AZ HEALTH ZONE

FY23 Special Project Report

A Participatory Approach to Developing An Evaluation Tool for Well-Integrated School Gardens in Arizona

September 30, 2023

Prepared for the AZ Health Zone by:

Theresa LeGros
Anvi Bhakta
Laurel Jacobs

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
Nutritional Sciences & Wellness

Contents

Progress Snapshot

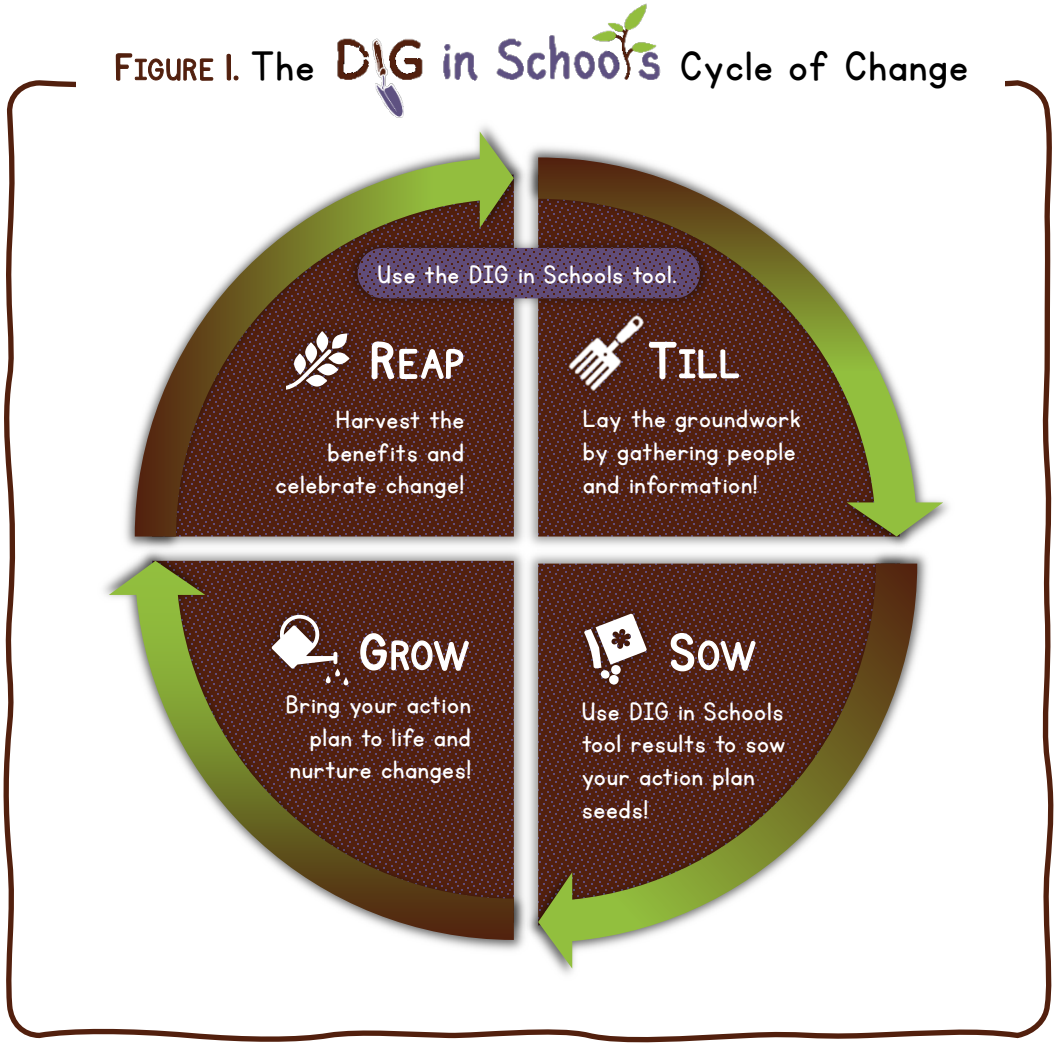
- **In fiscal year 2023 (FY23), we recruited 29 school-focused participants to an Arizona Gardens Expert Panel.** School-focused panelists represented Local SNAP-Ed Implementing Agencies (n=20), schools (n=6), and state agencies (n=3) across 11 of Arizona's 15 counties.
- **Panelists generated 104 "seeds" (important conditions) for successful school gardens.** In the first of three online questionnaires, 26 panelists answered two open-ended questions about what is needed to *create* and *maintain* a school garden. We grouped responses into the resulting "seeds" and streamlined their language.
- **Panelists rated 94 "seeds" as the most important for successful school gardens.** In the second questionnaire, 26 panelists rated the 104 seeds from the first questionnaire on perceived importance for a successful school garden, on a scale from 0 (not important) to 4 (essential). Seeds with a mean score below 2.50 were discarded or, rarely, edited to improve clarity.
- **Panelists rated 68 "seeds" as the most important for well-integrated school gardens.** In the third questionnaire, the State Evaluation Team introduced the idea of a *well-integrated school garden*.[1-2] Using the same importance scale used in questionnaire two, 25 panelists rated each of the 94 seeds. Seeds rated with a mean score below 2.95 were discarded.
- **We streamlined the final "seeds" from the third questionnaire to draft a new AZ Health Zone school gardens evaluation.** We condensed the remaining 68 seeds into 48 final items and used them to create the Developing Integrated Gardens in Schools (DIG in Schools) tool. This tool is intended to assess school garden integration, inform customized action planning, and measure changes in a school garden program over time. The more seeds a school plants, the better integrated the school garden!
- **In FY24, the State Evaluation Team seeks to pilot the draft tool.** This report includes a DIG in Schools pilot proposal. Upon approval (or approval-with-modification) by the AZ Health Zone State Implementation Team, we will implement the pilot starting in 2024.

Developing Integrated Gardens (DIG) in Schools

DIG in Schools was created as a guide for schools looking to start a new garden *or* enhance an existing garden. Currently in draft form, it involves four stages, or *seasons*, to help schools progress toward a more integrated school garden (**Figure 1**). A thriving school garden is considered to be *well-integrated* into the total school environment.

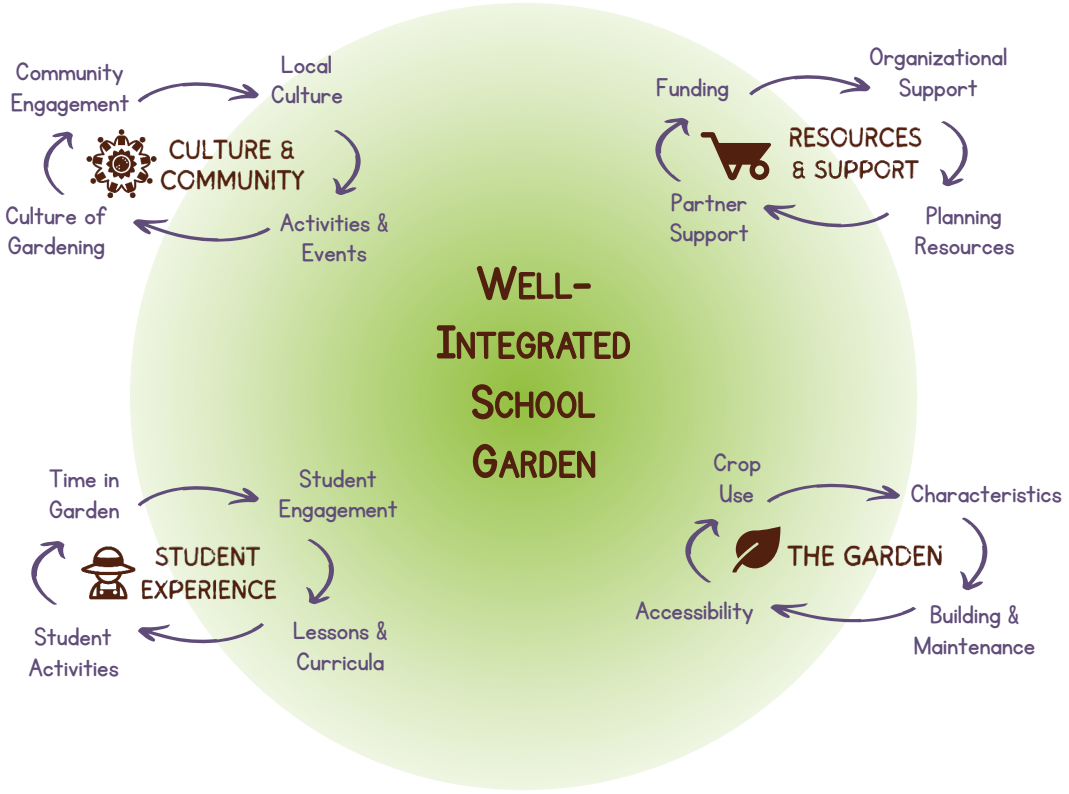
What is a well-integrated school garden? Burt et al.[2] define a well-integrated school garden as: "a maintained garden at or near a school, is primarily used as a learning environment to create meaningful experiences for students, is a valued part of the school's culture, and is sustained over time."

Figure 1. The DIG in Schools Cycle of Change



How does the DIG in Schools tool fit in? The DIG in Schools tool is the assessment tool for the process shown in Figure 1. It is foundational to the cycle of change. The tool is used at the start of the cycle as a “pre” assessment and the end of the cycle as a “post” assessment. In its present form, the draft tool includes 48 items organized into four interconnected sections, or domains **(Figure 2)**.

FIGURE 2. The DIG in Schools Tool Sections are Interconnected



The draft DIG in Schools tool can be found in the Appendix. Each of its 48 items is considered to be a seed that, when planted, helps a school move toward a more integrated garden. Because every school is unique, not all seeds will be appropriate for all schools: A "thriving" school garden does not need to have all seeds in place. This allows schools to choose the seeds that make the most sense for their community.

How can the AZ Health Zone use DIG in Schools? We suggest that the AZ Health Zone State Implementation Team (SIT) School Systems Specialist collaborate with the State Evaluation Team (SET) School Systems Evaluator around the DIG in Schools Cycle of Change. In this model, the evaluation team would lead the Till and Reap seasons associated with the DIG in Schools assessment tool, and the implementation team would lead the Sow and Grow seasons associated with action planning and making changes.

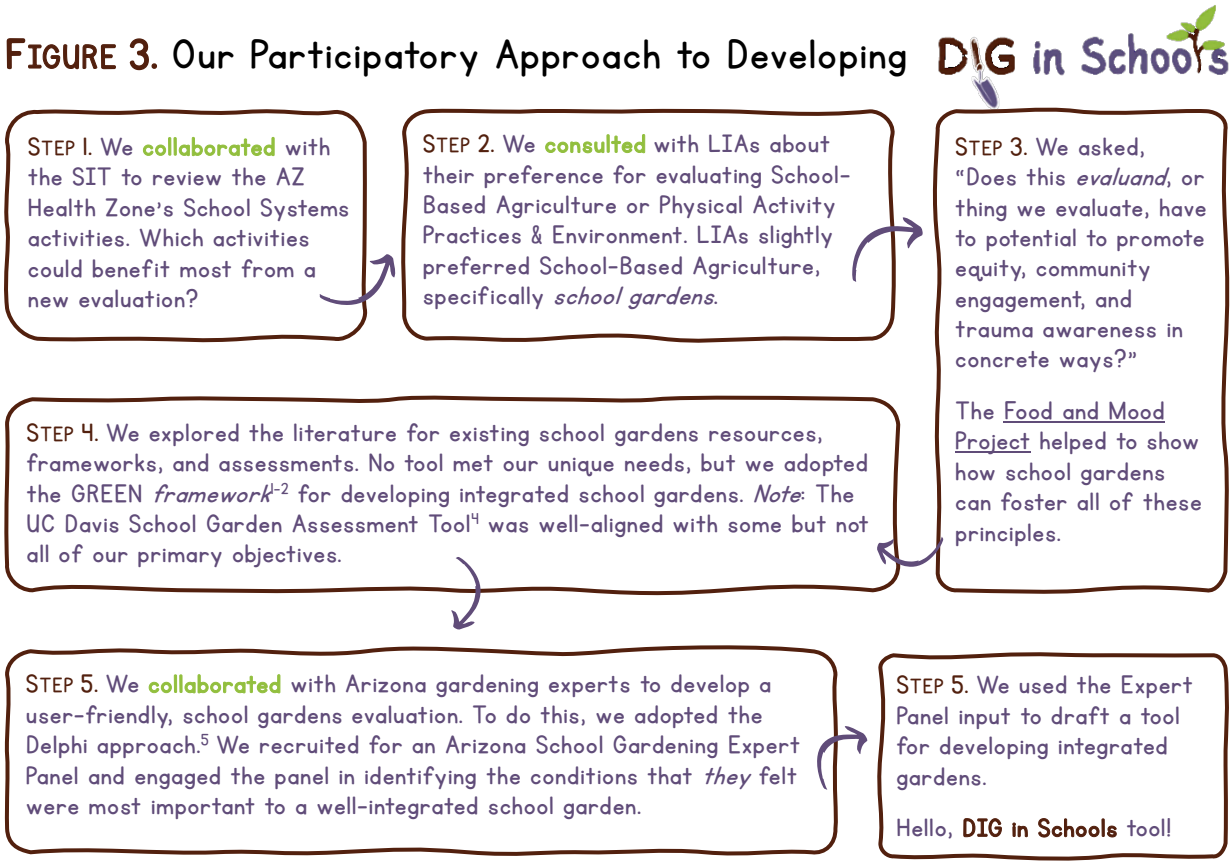
We also suggest that the DIG in Schools process follow the general model used by the AZ Health Zone for other School Systems evaluation/implementation cycles (i.e., the Smarter Lunchrooms Movement and the WellSAT 3.0-based Local Wellness Policy cycle of change). In this model, the AZ Health Zone trains LIA staff to become DIG in Schools Consultants. Certified LIA Consultants then engage interested partner schools in the DIG in Schools process, including the initial completion of the DIG in Schools tool, action planning and implementation support, and post-implementation completion of the DIG in Schools tool.

How Did We Get to DIG in Schools?

Goal. Our project aim was to leverage community engagement to expand the repertoire of evaluations available in Arizona to support school-based nutrition and/or physical activity efforts. Our objectives were to adopt an evaluation that (1) meets the needs of Arizona's school communities, as expressed by school, LIA, and state agency representatives; (2) integrates the principles of equity, community engagement, and trauma awareness[3] into the evaluation adoption/development *process*; and (3) reflects these three principles in the *actual tool* adopted.

Methods. Our project methods are summarized in Figure 3, with the elements of our participatory approach highlighted in green.

Figure 3. Our Participatory Approach to Developing DIG in Schools



Key Resources. After deciding on a school garden focus, we used two key resources as guides. While neither met our AZ Health Zone-specific needs and evaluation standards for outright adoption of their assessment tool, we referenced both during our tool development process:

- The Garden Resources, Education, and Environment Nexus (GREEN) framework[1-2] is "the first framework to identify how to operationalize school gardening components and describe an evidence-based strategy of successful school garden integration." [2 (p1517)] It includes four

interconnected domains for *Resources & Support*, the *Physical Garden*, *Student Experience*, and *School Community*. Within each domain are interconnected components: The more well-integrated the garden is into the school, the more components they have in place. The GREEN framework developers also created the School Garden Integration Scale[2] to measure each component. Scale results designate a school garden as having low, moderate, or high integration, depending upon the extent to which each component is in place.

Why Not Adopt the School Garden Integration Scale for Arizona?

The GREEN framework and scale were well-aligned with two of our three objectives, however the scale did not meet our Arizona-specific needs. First, the framework and associated scale were developed from a New York City school gardens initiative, a context quite different from Arizona gardening. Second, the scale was not designed to include the deeper level of guidance we sought for moving school gardens toward greater integration. Nevertheless, we found the general framework and process to be an essential guide in our own work.

The CalFresh School Gardens Assessment Tool[4] was designed for California's SNAP-Ed program. It assesses the level of school garden integration as low, intermediate, or high. Similar to the GREEN scale, this tool includes four domains: *Institutional Support and Partnerships*; *Garden Planning, Maintenance, and Suppor*t; *Student Experience*; and *Parent and Community Engagement and Support*.

Why Not Adopt the School Gardens Assessment Tool for Arizona?

This tool had a greater level of granularity than the GREEN Scale, which was better aligned with our needs. However, the tool did not meet some of our evaluation team's guiding principles. We found it too long to be feasible for our intended purposes, and we determined the design to be insufficient to promote accessibility and use. Finally, in keeping with our equity principle, we deemed it important to engage local communities in the tool development process to better reflect AZ-specific gardening practices and culture.

Our Participatory Approach. We referenced the Spectrum of Public Participation with the SIT, LIAs, and community experts during three steps of our development process. In Step 1, we *collaborated* with the SIT to identify School Systems activities that could most benefit from a new evaluation. In Step 2, we *consulted* with LIAs to help determine the focus of the new School Systems evaluation. Most notably, in Step 5 we *collaborated* with an expert panel of LIA staff, school garden representatives, and state agency staff to determine the most important conditions

for supporting well-integrated school gardens. Those conditions, combined with information gleaned from the key resources above, became the content of the draft DIG in Schools tool.

During the collaboration phase, we used the Delphi approach.[5] After recruiting the Arizona school garden expert panel, we asked them to complete three online questionnaires:

1. In Questionnaire 1, panelists were offered this definition:

> "Seeds for success" can be thought of as resources or activities needed to create a garden and keep it flourishing. They can include equitable access, processes, people, spaces, equipment, activities, funding, capacity, expertise, ways to involve culture and community, and anything else that comes to mind.

   Then, panelists answered two open-ended questions:

   - Please list all seeds for success that help to CREATE a school garden.
   - Please list all seeds for success that help to MAINTAIN a school garden.

   We performed a qualitative analysis of all Questionnaire 1 responses, grouping them and streamlining their language into a synthesized set of "seeds."

2. In Questionnaire 2, panelists rated the seeds on their perceived importance for a successful school garden, on a scale from 0 (not important) to 4 (essential). Seeds rated with a mean score below 2.50 were discarded or, in rare cases, edited to improve clarity.

3. In Questionnaire 3, we introduced the idea of a well-integrated school garden:[1-2]

> A "well-integrated school garden" is a maintained garden at or near a school, is primarily used as a learning environment to create meaningful experiences for students, is a valued part of the school's culture, and is sustained over time.

   Using the same importance scale used in Questionnaire 2, panelists again rated each seed on its perceived importance for a well-integrated school garden. Seeds rated with a mean score below 2.95 were discarded, and the remaining seeds provided the foundation for the DIG in Schools tool items. Most of the discarded items with ratings over 2.50 were maintained separately for potential development as a DIG in Schools implementation resource.

Tool Development. After the collaborative Step 5, we worked independently to further group and streamline wording for the highest-rated items. Many seeds were merged into a single item using a 0-2 rating scale (0 = not in place, 1 = partly in place, 2 = fully in place).

After identifying the final seeds, we examined how these items naturally grouped together. We compared these emergent groups with the domains of the GREEN framework and CalFresh School Gardens Assessment Tool.

- Where they aligned, we adopted the domain names of the evidence-based GREEN model.
- Where they misaligned, we developed the domain identifier based on the item content.

Based on our systems understanding of school garden programs and the GREEN framework, we designed the Dig In Schools tool to illustrate the interconnectedness of these domains.

Results. The School Gardens Expert Panel included 29 participants representing Local Implementing Agencies (n=20), schools (n=6), and state agencies (n=3) across 11 of Arizona's 15 counties. Counties not represented were Gila, Graham, La Paz, and Santa Cruz. However, Gila was represented for the parallel Community Gardens project.

Seeds for Success. Analysis of the first questionnaire generated 104 seeds for successful school gardens from 26 respondents. In the second questionnaire, 26 panelists rated 94 seeds as the most important for successful school gardens. In the third and final questionnaire, 25 panelists rated 68 seeds as the most important for well-integrated school gardens. We further condensed these 68 seeds into 48 final seeds by:

- Working multiple items into more inclusive items.
- Moving some items into the response options for the 0-2 rating scale.

Domains. Qualitative analysis of the 48 seeds led to four emergent groupings. These were compared with the GREEN and CalFresh domains: Two were very well aligned with the GREEN domains, one was mostly aligned, and one was partly aligned. As a result, we adopted four DIG in Schools tool sections:

1. **Resources & Support (11 items).** Our domain items aligned well with the GREEN model's Resources & Support domain. In the DIG in Schools tool, this section includes funding, organizational support, partner support, and planning resources.
2. **The Garden (19 items).** Our domain items mostly aligned with the GREEN model's Physical Garden. We determined that "physical" did not account for the more systems- or processed-based items and removed it. In the DIG in Schools tool, this section includes establishing the garden, its characteristics, maintenance processes, accessibility, and crop use.
3. **Student Experience (11 items).** Our domain items aligned well with the GREEN model's Student Experience. In the DIG in Schools tool, this section includes student engagement, student activities, lessons/curricular design, and time spent in the garden.
4. **Culture & Community (7 items).** Our domain items only partly aligned with the GREEN model's School Community. More than half of our items explicitly addressed culture, which we felt deserved to be elevated in the domain identifier. We also removed the word "school" to better highlight the importance of "community." In the DIG in Schools tool, this section includes community engagement, the integration of local culture, developing a culture of gardening, and garden-related activities and events.

Using a systems lens and GREEN model guidance, we also identified domain interconnectivity (see **Figure 2**). The resulting DIG in Schools tool is provided in draft form as the Appendix.

FY24 Pilot

Objective. Pilot the draft DIG in Schools tool with at least 10 LIA-supported schools to determine (1) its feasibility as a part of the AZ Health Zone evaluation menu and (2) a feasible protocol for administering the tool.

Design. Because SNAP-Ed evaluations are delivered in real-world settings, we should assess their feasibility in real-world contexts.[6] In FY24, we plan to evaluate the feasibility constructs[6] below for the DIG in Schools tool in a mixed methods pilot evaluation:

- Demand. To what extent do LIAs and their school partners seek a way to develop integrated gardens? To what extent does the DIG in Schools tool meet their needs, and why?
- Implementation. How do LIAs and schools use the DIG in Schools tool? Is there anything that can be improved to promote its intended use?
- Practicality. Given LIAs' and schools' limited resources, time, and commitment, what protocols and design elements are most and least feasible for completing the DIG in Schools tool?
- Acceptability. How does the DIG in Schools tool fit with LIAs' school garden programming? How do LIAs and school partners react to the tool and draft protocols?
- Integration. How can schools integrate DIG in Schools into their existing structure? How can the DIG in Schools process and tool protocols be designed to increase the ease of integration?

Recruitment & Data Collection. Starting in January 2024, we will work with LIAs to recruit 10-12 schools in at least four counties representing urban, rural, frontier/tribal, and border regions.

Inclusion Criteria	Exclusion Criteria
The school has an active partnership with an LIA.	The LIA-school partnership is <3 months old.
The school has an existing garden (any type).	The school is unavailable for an in-person visit.
At least one school representative can participate in the pilot process alongside the LIA.	The school is located within the same school district as another participating school.

After recruitment, we will visit each LIA-school dyad for data collection. Each visit will last approximately 75 minutes and include: brief introductions around the school's garden program and the pilot, our observation of the school and LIA staff as they complete the DIG in Schools tool, a mixed methods debrief (quantitative rating and open-intended interview questions) on the users' experience completing the tool, additional open-ended questions regarding the feasibility constructs above (a semi-structured interview), and our delivering a garden-themed basket of

tools and materials to schools for their time (an approximate $50 value, split funded with SNAP-Ed for allowable items).

In addition, we will present the draft DIG in Schools tool to LIAs during an FY24 Childhood Committee or other collective forum and collect qualitative feedback.

Data Analysis. We will analyze the quantitative data (tool completion & the dyad's ratings) using descriptive statistics. Data from the dyad interviews and forum will be analyzed qualitatively. The results will be used to:

- Determine the extent to which the DIG in Schools tool and protocols are useful, practical, and acceptable to schools and LIAs.
- Understand how DIG in Schools can be implemented/integrated by schools, with LIA support.
- Revise the DIG in Schools tool to increase feasibility across the constructs assessed.

2024 Timeline

Jan-Feb 2024	Recruit LIAs & schools, present draft tool to LIAs that support School Systems
Mar-May 2024	Visit LIA-school dyads, deliver school garden-themed baskets
Jun-Jul 2024	Make revisions to DIG in Schools, generate report
Aug-Sept 2024	Develop the LIA training & certification process to launch DIG in Schools in FY25

References

1. Burt KG, Koch PA, Uno C, and Contento IR. (2016) The GREEN Tool (Garden Resources, Education, and Environment Nexus) For Well-Integrated School Gardens. Laurie M. Tisch Center for Food, Education & Policy at the Program in Nutrition, Teachers College, Columbia University. Research Brief.
2. Gardner Burt K, Koch PA; Contento IR. (2017) Development of the GREEN (Garden Resources, Education, and Environment Nexus) Tool: An Evidence-Based Model for School Garden Integration. *J Acad Nutr Diet,* 117:1517-1527.
3. AZ Health Zone. FY21-25 Evaluation Framework. In the AZ Health Zone *Program Guidance and Policy Manual, Appendix D.* Available here.
4. University of California, Davis, CalFresh. School Gardens Assessment Tool. Available here.
5. Diaz JM, Warner LA, Webb ST. (2018) Outcome Framework for School Garden Program Development and Evaluation: A Delphi Approach. *Journal of Agricultural Education*, 59(2): 143-165.
6. Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., … Fernandez, M. (2009). How We Design Feasibility Studies. *American Journal of Preventive Medicine*, *36*(5), 452-457. http://doi.org/10.1016/j.amepre.2009.02.002.

Appendix

DIG in Schools

A tool for Developing Integrated Gardens in schools

School:

Your Name:

Date: / / Pre or Post

Each item in the DIG in Schools tool is considered one "seed" for integrating a garden more fully into your school community. Some seeds will be low-cost and easy to plant, while others may take more time and resources. Not all seeds are appropriate for every school, but in general the more you plant, the more integrated and long-lasting your garden should be!

INSTRUCTIONS

1. Look over this tool. Will you need to review materials, ask school representatives, and/or observe the garden?
2. Use the DIG IN SCHOOLS TOOL GUIDE to help you rate each "seed" as Not in Place (0), Partly in Place (1), or Fully in Place (2). Some items can be marked N/A.
3. Tally the section and total scores. How integrated is your current school garden program?
4. Discuss the results with your school community. What are the strengths of your garden program? What seeds would you like to sow in your DIG in Schools action plan?

RESOURCES & SUPPORT

Rating* 0, 1, or 2

The school administration (ex., Principal, Superintendent) actively promotes the school garden program.....

The school has sufficient funding to support all planned garden program activities.....

The school administration (ex., Principal, Superintendent) provides staff with dedicated time for planning, implementing, and evaluating a school garden program.....

The school has at least one garden champion or designated leader.....

The school regularly identifies new garden champions to ensure program continuity and vitality.....

The school is connected to local organizations or individuals that provide ongoing garden support (ex., AZ Health Zone, AmeriCorps, Master Gardeners).....

An active school garden committee includes representation from school staff, administration, students, families, and/or community partners.....

The school has a garden program guide that includes the following:.....

- ☐ Program vision & goals
- ☐ Intended use(s) for the garden
- ☐ Plan for obtaining funding & supplies
- ☐ Description of growing method(s)
- ☐ Seasonal growing plan
- ☐ Garden maintenance plan
- ☐ Plan for integrating the garden into the student experience
- ☐ Plan for integrating the garden into the broader school community.

HOW TO SCORE THIS ITEM

0 - No guide, or guide has 1-2 components

1 - Garden program guide has 3-6 components

2 - Guide program guide has 7-8 components

Teachers and other school staff receive gardening education and training.....

The school administration (ex., Principal) provides teachers with dedicated time for garden lessons.....

The school provides teachers with garden-related materials, curricula, and supplies.....

Resources & Support Subtotal - (add up all 1s and 2s) ____ of 22

*0 - Not in Place, 1 - Partly in Place, 2 - Fully in Place.

THE GARDEN

Rating*
0, 1, or 2

The school has a design plan (i.e., formal or informal sketch, blueprint, technical drawing, or other layout) for the garden space that includes:

- ☐ The type of garden (ex., raised bed, hydroponic)
- ☐ Lighting and shade
- ☐ Water delivery and drainage
- ☐ Supply storage
- ☐ Fencing or other protective barriers
- ☐ Traffic flow
- ☐ Capacity
- ☐ Accessibility for those with disabilities

HOW TO SCORE THIS ITEM

0 – No design, or the design has 1–2 components

1 – The design addresses 3–6 components

2 – The design addresses 7–8 components

The watering system addresses water scarcity in arid climates (ex., by using rainwater harvesting or hydroponics). ☐ Not Applicable

The school has all of the supplies needed to build and maintain the garden (ex., lumber, soil, shade cloth, shovels, hoses)

Everyone responsible for the garden has full access to it (ex., has gate or shed keys)

The school has a suitable garden space for all intended use(s), like growing and teaching

The garden area has sufficient lighting and shade for the intended use(s)

The watering system is suitable for the garden's intended use(s) and school's maintenance capacity

The garden has sufficient drainage. ☐ Not Applicable

The watering system is checked regularly by a designated person or group

The soil (or water, if hydroponic) receives nutrients/soil amendments, as needed

The garden has sufficient storage for tools, seeds, and other supplies

The garden has sufficient pest control for insects, rodents, and other pests

When active, the garden is regularly tended (ex., watered, pruned, checked for pests) by a designated person or group

The garden is accessible to adults and students with physical mobility impairments

The garden space has been assessed for safety, including child-safe pest control and tools, no vagrancy, and low risk of falling/slipping

The garden space is inviting and comfortable (ex., painted signs, shaded benches, work tables)

The garden is monitored and modified, as needed, in response to planned and unplanned environmental changes (ex., weather, new pests, novel uses)

Crops are grown in accordance with food safety guidelines for any foods tasted or consumed. ☐ Not Applicable

Crops are harvested for specific uses (ex., tasting, selling, making art, consumption)

The Garden Subtotal
(add up all 1s and 2s)

*0 – Not in Place, 1 – Partly in Place, 2 – Fully in Place.

STUDENT EXPERIENCE

Rating*
0, 1, or 2

The school engages students in garden planning and visioning.....

Students help to create and maintain the physical garden (ex., collect supplies, build, paint).....

The school has enough supplies for all students using the garden at one time to engage in gardening activities.....

Developmentally appropriate gardening activities accommodate students' unique learning needs, including those with individualized education programs (IEPs).....

Gardening activities engage students in planting, growing, and harvesting (i.e., the life cycle of crops).....

Gardening activities with students are integrated into students' regular routines (ex., lessons, "chores", or down time).....

Gardening activities with students include learning about nutrition.....

Gardening activities with students promote social emotional learning and behavioral health.....

Gardening activities with students purposefully encourage them to be physically active.....

Students spend time in the garden outside of structured lessons.....

Gardening activities with students are designed for continuity as students move through grade levels (ex., students plant seeds in spring, move up a grade, and then harvest the same plants in fall).....

Student Experience Subtotal –
(add up all 1s and 2s)
of 22

CULTURE & COMMUNITY

Rating*
0, 1, or 2

Diverse groups within the school community are engaged in garden program visioning and planning, including:.....

- ☐ Teachers
- ☐ Maintenance/facilities staff
- ☐ Administrators
- ☐ School specialists (ex, nurse, nutritionist)
- ☐ Other staff (ex., front desk)
- ☐ Families
- ☐ Community volunteers (ex., a local gardener)

HOW TO SCORE THIS ITEM
0 - Two or fewer groups are engaged
1 - Three or four groups are engaged
2 - Five or more groups are engaged

Maintenance/facilities staff help with the garden infrastructure.....

Local culture–including traditions, knowledge, practices, and/or preference–is integrated into garden planning (ex., garden design, crop selection).....

Local culture is integrated into school garden maintenance (ex., pest control, watering systems, pruning).....

Local culture is integrated into school garden program activities (ex., lessons, harvesting, garden food tasting).....

Garden activities/events for the broader community beyond students occur regularly throughout the year.....

Gardening a part of the school's identity/organizational culture.....

Culture & Community Subtotal –
(add up all 1s and 2s)
of 14

*0 - Not in Place, 1 - Partly in Place, 2 - Fully in Place.

TOTAL SEEDS

RESOURCES & SUPPORT		of 22
THE GARDEN		of 38
STUDENT EXPERIENCE		of 22
CULTURE & COMMUNITY		of 14
Add up all section scores for your DIG in Schools Total!	TOTAL	of 96

How integrated is your school garden?

Total Seeds	Level of Integration
0-31	**SPROUTING** Your garden is getting started! Use these results to progress.
32-63	**GROWING** Your garden is moderately integrated already! How can you build on these strengths?
64-96	**THRIVING** Your garden is well-integrated! Use these results to celebrate and keep flourishing!

WHAT IS A WELL-INTEGRATED SCHOOL GARDEN?

A well-integrated school garden (Burt et al., 2017): "is a maintained garden at or near a school, is primarily used as a learning environment to create meaningful experiences for students, is a valued part of the school's culture, and is sustained over time."

HOW DO THE DIG IN SCHOOLS TOOL SECTIONS WORK TOGETHER FOR AN INTEGRATED GARDEN?