

Manuela Aronofsky

Pratt Institute

STEAM Program for Early Childhood:

Sprouting into Springtime

Program Title

Sprouting into Springtime: Grow Your Own Seeds in a Jar!

Materials Needed:

- 1 clear jar for each workshop participant (recycled, clean, medium-sized mason jars work perfectly)
- Paper towels
- Permanent markers and masking tape for labeling the jars
- Water (in a watering can, or water jug is fine)
- Coloring and/or writing materials
- Seeds! (You can use many different types of seeds, but we recommend bean - such as fava, or lima bean - seeds, as they grow quickly. Make sure you plan on having at least 3 seeds per participant)
- You'll also need a large enough table for all participants to sit at, and comfortably assemble their seed jars

Collaboration and Outreach

This activity will be co-facilitated by coordinators from the local community garden! These gardening experts will be on-hand to answer any questions about the planting activity, as well as provide tips on how to plant more seeds at home, and ways to participate in your own local community garden.

Intended Outcomes & Corresponding Learning Objectives

1. By hearing about, participating in, and observing the live process of seed germination, children will build knowledge in the science of seeds, and plant development.

- *Learning Objective:* Children will listen to the librarian read two books about seed growth.
- *Learning Objective:* Children will be provided with a coloring sheet that shows the stages of a germinating seed.
- *Learning Objective:* With the help of caregivers and program facilitators, children will color in, and correctly label the four stages of seed growth.

2. By learning about gardening directly from experts, children will gain an interest in community gardens, and all of the resources, and participatory opportunities they have to offer.

- *Learning Objective:* Children will be told to think of one question (regarding the community garden) to ask of the community garden representative who is co-facilitating the program.

3. By going through the process of planting and watching a seed grow, children will learn the concepts of patience and responsibility when it comes to caring for a living organism such as a plant.

- *Learning Objective:* With the help of caregivers and program facilitators, children will construct their own seed jars, following the proper placement of the seeds, as well as watering techniques.
- *Learning Objective:* Students will take their seed jars home with proper care instructions, and for the next few days observe and care for the seed as it develops through each stage.

Program Curriculum

Just in time for spring, this STEAM-focused library program will provide young children with the materials for planting their own seed in a jar. This will allow them to examine the process of how a seed grows into a plant, enabling an introductory science lesson on germination. This program should take about one hour, and is best for children ages 4-6.

1. *Story Time: This program starts with a read-aloud of two books.*
 - a. The first book is **Eric Carle's *The Tiny Seed***, a fanciful story about one small seed that triumphs over several different challenges, and ends up growing into a (very large!) beautiful flower.
 - b. The second book is ***One Bean* by Anne Rockwell** - a more factual story that describes the very same process of planting a bean seed that the program attendees will be participating in.
2. *Seed Jar Construction: Each child will plant their bean seeds in a jar.*
 - a. Each child will receive their own mason jar.
 - b. Each child will fill their jar with folded paper towels.
 - c. Each child will be instructed to water the folded paper towels in the jar, until they are soaked through. There should not be excess water in the jar, beyond the wet paper towels.
 - d. Place the seeds into the jar. Each child should receive **at least 3** seeds to plant, as it is possible that not all of them will sprout. The seeds should be placed on the outer perimeter of the jar (in-between the paper towels, and the glass), so that they can be seen sprouting! Pictures supplied below.
 - e. With markers, either directly on the jar, or on masking tape that can be stuck onto the jar, label each jar with the type of seed(s) which have been planted.
 - f. Make sure each child and caregiver leave with a bookmark that shows seed care instructions.



Figure 1. Picture from Little Bins For Little Hands (<https://littlebinsforlittlehands.com/seed-jar-science-experiment-kids/>)

3. *Stages of Bean Seed Activity Sheet:* As the seeds will obviously not germinate immediately, each child will label and color in a sheet that shows the four main stages of seed growth. This will be a resource for the program participants to take with them, and will show them what to look for as their seed germinates. This sheet is two sided, with the back including more information about each seed phase, and the rough timeline of each phase. (See Figure 2 & 3.)

- a. With the help of caregivers, and facilitators, each child will label in the blank boxes each phase of seed growth. Phases are supplied on the activity sheet.
- b. Children can also choose to color in their activity sheets at this time.

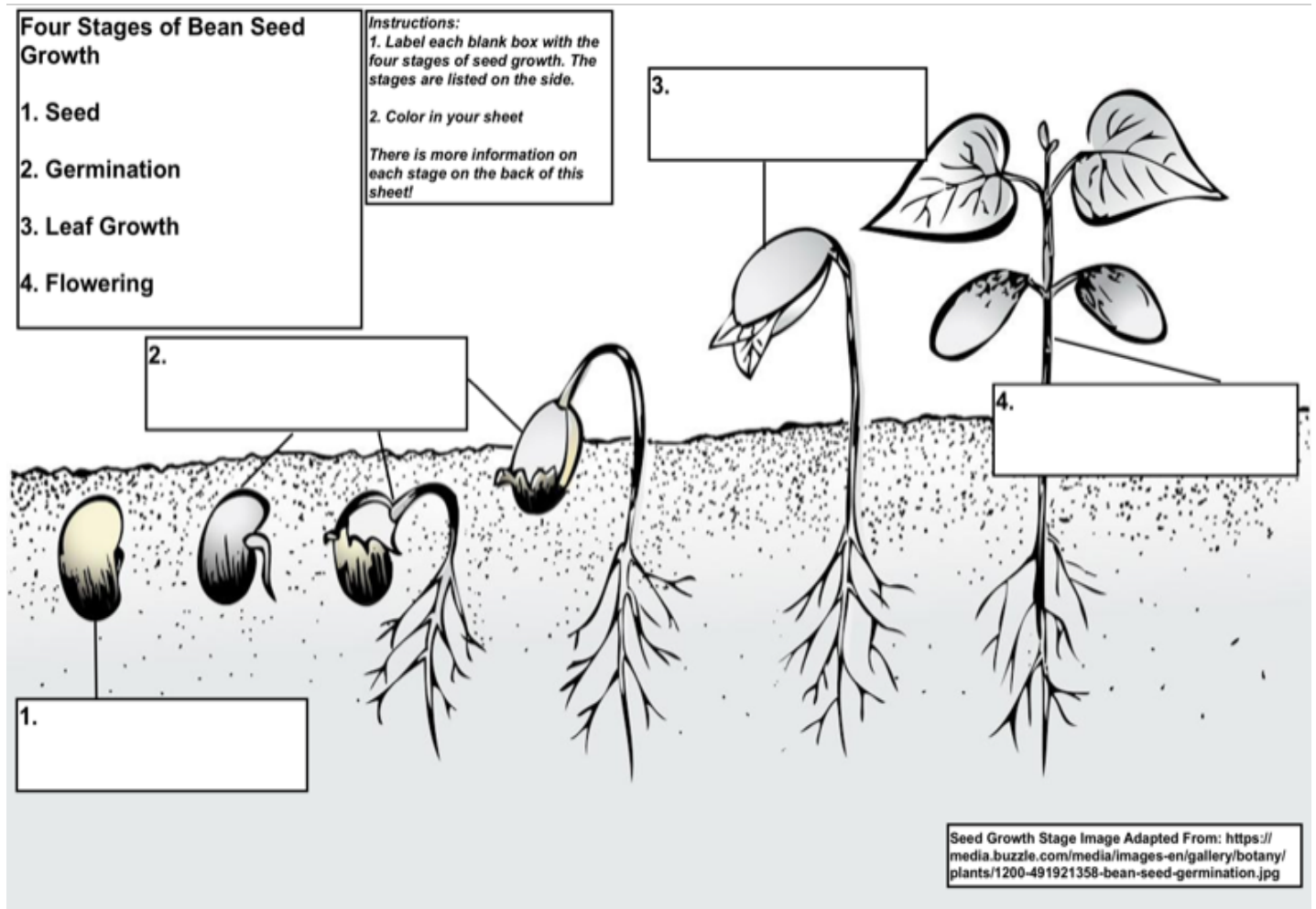


Figure 2a. Four Stages of Bean Seed Growth Activity Sheet (Front Side)

About The Four Stages of Bean Growth:**1. Seed Stage – This is the stage that you are planting your seed in**

The seed is the capsule in which the new plant is housed. Beans produce a variety of seeds, each concealed inside a pod. As the pod matures on the plants, it dries and splits open in the sun. The seeds will eventually fall out of the hard, dry, pod to the earth - or gardeners can remove them for storage or planting later.

2. Germination Stage – This stage should start to happen within 2 to 3 days

Germination is the process in which the baby plant emerges from the seed hull. Germination refers to the seed as it begins to sprout. Bean seeds germinate, or sprout, when water dissolves or cracks open the hard casing around the seed or embryo. Warmth speeds the process along. The bean will send out a tiny (embryonic) root called a radicle.

3. Leaf Growth Stage – This stage should start to happen within 5 to 6 days

Leaf growth begins when the seedling grows its true sets of adult leaves (as opposed to the immature initial leaf structures). After the seed germinates and the roots grow, the bean plant begins to push out a single stem. As the stem emerges from the soil, two little leaves emerge. The first leaves to emerge from a bean plant do not look like the typical bean plant leaves. They're rounded, and help the plant grow quickly into a strong, mature plant.

4. Flowering Stage – This stage should happen within 7 to 8 days

Flowering stages reveal that the plant has fully matured and is ready to begin reproducing. The end of the bean plant's life cycle is flowering. Flowers are the reproductive portion of the plant, and plants begin reproducing as soon as they are able to do so. The time it takes a bean plant to flower varies according to the types of bean, but generally within six to eight weeks of germination you'll begin to see flowers on the bean plant. As the flowers are pollinated or fertilized, seed pods develop.

This information was adapted from: <https://garden.lovetoknow.com/garden-basics/life-cycle-bean-plant>

Figure 2b. Four Stages of Bean Seed Growth (Back Side)

4. Q & A with Community Garden Expert: As part of this program's collaboration effort, any wrap-up, or extra time will be set aside for the children to ask questions of the community garden representative. The garden representative will also be on hand throughout the program to help with the activity, and answer any questions about the planting process, or about participating in the garden itself.

Evaluation & Hand-Outs

Before caregivers and parents leave, they will be asked to fill out a short evaluation form. The form will have three likert scale questions for them to answer, and one optional fill-in question:

1. How engaged did you feel your child was during this program?
Scale provided from 1 (not engaged) to 3 (very engaged)

2. How well do you think this program incorporated early childhood STEAM (Science, Technology, Engineering, Arts, Mathematics) curriculum?

Scale provided from 1 (This program did not support STEAM curriculum) to 3 (This program strongly supported STEAM curriculum)

3. How likely are you to return to the library for another STEAM-related early childhood program?

Scale provided from 1 (Not likely to return to another STEAM-related program) to 3 (Very likely to return to another STEAM-related program)

4. (Optional) What other programs would you like to see offered for your child at the library? This does not have to be a STEAM-related program!

Important! Each child & caregiver should also leave with their Stages of Bean Activity Sheet (which explains what they should be looking for in their jar throughout the next one to two weeks) and explains in detail the four seed stages, as well as a provided bookmark with further resources on seeds & seed-care tips. And, of course, everyone should leave with their seed jars!

Resources Consulted for This Program

BiologyWise. (2018). Life cycle of bean plant [online image]. Retrieved from <https://biologywise.com/life-cycle-of-bean-plant>

Little Bins for Little Hands. (2019, March 6). Seed germination experiment for kids [online image]. Retrieved from <https://littlebinsforlittlehands.com/seed-jar-science-experiment-kids/>

Martin, A. (n.d.) Life cycle bean plant [web page]. Retrieved from <https://garden.lovetoknow.com/garden-basics/life-cycle-bean-plant>

Vanstone, E. (2012, April 30). Bean in a jar [web page]. Retrieved from <https://www.science-sparks.com/bean-in-a-jar/>

Thayer, A. (2015). Germination activity - grow seeds in a jar! [blog post]. Retrieved from <https://teachingmama.org/germination-activity-grow-seeds-in-a-jar/>

Annotated Bibliography Text:

Selected resources from this list will be supplied on a bookmark (See Figure 4). The bookmark will also have a few tips on caring for the seed jar at home.

Informational Books

How A Seed Grows By Helene J. Jordan

This introductory science book provides accessible information on how seeds become plants, and trees. Also includes activity ideas.

Seeds Go, Seeds Grow By Mark Weakland

Part of the Science Sparks series, this book provides detailed, in-depth photos of seeds in all stages - and includes seeds from sunflowers, to watermelons!

A Tree Is Also a Plant By Clyde Robert Bulla

This book is part of the informative Lets-Read-And-Find-Out science book series, and specifically talks about the phases of tree growth.

Picture Books

The Carrot Seed By Ruth Krauss

This timeless classic is about a little boy who perseveres challenges to grow a **very** large carrot seed.

Plant The Tiny Seed By Christie Mathieson

This colorful picture book invites kids to tap, count, and wave at the tiny seeds that will soon bloom into a beautiful garden!

Ten Seeds by Ruth Brown

In this beautiful picture book, something different happens to each of the ten seeds planted in a garden. This book can also be a fun resource for beginning counting skills!

Informational Videos

“How Does A Seed Become a Plant?” Produced by SciShow Kids

This fun video describes the process of how a tiny seed becomes a huge plant! It also defines words such as **germination**, and parts of the seed.

Find this video by going to youtube.com, and searching "How Does a Seed Become a Plant"

“Olivia Plants a Garden”, Produced by Olivia the Pig (Official Channel)

Everyone's favorite literary pig has a ball waiting for her plants to grow, after her teacher gives them seeds to plant in the garden!

Find this video by going to youtube.com, and searching "Olivia Plants a Garden"



Figure 4. Bookmark supplied to program participants with further resources, and tips on caring for the seed jar at home

Extra! Program Flyer

SPROUTING INTO SPRINGTIME!

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OUTCOMES

By participating in, and observing the live process of seed germination, children will **gain knowledge in the science of plant development.**



By going through the process of planting and watching seeds grow, children will **learn the concept of patience and responsibility when it comes to caring for a living organism such as a plant.**

COLLABORATION

This activity will be co-facilitated by **coordinators from the local community garden!** These gardening experts will be on-hand to answer any questions about the planting process, as well as provide tips on how to plant more seeds at home, and ways to participate in your own local community garden.

PROGRAM



1. STORY TIME!

Two books will be read aloud at this program, both relating to seeds & plant growth.

2. SEED JARS!

Each child will get to go home with their very own bean seeds planted in a jar, as well as seed-care instructions on a bookmark.

3. SEED PHASE ACTIVITY SHEET!

In order to learn about seed phases, each child will receive a seed phase matching activity sheet, which they will complete and color at the program.

MORE INFORMATION

- **This program is intended for children ages 4 to 6.**
- **All children must be accompanied by a caregiver, or parent.**
- **All materials will be supplied at this free program!**
- **Any questions? Call the library!**



Image credit: Little Bins For Little Hands
(<https://littlebinsforlittlehands.com/seed-jar-science-experiment-kids>)

