

DIGGING IN

NOVA SCOTIA HORTICULTURE FOR HEALTH NETWORK

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The Nova Scotia Horticulture for Health Network is a coalition of people interested in supporting horticulture for health initiatives through resource-sharing, exchange of practices/knowledge, and networking.



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Photo top right: A. Phillips

Nature Connections: Research Validates Multiple Health Benefits

Text & photos by Lesley Fleming, HTR

Connecting with nature offers many health benefits with this topic appearing more frequently in research, magazines and online content. The relationships, feelings and connections between nature and humans support mental and physical health and wellbeing (Barragan-Jason et al., 2022). What does recent research reveal about nature connections, areas of interest and health benefits?

Nature, defined as natural spaces like meadows, forests, streams, and ecosystems also includes animals, water and plants. It was E.O. Wilson who popularized the term biophilia, defining the intrinsic human need to connect with other living things and nature (1984). Others including researchers Reese & Gosling (2020) and Reese & Myers (2021) have used a newer term, “eco-wellness” as a concept and practice for improving health and wellness, evolving from counselling students but applicable for all populations. Connecting with nature is primarily done as individual engagement. It was during COVID-19 that this aspect gained prominence as individuals sought refuge, relief and restoration from nature (Fleming, 2024).

Green is Serene

The restorative power of nature, sometimes referred to as “green is serene”, has the capacity to get people out into nature, beginning lifelong relationships. Van den Bosch describes serenity in nature as offering calm and quiet places (2015). A study where access to nature was limited, in socio-economically deprived communities, was a counterpoint—the impact of nature-based interventions in this context validated nature’s restorative powers (Harrison et al., 2023). Living closer to green and blue natural spaces is linked to wellbeing and life satisfaction, with the feeling of nature

connectedness considered positive by most. Nature-based activities and interventions are expanding, appearing in workplaces for example (Gritzka et al., 2020).

Nature Nurtures

Anecdotal stories and empirical studies have focused on how nature impacts human health. Research has investigated some key areas related to positive mental health and emotional wellbeing (Barnes et al., 2019; Buru et al., 2021; Chaudhury & Banerjee, 2020; Cox et al., 2017). [Improvements in mental health](#), mental restoration and the ability to sustain attention using nature interactions and interventions have been particularly relevant during COVID-19. Studies have referenced Kaplan's attention restoration theory (1999) (Crossan & Salmoni, 2021). Research investigating connections between time in nature, stress reduction and decreases in anxiety, some using salivary biomarkers have validated hypotheses (Hunter et al., 2019; Jones et al., 2022; Kang et al., 2023; Maund et al., 2019).

Research found nature engagement reduced the need for antidepressant medication, improved cognitive function and cardiovascular health (Helbich et al., 2018; Bratman et al., 2012; Bikomeye et al., 2022). Nature connections impacting physiological health, some associated with exercising in nature settings, included examination of shinrin yoku (forest bathing) and studies of motor skills development (Li, 2022, Antonelli et al., 2019; Lim et al., 2017). Additionally, research focused on different aspects of health and correlations with nature engagement: health improvements for elderly people (Catissi et al., 2024; Hassink et al., 2019), decreased risk of long-term psychiatric illness (Engemann, 2019), and effective treatment and recovery in nature-based rehabilitation (Eskilsson & Palsdottir, 2021).

Engaging with nature has positively impacted pro-social behavior in children and others according to research by Putra et al. (2020) as well as pro-environmental attitudes and behaviors (DeVillie et al., 2017). Measurements of happiness and life satisfaction indicate positive outcomes when in contact with nature and, increases in creativity (Weir, 2020; Pretty & Barton, 2020). A significant number of systematic studies have examined the scope of health impacts related to engaging with nature including nature-based interventions (Franco et al., 2017; Jimenez et al., 2021; Jones & Littzen, 2022; Kondo et al., 2020).

Nature-based Activities

Sensory engagement with tactile, visual, olfactory, gustatory and auditory inputs, most typically stimulating and pleasant to humans, is intrinsic to nature interactions. Examining activities that connect people to nature sheds light on the breadth of these activities and the benefits they provide. Visiting natural areas like forests, rivers, and oceans as well as settings with extensive nature elements including parks, beaches and botanical gardens provide opportunities to experience and engage with nature.

It has been demonstrated that more active nature involvement appears to deliver greater benefits (Richardson et al., 2020). Research has investigated these benefits for forest bathing (Antonelli et al., 2019; Hansen et al., 2017), nature-based outdoor activities, nature-



based expressive arts therapy, green exercise, interactions with aquariums, indoor plants, nature art (Coventry et al., 2021), and veteran to farmer activities (Fleming, 2015). Nature engagement as health interventions and recreational activities are evident at school gardens, school yard greening and forest installations, as well as gardening in residential and community gardens. A recent study by Sands et al. examined nature activities during pregnancy and found benefits to health during this phase of life (2023).

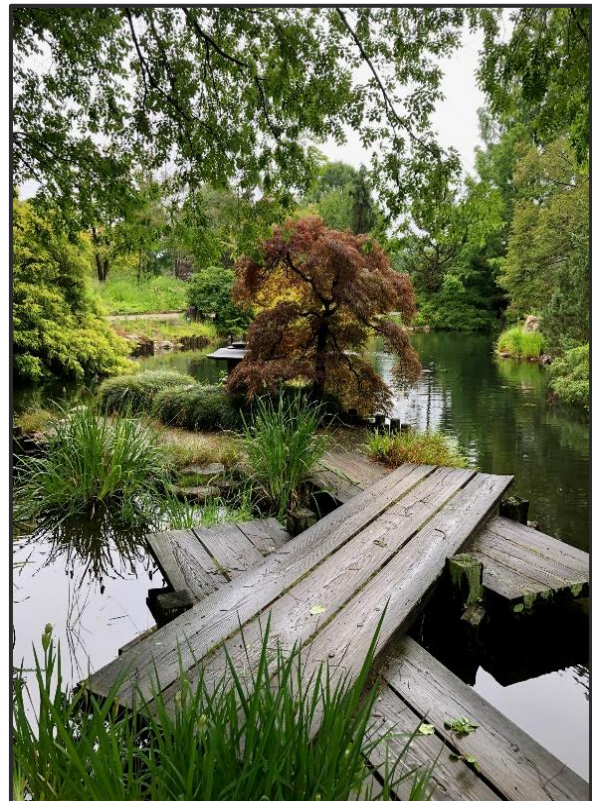
Nature-based Interventions

Multiple therapeutic approaches and modalities where nature (or horticulture in natural settings) plays a significant role in health interventions demonstrate the expanding interest and applications (Ho et al., 2022; La Puma, 2019; Oh et al., 2020). Ecotherapy and ecopsychology (Hinde et al., 2021), eco-wellness, wilderness camps, aromatherapy, and veteran to farmer programming are more widely recognized and used across health disciplines (Adewuyi et al., 2023; Leavell et al., 2019). Forest bathing and forest therapy, along with outdoor therapies are gaining greater acceptance, as are nature Rx-green prescriptions and nature-based social prescribing (Li, 2022; Harper et al., 2021).

Interventions using nature components are evident in treating veterans' PTSD (Bettmann et al., 2021; Noushad et al., 2022; Poulsen et al., 2015), cancer interventions focused on normalizing dichotomous realities (Blascheke et al., 2017; Chang et al., 2018; Hernandez-Garcis et al., 2021; Morris et al., 2021), nature-based programs for bereaved populations (Cleary et al., 2022), and trauma care (Hart & Zanskas, 2021). Mental health services involving nature are delivering measurable outcomes and health improvements, as substantiated by research from Bragg & Atkins (2016); Bratman et al. (2021); Lewis et al. (2022); and Owens & Bunce (2022). Horticultural therapy and therapeutic horticulture programs for children are becoming more widespread where nature plays a key role in overall child development (Crnic & Kondo, 2019; Griffin, 2023; Overbey et al., 2021).

Nature Networks and Movements

Organizations and movements with specific missions of promoting nature because of health benefits continue to emerge. [Children and Nature Network](#), begun by [Richard Louv, and his concept of nature-deficit disorder](#) has expanded applications beyond children. Organizations reference research using several constructs. Too much time indoors impacts pediatric (and other populations') health (obesity, depression, myopia, osteoporosis, attention deficit hyperactive disorder) (Messiah, et al., 2020). Unstructured nature play impacts and improves early child development (Dankiw et al., 2020). Neurosequential model of therapeutics for adolescents using outdoor behavioral modalities has proven effective as have nature connections for indigenous youth (Freedle & Slagle, 2018; Rowley et al., 2022; Hatala et al., 2019; Kurth et al., 2020).



The [Nature Rx](#) movement promoting interactions with nature, views humans as part of and benefitting from relationships and experiences with nature. The [Campus Rx](#) movement, involving 70+ colleges and universities supports time in nature as mechanisms for students' health and wellbeing. Research by Meredith et al. (2020) has been foundational for this population and has been cited extensively by others including Richardson et al. in their 2020 study. Nature engagement as part of [Campus Rx reveals a variety of applications](#), specific to each college, including nature prescription programs, outdoor environmental education (Pirchio et al., 2021), mindfulness hikes, biophilic design of buildings and campus grounds, research, nature connections through campus food gardens and food advocacy (Campus Rx, 2024).

Multiple organizations promote nature engagement as health outreach including [Center for Health and Nature](#), Center for Nature Informed Therapy, [Green4Care](#), Green Spirit (UK), Wilderness Foundation, the Collective for Nature Immersion Science and Practice, Nature Sacred (landscape focus), and the [Association of Nature and Forest Therapy](#).

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Lesley Fleming, HTR examined current research on benefits nature interactions provide as part of the [Florida Horticulture for Health Network's](#) revisions to its [Resource Hub](#) in 2024. She designed a nature-focused workshop for the Nova Scotia Horticulture for Health Network that was delivered in July 2024.



Workshop: Connecting with Nature

By Lana Bos, P.AG., BSc.Agr., Dip.OH, Maureen Bethel, BA, BEd, CAE & Lesley Fleming, HTR

Photo by B. House

A summer evening workshop hosted by the Nova Scotia Horticulture for Health Network in July 2024 provided an experiential session with the theme connecting with nature. Held in Truro NS' historic [Victoria Park](#), established in 1887, the setting provided connections with nature with its 175 step wooden Jacob's Ladder staircase to the top of the gorge, Joe Howe and Waddel waterfalls and 75 km of hiking trails, alongside its Lepper brook amidst the 3000 acres of woodland.

A cross-section of people and professions including horticultural therapists, [Dalhousie University's Agricultural Campus staff](#), faculty, and master gardener volunteers, health sector professionals, and others interested in nature's impact on human health and wellbeing participated. The experiential sessions focused on three activities, drawn from the University of Florida's [Therapeutic Horticulture Activities Database \(THAD\)](#), engaging participants in a variety of ways and connecting them to nature:

- ❖ Are You a Stream or a Forest? (adapted from THAD's [Choose One: Daisy or Rose](#))
- ❖ What in Nature Speaks to You? (adapted from THAD's [What Plant Speaks to You?](#))
- ❖ [Photographing Nature's Micro Patterns](#)

Lana Bos opened the session, with an overview of the benefits of connecting with nature. Participants enthusiastically embraced the activities which involved icebreakers, large group brainstorming, and individual reflection. These were followed by a group discussion. Topics ranged from nature experiences in the session, poems inspired by the nature setting, horticultural therapy (HT) and master gardener programs and their use of plant and nature-based activities, as well as nature metaphors for human traits.

The workshop was received as both a self-care session and as professional development for horticulture for health, HT and nature-based education. Workshop facilitators Maureen Bethel and Lana Bos found the experiential learning approach to the session engaged and challenged participants to explore a closer relationship with their surroundings. People-plant interactions happen every day – viewing plants growing through cracks in the sidewalk, walking across campus green spaces, watering office plants. When people purposefully connect with nature, the true wellbeing and health benefits of nature occur.

THAD Therapeutic Horticulture Activity Database

Activity: Nature Goal: Sensory Populations: Child/Youth

TH Activity Plan – Sensory Bin

Text by Lesley Fleming, HTR & Maureen Bethel, BA, BEd, CAE

Photo by Rhythms of Play

Original Publication: Fleming, L., & Bethel, M. (2024). TH Activity Plan – Sensory Bin. University of Florida. *Therapeutic Horticulture Activities Database*.



ACTIVITY DESCRIPTION: Participants will create a sensory bin using nature items that appeal to their senses - sight, touch, smell & hearing.

THERAPEUTIC GOALS:

Cognitive/Intellectual: Assess & understand risk of trying & doing something new; learn about nature & its sensory elements

Physical: Practice vestibular sense of balance, muscle strengthening & development in an outdoor setting; improve hand-eye coordination

Psychological/Emotional: Confront fear of nature (biophobia), anxiety related to attachment disorder & emotional dysregulation

Sensory: Explore nature items as sensory experience; decrease sensory defensiveness; modulate responses to sensory inputs

Social: Explore nature with others; share items from nature with group

Materials

Lightweight bins, buckets or bags

Magnifying glasses

Gloves, wipes

STEP-BY-STEP PROCESS:

1. **Pre-Session Preparation:** Review outdoor area where nature items will be collected to ensure it is safe (see safety notes below). Gather bins, buckets or bags & other materials.
2. Facilitator begins session by showing a sensory bin with items from nature that would be appropriate for children to collect. Prompts related to sensory elements like the smell of pine needles, the roughness of bark can guide participants before they collect items & suggest how they can experience nature using their senses. (During collection time, facilitator should also use prompts).
3. Rules are outlined relating to boundaries for activity, no eating or tasting of items, use of gloves if desired, children always stay with an adult, stay within garden area. Ensure adults know the time limits for the activity.
4. Distribute bins, buckets or bags to participants to begin search.
5. Volunteers, parents or facilitator can supervise participants, assist where needed, introduce sensory items, use pruners to cut pine needles, small twigs & other items.
6. Once the “hunt” is over, gather the group together, encourage each participant to show one of nature’s items, identifying what sense appealed to them (touch, smell, see, sound). Facilitator can engage group asking, “Who chose a pinecone? Who has something with a nice smell? Could you tell if this was a pinecone by just feeling it’s shape?”
7. For participants working on sensory goals, facilitator can work one on one, discuss how to modulate sensory defensiveness, or remove gloves to touch sticky sap from trees where appropriate.

APPLICATIONS FOR POPULATIONS: This TH activity is appropriate for most populations and can be particularly impactful, fun and therapeutic for children and youth. Adapted from an activity by A Shared Vision.org, it combines experiential learning, time outdoors, opportunities to take risks and make decisions, and it can be a platform for therapeutic interventions. These can include working on sensory challenges—sensory defensiveness in all of the sense domains (touch, smell, hearing, sight, interoception, proprioception, vestibular sense). Other goals might focus on: sensory integration, expanding sensory tolerance, practice regulating and modulating responses to sensory inputs, increasing confidence in reacting to sensory inputs, and increasing tolerance for non-preferred tasks that involve sensory inputs like hands getting wet or sticky.

For children or adults with visual impairments, some of whom may be overwhelmed by new experiences, textures or smells, making a sensory bin, or, as an adaptation, experiencing a sensory bin, can address trepidation, easing fears by practicing touching and smelling nature items.

By using a sensory bin activity children and adults can explore sensory stimulation, an important element of TH. In addition to using senses, the activity may help with psychological or emotional goals related to experiences that bring joy, happiness, pleasure and enhance mood. Intellectual/cognitive goals might work towards assessing and understanding risks like trying and doing something new. Using nature, outdoor settings or items from nature can contribute to broader understanding of the world around us and the environment. Social therapeutic goals, working with a partner to create sensory bins, can provide opportunities to behave in appropriate, cooperative, supportive manner.

SAFETY CONSIDERATIONS: Facilitators are responsible for knowing poisonous and toxic plants and plant parts.

Review the outdoor area where the activity is to take place to eliminate safety issues, tripping hazards, and toxic plants (mark these as out of bounds). Gloves should be provided; children's gloves are available to purchase online. Ensure rules are posted, such as no tasting or eating nature's items! Small items may pose a choking hazard. Know Heimlich maneuver as a precaution and have first aid protocols in place for emergencies.

NOTES OR OTHER CONSIDERATIONS: Once items have been gathered and shared with the group, several related activities can occur allowing for the integration of therapeutic interventions. These can include setting up a touching area in classroom or therapy room with open access for this engagement when participants/family want to touch items. Or a follow-up session using nature items for artwork—gluing items on paper or creating a wall mural, making mobiles, or plant pounding extracting natural dyes from flowers or leaves. Ideas for sensory bin activities geared for classroom and home schoolers are available online. These can be adapted for therapeutic horticulture.

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Hatch-Rasmussen, C. (2024). [Sensory integration in autism spectrum disorders](#). Autism Research Institute.

Reynandez, R. (2019). [Expand your classroom with nature-based sensory activities](#). Project Learning Tree.

Edits were made for THAD purposes in 2024.

TH Activity Plan form developed by Lesley Fleming, Susan Morgan and Kathy Brechner (2012), revised in 2024.

Nature's Micro Art

Text by Lesley Fleming, HTR

Photos by Janet Holmes, L. Fleming, Jen Langille, Maureen Bethel, Beth House & Antonia Phillips

Inspired by nature, and challenged to photograph nature's micro patterns, "the fractal nature of the viewable universe" came into view with surprising clarity and intricate details (Stark & Fleming, 2024).



Stark, B. & Fleming, L. (2024). [TH Activity Plan – Photographing nature's micro patterns](#). University of Florida. *Therapeutic Horticulture Activities Database*.

Resources Fall 2024



Photo: Kids in Parks

Books on nature, nature connections and human benefits abound.

Nature-based therapy: A practitioner's guide to working outdoors with children, youth, and families by Harper & Rose (2019) provides theories & therapeutic practices for developing sensory awareness, risk at play and case studies in outdoor spaces. New Society Publishers.

The nature fix: Why nature makes us happier, healthier, and more creative by Florence Williams (2018). Investigating the science behind nature's influence on humans, specifically the brain, the context is current day and diminishing time spent outdoors.

Forest bathing: How trees can help you find health and happiness by Dr. Qing Li (2018) introduces forest medicine, shinrin-yoku with 100 color photographs and science-based information.

Walking with the seasons: The wonder of being in step with nature by Alice Peck (2024). Her advice, meditations and activities connect people to nature while walking outdoors. CICO Books.

Publisher & Editor in Chief Lesley Fleming, HTR

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We would like to acknowledge Nova Scotia is traditional territory of the Mi'kmaq people.