. (Blair, 2009, p.34) School gardens can be seen as part of an agricultural system, one that brings people together through a common purpose. DeLind (2002) describes the work done in community gardens as “Civic Agriculture” and explains how this connects people through the shared goal of growing food. Community gardens can be used for a variety of reasons, but the most common is to feed people. “Whatever the ultimate goal [of a school garden], food, and thus the growing of food, is always a great tool of engagement.” (Nowatschin, 2014, p.35) Food invites all people into a community garden, it could be for a look, a taste, a touch or a smell; it is a shared experience that helps connect people of all kinds.

### Social Action

A school is a place for change-makers to begin. Many social changes begin on a smaller scale in a shared space such as a school. Clarke describes this action: “Consider the public

space...the schoolyard and school base. This has been the locus of change for the many community food programmes in progress: we start with serious change at the micro, we establish them as workable schemes, and we begin to connect them together to form an interdependent technology – a renaissance for the urban mind, a learning hub.” (2012, p.41) The skills and ideas that are exchanged at a local level have the potential to influence a much larger change. “What may look like an innocent raised bed is actually the representation of a radical realignment of human thinking about the urban space” (Clarke, 2012, p.42) Changing human thinking is one of the only ways that we can create social change. Creating change through gardening takes many forms in a garden: composting to keep waste from reaching a landfill, growing food to reduce reliance on multi-national factory farms and bringing people together to talk about the issues that affect them each day are just a few forms. Each one of these should be rooted in a local desire for social change. Community gardens have a way of creating social change by “responding responsibly to local needs” (Richardson, 2010, p.118)

### School Garden Design

It is obvious now that the positive benefits of school gardens are worth the time, money, and energy needed to sustain them. So why is there not a school garden in every community? What is standing in the way of students, staff and community members coming together and learn and interact in a school garden? The next section will provide some insight into the best practices of school gardens. The best practices come from a few case studies of school gardens and some much larger studies that look at best practices for school and community gardens. The best practices mentioned will also provide solutions for many common barriers around school gardens.



## Best Practices

### Resources and Support

#### People

The research tells us that the most important piece of a school garden is the people who design, use, and maintain it. Without the right people involved, a garden cannot flourish. The first steps of designing a school community garden is gathering the people who are interested in being a part of it (McKelvey, 2015). Nowatschin (2014) found across garden planning guides that they recommended using a design process that included all members of the school.

*“[Inclusive planning] entails inviting everyone who might have an interest in the school grounds, or may be affected by them, to provide input and participate; this includes teachers, caretakers, parents, the principal, school administrators, neighbours living adjacent to the school and, most importantly, students”*(Nowatschin, 2014, p.63).

Although not all these members are essential to the success of a garden, there are some that tend to determine the degree of the success. Hazzard et al. (2011) when studying school gardens in California found that seven out of the ten school gardens in the study had the support of administration, teachers, parent and community volunteers and a designated gardening coordinator. The same study made it clear that students were a big part of most of the gardens.

Support from administration may be one of the greatest factors in whether a garden will be sustainable or not. The GREEN (Garden Resource, Education and Environmental Nexus) Tool that was developed based on a study of New York school gardens lists administrative support as one of the four building blocks of a successful school garden. (Gardner et al., 2017)

One way that school gardens gain the support of school administration is by inviting them to see student participation in the garden. (Gardner et al., 2017) Having a principal who is enthusiastic about gardening has been shown to influence garden success positively. (Vesilind & Jones, 1998), Administrative support allows teachers and students to imagine what garden-based learning can be in their school.

What if a school does not have a principal who is ready to support a school garden? Luckily, there are other people that can lead a gardening initiative: garden coordinators. Some school gardens need an experienced adult volunteer, a master gardener, or a paid garden coordinator in order to survive (Blair, 2009) These people can train others, provide simple problem-solving based on their experience as well as organization and scheduling during the summer for the garden volunteers (Nowatschin, 2014) Some schools have found a way to do this by creating an elective class that allows a teacher to become the designated garden coordinator as part of their job (Hazzard et al., 2011). The role of a garden coordinator varies by school but includes creating lessons, organizing who is working in the garden, purchasing, and facilitating the student garden club (Hazzard et al., 2011) That same study also talks about using a master gardener as an outside resource that can be leaned on for advice. These are unpaid volunteers that are certified in their own state and required to share their time and expertise with others (Hazzard et al., 2011) Having one experienced person that oversees the garden and its maintenance is an asset that allows the garden to flourish.

There are lots of teachers who would like to be part of the garden so they can share the benefits with their class but do not feel comfortable because of their inexperience with gardening. This can be tough for those teachers who need to learn new lessons or new ways of teaching a previous concept. (Gardner et al., 2017) The greatest barriers for teachers are lack of

time, knowledge, and skills (Blair, 2009). Finding a teacher that are comfortable in the garden is important but working with the ones in a school is more realistic for some schools. Offering professional development either through a master gardener or a hired gardening coordinator is one suggestion made for building human gardening capacity in a school staff. A second suggestion is building gardening instruction into preservice teacher training (Blair, 2009). Teachers are at the frontlines of the school garden, so they need support in order to thrive.

Finding support in a gardening program needs to start at the beginning. Building a team of committed people with diverse skills and resources is a necessary step.

*“The creation of a committee or a collaborative committed to the school garden is the first and most important step. The committee should be composed of members from these 4 groups: school administrators, teachers, parent/community volunteers, and the garden coordinator” (Hazzard et al., 2011, p.412).*

This group of people is important to planning, but students need to have a genuine voice in the planning process as well. “Most schools had a designed group of adults and/or students responsible for garden care (57.1%); (Gardner et al., 2017) Everyone who will be affected by the garden should be part of the planning as well. Different perspectives can create a collective vision that ensures everyone who uses the garden is represented (Nowatschin, 2014) Including all members also creates a sense of excitement during the planning stage that carries through to the first planting and harvesting of the garden. Working together to plan, solve problems and implement can cultivate a spirit of learning (Kozak & McCreight, 2013). Although administration, teachers, gardening coordinators, families, and students will all be part of the best gardening program, that is not to say that a program will not survive without the help of one or two of these groups, it just may not flourish.

## Financial

Once a passionate team of community members, parents, teachers, administrators and students are assembled, they need a means of acquiring the physical resources that are necessary to create a sustainable school garden. Funding a garden, even a small one, is one of the first hurdles a school garden can face. (Blair, 2009, Hazzard et al., 2011, Nowatschin, 2014, Gardner et al., 2017) This is why many schools seek funding for a school gardening project before creating a committee. (Gardner et al., 2017) Once a school has a budget, they can begin to see what they can and cannot do with their garden design. Whether schools have funding or are looking to acquire it, capital is a major step in most garden designs. Schools in the design phase of school gardening need to think about funding for building and material costs but also the human resources they may need to maintain the garden (Nowatschin, 2014) Examples of human resource costs are teacher release time, summer student salaries, and professional development.

When it comes to funding, schools have found a lot of unique ideas depending on the size of their garden. “Most school gardens rely heavily on donations of funding, technical assistance, labor, and materials from school and community members” (Ozer, 2007, p.849). School gardens have a huge range in funding needs. Deciding on a size of the garden can determine the types of funding that is needed. When studying 54 potential garden plans in New York, researchers divided schools into three groups based on funding needs: under \$2 000, between \$2 000 and \$10 000, and over \$10 000. (Gardner et al., 2017) The most common source of funding for school gardens is grants. (Hazzard et al., 2011) In 2018 in Manitoba 22 schools received an Education for Sustainability grant of up to \$2 000 and thirteen of those schools used the grant for a school gardening initiative. (Education for Sustainability Grants, 2019) Writing grants can be time consuming and is not always a reliable way to secure funding for maintenance of a garden.

(Simpson, 2017) Finding money or other donations in the local community is another way that schools sustain their gardens. School gardens can look for donations from parent groups, local corporate sponsorship, or schools can do their own fundraising like holding a plant sale.

(Hazzard et al., 2011) However funding is secured, finding free materials is more cost effective. Looking for donations of plants, tools, or building materials is another way schools are creatively gardening. (Hazzard et al., 2011) Grants, partnerships, fundraising, and in-kind donations are being used by school groups to build and maintain their gardens.

### Physical Design

Once funding is decided upon, a school community needs to get to work on planning the physical layout of their garden space. “Generally, with a budget in place, school gardeners can allocate funds, develop and plan, and establish the garden” (Gardner, 2011 p.152). School gardens come in so many arrangements that we cannot look at best practices for design as static rules. There are many great guides for planning a school garden. In a particularly concise guide, Nowatschin (2014) created a 52-point design guideline checklist that potential school gardeners can use to consider physical garden elements as well as personal and management elements of a garden. Site location, water and sun are the main physical attributes that need to be considered. (Pounders, 2006, foodmattersmanitoba, 2016)

### Site Location and Soil

In the section about community involvement, it was made clear that design should be collaborative. An excellent way to get a shared vision for a garden is to start with the physical space. Schools who ask for student involvement can get students to draw what they want the space to look like (Pounders, 2006). One of the first decisions schools need to make is whether

they want to build raised beds or plant directly into the ground. Most school gardens opt for raised beds or enclosures of some kind (Gardner, 2017). These are the more expensive options but create a feeling of permanence (Nowatschin, 2014) When creating the space, it is important to consider who is using it. Are small students will short reaches going to be able to get to all parts of the garden? Do members have mobility issues and need wide flat paths? Accessibility and visibility are two factors that affect the location of a garden site (Nowatschin, 2014). Lastly, the type of soil must be considered when selecting a site. (Pounders, 2006, Ramsey & Ramsey, 2011, Nowatschin, 2014). Schools can work around this by making their own soil in containers or raised beds. In selecting a site, the best gardens are those that plan according to what the users need.

### Water

Access to water is essential for gardening, and the closer the water is to the garden, the better. If a water source is not conveniently located, the job of watering can become time-consuming and limit garden growth. There are various systems to consider: watering cans, garden hoses, drip irrigation, overhead watering (Pounders, 2006, p.43).

All of the school gardening guides list water as a crucial element when designing and planning for maintenance of a garden (Pounders, 2006, Ramsey & Ramsey, 2011, Nowatschin, 2014). Water, especially during dry prairie summers, can be one of the greatest challenges for a school garden. Reasons for this challenge range from difficulty finding access to water on site and having to bring water using watering cans (McKelvey, 2015) to not having people around to water for extended periods of time thus losing plants to drought (Nowatschin, 2014) Automatic watering systems work best but are also the most expensive and take away some of the daily connection with the garden. Finding ways to reduce the effects of underwatering like adding

organic matter to soil or shelter from wind is worth a lot in an effective watering plan. Part of the site selection needs to account for water, and the closer and easier it is to access, the better the garden experience will be.

### Sun

“Select a garden site that is easily accessible, preferably south facing, receives direct sunlight for 6 to 8 hours daily” (Ramsey & Ramsey, 2011 p.20) The six to eight hours of sun are required if a garden is going to provide fruits and vegetables and so it is important to find a space that accommodates these needs (McKelvey, 2015). In a city filled with buildings and large trees, this can be a very tricky thing to find. Luckily, most school yards have wide open spaces that are perfect for catching the necessary amount of sun (Nowatschin, 2014). Pounders suggests getting students to help find how much sun exposure a potential space receives: “Students can check the potential garden site at different times during the day and year to see how much sun it receives. Use a compass to identify which direction is north. Determine the path of the sun throughout the day to anticipate shadows” (2011, p.43). Not all of the garden space needs to get six hours of sun, some shade can also be an asset. Shade can be used for seating or growing shade tolerant plants like radishes, kale and lettuce (Nowatschin, 2014). Finding an accessible and visible space where soil, water and sun are all appropriate can be difficult, but all are essential when designing a new school garden.

## Methodology

### Goals and Objectives

This chapter describes in detail the methods used to select participants for this study, collect data, and analyze the information presented by participants. Each of these methods were shown to be the most appropriate for the goal of this study as well as answering the research question:

*How might we design a beautiful space for food production in Manitoba that includes all members of a school community in the opportunity to learn about gardening, food choices, and well-being?”*

The research pursued the following goal: to create a design for a school garden at Roseau Valley School that meets the needs of the school community.

The objectives used to achieve this goal are:

- To find data based on peer-reviewed research for benefits and best practices in school gardening.
- To assemble data based on a survey of school community including staff, students, parents, and community members
- To get advice based on interviews with local gardening experts.
- To create a school garden planning outline based on findings from the previous three objectives.



## Research Strategies

In creation of this research project, I made decisions based on the overall goal of the research as well as the nature of the organizational setting where it takes place and my relation to the school as one of its community members. Determining whether to pursue this research question using qualitative as opposed to quantitative was one of the first of such decisions.

As a member of the school community where this research study primarily is taking place, I am aware of how my own biases can affect the data collected. As stated in my description of myself, I am aware that my entire experience has led me to interpreting results through the lens of a teacher and nature-lover. “The data collected in qualitative research is thick, rich and deep, which often override the preconceived attitudes of the researcher. Researchers are concerned with controlling their biases as long as they are not immobilized by them! The idea is NOT to be a “clean slate”, but rather, more reflective and conscious of how “who you are” may shape and enrich what you study.” (Bogdan & Biklen, 1997 p.7) The data set I am collecting, and its interpretations are inherently shaped by who I am, and this is important for the reader to understand so they can draw their own conclusions.

By choosing the qualitative research methodology in this study, it fostered the exploratory nature of the question and allowed participants to answer questions in ways that could not be foreseen by the researcher. A qualitative study leaves room to be open-ended, which this research objectives require. The methods used to reach the research objectives were:

- A concentrated literature review that explored benefits of school gardens and school garden design.

- School community member surveys that focused on people who are interested in the garden at Roseau Valley School.
- Interviews with local gardening expert who have experience with gardening in southern Manitoba.
- Development of a school garden design at Roseau Valley School through analysis and synthesis of findings from the concentrated literature review, the school community member survey and the interviews with local gardening experts.

### **Concentrated Literature Review**

The concentrated literature review was conducted for two reasons: to explore secondary sources for school garden benefits and design guidelines as well as to inform the researcher of what questions should be asked during the interviews and surveys. The data found from the literature review was used to design the garden plan, too.

The topics examined in the literature review included benefits of school gardens, benefits of community gardens, school garden design guidelines and community garden design guidelines. School and community gardens were found to be used interchangeably in much of the research. Sources that were reviewed included school and community garden design manuals, magazines, academic articles, educational publications, design books, a Master of Landscape Architecture thesis, and a Master of Education thesis.

### **Community Member Survey**

The community member survey was used as a method of data collection because it is inexpensive, allows for open-ended answers, reaches a large variety of people, can be targeted to the specific school community, and it can gather information from a large group in a relatively

short time. Each member's responses were to be valued equally. "Qualitative research methods are ideally suited to examining the world from different points of view. All perspectives are valuable in the sense that there is something to be learned from them." (Silverman, 2016, p.26) A cross-sectional survey was used to find knowledge and attitudes of community members before a school garden is designed.

Participants were recruited using posters that we placed around the school and the community. We also sent home posters with students of the school. The posters gave community members the opportunity to volunteer for the study. This was an important point of data collection because it identified how many people in the school community are interested in a school garden. Questions in the survey ranged from very broad questions about attitudes and knowledge of school gardening to very specific ones about garden design and peoples' experiences with the current school gardens. (See Survey Appendix)

Survey participants completed the survey on their own time and returned them to the researcher for collection. Younger survey participants could have their parents or guardians help them by scribing their responses.

### **Local Garden Expert Interview**

The method for meeting the objectives of this study was local garden expert interviews. A semi-structured interview was used on this occasion because Barriball (1993) found that when a sample group varies in their professional, educational, and personal histories, interviewers need to be able to adapt and probe for better understanding. The semi-structured interview process also provided organization for the inexperienced interviewer. Guiding questions were used to help move the interview along but the interviewer was also free to ask questions based on

participant responses. Guiding questions covered the topics of community involvement, plant selection, physical garden attributes, teacher and administration participation and general garden design.

The participants were selected based on casual discussions with other local gardening experts about people in southern Manitoba that are passionate about school gardens as well as a search for the authors of previous research on Manitoba school gardens. Participants were contacted via recruitment email. (Appendix) Interviews were conducted over the phone and ranged from 10 to 20 minutes in length. Phone conversations were recorded and transcribed for clarity. Participants were able to choose the time and date for their interview.

### **Analysis, Synthesis and Creation of a Garden Planning Outline**

Survey and interview results were coded to better understand the results. These results were categorized with the data from the literature review to synthesize all parts of the research. The categories were used to inform the garden design process. A mix of best practices and local experiences guided the creation of the final garden planning outline.

### **Summary of Methodology**

The previous section provided the research methodology by explaining the goals and research objectives. It also offers an overview of each method used to obtain the goals and objectives.

## **Results and Analysis**

This chapter presents the data from the surveys of school community members as well as the data from garden expert interviews. It then analyzes the results and displays them for a better understanding. (See Results Tables at end of chapter)

### **Overview of Participants**

Surveys were completed and data was collected through the methods described in the methodology. The study takes place in a small town of less than 300 people in southern Manitoba. (For a detailed description of location, see previous chapter: History of Gardening at RVS). Five school staff members and nine members of the local community participated in the study. Of the fourteen participants, all have or had gardens of their own at home. Two participants used to have gardens at home but no longer do. Members of the community included parents, grandparents and others who live near the school. Two participants answered their survey as a couple, these two will be referred to as a single participant throughout the study because their responses were joined.

The second group of participants contributed through a conversational interview. Two participants responded to the conversational interview recruitment. One participant is an expert in school gardens. The other is an expert in raised bed gardening. Each of them grew up in a small town in Manitoba and have in-depth knowledge of climate and soil conditions. Each interview was between 20 and 30 minutes long. Participants were asked a series of eight questions (see conversational interview questions). All participants are adults as no students volunteered to take the survey.

## **Analysis**

Analysis of the results of this study are rooted in grounded theory (Glaser & Strauss, 1967). “[Grounded theory] means you start with individual cases, incidents or experiences and develop progressively more abstract conceptual categories to synthesize, to explain and to understand your data and to identify patterned relationships within it” (Charmaz, 1996, p.28). This approach was chosen because the goal of the study is using an understanding of personal experiences and preferences to create a plan for school garden design. Grounded theory allows the researcher to write the literature review alongside the research and begin developing theory while researching. “Grounded theory methods blur the often rigid boundaries between data collection and data analysis phases of research” (Charmaz, 1996, p.29). Collecting data and analyzing at the same time allowed the researcher to give the literature review, expert interviews, and community member surveys equal weight.

Interview and survey data were transcribed and analyzed through the methods of coding, grouping, memo-writing, sampling and comparing (Lawrence & Tar, 2013). These methods allow for the researcher to follow the data to get a deeper understanding of the narratives that they find important (Charmaz, 1996). This was especially useful when writing a literature review at the same time as interviews and survey data emerging. The analysis was focused on learning about local gardening experiences and knowledge. It focused on physical garden characteristics and best practices as well as motivations for gardening. Learning was rendered into a specific garden plan and design.

## **Presentation of Data**

All survey data collected was coded and grouped according to common themes that emerged. Accompanying each theme is a direct quote from a participant that either punctuates

the theme expressed or contrasts with other participant responses. This was necessary to build a narrative from the smaller data set. Each question, along with participant answers, was categorized below.

After conducting two expert interviews, each interview was transcribed and then compared to the other to look for themes. Data was also cross-examined with survey data to look for themes across the data collection methods. It was important to present each of these sources of data together to avoid a hierarchy. The following is a summary of those themes as well as quotes from each interview and survey.

### **Motivation for Gardening**

Tapping into the “why” of gardening for community members was a vital piece of the research because I thought that understanding participants’ motivations could lead to an understanding of what they find important about gardening. Of the thirteen participants ten mentioned that “watching things grow” was part of their motivation for gardening. Other key words that were discussed included “freshness” of the garden and the enjoyment of “eating” what they grew. One participant stated, “I love planting and producing my own food.”

A second motivation that five participants mentioned was relaxation and using gardening as a positive mental health practice. This is consistent with Shoie’s (2016) paper that found that adults’ mental health can benefit from gardening work. One participant reported: “for me, gardening is a stress release and a time for thinking.” Other motivations included saving money, being outdoors, and spending time with family. One expert who works with teachers and school gardens daily said:

*“Gardens stir things up. When you bring kids outside there is a re-organization of the social setting that is different than in the classroom. It mixes up the interactions between teachers and students as well as students and students.”*

Each expert talked about how hands-on learning is at its best in the garden and how being out in nature can be unpredictable. This kind of learning works for both the everyday gardener as well as students.

*“It forces teachers to do some of the newer styles of teaching: inquiry and hands-on learning. To embrace what nature is throwing at you, you need to be flexible. You can’t always prepare for what is happening in the garden.”*

### **Aversion to Gardening**

When asked “what do you not like about gardening?” the most popular responses were weeding and insects. “We have been surprised to find that even teachers who grew up in a semirural environment are apprehensive about the world of gardening, whether it is the unexpected creatures, the threat of dirt, or the sweat of pulling weed.” (Nimmo & Hallet, 2008) The anxiety and distaste for insects is troubling because when teaching students about even what many see as unwanted in the garden, is necessary to convey that all parts of the ecosystem are as important as the others. (Louv, 2008) Adopting positive attitudes towards weeding and insects would be an asset for anyone working with students around gardens. As one expert put it:

*If we are asking kids and their families to make personal sacrifices to save the world they are not going to want to if they think of nature as West Nile disease, Lyme disease, and bear attacks. But if they think of the garden and the know the names of every plant and insect, there is more emotional connection and they will be more likely to make pro-environmental decisions.*



Participants worried about back pain when weeding and one suggested: “it is hard work to bend over to weed. Container gardening would be easier.” A third dislike for participants was the threat of wildlife eating garden produce. Deer, rabbits, raccoons, moles, and gophers are all wildlife that can wreak havoc on a garden, especially in a rural Manitoba setting. The building of a fence that is both deer and rabbit-proof was recommended by a local expert. One other gardener revealed that a lack of confidence in their gardening ability is what they do not like about gardening.

### **Community Involvement**

Participants were asked whether they would be interested in tending the garden during the summer months. Only three participants said that they would be interested in helping out. Some participants felt that they were not physically capable of helping in the garden anymore. A large group of participants live outside of Dominion City and stated that driving in to tend the garden was impractical for them. This was echoed by one expert who said:

*I think one of the greatest barriers is getting the support from the community, especially farmers who are busy in the summer. The school garden seems terribly small and inefficient compared to the acre garden that families have in their backyard.*

A solution for this type of thinking was also presented by a participant who suggested having a garden night where people would come together from all over to help tend the garden and interact with one another. This interaction between community members around the garden is one of the benefits that participants wanted to see.

### **Physical Garden Preferences**

Plants

Participants were asked what kinds of plants they would like in a garden. This question was included to get an idea of the local preferences that should be planned for in the school garden. Different kinds of edible vegetables and fruits were the most popular responses: carrots, tomatoes, cucumbers, peas, beans, squash and corn. Flowers were also an important response as many participants wanted a mix of edible and decorative plants. “I garden for food but want to add flowers to bring in the pollinators and add beauty.” Most participants wanted a wide array of different plants and many listed 5-10 different ones. One expert talked about the importance of planning vegetables in the garden according to their growing season. Having things ready in the middle of the summer doesn’t allow for students to experience the entire life cycle of the food they are growing.

A second question also elicited responses about the types of plants that community members and teachers want in a garden. Five members choose herbs as an important part of their perfect garden which leads to another participant’s response: “Each plant would have its use. Some for preserving, pollinating, and harvesting to eat.” Some participants were more inclined to allow students to choose all the plants: “The plants depend on the soil, latitude, and the climate conditions. The students would have to do some research.” This was echoed in another reply that said the garden should be used “to exposed kids to types of food that they do not typically eat.” These each fit with the theme of student-centered responses.

Lastly, one expert presented their hierarchy for how they would choose plants for a school garden by saying “The more I can get out of plant, the more I love that plant”:

- Right plant, right place. Every plant needs to be suited for the space it is in.
- Food. If I can eat food from a plant that is the best.
- Culture. Does the plant have a significance to the local culture?

- Beauty. “This is important, but I would never choose a plant solely for that reason.

### Garden Space, Water, and Sunlight

When asked about what part of the school ground would be the best place for a garden, the most popular ideas were in a visible spot in front of the school and close to a water source. “I would place it in front where families can enjoy it as well.” Another replied: “I would place it in a visible location where students can enjoy watching it’s progress and observe the work being done.” Currently the school has two gardens). The vegetable garden is behind the school and not visible to the public. The pollinator garden is on the playground and visible to all. Neither is very close to a water source. There is a space with a water source and visibility for the public, but it is on the north side of the school where sunlight is at a premium. Three members said that sunlight is an important factor in the space they would choose. One expert warned against choosing a space that is too big to start. She said that one of the biggest mistakes she sees in school garden planning is doing too much all at once. She urges new school gardens to start small and grow over time.

Rain barrels, a timed sprinkler system, and watering cans were the three top answers when participants were asked about watering practices in the garden. Each of which comes with its own positive and negative aspects. A mix of each was suggested: “During the school months, students can water the garden, but a timed sprinkler would work in the summer.” Another suggestion that is currently the school practice with limited success: “Use family/community volunteers in summer on a weekly basis [to water].” Having people come to water is less reliable than an automatic sprinkler but it also disconnects the community members from the responsibility that builds emotional connection to the garden. One expert made it clear that to

make the garden accessible for small children and people with physical disabilities that watering should be close and easy. Some ways that participants ideas could mitigate watering problems were adding organic matter such as mulch on the top of the garden to suppress weeds and evaporation.

Another interesting group of responses talked about sharing the garden with a local seniors home, when talking about a place for the garden: “Not on the school yard... team up with [the seniors home] and have it back there... the old people would love it!” The seniors’ home is about a five-minute walk from the school grounds. When planning the garden space accessibility was also important to some participants: “Make sure to account for accessibility for all – wheelchair access and height of garden beds.” Each of these spaces comes with positive and negative aspects and will need deeper discussion.

### Composting

The school currently has a composting program that is run by a single grade that picks up small bins and empties them outside each Friday. The outdoor composter is a three-box passive compost bin that is located next to the vegetable garden. The responses mostly echoed the school’s current practices with seven replies saying that compost bins were necessary and five saying that compost should be applied in fall the next year. No participants were opposed to composting: “composting is a very good idea to help your garden do better!” Four participants said that they could not provide suggestions because they needed more experience with composting. Other recommendations included using a barrel that turns and adding coffee grounds from the staff room to the compost bins. Finding students and staff that are committed to composting was important: “find a dedicated, responsible group (class or committee) to start up the composting program.”

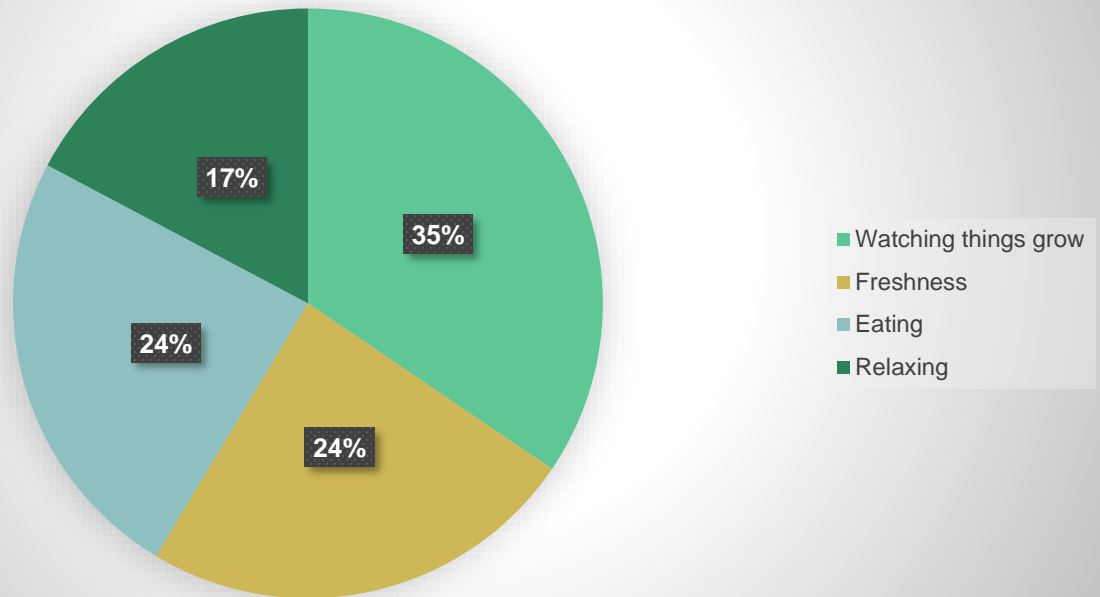
## Big Picture Thoughts

To sum up the importance that school gardens can have for students now and into the future, one expert stated:

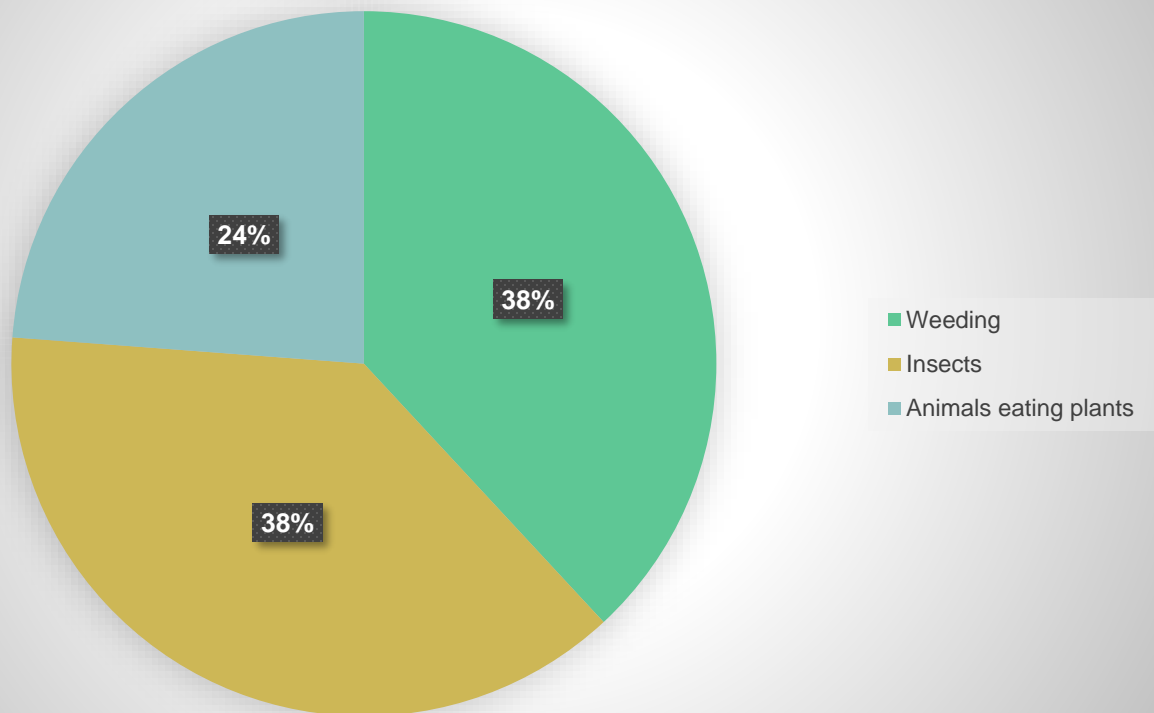
*I think every subject has a potential to be connected to a garden. Home economics should be connected, local food production and processing especially now that it is harder to rely on our weather system, we are going to have to rely on providing more food for ourselves, not just as a hobby but as a need. I think equipping our students for that sooner rather than later is a reality and a gift to them."*

## Tables of Results

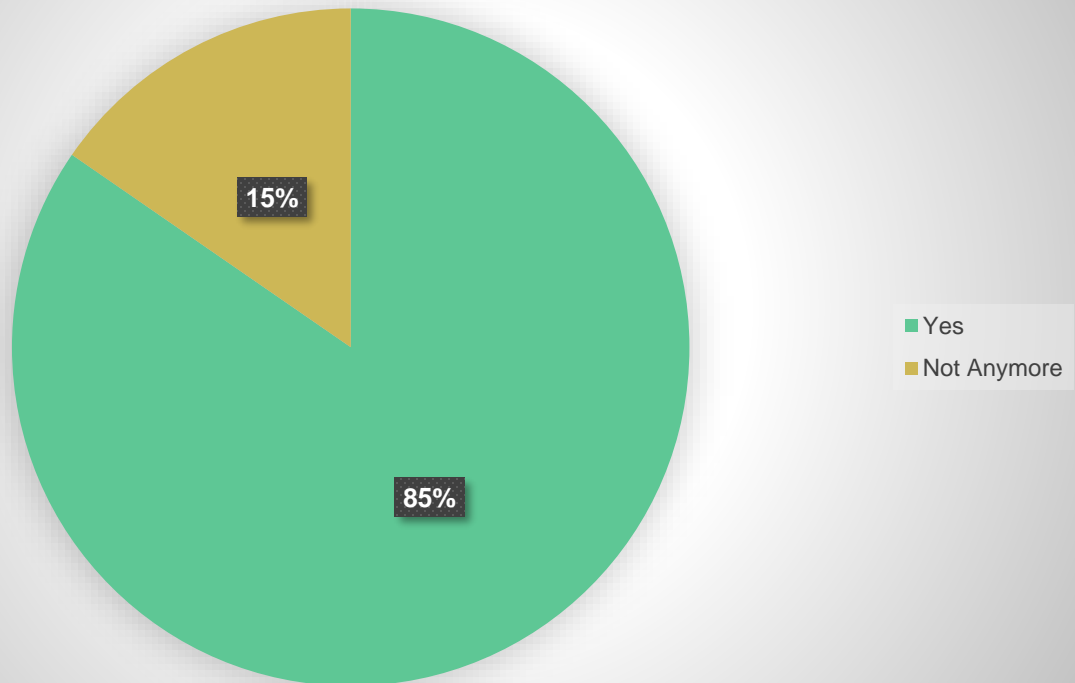
### What do you like about gardening or being in a garden?



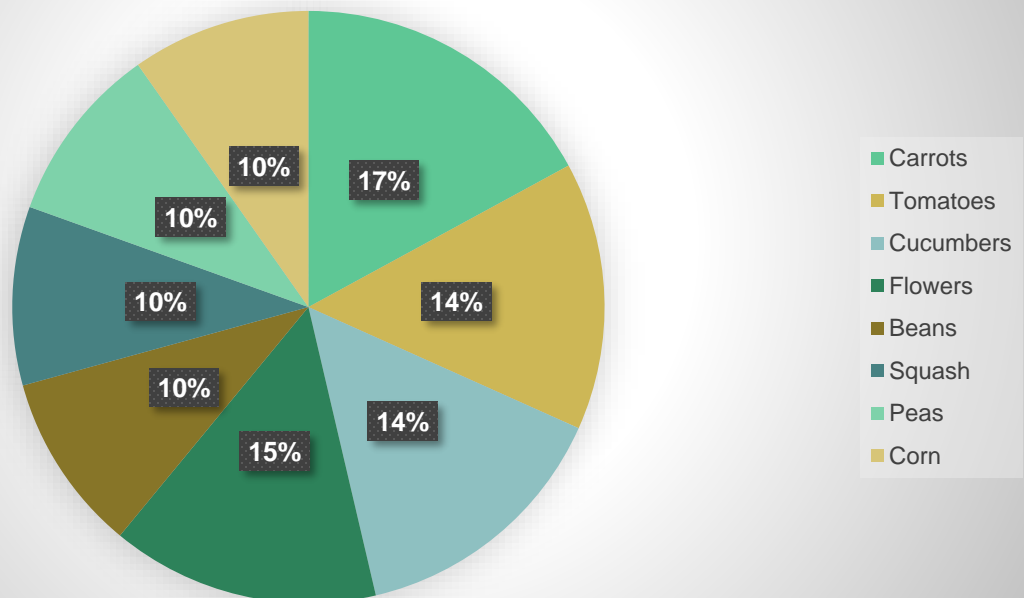
### What do you not like about gardening?



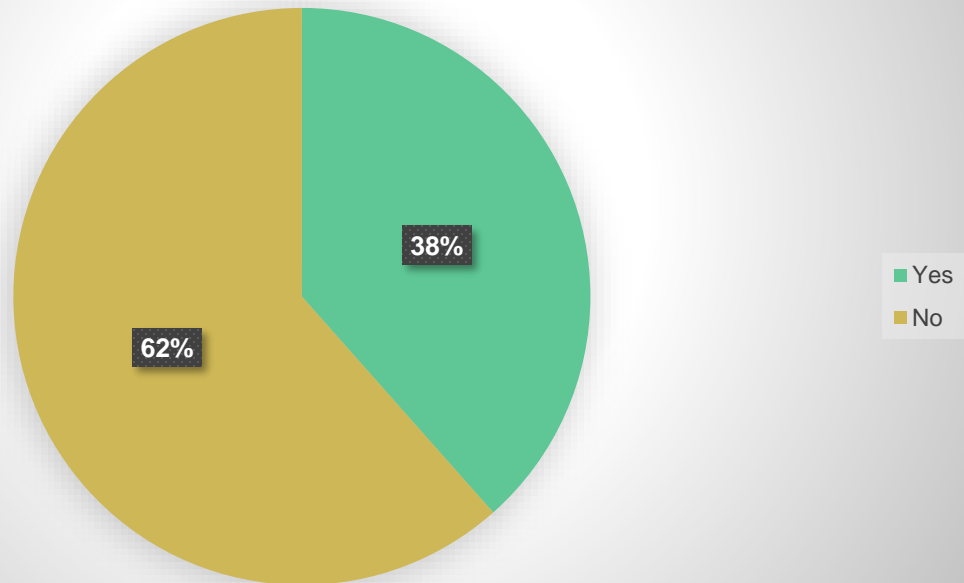
## Do you garden at home?



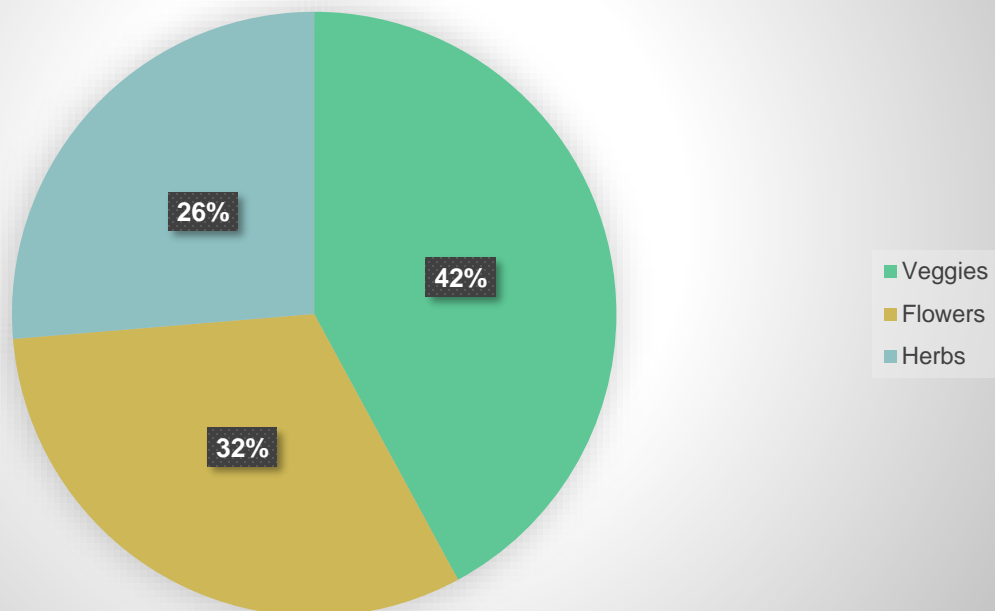
## What kinds of plants would you like in a garden?



**Would you come to the school to weed and water the garden? How could we make that part easier?**

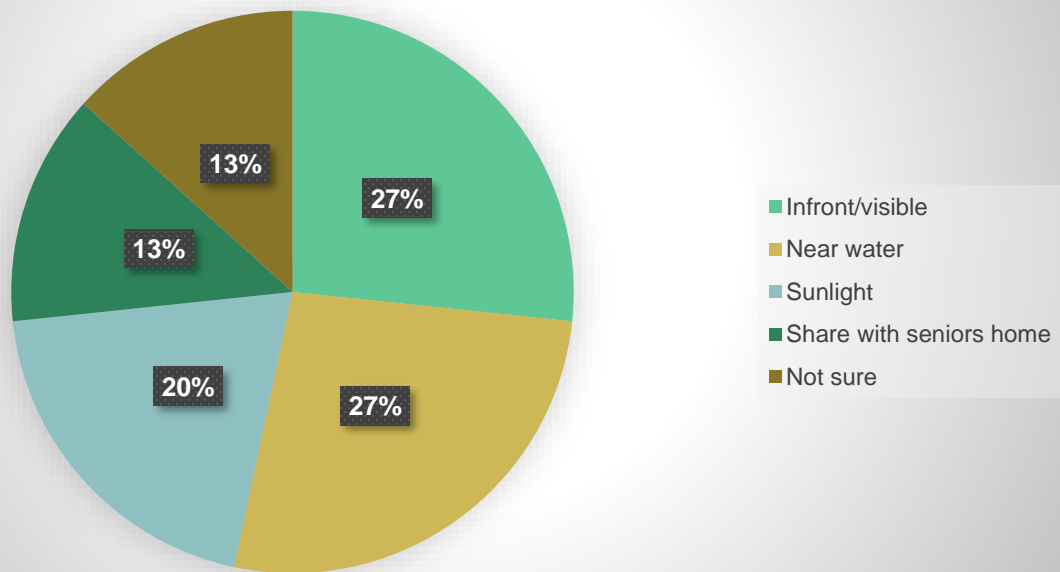


**If you could create the perfect garden, what would be in it? What would it look like?**

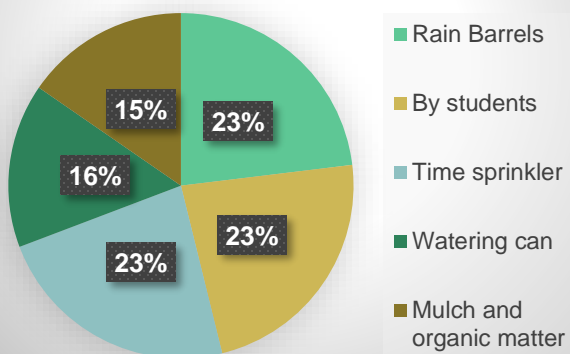




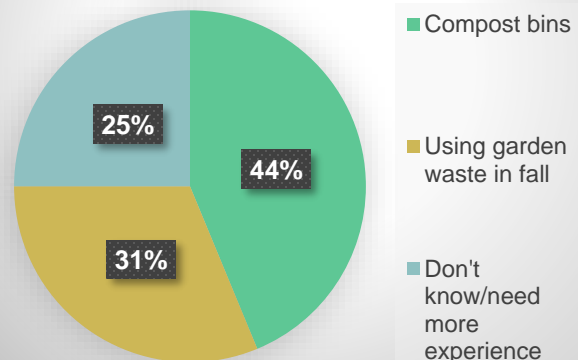
## Where on the schoolyard would you put the garden? Why?



## How do you think watering should be handled in the garden?



## How do you think composting should be handled in the garden?



## **School Garden Design Implications**

The literature review, results of the surveys and interviews as well as the analysis offered previously in this paper take into account research from around the world while also considering local knowledge and preferences. This chapter will bring all three pieces together to create an outline for future garden planning that will meet the requirements of the local users, specifically at Roseau Valley School, but can be adapted to fit any school or community. The outline is divided into five sections: develop a school garden committee, goal setting, designing the garden, maintenance, and plants. Sections of the outline are placed in chronological order to show a best sequence for planning. (See School Garden Planning Outline)

### **Develop a School Garden Committee**

The first and most important step of creating and maintaining a school garden is finding the right people. Literature and local research insist that having a single passionate garden coordinator or teacher is not sustainable as it leads to that person becoming burnt out or the garden falling to disarray if that person leaves the community. This does not mean that a single person cannot lead a committee, but they cannot be the only one on it.

Finding the right people can be difficult. It is important to create a diverse committee that consists of members from all parts of the community: teachers, administrators, maintenance staff, other school staff, students, parents and members of the local community. A more diverse committee can lead to increased buy-in from each part of the community and gives opportunity for all perspectives to be heard.

When recruiting these groups, the first step is gaining administrative support. Administration can show support by participating in committee meetings, allocating funds,

finding teacher release time, or providing professional development. Recruiting other stakeholders can be done in a number of ways. Posters, parent letters, email, advertising on school signs, and visiting local gardening functions are just a few of the ways that schools can find people that are interested in gardening and helping design the school garden. It is also important to search for contact with an expert or two. Having an expert gardener that can be accessed easily can help with any problems that may arise.

Although gardening has many of its own intrinsic motivations, extrinsic rewards can also be an important factor for some stakeholders. Offering free produce, school volunteer credit, transportation or simply food at meetings can help bring in people who are hesitant to join. Not all members will be part of the initial planning stage so leave the committee open to new members throughout the process.

### **Setting Goals**

At the first garden committee meeting, it is important to begin with members motivations for having a school garden. Understanding local needs is important to ensure a garden is designed to fit what is needed. Some goals that may be part of a garden initiative are:

- Learning garden skills
- Growing food
- Developing environmental attitudes
- Connecting with others in the community
- Beautifying the school
- Having a space for mental health benefits
- Connecting to Indigenous ways of knowing

Goals that are initially created may evolve over time, so it is important to revisit them during meetings. Big goals are recommended but they should be planned in stages. One of the biggest mistakes is designing and building a garden all at once. School gardens need to grow year-by-year in stages to allow for an understanding of the land, the people involved and how to maintain them. Creating a small successful garden will encourage members to think bigger and build on positive aspects of the garden.

### **Designing the Garden**

Once the goals are created and members understand why they are creating a school garden, you can move on to deciding how to make it. Research recommends starting by understanding the current space as well as possible. On rural schoolyards, space is not usually limited so deciding on a spot is about looking for the best spot not adapting the garden to the only spot available. The best spot needs to consider the following:

- Water
- Soil
- Sunlight
- Access

#### **Water**

Water the first on the list because in a prairie climate, rain cannot be relied on to grow vegetables. Confirm that water is available and easily accessible. Watering can look different during the school year and the summer, but a plan needs to be relayed to all members. Some ideas for watering are:

- **Watering cans:** Students fill watering cans and bring them to the garden. This allows for close daily interaction with the garden and precise watering. It relies on members remembering to water and is the most labor intensive.
- **Watering hose:** A slightly less labor-intensive watering practice. Hoses can be difficult to roll and unroll so the closer to the garden it is located the better.
- **Timed watering system:** This is the least labor intensive but the most expensive. The greatest advantage is the reliability of this system during the summer months although it disconnects many from the garden as there is no longer a need to check it daily. Older students may be interested in designing an intelligent system using microcomputers that waters according to necessity. Using drip irrigation or soaker hoses is recommended over an airborne sprinkler to save water and allow for maximum absorption by the roots.
- **Rain Barrels:** Schools often have large roofs which can allow for rain barrels to fill quickly in spring and be used as a water source all summer. For safety, rain barrels should be enclosed and secured. These are an inexpensive way to save water.
- **Mulch and Barriers:** Placing wood chips or straw around plants not only keeps weeds down but also slows evaporation in the soil and can be mixed into the garden as an organic soil additive.

## Soil

Testing soil before placing a garden can save a lot of time and money. School yards have a wide variety of soils, so it is important to understand what is in yours. Once you know what is in your soil, there are a few design considerations to be made:

- **Soil additives:** If the space you choose has a deficiency in the soil, supplementing the soil is an option. Adding organic matter, clay, grit or micronutrients can help ensure the garden plants have a chance to thrive. Choosing organic or vegan additives is an option as well. Local farms are a good source for manure or soil.
- **Contamination:** A soil test can tell you if your soil is contaminated with a substance that could be harmful to your plant or your members. If this is the case, a soil reclamation project may be needed.
- **Raised Beds:** A popular option for schools is creating raised beds and mixing their own soil. This is the most expensive way but often easiest to maintain. Local builders or carpentry classes are good sources of labor or expertise when building raised beds.
- **Compost:** An obvious partnership for school gardens is a school composting program. Collecting garden and food waste during the school year and adding it to the garden in the spring or fall will help a school garden thrive and reduce waste at the same time. Teaching students about the soil cycle and the importance of micro-organisms in soil is a key to any garden program. This can be done ideally on-site but off-site composting if offered by a town or city works, too.

### Sunlight

This is the third necessity for all gardens, especially those that are growing food. A garden space should receive at least 6-8 hours of sunlight. If the garden is next to a building, placing it on the south side is best to allow for maximum sun. If the garden is large enough, having spaces with full sun and partial sun is ideal for some leafy plants like kale and cabbage as well as some root vegetables like carrots and beets. One consideration when deciding which side

of a building to place a garden on in the prairies is where the prevailing winds come from and whether the garden can be sheltered from them.

### Access

Gardens should be placed in a visible area of the schoolyard with high foot traffic. This will ensure that members view the garden daily and see plant growth as well as the work that is being done. It also provides the most learning opportunities because gardens create a sense of wonder for passers-by. The following should be considered:

- **Accessibility:** Gardens need to be inclusive spaces. Placing the garden near sidewalks or near entrances allows for all people to take part in the garden. Create a space that small students and those with physical disabilities can reach is essential.
- **Vandalism:** Hiding a garden in the back of the school defeats the purpose of most gardens, as does locking a garden fence. Placing the garden in a space that is highly visible will deter most vandals. Placing it in view of school security cameras may also be necessary.
- **Summer Access:** during summer months when students and staff are not at the garden daily, the garden needs to be open and useable. Signage that indicates the garden purpose and norms of the garden can help invite people and make sure they understand how they can enjoy the garden.
- **Wildlife:** Deer and rabbits can be a problem for rural and urban gardens. Building a fence around the garden or including plants that deter wildlife need to be considered.

## Maintenance

Creating a robust plan for the garden includes how it will be maintained. By gathering all stakeholders and listening to ideas a school garden can ensure that it is sustained throughout the growing season and for years to come. School gardens need to think about the human resources they have, and plan based on what people are and are not willing to do. Here are ways to ensure the garden is taken care of:

- **Train many people:** Teaching each class and teacher in the school about how to care for the garden is ideal. Holding a garden training night can help include the greater school community.
- **Create a schedule:** during school, creating a schedule and posting it for classes and clubs helps everyone understand their responsibilities.
- **Partner with maintenance staff:** The maintenance staff are already taking care of the rest of the school. They need to be part of the planning for the garden to ensure proper maintenance.
- **Plan ahead for the summer:** Know who is willing to help in summer and how much they can do. It is important to make their job easy by planning garden systems that require less maintenance in summer. Mulch is a great way to reduce both the amount of watering and weeding necessary.

## Plants

Deciding on what plants will be in the garden can be a lot of fun as a group. Choosing the right plants based on the space, soil, water, and sunlight is paramount. School gardens need to plan based on their goals, physical garden, and barriers of time. Growing plants that will be



ready to harvest during the summer months makes it so only a select few people can see the fruits of their labor. One strategy is planting fast growing plants like leafy greens that can be ready before school is out. Another is planting slower growing vegetables like potatoes, pumpkins, carrots, and melons that students can find ready when they return to school in September. Considering the use of each plant when choosing and having a plan for each one helps make sure none are wasted. Plants with multiple uses are best. A garden can be both productive and beautiful, so adding flowering plants for color and to attract pollinators is recommended. Finding plants that are perennial and native to the school area creates less maintenance and saves money in the future. Deciding on plants can be left up to students who can research different plants and see if they will thrive in the garden space. Local greenhouses, community members, and businesses are all options when buying or searching for plants.

Using a participatory approach to make all the previous decisions is necessary for the sustainability of the garden. It also increases the ownership within the community. Decisions are more likely to be based on local practices and preferences using a diverse group of decision makers.

## School Garden Planning Outline



## Develop a School Garden Committee

Find the right people  
Diversity (all members of school community)  
Administrative Support  
Offer incentives



## Set Goals

Goals should be SMART and evolve  
Think BIG but in stages  
Common themes: growing food, learning skills, Indigenous perspectives, connecting with others, beautification,



## Design the garden

Water  
Soil  
Sunlight  
Access



## Maintenance

Plan for what people are willing to do  
Train many people  
Create a schedule  
Partner with school maintenance staff  
Plan for summer



## Plants

Right plants for the right place  
Let students plan  
Source plants locally  
Plant for readiness (not during summer)

## Conclusions

The research question: *How might we design a beautiful space for food production in Manitoba that includes all members of a school community in the opportunity to learn about gardening, food choices, and well-being?*” was answered in this study by considering previous research, local expert advice, and experiences of the local school community. The research found that a few key indicators for garden planning success. 1. Developing a diverse school garden committee that includes school administration. 2. Access to expert gardeners. 3. Setting goals that fit the local community’s needs. 4. Planning for physical garden conditions and limitations. 5. Creating a sustainable maintenance plan. Considering each of these indicators when planning a new school garden or improving a previous garden will help the garden succeed.

## Lessons Learned

The original goal of this research paper was to create a garden design based on research. As the study developed, it became clear that a single researcher creating a school garden design based on the input of a few school community members was not conducive to a successful school garden. Therefore the goal of creating a school garden design evolved into creating an outline for a school garden planning committee to follow when designing a new garden. This allowed for greater input from school community members with the goal of creating a sustainable garden program. This approach also helps other schools follow the outline process when designing a new school garden as opposed to simply viewing a finished product for inspiration.

## **Limitations**

When choosing the research method, surveys and interviews were used for cost and time efficiency. A barrier that was created was students under eighteen years old could not participate in the study without parental consent. This left out a key group of participants as none volunteered to participate in the study. A solution to this could be providing a survey at a time when parents and students are present such as a parent-teacher night or gardening committee gathering.

Another limitation of the study was the small sample size. In a school community of over 300 people, only 14 participants are not a large enough sampling. Key members of a gardening committee who were not represented in the data were school administration and school maintenance staff. As these are two of the most important members recommended for a school gardening committee, their input should be included in the data.

The last limitation is the qualitative nature of this study and how the researcher projects their biases on the data. Data was taken from multiple sources to combat these projections. Being a part of the school community indicated in the research and the lead garden teacher makes it difficult to separate personal opinions.

## **Indications for Future Research**

In her research, Simpson compared and contrasted the experiences of rural, northern, and urban Manitoba teachers in school gardens (2017). Future research is necessary to understand the motivations and experiences of rural students, administration, and maintenance staff around school gardens. Mundel and Chapman (2010) explored the relationship between a community garden and decolonization, but it was aimed specifically at adults. It would be very interesting to

see more research done on how school community gardens can help teach students important lessons about decolonization and valuing indigenous ways of knowing. Shiue (2016) observed how gardens can help promote positive mental health in adults and Louv (2008) writes about the importance of being in nature for adolescent mental health. Further research into how school gardens can be designed with student and staff mental health promotion as a goal is also necessary.

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DEPARTMENT OF EDUCATION  
CAPE BRETON UNIVERSITY

# PARTICIPANTS NEEDED FOR RESEARCH IN SUSTAINABLE GARDEN DESIGN

We are looking for volunteer students, parents and community members to take part in a study of school gardening at RVS.

As a participant in this study, you would be asked to answer a questionnaire on your opinions about school garden designs at RVS. Questions will also include your previous experience with gardening.

All surveys will take between 10-20 minutes to complete.



For more information about this study, or to volunteer for this study,  
please contact:

Jamie Felsch  
Cape Breton University  
at  
Email: [felschj@blsd.ca](mailto:felschj@blsd.ca)

**This study has been reviewed by, and received ethics clearance  
through a Cape Breton University Research Ethics Committee.**

**Recruitment Email****Title: Participants Needed for Research in Sustainable Garden Design**

Dear member of Roseau Valley School community,

We are looking for volunteers to take part in a study of school gardening at RVS.

As a participant in this study, you would be asked to answer a few questions in an interview on your opinions about school garden designs. Questions will also include your previous experience with gardening.

All interviews will take between 10-20 minutes to complete.

**Participation in this study is completely voluntary.**

For more information about this study, or to volunteer for this study,  
please contact:

Jamie Felsch  
Cape Breton University  
at  
Email: [felschj@blsd.ca](mailto:felschj@blsd.ca)

**This study has been reviewed by, and received ethics clearance  
through a Cape Breton University Research Ethics Committee.**

## INFORMED CONSENT

### School Garden Design: Creating School Spaces that Benefit Well-being for All

#### Research Purpose

The purpose of this study is to allow staff, students, parents, community members and gardening experts to share their thoughts and experiences gardening as well their ideas to inform the possible creation of new school gardens. The goal is to create a design for a gardening space for all to share that will positively affect food choices and well-being.

#### Researcher

James Felsch

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(204) 918-2575

#### Supervisor

Patrick Howard

Cape Breton University

[Patrick\\_howard@cbu.ca](mailto:Patrick_howard@cbu.ca)

(902) 563-1300

#### Research Description

If you choose to, you will be participating in this research study by answering questions in a questionnaire/conversational interview pertaining to your experiences in gardening and your ideas for new garden participation.

All information collected is confidential and will only be used as part of research work being carried out by researcher/research teams at Cape Breton University.

All data collected will be stored in a secure location under password protection. Access to questionnaires will only be granted to the researchers listed above or assistants working directly for them. Data, when reported, will be in aggregate form. No personally identifiable information will be given out at any time.

You may choose to cease your participation in this research at any time.

#### Informed Consent

I \_\_\_\_\_ have been informed of the purpose of this research and agree to participate in this survey.

If you have any questions that have not been answered satisfactorily by the researcher(s) or supervisor(s) named above, please contact:

Co-chair of the Research Ethics Board at CBU, Dr. Kathy Snow, at (902) 563-1170, email: [kathy\\_snow@cbu.ca](mailto:kathy_snow@cbu.ca)

Co-chair of the Research Ethics Board at CBU, Dr. John Hudec at (902) 563-1982, email: [john\\_hudec@cbu.ca](mailto:john_hudec@cbu.ca).

REB Administrator, Nicole MacDougall at (902) 563-1107, email: [ethics@cbu.ca](mailto:ethics@cbu.ca)

*Note: Participants are to be informed of the researcher(s)' "Duty to disclose" suspected abuse or neglect of a child or an adult in need of protection. Under section 23(1), Nova Scotia Children and their Family, The Protection of Children and Adoption (1990) states that "Every person who has information, whether it is confidential or privileged, indicating that a child is in need of protective services shall forthwith report that information to an agency." Agency is defined as "an agency continued by or established and incorporated pursuant to the act..." that is, Nova Scotia Department of Community Service Child Welfare. This may vary across provinces within Canada and different regions outside of Canada.*

## INFORMED CONSENT - Students

### School Garden Design: Creating School Spaces that Benefit Well-being for All

#### Research Purpose

The purpose of this study is to allow staff, students, parents, community members and gardening experts to share their thoughts and experiences gardening as well their ideas to inform the possible creation of new school gardens. The goal is to create a design for a gardening space for all to share that will positively affect food choices and well-being.

#### Researcher

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#### Supervisor

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(902) 563-1300

#### Research Description

If you choose to, your child will be participating in this research study by answering questions in a questionnaire/conversational interview pertaining to their experiences in gardening and their ideas for new garden participation.

All information collected is confidential and will only be used as part of research work being carried out by researcher/research teams at Cape Breton University.

All data collected will be stored in a secure location under password protection. Access to questionnaires will only be granted to the researchers listed above or assistants working directly for them. Data, when reported, will be in aggregate form. No personally identifiable information will be given out at any time. The research questionnaire will take approximately twenty minutes to complete.

You may choose to cease your participation in this research at any time.

#### Informed Consent

I \_\_\_\_\_ (parent) have been informed of the purpose of this research and

agree to for my son/daughter \_\_\_\_\_ to participate in this survey.



I \_\_\_\_\_ (student) have been informed of the purpose of this research and agree to participate in this survey.

If you have any questions that have not been answered satisfactorily by the researcher(s) or supervisor(s) named above, please contact:

Co-chair of the Research Ethics Board at CBU, Dr. Kathy Snow, at (902)563-1170, email:

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REB Administrator, Nicole MacDougall at (902) 563-1107, email: [ethics@cbu.ca](mailto:ethics@cbu.ca)

*Note: Participants are to be informed of the researcher(s)' "Duty to disclose" suspected abuse or neglect of a child or an adult in need of protection. Under section 23(1), Nova Scotia Children and their Family, The Protection of Children and Adoption (1990) states that "Every person who has information, whether it is confidential or privileged, indicating that a child is in need of protective services shall forthwith report that information to an agency." Agency is defined as "an agency continued by or established and incorporated pursuant to the act..." that is, Nova Scotia Department of Community Service Child Welfare. This may vary across provinces within Canada and different regions outside of Canada.*

## SURVEY- ADULTS

### School Garden Design: Creating School Spaces that Benefit Well-being for All

#### Research Purpose

The purpose of this study is to allow staff, students, parents, community members and gardening experts to share their thoughts and experiences gardening as well their ideas to inform the possible creation of new school gardens. The goal is to create a design for a gardening space for all to share that will positively affect food choices and well-being.

#### Researcher

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The following is a questionnaire to be answered by parents, teachers, staff, and community members.

1. What do you like about gardening or being in a garden?

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2. What do you not like about gardening or being in a garden?

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3. Do you garden at home?

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4. What kinds of plants would you like in a garden?

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5. Would you come to the school to weed and water the garden? How could we make that part easier?

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6. If you could create the perfect garden, what would be in it? What would it look like?

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7. Where on the schoolyard would you put the garden? Why?

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8. How do you think watering should be handled in the garden?

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9. How do you think composting should be handled in the garden?

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10. Any other suggestions for the garden that are not already mentioned?

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## SURVEY - STUDENTS

### School Garden Design: Creating School Spaces that Benefit Well-being for All

#### Research Purpose

The purpose of this study is to allow staff, students, parents, community members and gardening experts to share their thoughts and experiences gardening as well their ideas to inform the possible creation of new school gardens. The goal is to create a design for a gardening space for all to share that will positively affect food choices and well-being.

#### Researcher

James Felsch

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#### Supervisor

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(902) 563-1300

The following is a questionnaire for participants who are students.

1. What do you like about gardening or being in a garden?

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2. What do you not like about gardening or being in a garden?

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3. Do you garden at home?

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4. What kinds of plants would you like in a garden?

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5. Would you come to the school to weed and water the garden? How could we make that part easier?

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6. If you could create the perfect garden, what would be in it? What would it look like?

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7. Where on the schoolyard would you put the garden? Why?

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8. How do you think watering should be handled in the garden?

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9. How do you think composting should be handled in the garden?

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10. Any other suggestions for the garden that are not already mentioned?

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## Conversational Interview Questions

### School Garden Design: Creating School Spaces that Benefit Well-being for All

#### Research Purpose

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(902) 563-1300

The following questions are those that will be explored during a conversational interview with gardening experts and community members. All questions will refer to the interviewee's knowledge and experience in gardens.

1. In your experience, what are some of the benefits of school gardens?
2. What do some of the best school gardening designs have in common?
3. What are some of the biggest mistakes you see in school gardens?
4. Are there plants that you recommend in school gardens? Any you would like to see?
5. What resources have helped you in learning about school gardens?
6. What does the ideal school garden look like to you?
7. What barriers do you see in creating a school garden at Roseau Valley School?
8. What other programs at the school do you think should be connected to gardening?



## School Garden Design: Creating School Spaces that Benefit Well-being for All

School gardens and community well-being are two subjects that I am attracted to and I am lucky enough to find a project that brings these two passions together. My challenge builds on my current understanding of school gardening and looks to help expand the existing gardening program. My challenge question is as follows:

*“How might we design a beautiful space for food production in Manitoba that allows all members of a school community the opportunity to learn about gardening, food choices, and well-being?”*

I am sure this challenge question has many answers but part of the challenge is valuing the input of all garden users in order to create buy-in from a greater number of people in the school community. The design of this research gives space for teachers, administrators, teachers, students and community members to voice their experiences with school gardens as well as their hopes for the future of a school garden.

Gardening is beneficial to well-being in a number of ways and the goals of this project reflect some of those benefits. The first goal of the project is to understand how those in the school community feel about gardening. Finding out what they like, and dislike will lead me into the second goal of the project: discovering some best practices for garden design in a school that is reflective of the surrounding community. It is my hope that other prospective schools would be able to use this research to help inform their own garden design. The third goal is to use input from all members to plan specific programming in the garden for physical, mental and spiritual

well-being. This goal will be dependent on the responses from those in the community as to what kind of programming is needed or wanted.

Although this challenge is achievable, it has some constraints that will need to be considered. Time is a big constraint in a few ways. Our school year ends in June 2019, leaving me four months to complete the challenge. Another way that time can be constraining is our short growing season in Manitoba and the majority of the season is during July and August when students and staff are not in school. A second constraint is a perceived lack of gardening knowledge and interest from many staff members in the school. Motivating others to be part of the gardening program may be difficult.

With these constraints come many opportunities. A small established gardening program in the school has created a little group of students and staff with gardening experience. The excitement of a new greenhouse installed in fall has perked the interest of some staff. In our small rural community, many adults already have a garden of their own and therefore have expertise in growing vegetables. We have a successful breakfast program that has used some of what the garden produced in the past. Each of these could be factors in the success of the challenge.

The success of this challenge will be indicated in a few ways. Collection of data will hopefully help me understand the hopes and feelings of the school community towards gardening. These hopes and feelings will inform a final design of a garden space that can be shared with the community as well and help plan future programming for community. Finally, the research will help understand how a garden can benefit the well-being of all.

## Supervisor Signature for Student Ethics Application

Student name: Jamie Felsch

Title of the project: School Garden Design: Creating School Spaces that Benefit Well-being for All


All research that involves humans must be submitted through the CBU Research Ethics Board prior to the commencement of the project.

The Research Ethics Board of Cape Breton University operates to ensure that all research involving humans adheres to a moral code of practice. That moral code is expressed in the Tri-Council Policy Statement (TCPS) latest edition.

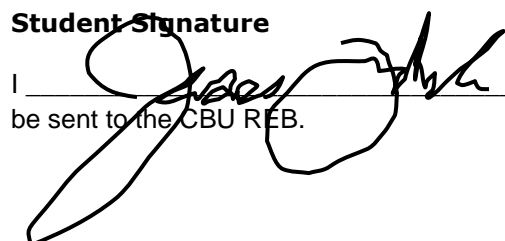
Supervisors are required to review student applications and ensure:

- a) the application is complete, coherent and accurately describes the project being undertaken
- b) that all appropriate forms, such as but not limited to, consent forms, interview questions or survey questions, have been reviewed and approved by the supervisor

**Supervisor Signature**

I  have reviewed this application and have approved it to be sent to the CBU REB.

**Student Signature**

I  have reviewed this application and have approved it to be sent to the CBU REB.

PANEL ON  
RESEARCH ETHICS

*Navigating the ethics of human research*

TCPS 2: CORE



## *Certificate of Completion*

*This document certifies that*

**James Felsch**

*has completed the Tri-Council Policy Statement:  
Ethical Conduct for Research Involving Humans  
Course on Research Ethics (TCPS 2: CORE)*

Date of Issue: **14 February, 2018**

## Dissemination Strategy Planning

### 1. What is the campaign purpose, the intended impact (benefit)?

The purpose of the campaign is to share the main two parts of my research: the final design of a garden at our school and the learning that was collected from staff, students, community members, garden experts, and literature that will be considered in the design. My hope is that through sharing these two pieces, people in the school community will be excited to begin the next steps of bringing the garden design to life. Also, I would like other schools to be able to use my research as a template for how to go about planning their own school garden. I am looking for feedback about the design and the process of creating the design as well from all audiences.

### 2. Describe the primary target audiences for your campaign.

The primary target audience for my campaign is our school community in order to help bring awareness about the school garden as well as recruit those who are excited to be part of the garden moving forward. This includes teachers and administration that would like to embed gardening into their teaching as well as staff, students, and community members that would like to use the garden and volunteer to help it grow.

3.  
What

✓ If you have additional important audiences describe them here

The second group is school members beyond my own school that are interested in starting or changing their own gardens. These could be in Canada but also, I hope that people across the world could consider the research in designing school and community gardens.

specifically do you want your audiences to do? To know? To believe?

I would like my school community to do a few things. Firstly, I would like to them understand that their input is valuable in designing the school garden and their knowledge was considered in the design. Secondly, I would like them to be excited to help in the creation and maintenance of the garden in the future. Lastly, I want them to believe that having a school garden is not only possible in Manitoba but an excellent opportunity for building a stronger community. I also want my audience to give feedback and share their opinions about the design and the process of creating the design.

4. What key messages do you want your campaign to communicate?

I want my campaign to communicate that a school garden at our school is important, worthwhile, and fun. I want it to communicate some of the interesting findings from school garden research, especially those that are pertinent to our school garden. I also want it to show hope for the future of the garden through the final design in order to get people excited to begin the next step in our garden creation. I also want the message to be used as a conversation starter. In my posts I will be asking for feedback on the design and process.

For my second audience (other schools), I want it show simple steps for consulting with a large community about designing a school garden.

5. What communication channels will you use? Consider what is available to you. (public media, print, school/organization networks/resources, social media channels etc. ) Be as specific as you can about ways you intend to use each channel you identify.

I plan to use my personal website as the main space where the research will be presented but because I do not have a large number of frequent visitors, I will use other social media to direct people there. The first and most useful channel is our school website. I plan to use the home landing page of the school website with a picture of the future garden design and a link to the underlying research. I also have many members of the school community as well as other schools on my professional Instagram and Twitter. I plan to use a media blitz of daily posts linking to research on my webpage. Lastly, for those members who cannot access either of those three forms of media, I plan to run a photo of the garden design on our school announcement screen for younger students to view and get excited for.

6. What permissions will you require? (model release forms, parental permissions, school/board permissions)

I will need school permission in order to post my research on their website and announcement screens.

7. What creative strategy will you use? Consider highlights you will emphasize, scenes, sounds, images taglines, tone, overall impression to be achieved through graphic elements – text, colour, font, ect.

I really want to emphasize the design of the garden as a place that is welcoming. Perhaps I can use soft modern fonts and colours that are associated with relaxation and well-being. I would also like to invoke an impression of friendliness by adding humor to my social media posts. I am thinking that this will help people click through to my website if they are given a reason to see more.

On the school website, I want people to feel like a new space just for them is being created. A tagline that I may use is "A space created for us, by us."

8. What costs, if any, may be associated with dissemination related strategies? What resources will you need to access? What may be available to help you achieve your strategies? (Consider both material and human)

I don't believe there will be any financial costs in this creation. All webpages that will host my research are already controlled by myself and free. I will need to access our school webpage and announcement screen through another teacher who is the administrator for the page. I will need to get the support of administration before using each of these.

For my Twitter and Instagram posts, in order to reach a larger audience, I will need to call on my network of educators to share some of my posts.



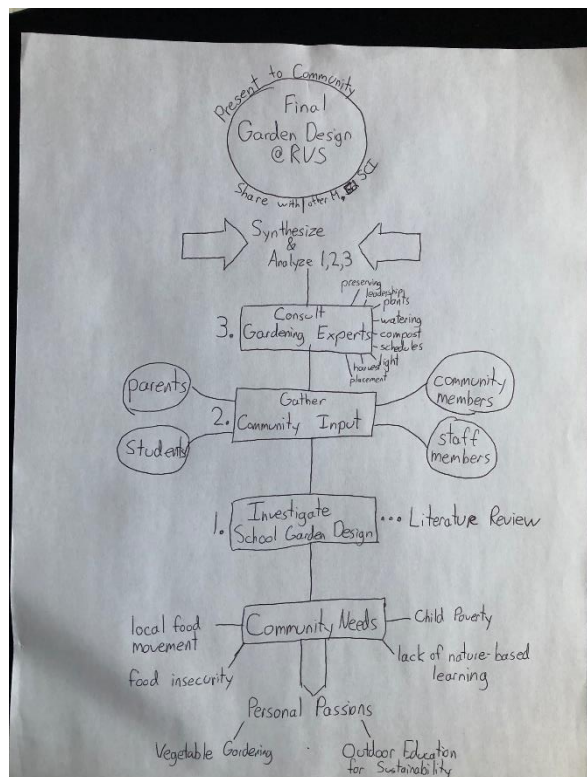
## Timeline of Activities

Objectives	Activities	Timeline (2019)
Investigate research-based principles for successful school and community garden design.	<p>Create inquiry questions for school garden design.</p> <p>Find research-based articles, books, and other media about school gardening design.</p> <p>Write a literature review based on findings.</p>	<p>Mar. 31 – Apr. 6</p> <p>Mar. 31 – Apr. 6</p> <p>Apr.7 - Apr.20</p>
Gather data from the local community, staff, parents, and students about gardening experiences, hopes and knowledge.	<p>Create questions for different members of the community that explore their experiences, hopes and knowledge.</p> <p>Design surveys that are appropriate for each age-level and investigates members experiences, hopes, and knowledge of garden design.</p> <p>Recruit members of the community to take part in the survey and obtain consent.</p> <p>Administer and collect surveys from all participants.</p> <p>Organize data retrieved from surveys.</p>	<p>Apr.7 - Apr.13</p> <p>Apr.7 – Apr.13</p> <p>Apr.7 – Apr.20</p> <p>Apr.21 – Apr.27</p> <p>Apr.28 – May 4</p>
Consult with school gardening experts about best	Create questions for gardening experts about best practices in school garden design.	Apr.14 – Apr.21

practices in school garden design.	<p>Design an interview that explores expert's knowledge of school garden design.</p> <p>Recruit experts to take part in the interview and obtain consent.</p> <p>Interview each expert and record data.</p> <p>Organize data retrieved from interviews.</p>	<p>Apr.14 – Apr.21</p> <p>Apr.14 – Apr.21</p> <p>Apr.21 – May 4</p> <p>May 5 – May 11</p>
Create a garden design based on all previous research.	<p>View all three data sets together and look for common themes.</p> <p>Make decisions for a garden design (watering, plants, shape, maintenance, etc.) based on literature, community input, and expert knowledge.</p> <p>Create a garden design that considers all factors and new knowledge.</p> <p>Write project compiling all previous objectives.</p> <p>Share garden plan with community, colleagues, and public through my website.</p>	<p>May 12 – May 18</p> <p>May 19 – May 25</p> <p>May 26 – June 1</p> <p>June 2 – June 22</p> <p>June 22 – June 29</p>

## Design Challenge Prototypes

Prototype 1



Prototype 2

