

CULTIVATE

FLORIDA HORTICULTURE FOR HEALTH NETWORK

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The Florida Horticulture for Health Network's vision: To promote activities and connect organizations to each other and resources that use horticulture to improve health including therapeutic horticulture and horticultural therapy, landscapes for health, nature, emerging professional support, allied horticulture and health services, community and school gardens, and food action initiatives.

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Students, School Gardens and Mental Health

Text by Lesley Fleming, HTR & Sarah Sterling, MSS, LSW

Photos by S. Sterling & L. Fleming

The mental health of students of all ages continues to be an ongoing health concern due to societal issues like social media, COVID-19 disruptions and mortalities, political vitriol and war, frequency of mass shootings, and a 29 percent increase in anxiety and 27 percent increase in depression diagnoses in children ages 3-17 between 2016 and 2020 (HHS, 2022). Strategies for preventative care, supportive services and alternative interventions are playing a role in mental health services for children and youth. [School gardens and services](#)

[delivered in these nature-based settings](#) are supporting emotional and social health and well-being. In addition to learning and food literacy, school gardens are, and can be platforms for mental health support (Fleming & Sterling, 2024).

Much of the literature on school gardens focuses on food gardens, nutrition and improvements in students' food literacy ([Florida Horticulture for Health Network Resource Hub](#), 2023). The literature also cites outdoor learning environments, schoolyards, neighborhood greenspace, therapeutic gardens at schools as well as parks, forests and camps. One of the more recent initiatives, the [National Schoolyard Forest System](#), seeks to increase "child-accessible tree canopy" on public school grounds addressing climate impacts, connections to nature and well-being.

Mental Health Well-Being

Current research reveals school gardens are sites for health interventions with impact across multiple health domains. Well-being is frequently cited in the research, with this facet of mental health receiving increasingly more attention. “UNICEF’s report on factors that shape child well-being in affluent countries lists ‘good mental well-being’ as a ‘key aspect of quality of life’, and notes that ‘more time playing outside is linked to much higher levels of happiness’” (UNICEF, 2020). While consensus on the definition of well-being is lacking, generally, hedonistic (finding pleasure and avoiding pain) and eudemonic (finding meaning and purpose) well-being are generally accepted as is the concept that well-being is multi-dimensional (Mann et al., 2022). Cognitive function, academic performance, and attention, considered to be factors of well-being, can be positively impacted by visitation and activity in school gardens, this validated by research from Dadvand et al. (2015), Davis et al. (2022) and Park et al. (2019). Oh et al. (2019) and Kim et al. (2020) examined real foliage plants in schools as visual stimuli improving concentration and attention and Van den Berg et al. noted green walls can create a restorative classroom environment (2017), these also addressing student stress and well-being. Mann et al.’s 2022 research states: “engaging with nature in nature-specific learning outside the classroom is a vital medium for developing well-being”; their dataset identifying 16% occurring in school gardens.

These school-based green environments are inter-related to the large body of evidence that has identified positive impacts of connecting with nature, including natural spaces on schoolgrounds, and other types of green space, for people of all ages including children. Pollin and Retzlaff-Furst provide a comprehensive summary of research on

Social Emotional Learning

Compiled by Lesley Fleming, HTR

Social Emotional Learning (SEL) defined: The way children acquire social and emotional skills for building healthy relationships, managing emotions, responsible decisions-making, handling stress and setting goals (Souza, 2023). The [fundamentals of SEL](#) are listed below.

5 Competencies of SEL

Self-awareness Social awareness
Self-management
Responsible decision-making
Relationship skills (Souza, 2023)

4 Effective SEL Approaches

“Sequenced connected coordinated activities to foster skills development
Active forms of learning to help students strengthen new skills
Focused attention and time for developing personal & social skills
Explicit targeting of specific social & emotional skills” (CASEL, n.d.)

An article by Pope, Thompson & Marston (n.d.) provides an overview of the role [school gardens can play in addressing social emotional growth](#). [Kids Garden Community chat](#) offers insights on the topic. School gardens are sites for health interventions related to SEL as well as functional behavioral analyses and implementation of [behavior intervention plans \(BIP\)](#).

Collaborative for Academic, Social, and Emotional Learning (CASEL. (n.d.). SEL in the classroom. <https://casel.org/systemic-implementation/SEL-in-the-classroom/> (ideas can be applied to gardens)
Pope, E.J., Thompson, M. & Marston, S. (n.d.). Social emotional growth in school gardens.
Souza, J. (2023). What is social and emotional Learning? *Child Mind Institute*.

psychological and physiological effects of connecting with nature in the context of school gardens (2021). Pirchio et al. (2021), Richardson et al. (2017), Zhang et al. (2020), and McCormick (2017) also took a broader approach, examining the effects of contact with nature, green space, and student well-being.

School gardens are being examined in relation to social and emotional learning (SEL), these primary elements related to mental health. School gardens can be a site for functional behavioral analysis/assessment delivering behavior intervention plans (BIF) (these originally developed for use with people living with an autism spectrum disorder and now used by other populations) (Souza, 2023). A scoping review by Lohr et al. in the *Journal of Adventure Education & Outdoor Learning* suggests that school garden programs have the potential to enhance five competencies of SEL including responsible decision-making, self and social awareness, relationship skills and self-regulation (2021). Research by Ohly et al. (2016), Pollin & Retzlaff-Furst (2021), and Bikomeye et al. (2021) identify school gardens as learning and experience space which along with exposure to nature, can influence prosocial and emotional behavior of students.

Research on school gardens and horticultural activities focusing on children's stress recovery and well-being is expanding with studies by Shao et al. (2020) published in the *International Journal of Environmental Research Public Health*, Chiumento et al. (2018) in *BMC Public Health*, and Oh et al. (2020) in *Integrative Medicine Research*.

An expanding area of research is investigating college students, as a distinct student group with their own particular needs. Research themes of time in nature supporting mental well-being (Meredith et al., 2020; Rakow & Fells, 2019), COVID-19 stress among college students and nature engagement (Larson et al., 2022), campus gardens (Baur, 2020), foliage colors improving relaxation and emotional status of university students from different countries (Kexiu et al., 2021), and Diehl (2021) and Li et al.'s (2022) examination of the effect of therapeutic horticulture on college students' well-being are part of this body of literature.

Limited research is available on school gardens used for interventions where students have specific mental health diagnoses. Faber Taylor and Kuo looked at ADHD and exposure to children's play settings (2011). Latane's book *Schools that Health: Design With Mental Health in Mind* (2021) includes recommendations for school gardens. Jung and Lee (2021) looked at horticultural activities used with high school students with depression and aggression. Friedman's 2023 research examined school garden access for students diagnosed and living with an autism disorder. Real life examples, like the [Els Center for Excellence School and its Sensory Garden](#) in Jupiter, FL designed specifically for children with autism to play, socialize, and learn, with gardens and nooks called *Places Away* for calming spaces and interventions, though not empirical research, offers insights that can advance the understanding of benefits of school garden settings as delivery sites for health interventions where students have been diagnosed with a specific mental health disorder.

Both diagnosed and undiagnosed mental health challenges experienced by students are important health concerns. Strategies, interventions and effective best practices continue to be explored, with positive psychology framework (Harvard Medical School, 2024) playing a role in research, interventions and approach addressing student mental health and well-being.



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Lesley Fleming, HTR has led the Florida Horticulture for Health Network in gathering research compiled into its Resource Hub, with more than 3,000 citations and program models including school gardens and programming for children using plant-based activity. Sarah Sterling, MSS, LSW, is a licensed social worker whose professional career has focused on adolescent mental health and well-being, and who uses her training in horticultural therapy to research and identify best practices for integrating HT into school settings.



School Gardens: Platforms for Learning, Therapy & Community Involvement

Text By Lesley Fleming, HTR & Sarah Sterling, MSS, LSW
Photo by L. Fleming

School gardens have the capacity to play multiple roles—sites for learning and therapy, play zones, environments for cultural connections, Individualized Educational Plan (IEP) work, students mentoring other students, and community connections. At a forum discussing school gardens, hosted by the Florida Horticulture for Health Network, professionals from several disciplines shared successes at school gardens where they work and volunteer.



- Promoting cultural awareness and connections using the Indigenous tradition of [three sisters garden](#), integrating history and horticulture lessons while harvesting and eating popcorn (corn) grown in the school garden
- Teaching botany courses to all grade levels including dual enrollment high school students in the school garden
- Student mentoring, within an existing program, using the school garden and gardening activities as an additional context for student interactions and connecting with nature
- Delivery of therapeutic services, IEPs and behavioral therapy, with school counsellors expanding opportunities for inclusion of students living with neurodivergent, physical challenges or special needs
- Introducing vocational and life skills at non-traditional [school gardens at juvenile detention](#) centers, where volunteers codify lessons as one part of the program using stories, hands-on plant activities, these supporting empowerment and hopeful attitudes
- Garden maintenance during summer months where students assume leadership, mentorship tasks committing to service hours
- Promoting [social and emotional learning in school gardens](#)

Many impactful activity can be conducted at school gardens. These include integrating lessons across subjects delivered outdoors in a green space, creating play zones like [mud kitchens](#) in the garden setting, delivery site for summer programs, addressing food insecurity by growing and donating produce to community groups (some sent home with students), and using community resources to build relationships while making school gardens special. Some interesting examples—partnering with

a New York company that promotes student entrepreneurial aspirations buying peppers grown in the school. An Anna Maria Island (FL) restaurant funding garden supplies and then hosting lunches twice a year for student gardeners using the school garden produce.

No two school gardens are the same. These green settings attempt to use the school's particular essence, addressing the needs of their students, adapting to their sites, populations and funding. Not all school gardens are in typical settings, some schools do not have garden space and/or resources for participation by all grades. As an alternative to a physical on-site school garden, Sarah Sterling, Coordinator of Educational Horticulture at The Shipley School (PA) connects with the community for plant-based projects across subjects with students participating in grave gardening at a local cemetery, competing in the Philadelphia Flower Show, and integrating an assortment of horticultural activities into the classroom setting. Nutritionist-led Nourish Nova Scotia, tasked with responsibility for school lunches and in conjunction with the provincial department of education has expanded its role and leadership to include school gardens, promoting nutrition and food literacy while integrating [food procurement policies with local growers](#), using school-grown food in school cafeterias, and encouraging student-led garden activities (videos and stewardship).

School gardens have embraced community involvement recognizing that Individuals can make a difference. Looking beyond traditional connections with science teachers, a talent pool of volunteers, parents, master gardeners, horticultural therapists and teachers from other subject areas have been invited to participate in school garden initiatives. School counselors have been champions for school gardens, writing grants, encouraging more classes to use the garden, collaborating with local organizations like Extension services and botanical gardens, using a perspective that school gardens need to be sustained on many levels. They have influenced the integration of themes like ethnobotany and global gardens, taking a holistic view of the school. This in turn has resulted in greater number of students participating, while providing opportunities for students to demonstrate their broader abilities.

There are certainly challenges school gardens face: safe food handling at food gardens, cafeterias' use of school garden produce and compliance with safety protocols, staffing changes impacting gardens, capacity building, summer garden maintenance when student/staff presence is limited, and overgrown gardens as students return in the fall. But these pale in comparison to the versatility and roles school gardens can and are playing for learning, therapy and community involvement.

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Authors Lesley Fleming, HTR & Sarah Sterling, MSS, LSW participated in the Florida Horticulture for Health Network's school garden forum where professionals from different parts of the U.S., with expertise in multiple fields including social work, horticulture and horticultural therapy, education, corrections, and counseling shared their ideas and perspectives on school gardens. Thanks to Shauna Farmer, Julie Hudak-Salvat, LCSW, Carol Dorsey, BS, Master Gardener, Karena Poke, Susan Morgan, MS & Jessica Sullivan for their contributions to this article.



Therapeutic Horticulture Activities Database (THAD)

Text by Lesley Fleming, HTR & Elizabeth (Leah) Diehl, RLA, HTM

Graphic by Alex Lopez. Photos by F. Hart, S. Morgan & A Golden Afternoon

Therapeutic Horticulture Activities Database, being referred to by its acronym THAD, is a collaborative project providing a free online database of therapeutic horticulture activities. It was initiated in 2023 by Diane Relf, the THAD Working Group which includes the Florida Horticulture for Health Network, Nova Scotia Horticulture for Health Network, California Horticultural Therapy Network, Mid Atlantic Horticultural Therapy Network, Carolinas Horticultural Therapy Network, and the University of Florida's Department of Environmental Horticulture.

It was created acknowledging activities are an integral component of horticultural therapy (HT) and therapeutic horticulture (TH) programs. One key component is that intentional connections to plants are an essential element of each activity. In HT/TH programs, plant-based activities are designed and structured to emphasize identified goals, objectives, and therapeutic benefits based on the needs of the clients.

Most high-quality activities can be adapted or modified to serve different client groups successfully. The activities found in THAD have been developed or adapted by HT professionals and are presented in compliance with standards of practice from the American Horticultural Therapy Association (2023). Although they are formatted for use by horticultural therapy practitioners, the activities can be adapted and implemented by a broad range of practitioners to suit the needs of both those delivering and benefitting from the activities.

THAD uses three primary categories to present and organize activities: *Activities*, *Goals* and *Populations*. Each primary category contains related sub-categories.

Therapeutic goals are suggested, in multiple health domains for each activity. Though there may be a number of therapeutic goals identified, typically there would be one or two used in the delivery of the TH intervention.

THAD activities include a description of the activity, therapeutic goals, step by step process for delivery, materials list, safety considerations, applications for populations and author/photographer credit.

THAD includes wide-ranging TH activities like air drying leafy herbs, [building and planting a pallet garden](#), propagating herbs by division, repotting plants, [harvesting herbs grown for roots/rhizomes and bulbs](#), making herbal oils, lavender misting spray atomizer, freezing herbs, [handmade paper](#), and field trip to a community garden.

Activities	Goals	Populations
Planting	Cognitive/Intellectual	All Populations
Propagation	Physical	Children/Youth
Plant Care/Maintenance	Psychological/Emotional	Corrections
Harvesting	Sensory	Physical Disabilities
Herbs	Social	Mental Health
Food/Cooking		Rehabilitation
Design		Food Insecure
Creative Expression/Arts		Veterans/Military
		Medical Conditions
		Seniors/Dementia
		Other Specialized Populations

THAD was launched in December 2023, has more than 90 TH activities with more being added each month. THAD can be accessed via the link:

<https://hort.ifas.ufl.edu/therapeutic-horticulture-activities-database/>



[Nature Mandala](#)



[Plant Puns on Pots](#)



[Tea Cup Planting](#)

THAD Therapeutic Horticulture Activities Database

Activity: Design Goal: Physical Populations: All

TH Activity Plan – Plan, Plant & Eat the Rainbow

Text by Lesley Fleming, HTR

Photos by Daily Mail & Susan Samueli Integrative Health Institute



Materials

Graph paper, pencils
Seed packs, transplants
Trowels, water source, cans
Gloves, wipes



ACTIVITY DESCRIPTION: Participants will design, plant & eat produce from a garden using a theme of rainbow-colored edible plants. This can be a multi-session or a single session TH activity.

THERAPEUTIC GOALS:

Cognitive/Intellectual: Develop nutrition-based strategies for self-care improving or coping with physical/medical/lifestyle challenges

Physical: Reduce blood pressure, A1C diabetes metrics, weight

Psychological/Emotional: Address challenges re weight management, healthy diet & related health issues like addictions & abuse

Sensory: Use sensory activity as mechanism for exploring joy, pleasure

Social: Develop sense of self by planning a rainbow garden that appeals to & reflects all the different parts of one's self

STEP-BY-STEP PROCESS:

1. **Pre-Session Preparation:** Gather materials for each session in this multi-session activity, depending on what phase will be occurring. Determine if the planning/design of the rainbow garden will be done in small groups or as an individual activity.
2. Facilitator begins session by discussing the various phases of this activity. After introducing some garden design tips for edible produce crops that thrive in the garden (refer to USDA Growing zone), help plan for the current session & factors to be considered (seasons, temperatures, growing days to harvest for various plants, available garden space, budget) plus the nutritional value of various edible plants. Visiting the garden space is optimal.
3. Participants can design their gardens in small groups or individually. Note that the garden design process & drawings may be used for their home gardens as an option, or as the program's garden design.
4. Peer review of each other's design can identify positives & challenges for actual garden installation, maintenance & beautification.
5. For the session when planting occurs, trowels, seeds or transplants & water should be available, along with the selected garden design.* Assignments or group decisions re who plants what & where can promote a sense of self-efficacy, direct responsibility & teamwork.
6. The session where produce is harvested &/or eaten* should include evaluating what crops thrived, the nutritional value of harvested produce, insect infestations if any & ideas for improving the garden.
7. Eating the rainbow colors of produce should occur after safe food handling rules are discussed along with a discussion on nutrition.

* These sequential session activities have not been fully described here. Refer to THAD activities that may provide more detailed information.

APPLICATIONS FOR POPULATIONS: Planning, planting and eating edibles inspired by the colors of the rainbow can be a fun and therapeutic program. For TH programs that run over a period of months and growing season(s), this activity can be sequenced as a multi-session progression. Or it can be delivered in component parts: planning the garden, planting, and eating produce. Most populations can participate in an activity like this, with specific focus and therapeutic goals related to chronic medical conditions and strategies to improve weight, A1C diabetes, blood pressure being a natural fit. Many hospitals are now delivering nutrition-based programming for populations with these and other health issues, and these are being delivered at wide-ranging places from affiliated community gardens, corner stores, onsite hospital gardens, CSAs, pop-up food demonstrations, as well as Fresh Rx Farm to Patient programs, as nutrition education plus HT/TH services (Fleming et al., 2022).

“The role that plants play in health and nutrition has been examined by The National Institutes of Health and others for the potential to prevent, manage and treat disease (2016; Ahonen et al., 2019; Veldheer et al., 2020). Nutrition focused interventions are linked to improvements in chronic disease and disease management, diet quality, food security, hospitalization and health care costs...Research covering diverse health conditions and links to nutrition span brain health...child and youth development...dietary patterns and cognitive health in older adults...chronic disease prevention...substantiat[ing] the importance of nutrition interventions.”

Programs interested in this focus should be aware of the *Food is Medicine* movement, *Produce Prescription Program* and other *Preventative Programs* where a strategy of providing access to fresh fruits and vegetables addresses poor diets, food insecurity and many specific health conditions (Downer et al., 2022; Fleming et al., 2022). Until the recent COVID-19 pandemic, many of these efforts focused more on the nutritional value of produce consumption than on the therapeutic value and benefits that can be derived from the growing process.

SAFETY CONSIDERATIONS: For the eating component, activities may not be appropriate for individuals or populations who have swallowing, allergies, or contraindications with medication issues. Physician approval may be required where participants have serious health conditions and are exercising and eating program produce. Seating, shade, restrooms and garden accessibility in support of easy mobility should be considered. Safe food handling protocols should be planned/implemented well in advance. Sun protection is also recommended.

NOTES OR OTHER CONSIDERATIONS: Fruits and vegetables offer vital nutrients, dietary fiber and phytonutrients that support a healthy diet to maintain healthy weight while reducing the risk of heart disease, diabetes, and other diseases. Consider dividing the garden into color zones. Red vegetables: lettuce, beets, radishes, watermelon. Yellow zone: peppers, tomatoes, summer squash, sweet corn. Green zone: spinach, kale, Chinese cabbage, broccoli, peas. Blue/violet zone: purple cabbage, purple potatoes, purple basil, purple cauliflower.

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TH Activity Plan form developed by Lesley Fleming, Susan Morgan and Kathy Brechner (2012), revised in 2023.

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