<u>Spring…</u>
<u>Into the Garden!</u>

<u>A Garden-Based Curriculum</u>
Developed by the Southern Boone Learning Garden

ABOUT

The spring of 2013 brought new opportunities for the Southern Boone Learning Garden (SBLG). More full-time garden activity coordinators meant more lessons in the garden—along with adequate time to compile lessons and activities to serve as a useful resource for teachers and/or similar programs nationwide. Included are *stand-alone* (see our themed units for ideas on how to use the garden more frequently) lessons implemented during the spring targeting students in grades K-5th. With an emphasis on teaching science, topics vary ranging from testing different soil types to investigating the different parts of plant. It's important to note that no lessons are season specific, and the grade levels are simply suggestions.

HOW TO USE THIS UNIT

- The standards-based lessons are laid out in a template form with specific objectives and standards
- The last section, *Extension, Digging Deeper,* offers modifications for different grade levels and/or additional activities
- Use one, two, or all lessons when it fits into your instructional time—each was taught separately, so there is no 'correct' order.
- This is an example of what SBLG has done during the most recent spring. Alter and add what works best for your needs. We are constantly changing our units, so we encourage you to do the same!

Experimenting with Different Soil Types

Time & Description	45min.-1 hour Students will feel and describe the different soil types. Afterwards, they will predict and observe which soil type is the best for plants through an experiment.
Objective	To describe the properties of soil: odor, color, texture, and ability to hold water by observing each soil types water absorption rate.
Grade Level	K-2nd
Teaching Standards	**Next Generation Science** • **2-LS4-1:** Make observations to collect data, which can be used to make comparisons. • **K-2-ETS1-1**: Ask questions based on observations to find more information about the natural and/or designed world(s).
Materials	❖ Samples of sand, silt, clay, and loam and containers for each ❖ Coffee filters (4), rubber bands (4) ❖ Whiteboard/chart paper, permanent marker ❖ Water ❖ Empty two liter soda bottles (4)
Preparation	○ Construct apparatus with soda bottles: • Discard cap, cut each bottle in half—bottom half a bit bigger • Label bottles: sand, silt, clay, and loam • Place coffee filter over the drink opening and tie rubber band around the neck to secure • Turn top part upside down and set on/in other half of bottle—drink opening faces down • Put designated soil type in the top part (directly on coffee filter) of each bottle ○ Obtain the three soil types, place in containers, and set out materials
Procedure	1. Discuss: what is soil? What is it made of? What lives in it? What grows in it? Why is it important? How does it help plants or seeds grow? 2. Split class into four groups: sand, silt, clay, and loam—each group starts at their designated soil station 3. At each station, the group will use their five senses to describe the soil type 4. Rotate the groups to the next soil type until they reach where they started 5. Facilitate, questioning about water absorption and whether plants would be able to grow successfully in the specific soil type 6. Regroup: briefly list characteristics discussed for each soil type on whiteboard/chart paper 7. Begin experiment to observe water absorption where everyone can see • Ask students to predict which soil type will hold the most water? The least? • Choose a student to pour about a cup of water into top part of first bottle • Class counts aloud as soon as water hits the soil • Stop counting when water comes out through coffee filter into the bottom part of the bottle • Record seconds on board • Repeat and record for each 8. Conclude: why is it bad for a soil to hold too much water? Why is it bad for a soil to hold too little water? Loam, the mixture of all three soils and compost, absorbs the right amount of water, which will help seeds, or plants grow successfully
Extension, Digging Deeper!	❖ Conduct another experiment! Plant the same type of seed in each soil type. Keep everything else the same (placement and amount of water). Observe plant growth in a science journal for 3-4 weeks. Discuss which grew best and why this happened?

Adapt Me: I Want to Grow!

Time & Description	45 min.-1 hour Students will use man-made materials to alter a seed for dispersal—floating, flying, or attaching.
Objective	To understand why and how seeds are dispersed.
Grade Level	3rd-5th
Teaching Standards	**Next Generation Science** • **2-LS2-2**: Plants depend on animals for pollination or to move their seeds around. • **3-LS1-1**: Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. • **3-LS1-1, 4-PS4-2, 5-PS3-1**: Develop a model to describe phenomena. • **3-5-ETS1-2**: At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
Materials	❖ Seeds: bean, pumpkin, or pea ❖ Whiteboard/chart paper ❖ Construction paper ❖ Tape ❖ Glue/paste ❖ Collection of materials: rubber bands, toothpicks, balloons, scissors, pencils, plastic bags, cork, cotton, feathers, tacks, metal springs, wire, etc.
Preparation	○ Gather materials and set out
Procedure	1. Discuss: where do seeds come from? How does a seed get to a new place? 2. Student volunteers write different ways a seed can travel 3. Divide the class into partnerships 4. Explain that each partner will be a team of inventors who are trying to make a seed fly, float, or attach using materials laid out on a table 5. Give each pair the choice to adapt their seed to either: fly, float, or attach 6. Ask each pair what they decided and hand them a seed 7. Facilitate discussion and question as they create their adaption 8. When the inventions are completed, have each partnership share 9. Wrap up discussion: why do seeds have dispersal techniques? What would happen if a seed (tree) fell straight to the ground and grew right under it?
Extension, Digging Deeper!	<u>Bell Pepper Seed Count:</u> ❖ Cut open a pepper and count the number of seeds inside ❖ How many pepper plants could grow from the seeds? ❖ If one pepper produces 30 peppers, how many plants could be grown from all the seeds of those 30 peppers? ❖ Why don't peppers cover the earth?

**Inspired and altered from Life Lab's <u>The Growing Classroom</u> by Roberta Jaffee and Gary Appel*

What is a Plant?

Time & Description	45min.-1 hour This indoor lesson guides students to think deeper about what a plant is. It's a simple lesson focusing on the students' own questions and thinking. Once they distinguish what a plant is or is not they will have the opportunity to plant seeds.
Objective	Students will be able to define what a plant is and explain what a seed needs to grow successfully.
Grade Level	K-2nd
Teaching Standards	**Next Generation Science** • **K-LS-1**: Use observations to describe patterns of what plants and animals (including humans) need to survive. • **MS-LS1-4**: Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. • **4-LS1-1**: Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, & reproduction.
Materials	❖ Tarp ❖ Planting trays filled with potting soil ❖ Popsicle sticks ❖ Whiteboard/chart paper ❖ Permanent markers ❖ Various objects (man-made, living plant, non-living) o Examples: seeds, sticks, apples, rocks, pens, paper clips, soil, insects
Preparation	○ Place objects at different tables ○ Prepare T-chart labeled "Plant & Non-Plant" ○ Lay out tarp and place prepared planting trays on top
Procedure	1. Seat groups of students at tables 2. Each group will discuss whether objects at their table are a plant or not 3. Rotate students to the next table, continuing discussions and rotations until each group has visited every table 4. Regroup: discuss all objects and mark findings on T-chart 5. Ask: what is a plant? What does a plant need? How is a plant created? How do other objects get created? What is the difference? 6. Demonstrate how to plant in cells and how to label by writing their name, date, and seed type on a popsicle stick 7. Call tables to find a 4-cell pack to plant in 8. Plant! Pass out markers and popsicle sticks to those who finish 9. Wrap up: What will these plants need to grow? (water, sun, air, nutrients)
Extension, Digging Deeper!	❖ Conduct a controlled experiment: obtain two of the same plant. Place one plant in sunlight, water it, etc. Place the other under a paper bag and neglect it. Record observations in their science journals. ❖ When weather permits, transplant or plant new seeds outside learning about plant parts!

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The Parts and Needs of a Plant

Time & Description	45 min.-1 hour This lesson teaches students about the basic structure, function, and needs of a plant in an easy and fun way.
Objective	Students will be able to identify different parts of a plant (seed, root, stem, leaf, flower), describe the basic function of each part, analyze the purpose of different leaf formations, and explain what a plant needs to grow successfully.
Grade Level	K-2nd
Teaching Standards	**Next Generation Science** • **K-ESS3-1**: Use a model to represent relationships in the natural world. • **1-LS1-1**: Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. • **K-2-ETS1-1**: Asking questions, making observations, and gathering information are helpful in thinking about problems.
Materials	❖ <u>Parts of a Plant</u> by Wiley Blevins ❖ Whiteboard/chart paper ❖ Markers ❖ Plants/seeds for each student and for demonstration ❖ Hand tools ❖ Magnifying lenses
Preparation	o Check out book o Write leaf characteristics on whiteboard (big, smell good, smell bad, spiny, waxy, thick, trap insects, edible) o Draw plant part diagram o Obtain plants/seeds o Set out materials
Procedure	1. Read aloud <u>Parts of a Plant</u> 2. Discuss parts of a plant they learned 3. Split into two groups, which will switch 4. Planting: explain/model directions • Hold up plant/seed, predict what it is • Select student to point to the roots • Loosen the roots and discuss why • Assign/direct students where to begin digging • Plant, cover, and water! 5. Leaf scavenger hunt: • Walk around the garden looking for different types of leaves listed on white board/chart paper • Keep track/collect/taste leaves seen while questioning why they think they are shaped that way 6. Regroup once both groups have switched 7. Share scavenger hunt findings 8. Choose students to label parts of a plant on a blank diagram of one
Extension, Digging Deeper!	❖ Cut open and observe the parts up close with magnifying lenses. Discuss the important role that part plays. ❖ Discover how water travels from the roots to the leaves. Add water and food coloring into a container. Place a celery stalk with the bottom cut off into each filled container. Label and set containers in a visible location. Each day observe and record the height of the colored water in the stalk. When the color reaches the leaves, cut the stem and examine it. o *Inspired and altered from Life Lab's <u>The Growing Classroom</u> by Roberta Jaffee and Gary Appel*