HOW DOES YOUR GARDEN GROW?

PROGRAM FACILITATOR’S GUIDE

Summer Learning Challenge 2015
Garden Program Facilitator’s Guide

Eastern Counties Regional Library has created this *How Does Your Garden Grow* guide for programming at ECRL libraries. This program will be the Gardening Badge for the ECRL 2015 Summer Learning Challenge.

**Growing kit**

Each kit includes:

- Growing set suitable for 8-12 children
- SLC Facilitator’s Guide
- [Craft/growing Supplies]
- Participant Release Forms
- Participant Registration Forms
- Program Checklist
- Story time and “Further” Reading Books.

**Workshop goal**

Children will learn about the basic things that every living organism needs to survive. Children will work with, and examine, plants and a garden ecosystem to learn how the basic needs of different organisms (plants, earthworms, insects, amphibians, etc.) found in the garden are met. They will learn how they can assist in meeting these needs.

**Key learning points**

Every living thing needs sunlight, water, air, food and shelter or habitat.

A seed contains everything it needs to form a new plant once conditions are right.

We all depend on plants to meet our needs as living organisms.

When we garden, we can assist in creating conditions that help plants flourish and grow.
Background information

Every living organism on earth needs a few basic things to survive (highlighted words are key concepts that need to be understood):

- **Sunlight**: This is probably the most important need for all living organisms because it is the source of all energy. It also provides heat for plants and animals.
- **Water**: Water is the medium in which living cells and tissue work. Water is also a living environment for many plants and animals.
- **Air**: Air is made up of several gases, but the two most important gases are Oxygen and Carbon Dioxide. Without oxygen, animals will die, and without carbon dioxide, plants cannot survive.
- **Food (nutrients)**: Living things need energy to function. Energy is needed to grow, reproduce, move, and to work. **What would happen if you went for three days without food?**
- **A Habitat with the Right Temperature**: Too cold or too hot? Every living organism needs the ideal temperature to survive either on land or in water.

Plants and gardens provide an excellent opportunity for children to learn, in a concrete way, these fundamental concepts.
**Garden Program Facilitator’s Guide**

**What do participants get out of the workshop?**

- Basic understanding of how a garden grows
- A story
- Activities and take-home project
- Dirty hands!
- Positive experience.

**Prepare for the program**

- Review the Program Guide
- Read the Facilitator’s Guide
- Familiarize yourself with the concepts, story and activities
- Read the story time book(s) and prepare relevant questions
- Do the activities in advance of the program
- Obtain the necessary materials for the program activities
- Ensure there are Gardening badges to hand out.

**Just prior to the program**

- Make sure everyone is registered
- If not already signed, have parents/guardians sign release forms, explaining purpose. If anyone does not want to sign, that’s okay; just make sure those children aren’t included in any photographs taken.
Activities

**Story:** 10-15 minutes

Begin with a garden-related children’s story from the reading suggestions list. Before reading the story, ask children: *What do living things need to survive?* Task them to watch for needs of the living things mentioned in the story. After reading the story, check in again.

**Questions:** *Did we name all the things that living things need to survive? Are there any mentioned in the book that we missed?*

**Examine a Seed:** 15 minutes

**Materials:**
- Presoaked bean seed for each child
- Magnifying glass
- Diagram – parts of a seed (attached)

**Instructions:**

Give each child a bean seed. Using their fingernails, each child will carefully remove the seed coat and gently split the seed into the two halves. Using the magnifying glass, examine the inside of the seed closely.

**Question:** *What do you see?*

Have children identify the parts of the plant they see.

**Answer:** The root, shoot and leaves.

**Question:** *What do you think the half (cotyledon) around the baby plant (embryo) is for?*

**Answer:** Food source to get started.

**Question:** *What do you think this baby plant embryo needs to become a seedling and then a plant?*

**Answer:** Moisture, warmth, eventually sunlight and soil nutrients. Seeds want to grow. Our job is to give them the right conditions. Not too hot, not too cold, not too wet, not too dry – JUST right!
What’s in a Seed?

Soak a bean seed in water for several hours until you can peel the skin off. Split it apart and see what’s inside.

Baby bean plant
The part of the seed that looks like a grain of rice is the root. The tiny feathery parts on the top are the first “true leaves”. Everything else — more roots, the rest of the leaves, the stem, flowers, pods and seeds — grow from this.

Skin or seed coat
Protects the seed from damage and disease, and prevents rapid changes in moisture.

Cotyledons
Store starch to feed the baby plant until the seed germinates. They are also the “seed leaves” of the bean sprout.

How Seeds Grow
When a seed sprouts, the root grows first. It tunnels downward, no matter which way it is planted, and anchors itself by growing side roots. Then, powered by the food stored in the cotyledons, the growing stem pushes the whole seed up and out of the ground. When the sprout emerges into the sunlight, the cotyledons turn green, and make new food through photosynthesis. They then shrivel and fall off, the “true leaves” expand, and the plant really starts to grow.

<table>
<thead>
<tr>
<th>To germinate seeds</th>
<th>To store seeds</th>
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<tbody>
<tr>
<td>Moisture triggers seeds to grow</td>
<td>Dry air puts seeds to sleep</td>
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<tr>
<td>Warmth triggers seeds to grow</td>
<td>Cold makes seeds consume food slowly</td>
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<tr>
<td>Light is needed by some seeds to germinate</td>
<td>Darkness helps keep seeds dormant</td>
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Family Relations
Why does a bean look so much like a peanut?
Beans and peanuts are both in the legume family. Other legumes like peas, chick peas and lentils also look very similar inside.

There are hundreds of plant families and their seeds are all shaped differently, but all seeds contain the same parts. We use beans for this example because they’re easy to see and easy to handle.

Why don’t old seeds grow?
There’s a living plant inside every seed and it needs food. The longer the seed ripens on the vine, the more food it stores. When the food runs out, it dies.

Old seeds sometimes take longer to germinate because their low food reserves make them go dormant (like hibernating) more deeply.

Make your seeds last longer
To keep a seed alive in storage for a long time, you have to slow down the baby plant’s metabolism so it consumes food slower.

Seeds go dormant when they’re dry and cold. This is easy to remember because it’s the opposite of what they need to germinate.

Seed savers – start strong
Harvest your seeds from healthy plants, and leave the seed or fruit on the plant as long as possible.

Seeds harvested before their prime will often grow if you plant them right away, but those that have had time to store lots of food are the healthiest and longest-lasting.

**PLANTING:** 10-20 minutes

**Materials:**
- Transplants – Tomato, pepper, basil, onions
- Seeds – green onion, spinach or mixed lettuce
- Containers (for inside gardens) or garden plots (outside)
- Soil
- Garden trowel

**Instructions:**
If Branch has inside gardens, several children will need to work together to plant the large containers. (1 tomato plant or 1 pepper plant or 3-5 small leaf basil plants or 3 oregano plants or 3-4 onion blocks or small pinch of lettuce/spinach seed sprinkled on the surface per container). Using a garden trowel, fill the container half full with soil. Then, put the transplant on the soil, and holding the transplant gently with one hand, use either the trowel or other hand to sprinkle soil around the transplant until only the tip of the plant is showing. The soil is then gently pressed in around the plant. Water gently but thoroughly.

If Branch has garden plots, tomato and pepper plants should be spaced approximately 18-24 inches apart; basil, oregano and onion transplants can be interspersed and interplanted throughout the beds in spaces between. Show children where they can place a transplant, and use the same instructions as above to put the plant in the garden.

Draw parallels from discussion and story about the plants’ needs:
- **Food** - Soil and sunlight provide food. The soil contains nutrients the plants use along with the sunlight on their leaves to make their own food.
- **Water** – making sure the soil is moist – not too wet (drown), not too dry (wilt). It is a good idea to water the soil, not the plant to prevent fungal diseases and sunscald.
- **Air** – The plant gets air from all around it and from the spaces throughout the soil. It is important to give each plant enough room to grow, without enough air and air circulation around each plant diseases can attack.
- **Habitat/shelter** – container or garden bed, soil as anchor for roots. In addition to providing food, the soil acts as an anchor/home for roots as well.
Note:
Locations with outdoor gardens will have, by necessity of the growing season, planted much of their garden plots previous to this SLC workshop. This workshop provides another opportunity to deepen the children's knowledge and understanding of the natural processes at work all around us and in gardens and container gardens in particular. Transplants of warm weather crops such as tomatoes, peppers and basil benefit from the [hopefully] settled and warmer weather of early summer.
Crafts  Several options are included. Choose one or more.

TOAD HOME: 15 minutes

Materials:
- 2L milk carton, cut in half
- Paper lunch bag
- Permanent markers
- Crayons
- Scissors
- Masking tape

Script: Toads are great friends of the gardener. They can eat up to 1000 bugs a day! They help control slugs and other insects that nibble on your plants. Toads like cool, moist places to hide. A cracked clay pot turned upside down and propped up slightly makes an excellent home/shelter for a toad. Today you’re going to make your own toad house using a milk carton and paper lunch bag.

Instructions:

Give each child a milk carton and a paper lunch bag. The milk carton will become the planting container; the lunch bag will become the roof of the toad house. Cut the carton in half, saving the bottom half. Mark the height of your carton on the paper bag.

Using permanent markers and crayons decorate the bottom part of the lunch bag to make it look like a house. Add roof shingles, windows, curtains, door, shrubs, flowers, window boxes, mailbox – you name it!
Place the carton inside the paper bag and fold the extra length to the inside.

Cut out a “door” about 5cm X 5cm on one side.
Tape the edges of this door with masking tape.

Place your toad house in a shady spot in your yard.
**RAIN GAUGE:** 15 minutes

**Materials:**
- Sharp knife
- Clean, clear pop bottle
- Ruler
- Permanent markers
- Masking tape
- Tape or staples

**Script:** How much water does your garden need? About an inch (2.5cm) of rain per week is about right for most plants. A rain gauge can help you decide if you need to give your plants more water. Today, we will make a rain gauge from a pop bottle.

**Instructions:**

1. Cut a clean and empty soda bottle in half.
2. Run a line of masking tape or other tape you can write on along the height of the bottle's base.
3. Using a marker, mark each inch or milliliter along the tape (start with zero at the bottom).
4. Turn the top part of the bottle upside down and into the soda bottle. Attach with tape or staples if needed.
5. Place the rain gauge outside to catch the rain. Take daily measurements when it's raining.
GARDEN MARKERS: 15-30 minutes

Materials:
- Beach stones or stakes (paint stir sticks work well)
- Acrylic paint or permanent markers
- Paint brushes
- Urethane

Script: *Use your imagination and creativity to create beautiful markers to show everyone what is growing in your garden.*

Instructions:
Make sure stones or stakes are clean and dry. After children have finished drawing or painting, apply a coat of clear urethane to the marker. Be sure to do this in a well-ventilated area.
Snack Time: 10 minutes

Optional, but so much fun!

Script: Every garden needs Earthworms! They wriggle through the soil which helps air get in; they eat organic matter and enrich the soil with their castings – a fancy word for poop!

Worms in Dirt!

Materials:

- Chocolate pudding
- Granola or Oreo cookie crumbs
- Gummy worms
- Small paper cups
- Spoons

Instructions:
Place pudding in cup. Sprinkle with granola or cookie crumbs. Add a gummy worm or two or three. Enjoy!

Wrap up: 10 minutes

- Clean up, if not already done
- Encourage children to report back on progress of their seed...maybe they can take a photo of it to send to the Library!
- Hand out gardening badge
- Encourage children to check out books.
Resources

**A Seed Was Planted.** Palazeti, Toulla, Raven Tree Press, 2009.
A wonderful cycle of giving begins when a seed is planted. Pieces and sprouts of walnut tree are passed along from one person to that person's friend and on that friend's neighbor and on and on and on. The circle of giving creates a new crop of trees (supporting the idea of reforestation) and instills traditional values of sharing and caring.

**The Best-Ever Step-By-Step Kid's First Gardening: Fantastic Gardening Ideas For 5-12 Year Olds, From Growing Fruit And Vegetables And Fun With Flowers To Wildlife Gardening And Craft Projects.** Hendy, Jenny; Southwater, 2014.
This award-winning book includes 120 lively projects, with easy-to-follow step-by-step pictures, to help children learn all about how plants grow.

Explores the intricate relationship between seeds and the plants which they produce.

**Garden to Table: A Kid's Guide to Planting, Growing, and Preparing Food.** Hengel, Katherine; Scarletta Junior Readers, 2014.
Fill your plate with fresh, self-sustained produce that comes straight from your garden. Step-by-step planting, care and harvesting tips give the beginning gardener a good basic understanding of the growing process. Over 30 delicious recipes made with basil, carrots, green beans, leaf lettuce, potatoes, and tomatoes, complete with step-by-step photos, bring your homegrown foods to the table to share with others. Incorporating unique flavors and easy-to-grow veggies, these simple recipes will have you asking for seconds!

This title features fun things for children to create throughout the year whether they live in a city flat or out on a farm. It includes sections on basic gardening skills, creative techniques and craft activities.
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A refreshing source of ideas to help your children learn to grow their own patch of earth, *Gardening Lab for Kids* encourages children to get outside and enjoy nature. This fun and creative book features 52 plant-related activities set into weekly lessons, beginning with learning to read maps to find your heat zone, moving through seeds, soil, composting, and then creating garden art and appreciating your natural surroundings.


Budding gardeners will learn what it takes to make things grow with fun activities that require only readily available materials.


Uses observations of bean seeds planted in eggshells to demonstration the growth of seeds into plants.


A collection of gardening activities, scientific experiments, art projects, cooking ideas, and magic tricks helps youngsters learn about the structure and life cycles of plants, as well as offering advice on how to grow their own gardens.


Something magical happens when you plant a dream with a seed. With plenty of love and patience, they can blossom into an extraordinary gift. To be shared with those you love and those with big dreams, this book encourages us to never give up.


This Jumbo Book is a complete organic guide for every budding gardener.

*Kids’ Container Gardening* will teach enthusiastic young gardeners how to create an assortment of container gardens that are simple to make, that are fun to work on, and that make great gifts. Organized by season, the books’ chapters will help kids develop their green thumbs with projects ranging from “Great Big Garden Bowls for Mom,” “Father’s Day Fountains,” and other special occasion/holiday containers to sand art terrariums. In addition to providing the basics on plants and gardening, this helpful guide also includes a glossary of terms, a listing of plants used in the book, a list of resources, and numerous photographs to show kids that they’re proceeding on the right path as they create their individual containers.


From early spring tilling and seeding through summer bounty to late fall harvest and cleanup, the author shadows ten young people as they grow some of their own foods. Each young person’s focus is somewhat different. This book will delight experienced growers and encourage new gardeners to try their hand at growing fresh foods. The book features sidebars with relevant information, charts, a few garden journal pages, photographs and other visual images, recipes, even garden-related jokes.

Lola Plants a Garden. McQuinn, Anna; Charlesbridge, 2014.

Readers who loved Lola at the Library, Lola Loves Stories, and Lola Reads to Leo are in for a backyard treat. After Lola reads a book of garden poems, she wants to plant some flowers. She gets books from the library and chooses her plants. Then Lola and her mommy buy the seeds, make the garden, and mark the rows. Now it’s time to wait....


Kids see plants, flowers, and trees around them every day. In this lively and educational reader, they'll learn how those plants grow. Kids will take this magical journey from seed pollination to plant growth, learning about what plants need to thrive and grow with the same careful text, brilliant photographs, and the fun approach *National Geographic Readers* are known for.
**One Bean.** Rockwell, Anne; Bloomsbury Juvenile UK, 2002. What happens when you plant just one little bean? A fundamental childhood experiment charmingly unfolds in this first science book about planting and observation. A perfect balance of simple narration and cheerful, thoughtful three-dimensional paper sculptures just right for the very young, *One Bean* carefully and joyfully takes the young observer step-by-step through a plant’s growth cycle, from planting the bean in a paper cup to the tasty results.

**Rocks, Dirt, Worms & Weeds: A Fun, User-Friendly, Illustrated Guide to Creating a Vegetable or Flower Garden with Your Kids.** Hutton, Jeff; Skyhorse Publishing, 2012. Let writer and gardener Jeff Hutton show you and your kids how to grow your own food and your favorite flowers, attract butterflies, create crafts, and more. Teach your children how to start garden seeds indoors as well as how to prepare soil, plant seeds, and transplant seedlings. Additionally, there are over a dozen fun recipes and instructions for making stepping stones, decorating egg carton planters, planting a sunflower maze, and much more. Parents and children are sure to have a blast in the garden all year round!

**Roots, Shoots, Buckets & Boots: Gardening Together with Children.** Lovejoy, Sharon; Workman Publishing Company, 1999. In *Roots, Shoots, Buckets & Boots*, Lovejoy presents 12 spirited, easy-to-implement ideas for theme gardens that parents and kids can grow together. Each garden includes a plan, the planting recipe -- seeds, seedlings, and growing instructions spelled out step-by-step -- and activities. Discovery Walks teach kids how the gardens work, and a chapter on gardening basics includes a child-friendly 10-Minute Plan for planting and maintenance, plus a list of the top 20 plants guaranteed to make gardeners out of kids.

**Secrets of the garden: food chains and the food web in our backyard.** Zoehfeld, Kathleen Weidner, Random House, 2012. Depicts a family of four who make their garden their summer home as they prepare the soil, plant seeds, water the garden, and watch for a harvest of vegetables.

**Sow and grow: a gardening book for children.** Davis, Tina; Stewart, Tabori and Chang, 2008. *Sow and Grow* acquaints children with the basics of plant biology, teaching them the meanings of words like “fruit” and “flower” and explaining the roles of light, air, and water in plants’ development. *Sow and Grow* is illustrated with charming vintage drawings from children’s books of the past. Its lay-flat wire-o binding makes it easy to refer to during use.
Square Foot Gardening with Kids. Bartholomew, Mel; Cool Springs Press, 2014. A Square Foot Garden is more than just a perfect place to grow vegetables--it is an ideal environment for sharing and teaching kids of all ages, and this book will show you how. In Square Foot Gardening with Kids, Mel Bartholomew reveals all of the tips, tricks, and fun projects he has used over the decades in one of his most cherished pursuits: teaching youngsters to build and grow their own kid-sized SFGs. Because of its simple principles and fast payoff, Square Foot Gardening is perfect for children.

Ultimate Book of Step-by-Step Cooking and Gardening: Projects for Kids. McDougall, Nancy and Jenny Hendy; Hermes House, 2012. This fabulous practical guide is packed with tasty recipes and activities for inside and outside!

Water, weed, and wait. Fine, Edith Hope, Tricycle Press, c2010. When Miss Marigold challenges the kids at Pepper Lane Elementary to turn an unpromising patch of their schoolyard into a garden full of fruits, flowers, and vegetables, they know they'll need all the help they can get. Soon everyone in the community is lending a hand—including an unlikely neighbor with a soft spot for gardening—and it isn't long before peppers, zucchini, sugar peas, snapdragons, zinnias, and much more are growing and blooming.

Wigging Worms at Work (Let’s-Read-and-Find-Out Science 2) Paperback. Pfeffer, Wendy; HarperCollins 2003. Crawling through the dirt, worms are hard at work, helping plants to grow. Worms help the fruit and vegetables we eat by loosening the soil and feeding the plants. Read and find out about these wiggling wonders!

Yucky Worms: Read and Wonder Paperback. French, Vivian; Candlewick Press, 2010. Who would want to be friends with a wiggly, slimy worm? You can’t even tell which end is which! But there’s more to these lowly creatures than meets the eye. Kids are invited to find out where worms live, see how they move, and understand why gardeners consider them friends with the help of this humorous and informative look at an unappreciated — and fascinating — creature.

Note: Descriptions for books taken from either the ECRL catalogue or Amazon.ca. Some editing was done.