

An introduction to therapeutic horticulture for lower elementary school students

by

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Abstract

Therapeutic horticulture is an emerging therapeutic approach that utilizes plants and plant-related activities to promote overall well-being. Research has demonstrated numerous benefits to TH, including improved attentional capacity, reduced stress, and greater academic achievement (Guo et al., 2024). Additionally, engagement with plants and the natural world has also been linked to students achieving higher test scores, improved writing skills, enhanced creativity, and greater cognitive development (Dadvand et al., 2015). This work highlights the value of TH programming for improving student wellness and educational outcomes, while also serving as a foundation for future development in the field. By translating scientific research into templates, lesson plans, and resources, this curriculum serves as a tool for facilitators to create their own TH programs. Future research will further strengthen the curriculum and enable its application to wider audiences and programs as the field continues to grow.

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Chapter 1: Background

Human interactions with nature have progressively declined as the general population becomes more separated from the natural world. From 1800 until 2020, connections between people and nature have declined by over 60%, with an anticipated continued decline through 2050 (Richardson, 2025) if an intervention is not implemented (Larouche et al., 2023).

While many factors can be credited for this decline, much of it can be attributed to urbanization and technological advances. As much of the world population has traded rural living for the convenience and opportunities of urban life, the generational passing down of outdoor pastimes and activities has significantly decreased and, in some cases, has completely ceased (Kamphuisen et al., 2025). Because of this, children are spending less time outdoors and are often choosing to engage with screens indoors instead. According to a study published by the National Library of Medicine, “more than 1600 children in the USA tracked screen use trends from 2015 to 2019. It found that children aged 8–12 years used screens for entertainment for an average of 4 hours and 44 minutes a day. The figure for those aged 13–18 was 7 hours and 22 minutes a day” (Korhonen, 2021). This could result in youth spending approximately one-third to nearly one-half of their total awake hours each day watching television, playing video games, surfing the internet, or completing school work using a screen. Time spent on devices directly reduces time that could be spent outdoors (Korhonen, 2021).

According to research published by the American Journal of Preventive Medicine, “Time spent in nature provides myriad physical and mental health benefits for both adults and children”, yet, “most people spend too little time in nature to realize the maximal effect” (Kellstedt et al., 2024, p.1).

Other research conducted by the journal, *Scientific Reports*, supports this as well, finding that time engaged in horticultural spaces and activities leads to improvements in physical and mental health. According to their research, “living in greener urban areas is associated with lower probabilities of cardiovascular disease, obesity, diabetes, asthma hospitalization, mental distress, and ultimately mortality, among adults; and lower risks of obesity and myopia in children” (White et al., 2019). White’s study also found that greater amounts of neighborhood nature were associated with better self-reported health and subjective well-being in adults, as well as improved birth outcomes and cognitive development in children (White et al., 2019).

Statement of Purpose

The purpose of this work is to create a usable, accessible guide to building a therapeutic horticulture program suitable for lower elementary school students. This guide is intended for use by a program facilitator who educates students in kindergarten through second grade, integrating the basics of therapeutic horticulture to promote well-being in the students. To maximize program impact, the program facilitator should be trained in the use of horticulture for therapeutic value. In the absence of a facilitator with such training, the activities will still be useful for this targeted population, but the therapeutic outcomes may be minimized. A collaborative team of facilitators may be assembled to incorporate therapeutic training from another modality, such as play therapy, occupational therapy, or recreational therapy, into the therapeutic horticulture program.

What is Therapeutic Horticulture

Therapeutic horticulture (TH) is a method of targeting participants' well-being through horticulture-based activities (*American Horticultural Therapy Association, n.d.*). Therapeutic horticulture programs are facilitated by trained professionals who design TH sessions that address both specific and general goals for the participants. Facilitators for TH programming can include registered horticulture therapists, individuals certified in therapeutic horticulture, and other professionals with the proper training. The American Horticultural Therapy Association (AHTA) is a non-profit educational organization that helps promote education for facilitators and the use of gardening and horticulture based therapies (*American Horticultural Therapy Association, n.d.*). AHTA is the current professional entity that provides standards of practice and criteria for which TH programs can be evaluated. TH sessions focus on participants' progress rather than on the physical product since the goal is to promote well-being. Progress is defined as a personalized, non-linear process that involves positive improvements to a participants mental or physical well-being (Flint, 2023). The goals and progress are tailored to the individual, so clients can be of any age and ability. A diagnosis is not required for treatment through TH, though sessions are beneficial for children and adults with social, physical, and mental health disorders.

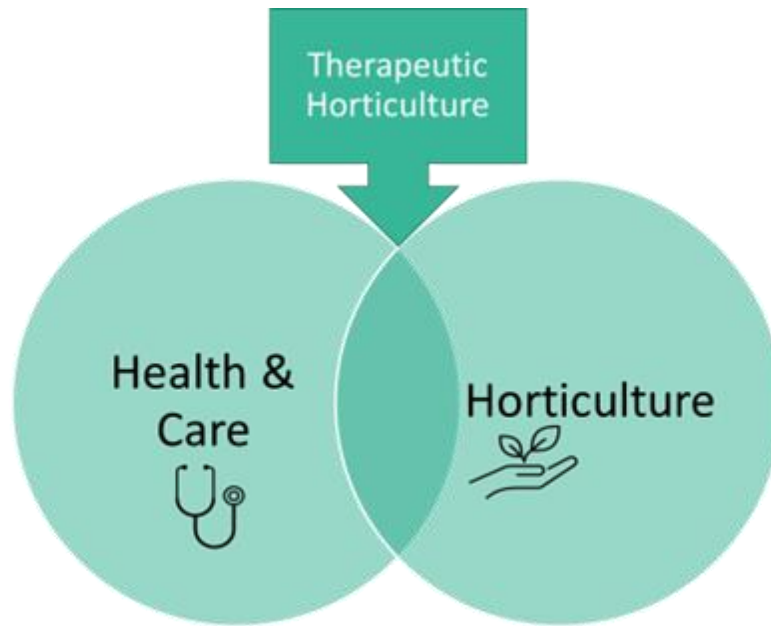


Figure 1: Health and Horticulture

(Therapeutic Horticulture, n.d.)

Table 1 illustrates the relationship between health and horticulture as it relates to therapeutic horticulture. Where the science, art, and practice of cultivating plants overlaps with improving health and wellness, there is an opportunity for therapeutic horticulture.

The therapeutic benefits of horticulture and the natural world have been recognized throughout history. In 2000 BC in Mesopotamia, TH strategies were practiced as a method of calming the senses (Detweiler et al., 2012). Gardens specifically designed to induce this calming effect were constructed in Persia in 500 BC with flowing water, lush vegetative landscapes, and the scent of vibrant florals (Detweiler et al., 2012).

In the late 1700s, Dr. Benjamin Rush, considered the “father of American psychiatry”, began researching the positive effect of field work on the mental health of farm workers (Fleming, 2015). Rush was a well-respected professor of medicine, writer, and researcher who strongly believed in the value of cultivation as a medical intervention. Dr. Rush began his

research while studying the effect of gardening on male patients suffering from mania at a psychiatric institution. During this time, his data found that workers suffering from mental illnesses experienced enhanced wellness from their work in the fields (Detweiler et al., 2012). From these findings, Dr. Rush concluded that the practice of growing food and consuming it offered significant health benefits both mentally and physically. Rush's discoveries sparked a renewed interest in studying the therapeutic value of the natural world, and by the 1800's, farming began to be utilized as a treatment for people in mental health facilities.



Figure 2: Soldiers work in fields near medical facilities seeking improvements in mental and physical well-being.

. (Rothfeld, 2024.)

During World War 1, the benefits of therapeutic horticulture were witnessed when large numbers of soldiers afflicted with physical and mental trauma began filling hospitals (Altman & Patel, 2021). Due to the severity of their injuries, many of these soldiers would spend weeks to months confined to medical facilities without exposure to the restorative benefits of the natural world. To aid in the treatment of these individuals, doctors began using TH for physical

rehabilitation and to relieve the effects of psychiatric conditions (Altman & Patel, 2021). This trend continued into the second world war, as hospitals and rehabilitation facilities began to develop programs and architecture to meet these needs.

Following the end of World War 2, the prevalence of therapeutic horticulture spread. The emergence of rehabilitation gardens in the 1950s and 1960s allowed for the first programs specifically tailored to individual patient needs (Zhu & Sarah, 2024). In 1973, the American Horticultural Therapy Association was founded, and the formal development and organization of HT and TH began (Zhu & Sarah, 2024).

Currently, therapeutic horticulture serves as a therapeutic medium for people of all needs, ages, and abilities. Due to its adaptability, it is used in settings worldwide, including medical facilities, retirement homes, and elementary schools. Within these programs, therapeutic horticulture is used as a tool for education, mental health interventions, physical development, and more. Regardless of program type or specific client objectives, trained facilitators design TH sessions with purpose and value to accomplish the underlying goal of improving participants' well-being. TH programming is typically categorized as social, vocational, or general TH. Each TH category has target populations and focused outcomes, while maintaining the underlying goal of improving participants' overall well-being.

Social Therapeutic Horticulture: Social TH programs focus on the goal of enhancing social skills and providing opportunities to socialize through horticultural activities in a positive environment. Sessions may take place in small groups of 2-3 participants or in a larger group with many clients working together. Examples of settings where social TH programs may be held include community gardens, schools, assisted living centers, nursing homes, and group

homes. Within each of these settings, participants may work together towards group goals while simultaneously supporting their individual growth.

Vocational Therapeutic Horticulture: Vocational TH programs are designed to provide skills-based education to enhance participants' employability. Participants learn valuable horticultural skills that can help improve their well-being while simultaneously developing soft skills that are advantageous for employment. A typical goal of vocational TH programs is for clients to enter or re-enter the workforce using the skills they have gained in the program. Common locations where vocational TH programs are implemented include colleges, group homes, correctional facilities, and rehabilitation centers.

General Therapeutic Horticulture: General TH programs are intended to improve physical health, emotional well-being, and personal growth. Participants learn skills for stress reduction, mood regulation, and increasing cognitive function. Participants may also engage in rehabilitation strategies following trauma or injury. Common locations for general TH programs include schools, community centers, nursing homes, group homes, correctional facilities, botanical gardens, and extension centers.

TH sessions can be conducted indoors or outdoors and use passive or active engagement, depending on participants' needs and abilities. Passive engagement involves activities that do not require hands-on labor or physical tasks. This type of engagement uses the restorative benefits of nature through sensory stimulation, such as auditory, olfactory, and visual experiences. It is grounded in the principles of observation and reflection and typically provides participants with a sense of peace, stillness, or tranquility (Zhu & Sarah, 2024). Examples of passive engagement include reclining in a natural space, taking an intentional walk to listen for the sounds of nature, or simply sitting on a park bench and observing the surrounding greenery.



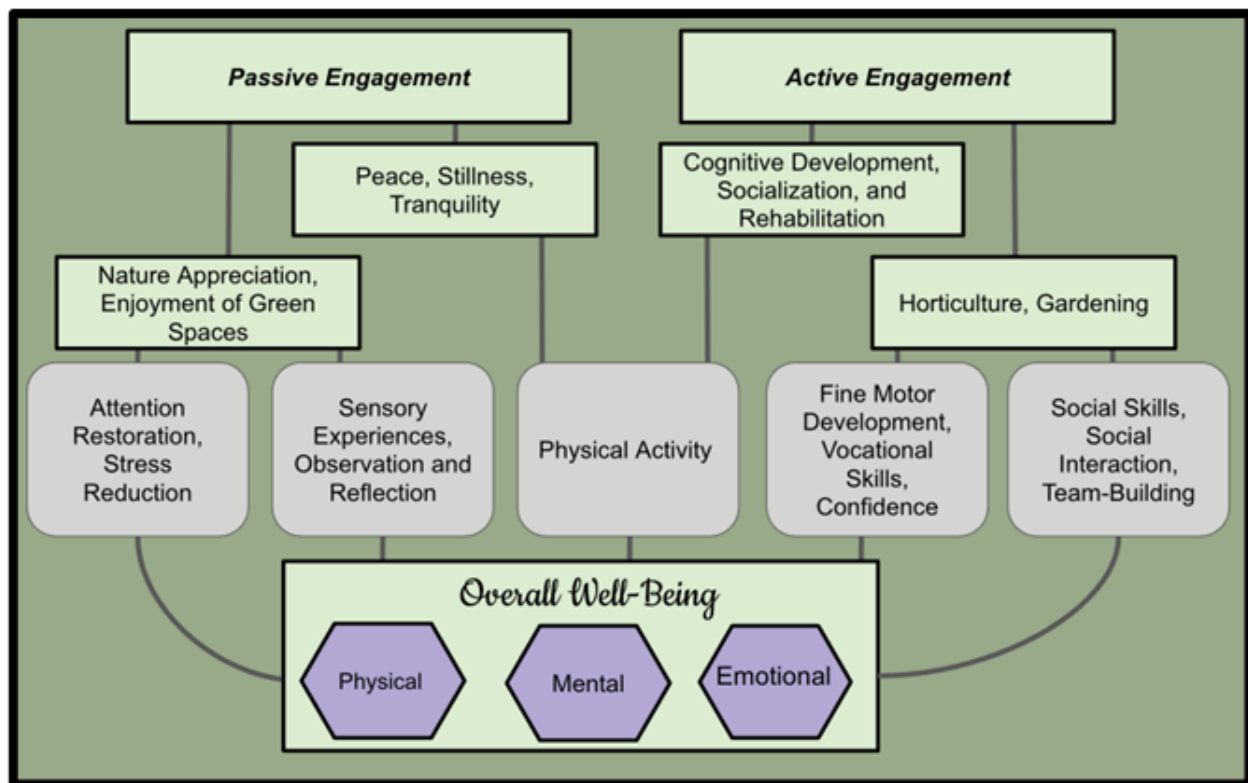
Figure 3: Children may passively engage with nature by learning in an outdoor classroom instead of the traditional indoor environment.

(StockCake, 2024.)

Active engagement requires physical effort from the participant. Active engagement activities include hands-on tasks and direct physical contact with plants or the natural world. Activities such as weeding, planting, watering, and harvesting are all examples of active engagement. Active engagement can target goals that promote the development of a participant's fine motor skills, social skills, or cognitive development. Active engagement sessions could incorporate an artistic focus by creating nature crafts or floral arrangements. Table 2 below describes the relationship between passive and active engagement with a flow chart. With either approach, the end result is improved well-being, but the process is tailored to the participant.

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Table 1: Types of Engagement



Chapter 2: Planning a TH Program

Defining Program Goals

In an educational setting, therapeutic horticulture offers many benefits, including improved attention capacity, reduced stress, and greater academic achievement (Guo et al., 2024). Spending time with plants and the natural world has been linked to students achieving higher test scores, improved writing, enhanced creativity, and greater cognitive development (Dadvand et al., 2015). According to a study published in the National Academy of Sciences, “natural environments, including green spaces, provide children with unique opportunities such as inciting engagement, risk taking, discovery, creativity, mastery and control, strengthening sense of self, inspiring basic emotional states, including sense of wonder, and enhancing psychological restoration” (Dadvand et al., 2015).

Targeted goal setting is often one of the most important pillars of a therapeutic horticulture program. Individualized goals for each client or group inform the plan for which activities will be conducted during the TH sessions. Regular evaluations of client progress enable facilitators to adjust the goals and activities to minimize client stress and maximize positive outcomes.

Documentation is an important component of successful TH programming. By assessing participants, facilitators are able to establish targeted goals based on the abilities and personal goals of the individual/group. Keeping records of each session for each participant enables the facilitator to track progress and adjust the programming accordingly to promote ongoing growth. Documentation is useful for collaborating with other professionals on the treatment team who are serving the participants and determining next steps towards the individual’s well-being.

Goal sheets are structured, living documents that outline a participant's/guardian's desired outcomes through the program. Within these documents, outcomes are mapped out, broken into achievable steps, and written as S.M.A.R.T. (Specific, Measurable, Achievable, Relevant, Time-Bound) goals (Bowman et al., 2015). Goals should be written in achievable steps, including short-term and mid-term goals that align with the long-term goals. Goal sheets may also document the participants' strengths, weaknesses, and possible treatment obstacles.

TH goals are typically broken down into five categories, including: social, cognitive, physical, vocational, or general TH. Goals may overlap multiple categories, but proper categorization is important to ensure the activities selected for the plan are relevant. Table 3 provides an overview of this process, giving specific examples of goals in each category.

Social TH goals are associated with socio-emotional health and improving participants' well-being by fostering connections and community. These goals aim to strengthen friendships, trust, and team-building skills, increase empathy, and reduce feelings of isolation and rejection.

Cognitive TH goals aim to improve brain health and mental capacity through decision-making, problem-solving, and critical thinking. Horticulture tasks are designed to give participants opportunities to increase their attention span and focus.

Vocational TH goals aim to develop participants' marketable job skills, specifically in the field of horticulture, to prepare them for employment. Punctuality, following directions, independence, and learning job-specific skills such as landscape maintenance and operating a cash register may all be classified as vocational goals.

Physical TH goals are associated with improving, rebuilding, or maintaining the body's ability to perform daily or enhanced functions. These goals also target increasing fine motor skills, physical strength, pain management, and balance.

Emotional and Psychological goals are associated with mental wellness and emotional health. These goals focus on developing healthy emotional regulation, self-confidence, and stress management strategies. Other objectives for these goals include reducing anxiety, managing trauma responses, and increasing self-esteem. Table 3 highlights differences between the various types of client goals. Before writing a goal, the appropriate category should be determined to ensure it aligns with participant needs.

Table 2: Categorizing Appropriate Client Goals

<i>The Client Will</i>	<i>Emotional/ Psychological Goal</i>	<i>Social Goal</i>	<i>Cognitive Goal</i>	<i>Physical Goal</i>	<i>Vocational Goal</i>
	Experience a sense of pride after successfully cultivating a plant or crop	Work in pairs and communicate to complete a task together	Accurately complete a 3-step planting process within two attempts	Practice holding and operating simple garden tools by hand	Arrive on time and complete a task within the designated time frame
	Regularly attend sessions and feel an increased sense of positivity and wellness	Participate and maintain a 5 minute conversation with program leader	Recall and be able to explain the watering process from start to finish	Utilize pinching grasp to pick up and plant various sized seeds	Complete a task independently from verbal or written instructions

Once goals are established, an appropriate activity plan can be created. An activity plan is a descriptive, structured outline of a planned TH session. Activity plans serve as a TH session guide and should include a description of the activity, the amount of time required, and targeted session goals. Activity plans should also list all necessary materials for the session and provide descriptive steps for implementing the activity.

Site Selection

The site that hosts the TH program is highly influential on a program's success and should align with program and participant goals. Although not all facilitators will have the opportunity to select their site, sites should still be developed to functionally host sessions. For

example, if a program's goal is to ensure participants spend more time outdoors, then the selected site must have access to an appropriate outdoor space. There should also be an indoor option in the event of poor weather. Other considerations when selecting a site are listed below:

- Is this site suitable for participants of all ages and abilities?
- Is the site easily accessible?
- Is the site conveniently located for both participants, facilitators, and support staff?
- Will students with mobility concerns be able to navigate the space successfully?
- Is there available protection from the weather?
- How much will it cost to use and maintain the site?
- Are there any local regulations that may interfere with session programming or infrastructure?
- Are there any safety concerns with the space? (Is there a fence, water feature, toxic plants, or anything else that may put participants at risk?)
- Are bathrooms and running water readily available?
- Is there room for program growth, or will it only meet the current needs?

Once the site has been thoroughly evaluated for safety and goal-oriented purposes- budget/costs, regulations, and available support (labor) for the program.

Accessibility

Accessibility should be a top priority when designing a TH program. Accessibility is defined as “the practice of ensuring that all students, irrespective of their abilities or backgrounds, have equal access to educational resources, programs, and opportunities”(Wilkinson et al., 2025). To create an accessible program, facilitators should

consider the needs of a wide spectrum of abilities, including those with physical, cognitive, and sensory disabilities. By designing a program for inclusion, hasty adaptations can be avoided, and a wider range of needs can be served. Raised garden beds (pictured left), wide-handled tools, and walkways designed for assistive devices (pictured right) are all examples of proactive accessible adaptations.



Figure 4: Examples of outdoor gardens with accessible features.

(Oklahoma State Extension, 2023.)

Accessibility should also be considered in session planning, with activities designed or specifically adaptable to diverse needs. Facilitators should plan for adaptations in their program to best serve their participants. Examples of how accessibility can be integrated into the lesson include visual instruction cards for participants with auditory learning disabilities, rubber gloves for participants with sensory issues, and quiet spaces to take a break from session stimulation. Other examples of accessibility include allowing students to opt out of sensory experiences or receive additional help from a partner. Table 4 gives more information and examples about how to make planned adaptations for diverse participant needs.

Table 3: Creating Adaptations for Diverse Needs

Physical Adaptation	Cognitive Adaptation	Sensory Adaptation
<i>Shade structures for students prone to heat-sensitivity during outdoor activities</i>	<i>Project steps are provided in shorter segments, which are easier to remember and follow</i>	<i>Provide additional or softer lighting indoors for students with light sensitivity.</i>
<i>Flexible seating options for students with mobility concerns</i>	<i>Sample project provided as a reference</i>	<i>Allow students to observe new textures and scents from a distance.</i>

Communication

Communication with parents, teachers, and other stakeholders will significantly enhance the effectiveness of any TH program. As TH may be an unfamiliar concept, it's methodology and purposes should be clearly communicated before programming begins. All communication should be provided in non-technical terms and easily understood by those unfamiliar with TH. Concepts such as participant goals, session descriptions, and opportunities to participate and volunteer should be provided to parents or guardians. Additionally, reinforcing the purpose of programming as a supplemental resource and not a clinical practice, should be conveyed as well.

Creating a Plant Cart

Even when an outdoor space or permanent garden is unavailable, there are opportunities for TH programming. This can be done using a plant cart to move between classrooms. A plant

cart is a mobile, easily transported unit that is designed to bring TH activities directly to the participant. Units should be wheeled and designed for accessibility and convenience, creating a classroom on wheels. Plant carts can be utilized in a single space to provide participants with access to materials and serve as a centralized location for TH session supplies. A plant cart should be designed to support each facilitator and their specific program needs. The following ideas and designs provide a framework that can be tailored to the needs of individual TH programs.

Design: A TH plant cart should be mobile and functional as transportation for necessary materials. The cart should be made of a sturdy material that can be cleaned and disinfected. Metal, heavy plastic, and sealed-wood carts are good options.

Other considerations include:

- Plant Cart Storage: Will the plant cart be stored somewhere on-site or travel with the facilitator? If traveling, will the cart break down easily to fit in a vehicle? Are the wheels large enough to be used outside? Is there a cover available in the event of poor weather?
- Plant Cart Width: Will the cart easily fit through doorways?
- Weight: Can it easily be lifted if necessary, and will stairs be an issue?
- Material Storage: How will materials be securely stored on the cart? Will anything fall when the cart is being moved?
- Safety: Are all sharp materials and chemicals out of reach? If not, how will they be secured or safely stored?

- Stability: Will the cart stand up to long-term use? Are the all-terrain wheels enough to be used on a sidewalk or parking lot if necessary? Will the cart's structure withstand the weight of all session supplies?

Finally, the cart design itself should be visually engaging and stand out as something special for participants. Adding stickers, paint, or colorful materials is a great way to make the cart more inviting and enhance participant interest.

Suggested Cart Contents:

- *Wire cutters*
- *Scissors*
- *Sharpies*
- *Pens*
- *Pencils*
- *Markers*
- *Non-toxic hand wipes*
- *Hand sanitizer*
- *Paper Towels*
- *Trowels and scoops*
- *Blank and lined paper*
- *Extra newspapers or paper to line tables*
- *Watering can*
- *Misting bottles*
- *Cleaning supplies*
- *Materials for upcoming sessions*

Chapter 3: Implementation

Implementing a TH program takes time, planning, and proper preparation. Facilitators should spend significant time reviewing curriculum, participants, and program goals. Other ways facilitators may prepare for implementation include site set-up, conducting safety assessments, and creating or adapting activity plans for individual client needs. Activities can also be adapted to support existing curriculum and program objectives.

Facilitators lead sessions using activity plans completed for each participant or group. When meeting with participants for the first time, care should be taken to ensure students are comfortable with the facilitator, that classroom expectations are set, and that all introductions are made among participants (if applicable). Icebreakers may serve as a good way to begin group programming and allow for adjustment time in each session. Examples of easy icebreakers include a question of the day, a quick game, or a short movement activity that gets students engaged.

Once sessions begin, a consistent structure and schedule should be maintained throughout the course of the program. Consistency allows participants to relax and feel comfortable in the setting without fear of constant change and adjustment. Facilitators should be flexible with the session to allow for natural learning to occur and to make adaptations to accommodate participant needs while avoiding unnecessary changes that may feel chaotic.

Regardless of the amount of planning before the session, facilitators should always be prepared to modify or adapt activities as they are being completed. Scaling an activity up may be necessary to challenge participants who are easily surpassing session goals. Conversely, however, facilitators should also be prepared to quickly simplify activities that exceed participants' current abilities.

Evaluations are essential for assessing the impact and effectiveness of a TH program. Through an evaluation system, facilitators can determine what methods are successful, what should be modified, and where program improvements are needed. Progress should be evaluated after each TH session, with goal progress being thoroughly documented and gauged. During evaluations, facilitators should reflect on what went well, what didn't, and how participants responded to different tasks. Notes about participant mood, struggles, and successes are all relevant for evaluation. Any adaptations or modifications made to the activity should be documented as well. Collected information and notes will then be used to improve future sessions, set goals, and plan for additional support if necessary. The sample evaluation sheet located in Appendix E provides space for organizing observations and can be adjusted to fit facilitator needs.

After the session, facilitators should consider the following questions:

- Timing: Was there sufficient time to complete the activity? Did any part of the session feel rushed? Were there any surpluses of time where students became unengaged?
- Instruction: Were students easily able to follow instructions without confusion? Did the instructions need to be repeated frequently?
- Activity: Was the activity successful? Did participants enjoy it?
- Schedule: Did transitions between activities flow smoothly?
- Set up: Were participants able to access all necessary materials? Were they able to utilize the provided tools and facilities?

Sample Activity Plans

The following pages include 5 sample activity plans that can be utilized independently or in tandem with this curriculum. Additionally, a full 8-week sample program is provided in

Appendix A that coincides with the available activity plans. Facilitators should adapt and modify the sample plans as necessary to suit their participants and program goals.

Activity Plan 1

Teacup Gardens



<https://www.gardeningknowhow.com/special/containers/growing-teacup-mini-gardens.htm>

Participant(s): Youth, ages 5+

Area(s) to work on: Enhancing fine motor skills, creativity, and focus.

Goals: The primary goal of this session is to encourage participants to work creatively to design something they consider beautiful while engaging their fine motor skills and focus.

Activity: Participants will design and build a miniature garden in a teacup with succulents, pebbles, and other creative materials as desired.

Estimated time: 60 minutes

- Introduction: 10 minutes
- Activity: 35 minutes
- Clean up: 10 minutes
- Reflection/Group Discussion: 5 minutes

Necessary supplies:

- Newspapers
- Teacups
- Soil Mix (A succulent or cactus soil is important for proper drainage)
- Succulents
- Misting bottle
- Hand tools
- Small decorative items/figurines
- Small boxes for transporting teacups home
- Gravel/pea pebbles

Before the session:

Before the session, the facilitator should complete the following:

- Purchase/gather all necessary supplies (soil, teacups, newspapers for laying down on tables, hand tools, small decorative items/figurines, small boxes for transporting teacups home, gravel/pea pebbles, succulents).
- Cover tables with newspaper for easy clean-up.
- Organize supplies for easy access.
- Create plant care cards to send home with participants (Included)
- Create a sample garden to show participants.

Step 1.) Introduce the activity to participants and show the completed sample garden so they can visualize the project.

Sample Instruction to Students:

“This project is an opportunity for you to be creative. Every teacup garden will look different. These plants are called succulents, and they can survive in climates with limited water.

To take care of them, you will need to make sure they get lots of sunlight and are not overwatered. You can add decorative pieces to the teacup when you finish the planting.”

Step 2.) Allow students to choose their teacup and a couple of succulents. Each student should start by filling their teacup $\frac{3}{4}$ full of unpacked soil. Once the soil is added, demonstrate to students how to make a small dent ($\frac{1}{4}$ - $\frac{1}{2}$ inch deep) in the soil where their succulent will be planted. Students may then begin planting, taking care to lightly pat the soil into place around the base of the plant.

Step 3.) When planting is complete, students may begin adding decorative items such as pebbles, stones, and miniatures. Limitations of each supply should be determined by the facilitator as needed for their selected groups.

Step 4.) Once students have finished the activity, instruct them in proper watering and care techniques, using the provided care card below. Lastly, allow each participant to lightly mist each garden until the soil is damp.

Step 5.) Clean up and gather for the closing discussion.

Sample Closing:

“Let’s identify similarities and differences among the teacup gardens you created. (Allow student feedback.) Just like these tiny gardens, each of you are unique and special in your own way.” (Allow students to share, as time allows.) Other topics of discussion could include challenges experienced during the project, if they would do anything differently, and ideas for future projects. After the discussion, end the session by encouraging participants to continue thinking about the qualities that make up their own identity and what makes them unique.

Modifications/Adaptations: This activity could be adapted for younger or less dexterous students by providing larger planting containers, prefilling cups with soil and sand, or by selecting non-breakable containers for planting.

Activity Plan 2

Nature Masterpieces



Participant(s): Youth, ages 5+

Area(s) to work on: Mindfulness, creativity, and stress reduction.

Goals: The primary goal of this session is to teach participants mindfulness strategies and to provide a creative, sensory experience.

Activity: Participants will take part in a mindfulness walk through a natural setting, then spend time collecting natural materials to create artwork.

Estimated time: 60 minutes

- Introduction: 5 minutes
- Mindfulness Walk: 20 minutes
- Art creation: 20 minutes
- Clean Up: 10 minutes
- Reflection/Group Discussion: 5 minutes

Necessary supplies:

- Paper sacks for collecting items
- Extra project materials (dried leaves, small sticks, dried grasses, etc.)

Before the session:

Before the session, the facilitator should complete the following:

- Purchase/gather all necessary supplies.
- Evaluate the mindfulness walk path for accessibility, potential dangers, or toxic plants, and gather any extra supplies for the activity.

Step 1.) Introduce the concept of mindfulness to participants and discuss how to use each of their senses during the walk, such as sight, smell, and touch.

Sample Instruction to Students:

“Today’s activity is an opportunity for us to practice mindfulness. Mindfulness is the practice of intentionally paying attention to the world around us and how it makes us feel. To practice this skill, we are going to go on a walk outside and then create a small craft. On our walk, I would like you to use your senses to observe the world around us. Pay close attention to what you see, smell, or feel during this time. We are also going to be looking for materials for our craft later on. You may gather fallen twigs, dried leaves, or dried grasses on or beside the walking path.”

Step 2.) Begin the walk and remind students to actively use their senses. Additionally, allow participants to gather materials for their project as they see them and remind them to utilize a wide variety of materials.

Step 3.) Once participants have collected their supplies, return to the original session location and allow each participant to find a place to lay out their design. Encourage students to

spend time playing with the materials and experimenting with the different pictures they are able to create.

Step 4.) After participants have had sufficient time designing their projects, allow them to walk around and share their designs with the group.

Step 5.) Clean up and gather for the closing discussion.

Sample Closing:

“Who would like to share something they observed or felt during our mindfulness walk? (Allow student feedback.) Just like we practiced on our walk today, we can use mindfulness every single day. When you are riding in the car, playing outside, or feeling lots of emotions, I want you to practice being mindful. Does anyone have other ideas for when we can be mindful?” (Allow student feedback, as time allows, before concluding the discussion.)

Modifications/Adaptations: This activity could be simplified for younger students or, due to time constraints, by separating it into two separate activity plans.

The mindfulness walk and the nature masterpieces could be adapted as standalone activities with their own focus and goals.

Activity Plan 3

Herb Sachets



(Learning Herbs, n.d.)

Participant(s): Youth, ages 5+

Area(s) to work on: Sensory stimulation and independent peer communication.

Goals: The primary goal of this session is for participants to work collaboratively with a single partner as they take turns adding items to an herbal sachet.

Activity: Participants will fill mesh drawstring bags with dried herbs to create scented sachets.

Estimated time: 45 minutes (For a 60-minute session, it is recommended to add the optional bag decorating step to this timeline)

- Introduction: 5 minutes
- Herb and Oil Selection: 10 minutes
- Activity: 15 Minutes
- Clean Up: 10 minutes
- Reflection/Group Discussion: 5 minutes

Necessary supplies:

- 4x6 inch drawstring bags (bags should be made of cotton, linen, or mesh)
- Variety of dried herbs (lavender, chamomile, mint, rose petals)
- Variety of essential oils
- Small plastic funnels or thick construction paper rolled into funnels
- Plastic containers with lids (such as recycled food containers)

Before the session:

Before the session, the facilitator should complete the following:

- Purchase and gather all necessary supplies
- Prepare containers of herbs and essential oils
- Organize all supplies and materials for easy access during the session

Step 1.) Introduce the activity to participants and provide them with an opportunity to experience the different herbs through sight, smell, and touch. Allow them to touch and closely smell the different herbs.

Sample Instruction to Students:

“Can you remember a time when you could not do something on your own? (Allow students time to think.) Perhaps you have needed help from a teacher, a parent, or a friend to accomplish a task. Today, we are going to do an activity that would be much harder to do without help. We will be making herbal sachets, and you will need to work with a partner to complete your activity.”

Step 2.) Group students into pairs and allow them to begin choosing dried herbs and oils to fill their sachets. Depending on participants' ages and abilities, facilitators may choose to scoop out the aromatics or allow students to complete this step on their own. Dried herbs should

be scooped directly into the lidded plastic containers before adding 3-4 drops of the essential oil of your choice.

Step 3.) After confirming that the lids are secure, students may vigorously shake to spread the oil throughout the mixture.

Step 4.) Students should then alternate holding the funnel in the mesh bag, as their partner fills the sachet until full.

Step 5.) To complete the sachet, participants should tie a double knot with the drawstrings to ensure the contents will not fall out. During this process, facilitators should walk around, assisting as needed, and confirming that each bag is securely tied.

Step 6.) Clean up and gather for the closing discussion.

Sample Closing:

“Today we practiced working with others, instead of by ourselves. Why do you think it is important to be able to work with others? (Allow students to think.) That’s right, there are many times in life when you may not be able to do something on your own. Everyone needs help sometimes, even grown-ups. Who can you go to for help?” (Allow students time to share.) Once students have answered, fill in any answers that were not given, reminding them that they can always ask for help from their teachers, parents, grandparents, and other trusted adults.

Modifications/Adaptations: Depending on session length, an additional step may be added before students select their sachet scents. For this step, students may customize their bags using fabric-safe markers to draw shapes, designs, or their name.

Activity Plan 4

Pinecone Feeders



(Audubon Southwest, n.d.)

Participant(s): Youth, ages 5+

Area(s) to work on: Areas to work on in this project include dexterity and fine motor skills as students work to cover their pinecones in “food glue” and birdseed. Other areas to work on include exposure to new sensory experiences and promoting self-confidence through independent accomplishments.

Goals: Participants will attempt to coat their pinecone with food glue at least two times before seeking facilitator assistance. Participants will also practice using positive language, such as “I can” statements, regarding their ability to complete the project.

Activity: Participants will create natural bird feeders using pinecones, “food glue”, and birdseed.

Estimated time: 45 minutes

- Introduction and opening discussion: 15 minutes
- Activity: 15 minutes
- Clean up: 10 minutes

- Reflection/group discussion: 5 minutes

Necessary supplies:

- Peanut butter, sunflower butter, or suet/lard (food glue)
- Birdseed (a small seed variety mix works best)
- Paper plates (ensure plates have a significantly raised edge to prevent excess bird seed spillage)
- Large popsicle sticks
- Heavy cotton string or twine
- Pinecones
- Scissors
- Paper sacks, staples, and a stapler

Before the session

Before the session, the facilitator should complete the following:

- Ensure that there are no food allergies to any of the session supplies and confirm that all supplies are safe for student use
- Purchase and gather all necessary supplies
- Lay down newspapers on tables and place cleaning wipes in accessible locations across the room
- Organize all supplies and materials for easy access during the session

Step 1.) Introduce the activity to participants and discuss the different types of local birds, how to recognize them, their sounds, and the important role birds play in our natural world. During this time, a non-fiction, age-appropriate book can be read to participants, and printed pictures or photo books of different bird species may be passed around.

Step 2.) Participants should first attach the cotton string or twine to their pinecone. This step should be stressed as highly important, with students wrapping the string around multiple times before tying double knots. Without a secure knot, the feeder may fall to the ground and be unusable to its target population.

Step 3.) Once the string is securely tied, students should receive a small cup of the selected “food glue” for the bird seed. Options for the “food glue” include peanut butter, sunflower butter, suet, or lard. Popsicle sticks can then be used to thickly coat the entire pinecone with this material.

Step 4.) before rolling the sticky pinecones in birdseed. Depending on the session size, facilitators may either pour birdseed directly onto each participant's plate or have participants take turns rolling their pinecone in a large tray of birdseed, with the facilitator monitoring. Once the pinecones no longer pick up birdseed, participants may place their creation in a stapled paper bag to prevent messes during transportation.

Step 5.) Clean up and gather for the closing discussion.

Sample Closing:

“Let’s identify some challenges we may have encountered while making our bird feeders. How did you adapt to meet these challenges while completing the project? (Allow time for response.) Now that you have completed your bird feeder, take it home and find a secure place to hang it outside. Make sure the location you choose will allow you to observe the birds when they come to visit.”

Modifications/Adaptations:

For younger students or participants with limited fine motor skills, add twine to the pinecones before the session begins. Thick-handled utensils such as spoons or spatulas could also

be helpful adaptations for students with grip strength or dexterity issues. Other materials could also be used as a base for this project, such as thick chunks of bark, recycled cardboard tubes, or stale bread.

Activity Plan 5

Bean Sprout Planting



Participant(s): Children and youth, ages 4+

Area(s) to work on: Enhancing fine motor skills, developing patience, and responsibility

Goals: Students will be able to list 3 of the 5 basic needs of a plant, and successfully write or draw observations about their plant in a weekly journal.

Activity: Participants will plant bean sprouts in clear plastic cups and continue observing their growth and changes over the 8-week program.=

Estimated time: 45 minutes

- Introduction: 10 minutes
- Activity: 20 minutes
- Clean up: 5 minutes
- Reflection/Group Discussion: 10 minutes

Necessary supplies:

- Newspapers
- Clear plastic cups (Approximately 12 oz cups or larger)
- Soil Mix
- Dried Bean Seeds
- Misting bottle
- Small watering can
- Popsicle sticks (For labeling)
- Non-toxic Markers
- Observation charts for each student

Before the session:

Before the session, the facilitator should complete the following:

- Purchase/gather all necessary supplies
- Create an appropriate observation chart for students to fill out as their seedling grows
- Lay down newspapers on tables and organize supplies for use
- Create plant care cards to send home with participants
- Prepare a sample cup a week in advance to ensure germination
- Open all supplies and ensure the soil is set up for easy student access during the activity

Step 1.) Begin the session by introducing the activity and showing students the sample project.

Sample Instruction to Students:

“Today, we are going to learn about the 5 things a plant needs to grow. What do you think you and I need to grow? (Allow time for students' response.) Plants need many of the same things we do to grow and thrive. Plants need nutrients, water, air, space, and light. Plants begin

their lives as seeds and need each of these 5 things to sprout and grow into mature plants. Once you have planted your seed, you will take it home and get to watch the process occur.”

Step 2.) After the discussion, students may write their name on a popsicle stick and then be given an empty plastic cup to fill with soil. Cups should be filled $\frac{2}{3}$'s full with soil to prevent excess spillage and provide the sprout with ample room to grow.

Step 3.) Once cups have been filled with soil, demonstrate to students the proper planting depth of the seed and how to indent the soil with their finger. Students should then plant the seed and heavily mist their cup until the soil is damp.

Step 4.) Students may finish the activity by inserting their labeled popsicle stick into the soil and filling out the first section of their observation chart.

Step 5.) Clean up and gather for the closing discussion.

Sample closing:

“How are the needs of a person similar to the needs of a plant? (Allow students time to respond.) Now that you have planted the seed, with proper care, you will soon have a sprout and then a plant. Make sure to place it in a sunny windowsill and water it whenever the soil becomes dry to the touch.”

Depending on the session location and frequency, students may take their plant home or leave it in the classroom. Facilitators should determine the appropriate format of this activity and how it will best serve their participants.

Modifications/Adaptations:

This activity could be adapted for younger or less dexterous students by prefilling cups with soil. Other adaptations may include adjusting the difficulty of the observation chart or

selecting different varieties of quick-sprouting seeds. Different seed options for this project include sunflowers, marigolds, basil, or certain varieties of grass seed.

Chapter 4: Discussion

Limitations

Limitations of this curriculum include its restriction to the Kindergarten through Second Grade age group and the need for a trained facilitator. Other limitations may include a lack of school funding for program implementation, materials, or support staff. This program has not been substantially adapted for use with students in Specially Designed Instruction programs and may not be directly suitable for every student. Although adaptations are provided for different activities and spaces, facilitators are encouraged to review these adaptations and create their own to best serve their participants. Time constraints in a school setting and limited access to outdoor spaces may also inhibit the implementation of part of this programming.

Existing Therapeutic Horticulture Curriculum

While TH curriculum is not a novel concept in itself, there are significant limitations to the currently available publications. Existing curricula are designed primarily for horticultural therapy, which is significantly more clinical in approach, and are not suitable for use in a TH program (Bui, 2025). Existing curricula additionally focus on older populations, such as the elderly or high school participants, with very limited research or programming available for students in lower elementary (Steward, 2016).

Agricultural education and science-based curriculum exist for school use as well, but have significant limitations in their suitability for TH programs. As these curricula are focused on meeting educational standards, they lack the necessary therapeutic focus of a TH

program. In addition, existing programs lack the critical information about the development and facilitation of a TH program that makes this curriculum unique.

Conclusion

The purpose of this curriculum is to provide a practical and accessible guide for developing a therapeutic horticulture (TH) program for lower elementary school students. The program was intentionally designed in an accessible, flexible, and user-friendly format to support facilitators in a variety of different educational and therapeutic settings. The report is grounded in significant research highlighting the advantages of TH as a therapeutic medium and as an educational tool (Zhu & Sarah, 2024). Benefits of TH include improved attentional capacity, reduced stress, and greater academic achievement (Guo et al., 2024). Spending time with plants and the natural world has also been linked to students achieving higher test scores, improved writing skills, enhanced creativity, and greater cognitive development (Dadvand et al., 2015). By translating the scientific research into templates, lesson plans, and resources, this curriculum serves as a tool for facilitators to create their own TH programs. Future research will further strengthen this curriculum and enable its application to wider audiences and programs as the field continues to grow. Ultimately, this work highlights the value of TH programming for improving student wellness and outcomes, and serves as a foundation for future development in the field. While this curriculum does not explicitly center urban food systems, it supports them by building early engagement, plant awareness, and positive relationships with growing systems in young children. These are foundational skills that precede food production, food literacy, and participation in urban agriculture. Future iterations of this work could more directly integrate edible crops, food access themes, and community-based food systems to support the health of the mind and body of participants.

Definitions

For this report, the following definitions were used as they relate to the practice of therapeutic horticulture:

Therapeutic Horticulture (TH): Participation in horticultural activities facilitated by a registered horticultural therapist or other professionals with training in the use of horticulture as a therapeutic modality to support program goals. Therapeutic horticulture is the process through which participants enhance their well-being through active or passive involvement in plant and plant-related activities (*American Horticultural Therapy Association, n.d.*).

Therapeutic Garden: A therapeutic garden is a garden utilized for therapeutic horticulture or horticulture therapy programs and activities. These gardens are designed to meet the needs of a specific user or population, accommodating goals and facilitating people-plant interactions.

Facilitator: A trained professional who utilizes passive and active therapeutic horticulture activities to promote the physical, emotional, and social well-being of participants in a non-clinical setting.

Participant: A person of any age and ability who participates in a therapeutic horticulture session.

Active TH: Therapeutic exercises that promote participant well-being through physical interactions such as planting, weeding, construction, or propagation.

Passive TH: Therapeutic exercises that promote participant well-being through sensory and observational methods, without requiring physical interactions. Examples include reclining in a natural space, listening for birds outside, or sitting on a park bench to observe the surrounding greenery.

Therapeutic Horticulture Session: An intentionally planned and scheduled meeting between a therapeutic horticulture facilitator and their participant(s). Sessions can be completed in a group setting or one-on-one between the client and facilitator.

Horticulture Therapy (HT): Participation in horticultural activities facilitated by a registered horticultural therapist to achieve specific goals within an established treatment, rehabilitation, or vocational plan. Horticultural therapy is an active process which occurs in the context of an established treatment plan where the process itself is considered the therapeutic activity rather than the end product (*American Horticultural Therapy Association, n.d.*).

Adaptations: Accommodations or modifications made to an environment, instructions, assessment, or curriculum that allows participants to be successful.

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Appendix A A.1Appendix E A.1

Appendix A - 8 Week Sample Program

- **8 Week Therapeutic Program for Lower Elementary School Students**
- Program length: 8 consecutive Weeks
- Session Length: Sessions will be held once a week in 45-60 minute sessions.
- Target Population: Elementary students, ages Kindergarten through Second Grade

Week	Session Theme	Therapeutic Goal	Sample Activity
Week 1	<i>What do plants need to grow?</i>	<i>Sensory Exploration and Responsibility</i>	<i>Growing Bean Sprouts Activity</i>
Week 2	<i>Observing the natural world around us.</i>	<i>Emotional Regulation and peaceful strategies</i>	<i>Nature Art and Mindfulness Walk Activity</i>
Week 3	<i>Design and Self-Expression</i>	<i>Creativity and fine motor skills</i>	<i>Teacup Garden Activity</i>
Week 4	<i>Interactions with the natural world.</i>	<i>Fine motor skills and independence</i>	<i>Pinecone Bird Feeder Activity</i>
Week 5	<i>Exploring the sensory benefits of plants.</i>	<i>Social skills and communication</i>	<i>Herb Sachet Activity</i>
Week 6	<i>Insects in the garden</i>	<i>Inquiry and curiosity</i>	<i>Garden Creature Scavenger Hunt</i>
Week 7	<i>Textures in the Garden</i>	<i>Observation and focus</i>	<i>Garden Texture Print Making Activity</i>
Week 8	<i>Flavors of the Garden/End of Program Reflection</i>	<i>Sensory Engagement and Reflection</i>	<i>Herbal Lemonade in a Bag</i>

Appendix B - Your Appendix B title here

Plant Name: _____

I was planted on: _____

Idea Temperature: _____

Sunlight:

- **Direct (4+ hours of full sun each day)**
- **Bright Indirect (Near a sunny window)**
- **Low Indirect (Away from a window)**

Water:

- **Thirsty: (Keep soil moist)**
- **Surface Drying: (Allow for the top 1” of soil to dry between waterings)**
- **Dry Out (Let soil dry completely between waterings)**

Notes: _____

Plant Care Card

Plant Name: _____

I was planted on: _____

Idea Temperature: _____

Sunlight:

- **Direct (4+ hours of full sun each day)**
- **Bright Indirect (Near a sunny window)**
- **Low Indirect (Away from a window)**

Water:

- **Thirsty: (Keep soil moist)**
- **Surface Drying: (Allow for the top 1” of soil to dry between waterings)**
- **Dry Out (Let soil dry completely between waterings)**

Notes: _____

Appendix C - Sample Goal Sheet

Participant Name: _____

Date: _____

Facilitator Name: _____

Timeline (Number of sessions, session times, Start-End Date):

Objectives (areas to work on): _____

Resources: _____

Needed Support: _____

Potential Barriers: _____

Outcomes (Desired results for each step): _____

Appendix D - Plant Growth Observation Chart 1

Draw your observations as you notice changes in your plant.

Day: _____ 	Day: _____ 	Day: _____
Day: _____ 	Day: _____ 	Day: _____
Day: _____ 	Day: _____ 	Day: _____

Plant Growth Observation Chart 2

Write down notes and observations as you watch for changes in your plant.

Day: _____ <i>I observe:</i> 	Day: _____ <i>I observe:</i> 	Day: _____ <i>I observe:</i>
Day: _____ <i>I observe:</i> 	Day: _____ <i>I observe:</i> 	Day: _____ <i>I observe:</i>
Day: _____ <i>I observe:</i> 	Day: _____ <i>I observe:</i> 	Day: _____ <i>I observe:</i>

Appendix E - Progress Evaluation Sheet

Participant: _____

Date: _____

Activity: _____

4

<u>Goal:</u>	<u>Goal:</u>	<u>Goal:</u>
<u>Progress towards completion:</u>	<u>Progress towards completion:</u>	<u>Progress towards completion:</u>
<u>Notes:</u>	<u>Notes:</u>	<u>Notes:</u>