**Preschool Gardening Inside and Out**

**Preschool**

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**This Unit is composed of Four Modules**

* Module 1-Introducing the School Gardens
* Module 2-How do we start a Garden?
* Module 3-Caring for and Observing our Garden Plants
* Module 4-Harvesting and Enjoying our Vegetables

**About these GPBL Units (read before using)**

*Origin of These Units*. These Garden Project-Based Learning (GPBL) units originate from instruction that North Elementary School (Morgantown, WV) teachers began providing to students in the Spring of 2011. We launched our school gardening efforts through a “Lowe’s Toolbox for Education” grant and in partnership with the College of Education and Human Services at West Virginia University, Monongalia County Extension Office, Monongalia Technical Education Center, and parents of our students.

*When and Where it Happens.* In all of these units, GPBL takes place inside (the indoor classroom) and outside (the school garden area “outdoor” classroom). Indoors, students learn through the use of grow lights, heat mats, seed germination and growing containers (e.g., EarthBox®), and vermicomposting bins. Instruction is extended to the outdoors through the use of raised garden beds, in which students directly sow seeds and transplant classroom seedlings (see <http://www.thevegetablegarden.info/planting-schedules> for USDA growing zones). Students also use low tunnels over the raised beds in order to extend the growing season and protect crops from pests. With permission, garden produce may also be served as part of the school lunch. Cafeteria fruit and vegetable clippings/refuse that is not served to the students can be composted and used to amend the garden soil. Learning can continue throughout summer vacation, where students assist their parents who volunteer to take care of the raised beds (watering, mulching, weeding, trellising, etc.). Produce can be vended at a local farmer’s market.

*What’s Essential*. First and foremost: You need strong support from the principal, custodial and cafeteria staff, and parents as well as expert assistance from the local extension office, including volunteer master gardeners. Here are a few more essentials:

* Integrate GPBL with core curriculum/standards; do not make it an “add-on.” School gardening is an excellent context for application of the Next Generation Science Standards “Science and Engineering” practices and Common Core Mathematics Practices
* Maintain a small library of gardening text and Internet resources.
* Share knowledge and collaborate on projects.
* Install a *fence around* and a *supply shed close to* the outdoor garden; have a close-by water supply, > 6 hours sunlight, and high quality soil (consult County Extension).

* Take safety precautionssuch as:
	+ know what students are allergic to (including bees) and avoid contact; a bee sting to a person with severe allergy (anaphylaxis) requires immediate medication (usually injection of epinephrine) and medical attention (emergency room);
	+ wash hands after any gardening activity and keep a first aid kit handy;
	+ always install tube covers over fluorescent grow lights;
	+ keep water away from electrical outlets/avoid shock hazards;
	+ don’t use “chemical” pesticides;
	+ use plastic versus glass containers and wear goggles when eye damage may occur
	+ supervise students and provide instructions on the use of garden tools (young learners should not use “adult-size” shovels and hoes).

Supplies Commonly Used In Units. (Identification of any product does NOT constitute endorsement).

* Seeds (not treated) or Bare Roots (for strawberries and certain flowers)
* Pots or Sheets of Cells (in which to germinate seeds) and Trays (in which to hold pots)
* Seed Germination Heat Mat
* Craft Sticks for Marking Type/Locations of seeds/transplants
* Grow Lights (e.g., Hydrofarm® T5 Growlight System or cart with lights and place for seed trays)
* Tube Covers/Protectors (you MUST install tube covers over any fluorescent lights)
* Timers (to automatically turn on and off grow lights)
* Containers/kits for Indoor Gardening (e.g., EarthBox®)
* Low Tunnel (you generally need to make these yourself using greenhouse film and bendable hoops, such as PVC pipe or wire that is secured into the ground or in a wooden frame)
* Potting Soil (WonderSoil® or other suitable products also can be used). Note: Soil for planting should be moist enough to form a clump but not gush water when squeezed).
* Measurement Tools (e.g., rulers, moisture/temperature gauges, scale, graduated cylinder/beakers
* Mulch (e.g., partially composted leaves, organic straw, NOT grass from “treated” lawns)
* Wood/frames (NOT treated) and suitable topsoil (check with County Extension) for raised beds
* Horticultural fleece (garden fleece, Agribon®, Reemay®) for insect barrier and frost protection
* Garden Tools (e.g., trowel, shovel, hoe, rake…a mattock for landscaping to install raised beds)
* Compost to Amend Soil (check with County Extension)

*How These GPBL Units are Structured.* The graphic on the next page illustrates the components of a GPBL unit as well as how these components are interrelated. For units that require the care of garden plants in summer: Students must prepare a caretakers’ guide. They also write a persuasive letter to parents inviting them to a presentation about the garden and to be caretakers (along with their children) during the summer. Development of the guide, letter, and presentation are excellent ways to integrate English/language arts and art as well as apply the science that they have learned throughout their GPBL.

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**Project Summary**

Preschoolers will be introduced to gardening and will explore and learn about what is needed to grow vegetables/fruits. Focusing on developing skills in observation, prediction and investigation, the project additionally incorporates standards from all domains.

**Project Driving Question(s)**

Do Vegetables/Fruits grow better inside or out?

**Major Products & Performances in Unit**

Year-long garden

Artistic representations of the garden, journaling, graphing

Panels/displays, final presentation and caretakers guide

**Resources Needed for Unit**

Gardening areas-indoor and out

Indoor –Earth Box, grow lights

Soil

Seeds

Garden tools

Writing materials-paper, colored pencils, clipboards

PreSchool story books/relevant literature -Growing Vegetable Soup, The Carrot Seed, Planting a Rainbow, Are You Living? A Song about Living and Non-Living Things by Laura Purdie Salas, Viviana Garofoli (Illustrator)

You tube videos/Online resources-(see reference section as well)

* Living & Nonliving Things 2013 by Amanda Ellis <https://www.youtube.com/watch?v=Z_aAkuK_8nQ>
* Sid the Science Kid <http://www.pbslearningmedia.org/resource/f6341f76-e155-4320-897f-2efe9a04481c/f6341f76-e155-4320-897f-2efe9a04481c/>

PreSchool science manipulatives and materials-natural collections, magnifying glasses, etc.

Measurement devices-rulers, thermometers

Classroom discussion journal

Camera

**References Used in Developing Unit**

Amanda Ellis Living & Nonliving Things <http://www.youtube.com/watch?v=Z_aAkuK_8nQ>

Teach Preschool-Identifying Living and Non-Living Things on the Magnetic Board <http://www.teachpreschool.org/2012/09/identifying-living-and-non-living-things-on-the-magnetic-board/>

Kiddie Gardens-Growing Vegetables with Kids <http://www.kiddiegardens.com/growing_vegetables.html>

USDA-Grow It! Try It! Like It! <http://www.fns.usda.gov/tn/grow-it-try-it-it>

Utah State University Cooperative Extension <http://extension.usu.edu/yardandgarden/htm/vegetables-herbs>

Sid the Science Kid <http://www.pbslearningmedia.org/resource/f6341f76-e155-4320-897f-2efe9a04481c/f6341f76-e155-4320-897f-2efe9a04481c/>