

In this unit students will plant a Sunflower House and Bean Trellis. Key concepts include 'āina, the sunflower and green bean life cycles, measuring and counting, garden data collection, harvesting for food and seeds, pollination, and seed saving.

RECOMMENDED GRADE LEVEL

Grade 1

This unit is easily adaptable for other grade levels.

LESSON DELIVERY

This unit consists of four 45-minute lessons to be taught at 3 to 5 week intervals (about one lesson per month) over the course of one semester. Regular garden care and observations should take place between lessons, and teachers are encouraged to use the Lesson Extensions or create their own extension activities in order to connect the gardens with other classroom learning. Sunflower and pole bean seeds may be planted year-round.

GARDEN CARE

- Teachers and students are responsible for watering and weeding their garden. Regular applications of organic nutrients (vermicast) are scheduled as part of each lesson.
- Add **Garden Monitor** to the list of classroom jobs assigned; these students should visit the garden daily to water the soil, check on the gardens, and make observations.
- Set up a shared weekly watering schedule amongst grade level teachers and/or parents and garden docents to make sure the garden receives adequate moisture.
- Please do not use synthetic chemicals (pesticides, herbicides, and/or fertilizers) in or around school and home gardens. If necessary, use "OMRI" (organic certified) products only.
- Post the **Garden Agreements** in the classroom and review them often with students.



PRE & POST UNIT SURVEYS, TAKE HOME LETTERS, & STUDENT WORKBOOKS

- Pre and Post Unit Surveys measure student progress related to content knowledge, attitudes, and behavior change related to 'ĀINA Lessons.
- Take Home Letters contain suggested questions/activities for each lesson for families to help reinforce, engage, and learn along with their child.
- Student Workbooks include Student Worksheets and Take Home Letters, available for download at www.kokuahawaiifoundation.org/aina.
- Regular student observation time in the garden is encouraged with the use of individual Garden Journals or Folders, where drawings and writings can be kept by each student, or a Class Journal where weekly garden observations can be recorded by Garden Monitors.
- Plan to review and select examples of student work to be shared with the Kōkua Hawai'i Foundation.

LESSON EXTENSIONS

Gardens offer infinite, engaging learning opportunities, and teachers are encouraged to utilize them beyond these lessons. The lesson plans include a number of suggested activities (Lesson Extensions) designed for teachers and students to make the most of the gardening experience!



NEED HELP?

Contact the Kōkua Hawai'i Foundation with any questions or comments about this unit:

- aina@kokuahawaiifoundation.org
- (808) 638-5145

A bamboo trellis is used as a trellis for pole beans.



THE LITTLE SEEDS, BIG PLANTS GARDEN

Lesson 1	Lesson 2	Lesson 3	Lesson 4
Sunflower Life Cycle	Observations & Data	Green Bean Life Cycle	Seed Harvest
SUGGESTED DELIVERY TIMES FOR FALL SEMESTER (3 to 5 weeks apart)			
September	October	November	December
SUGGESTED DELIVERY TIMES FOR SPRING SEMESTER (3 to 5 weeks apart)			
February	March	April	May
LESSON OVERVIEW			
Key Concepts <ul style="list-style-type: none"> • Needs of plants and people • Sunflower life cycle • Garden Agreements • Planting seeds 	Key Concepts <ul style="list-style-type: none"> • Data • Measuring • Counting • Garden care 	Key Concepts <ul style="list-style-type: none"> • Green bean life cycle • Trellis • Mature • Harvesting 	Key Concepts <ul style="list-style-type: none"> • Pollination • Pollinators • Seed saving
Introduction Discuss the needs of plants and people. Read the <i>Sunflower House</i> book and draw the sunflower life cycle as a group. Introduce the Garden Agreements.	Introduction Act out the sunflower life cycle with students. Discuss data collection and the use of tools for measuring in the garden.	Introduction Discuss the green bean life cycle and which beans to harvest for eating and seed saving. Sing the Harvest Song.	Introduction Review the sunflower life cycle and discuss pollination and the important role of pollinators in helping plants create seeds. Discuss seed saving.
Activity 1: Sunflower House Mix soil with vermicast and add soil mix to milk carton pots. Plant and water sunflower seeds inside the milk carton pots to begin the Sunflower House.	Activity 1: Data Collection and Observations Make garden observations and collect and record data using the Garden Observations & Data Student Worksheets.	Activity 1: A Bean's Life and Green Bean Harvest Read <i>A Bean's Life</i> and act out the green bean life cycle. Explore, harvest, count, and wash fresh green beans to eat and seed saving.	Activity 1: Sunflower Drawing Together as a group, draw a life-sized picture of a sunflower, including other garden plants, creatures, and elements of nature.
Activity 2: Bean Trellis Loosen the soil, plant and water pole bean seeds at the trellis to make a bean trellis. Plant flower seeds (marigolds, cosmos, zinnias) around the trellis to help attract pollinators.	Activity 2: Garden Care Help the garden by watering, weeding, and feeding with vermicast. Plant more seeds as needed.	Activity 2: Sunflower Data Collection and Garden Care Make garden observations and collect and record data. Water, weed, and feed the garden. Eat fresh green beans during the Closing and Snack.	Activity 2: Garden Activities Experience being inside the Sunflower House and Bean Trellis. Harvest sunflower, flower, and bean seeds. Eat fresh green beans and sunflower seeds during the Closing and Snack.
Follow Up Activities <ul style="list-style-type: none"> • Daily garden care and observations • Remove cover cloth when sprouts emerge (if used) • Transplant sunflowers • Create labels for Lesson 2 • Student Worksheet: Sunflower Life Cycle • Journaling and discussion • Lesson Extensions • Take Home Letter 	Follow Up Activities <ul style="list-style-type: none"> • Daily garden care and observations • Harvest, wash, count and eat fresh green beans • Weekly data collection using the Garden Observations & Data Student Worksheets • Journaling and discussion • Lesson Extensions 	Follow Up Activities <ul style="list-style-type: none"> • Daily garden care and observations • Continue to harvest green beans and seeds and record data on the Class Data Sheet • Student Worksheet: Green Bean Life Cycle • Journaling and discussion • Lesson Extensions 	Follow Up Activities <ul style="list-style-type: none"> • Continue to care for the gardens and harvest, dry, and save seeds • Place mulch over bare soil • Student Worksheet: Garden Reflection • Journaling and discussion • Lesson Extensions • Submit examples of student work to Kōkua Hawai'i Foundation

ACADEMIC STANDARDS GUIDE: GRADE 1 ALIGNMENT

Common Core Standards (CCSS), Language Arts		
1.RL.1	Reading Literature: Key Ideas and Details: Ask and answer questions about key details in a text.	Lesson 1
1.RI.1	Reading Informational: Key Ideas and Details: Ask and answer questions about key details in a text.	Lessons 3, 4
1.RI.2	Reading Informational: Key Ideas and Details: Identify the main topic and retell key details of a text.	Lessons 3, 4
1.RI.7	Reading Informational: Integration of Knowledge and Ideas: Use the illustrations and details in a text to describe its key ideas.	Lessons 3, 4
1.W.1	Writing: Text Types and Purposes: Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.	Lesson 2
1.W.2	Writing: Text Types and Purposes: Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.	Lessons 2, 3
1.W.3	Writing: Text Types and Purposes: Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.	Lessons 1, 2
1.W.8	Writing: Research to Build and Present Knowledge: With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	Lessons 1, 2
1.SL.2	Speaking and Listening: Comprehension and Collaboration: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.	Lesson 1
1.SL.4	Speaking and Listening: Presentation of Knowledge and Ideas: Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.	Lessons 2, 3
1.SL.5	Speaking and Listening: Presentation of Knowledge and Ideas: Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.	Lessons 1, 2, 3

Common Core Standards (CCSS), Mathematics		
1.OA.1	Operations and Algebraic Thinking: Represent and solve problems involving addition and subtraction: Use addition and subtraction within 20.	Lessons 2, 4
1.NBT.1	Number and Operations in Base Ten: Extend the counting sequence: Count to 120, starting at any number less than 120.	Lessons 1, 2, 4
1.MD.1	Measurement and Data: Measure lengths indirectly and by iterating length units: Order three objects by length; compare the lengths of to objects indirectly by using a third object.	Lesson 2
1.MD.2	Measurement and Data: Measure lengths indirectly and by iterating length units: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end.	Lesson 2
1.MD.4	Measurement and Data: Measure lengths indirectly and by iterating length units: Organize, represent, and interpret data with up to three categories.	Lessons 1, 2, 3, 4

(Academic Standards Guide continues on page 4)

ACADEMIC STANDARDS GUIDE: GRADE 1 ALIGNMENT (CONTINUED)

Hawai'i Content & Performance Standards III (HCPS III)

FA.1.1.1	How the Arts are Organized: Use various types of art media.	Lessons 1, 4
FA.1.1.5	How the Arts Communicate: Use familiar subjects and experiences to create original works of art	Lesson 4
FA.1.4.4	How the Arts are Organized: Repeat a simple movement sequence by imitation.	Lesson 2, 3
HE.K-2.1.7	Personal Health and Wellness: Describe the benefits associated with personal cleanliness	Lessons 1, 2, 3, 4
HE.K-2.1.8	Personal Health and Wellness: Describe the signs and symptoms of common illness and strategies one can use to avoid spreading or catching illnesses	Lesson 3

Next Generation Science Standards (NGSS)

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information: Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas.	Lessons 1, 2, 3, 4
Analyzing and Interpreting Data: Use observations to describe patters in the natural world in order to answer scientific questions.	Lessons 1, 2, 3, 4
Developing and Using Models: Use a model to represent relationships in the natural world.	Lesson 1, 2, 3

Crosscutting Concepts

Patterns: Patterns in the natural and human designed world can be observed and used as evidence.	Lessons 1, 2, 3, 4
Systems and System Models: Systems in the natural and designed world have parts that work together.	Lessons 1, 2, 3, 4

NGSS Performance Expectation: 1-LS3-1 Heredity: Inheritance and Variation of Traits

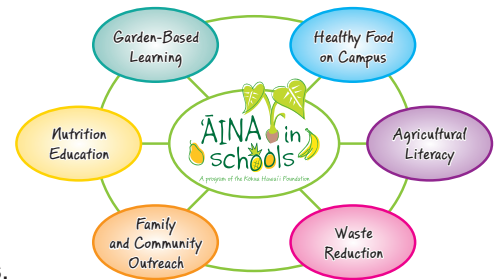
Students who demonstrate understanding can:

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Lesson
<p>Constructing Explanations and Designing Solutions: Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. 	<p>LS3.A: Inheritance of Traits: Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents</p> <p>LS3.B: Variation of Traits: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.</p>	<p>Patterns: Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.</p>	Lessons 1, 2, 3, 4

ABOUT 'ĀINA IN SCHOOLS

'ĀINA In Schools is a farm to school initiative that connects children to their local land, waters, and food to grow a healthier Hawai'i. In addition to encouraging the use of locally grown fruits and vegetables in school meals and snacks, the program includes standards-based nutrition, garden, and compost curricula that empower children to grow their own food, make informed food decisions, and reduce waste. 'ĀINA In Schools also provides field trips to local farms, chef cooking demonstrations in classrooms, as well as waste reduction, garden, and cooking educational opportunities for families and community members.



PUBLISHING INFORMATION

The 'ĀINA In Schools curriculum includes Nutrition Education, Garden-Based Learning, and Waste Reduction lessons for kindergarten through sixth grade students.

All 'ĀINA In Schools curriculum and materials are property of the Kōkua Hawai'i Foundation and are distributed to trained educators for use at schools participating in the 'ĀINA In Schools program. The curriculum and materials may be reproduced for individual classroom use by schools participating in the 'ĀINA In Schools program or by registered users approved by the Kōkua Hawai'i Foundation. Reproduction of the curriculum and materials is not permitted by unregistered users without the express written consent of the Kōkua Hawai'i Foundation.

The registration and training process helps Kōkua Hawai'i Foundation to gather educator feedback on the curriculum and to document how many children and schools are being reached through the lessons. Visit our website to become a registered user, sign up for trainings, and gain access to all Kōkua Hawai'i Foundation curriculum and resource guides. If you receive a copy of the curriculum via other means, we ask that you please email aina@kokuahawaii.org to share your plan for use of the materials. Please direct questions about the 'ĀINA In Schools program and curriculum to aina@kokuahawaii.org.

MAHALO

The Kōkua Hawai'i Foundation thanks the following organizations and individuals who have assisted with the development of the 'ĀINA In Schools curriculum and materials:

- **Kōkua Hawai'i Foundation:** Kaliko Amona, Lydi Morgan Bernal, Sarah Gelb, Kim Johnson, Julius Ludovico, Summer Maunakea, Debbie Millikan, Deanna Moncrief, Kelly Perry, www.kokuahawaii.org
- **The Green House:** Betty Gearen and Tia Meer, www.thegreenhousehawaii.com
- **GrowingGreat:** Marika Bergsund and Lori Sherman, www.growinggreat.org
- **Food for Thought:** Marty Fujita, www.foodforthoughtojai.org

Special thanks to the students, teachers, and volunteers who have participated and taught lessons in previous years and provided their valuable feedback to improve them.

Mahalo nui!

This Pre-Unit Survey is to see what you already know about these topics. It is ok if you don't know any of the answers. You will be learning about these topics this semester. Try your best and have fun!

1. Draw a **circle** around what is missing in #3

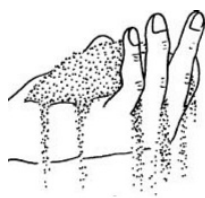
on the picture of the sunflower life cycle:



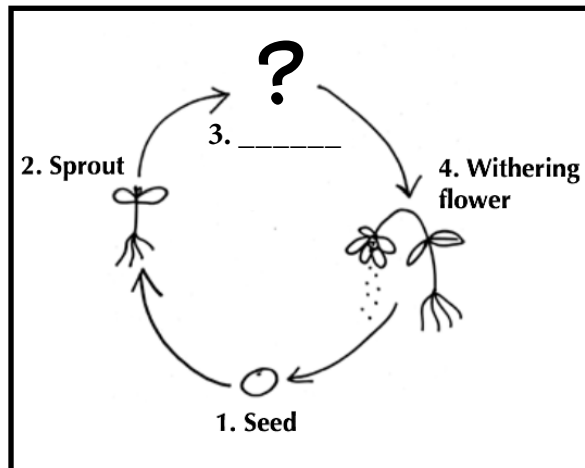
Bee



Flower



Soil



2. Draw a **circle** around what a flower makes as a result of pollination:



Leaf



Seeds

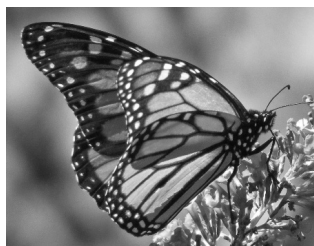


Bee

3. Draw a **circle** around the pollinator:















Sow Bug



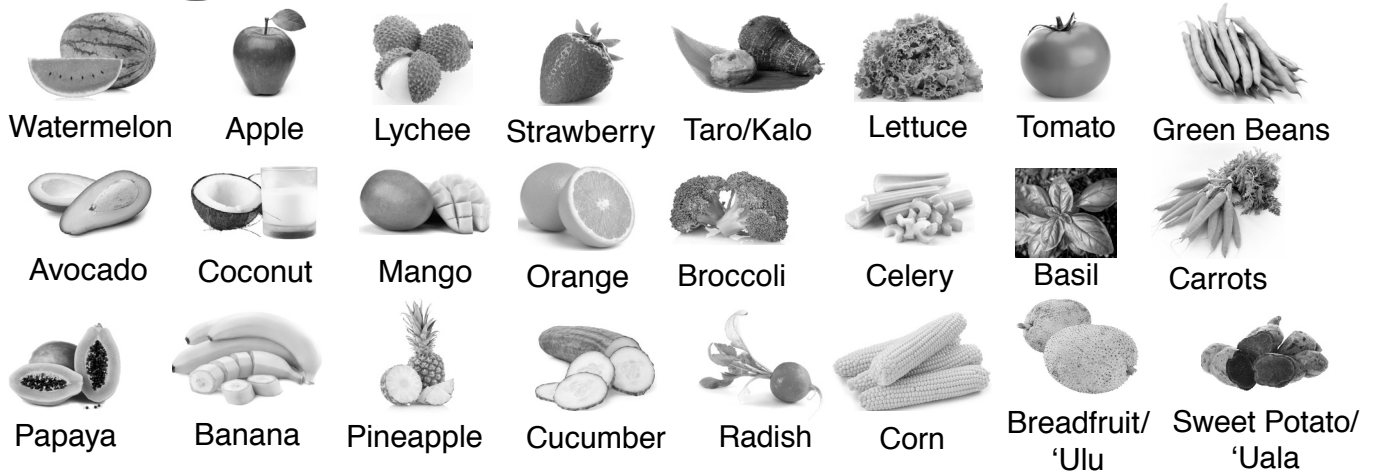
Butterfly



Worm

4. Do you like gardening? **Circle** ONE answer:  Yes  I don't know  No
5. Do you like eating fruits and vegetables? **Circle** ONE answer:  Yes  I don't know  No
6. Do you like cooking? **Circle** ONE answer:  Yes  I don't know  No
7. Do you like 'ĀINA Lessons? **Circle** ONE answer:  Yes  I don't know  No

8. Draw a **Circle** around all the fruits and vegetables you like to eat:



9. Draw a picture of what 'āina means to you.

Dear Parent or Caregiver:

This semester, 1st graders will be participating in four garden lessons being delivered by volunteers of ĀINA In Schools, a program of Kōkua Hawai'i Foundation. ĀINA In Schools is a farm to school initiative that connects children to their local land, waters, and food to grow a healthier Hawai'i. Program components vary from school to school and include nutrition education, garden-based learning, healthy snacks, farm field trips, chef visits, waste reduction, and family and community outreach.

Although the lessons are delivered once a month, the students will be continually engaged in between lessons with regular garden activities that include watering, weeding, making observations, and spending time in the garden.

Photos and Media Releases: By now each of you should have received a Kōkua Hawai'i Foundation Media Release Form. We hope that you have filled out this form and have submitted it to your child's classroom teacher. From time to time, KHF takes photos/videos of our lessons to highlight activities that are noteworthy.

To keep yourself up to date on what your child is doing in ĀINA, we suggest putting this up on your refrigerator or bulletin board and follow up as the lessons are delivered. You can help reinforce, engage, and learn along with your child by going over the lessons and activities after each lesson. A unit summary and suggested questions/activity for each lesson are listed below.

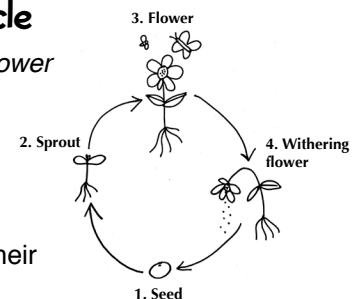
Mahalo!

In **The Little Seeds, Big Plants Garden** unit, students will plant a Sunflower House and Bean Trellis. Key concepts include 'āina, the sunflower and green bean life cycles, measuring and counting, garden data collection, harvesting for food and seeds, pollination, and seed saving.



Lesson 1 - Sunflower Life Cycle

In this lesson, students read the *Sunflower House* book and discuss what plants need to survive and thrive, and draw the life cycle of the sunflower. In the garden, students plant sunflower, pole bean, and marigold seeds to create a Sunflower House and Bean Trellis in their Little Seeds, Big Plants Garden.



Questions to discuss with your child:

- What do plants need in order to survive and thrive?
- What are the stages in the flower life cycle?

Suggested home activity: Planting Sunflower Seeds

- Start a sunflower garden either in a pot or allot some space in the garden at home.
- Care for the plant after sprouting with regular garden care - watering and weeding.
- Suggested varieties to consider: mammoth - can get up to 8' tall or teddy bear - that grows up to 2-3' tall. Seeds can be purchased at any local home gardening stores or on-line at www.highmowingseeds.com.

Lesson 2 - Observations and Data

In this lesson, students act out the life cycle of a sunflower plant, discuss data collection and the use of tools for measuring. They collect and record data and observations about a sunflower plant of their choice and care for their garden.

Questions to discuss with your child:

- How did you practice being scientists today?
- What changes have you observed in the garden?

Suggested home activity: Weather Study and Observation

- Observe the movement of the sun across your home or garden throughout the day. Relate this to the growth patterns of plants.



Lesson 3 - Green Bean Life Cycle

In this lesson, students learn how to properly harvest and wash green beans for eating and for saving seeds. They explore the green bean life cycle by reading *A Bean's Life* and act out the life cycle. In the garden they harvest, count, and wash their green beans and care for the garden. They enjoy a green bean snack or take home to share with their families.

Questions to discuss with your child:

- What are the stages in the green bean life cycle?
- How do you know when the green bean seeds are ready to be harvested?
- How did the green bean taste?

Suggested home activity: Flowers, Seeds, Fruits & Vegetables

- Discuss important role of flowers in the formation of seeds, fruits and vegetables.
- Talk about why plants make fruits.
- Cut open different fruits and vegetables and explore their seeds.



Lesson 4 - Seed Harvest

In this lesson, students review the sunflower life cycle, discuss pollination, and read *From Seed to Sunflower*. They harvest mature sunflower heads and bean pods, then harvest and save seeds. They draw two life-sized sunflower charts, experience being inside the Sunflower House and Bean Trellis, care for their gardens, and enjoy a sunflower seed and green bean snack.

Questions to discuss with your child:

- What is pollination and why is it important?
- Why is seed saving important?

Suggested home activity: Plant a Flower Garden

- Harvest sunflower seed if wilted. Hang for about a week to dry.
- Separate seeds from the flower head by rubbing two flowers together or by hand.
- Save seeds by placing in an airtight container and label.
- Generally, replanting can be done shortly after seeds have dried.



If you have any questions or are interested in becoming an 'ĀINA In Schools docent, please do not hesitate to ask.

To learn more about 'ĀINA In Schools at your child's school, please contact your school's 'ĀINA Team Coordinator, or contact:



'ĀINA In Schools
aina@kokuahawaiiifoundation.org

DESCRIPTION

Students will discuss what plants need to survive and thrive. They will read the *Sunflower House* book and discuss and draw the life cycle of a sunflower. In the garden, students will plant sunflower, pole bean, and marigold seeds to create a Sunflower House and Bean Trellis in their Little Seeds, Big Plants Garden.

TIME: 45 minutes

SUBJECTS: Health, Language Arts, Science

LEARNING OBJECTIVES

After this lesson students will be able to:

- Understand that plants need soil, water, sun, air, and love in order to survive and thrive.
- Describe the stages of the sunflower life cycle: Seed, sprout, flower, withering flower with seeds.
- Understand that seeds are alive and contain a tiny plant inside; they should be planted with love.
- Recognize that gardens need people to care for them by watering and visiting them often.



ACADEMIC STANDARDS*

CCSS, Language Arts: 1.RL.1, 1.W.3, 1.W.8, 1.SL.2 **HCPS III:** HE.K-2.1.7 **NGSS:** LS3.A, LS3.B, Developing and Using Models, Patterns, Systems and System Models, **Lesson Extensions:** 1.SL.5, 1.NBT.1, 1.MD.4, FA.1.1.1, Obtaining, Evaluating, and Communicating Information, Analyzing and Interpreting Data, Constructing Explanations and Designing Solutions, Patterns

*A detailed list of the Academic Standards can be found in the Unit Overview document

LESSON OUTLINE

- I. Introduction (15 minutes)
 1. What Do Plants Need?
 2. Sunflower Life Cycle
 3. Group Activities Overview
- II. Group Activities (25 minutes)
 1. *Sunflower House* (12.5 minutes)
 2. Sunflower House & Bean Trellis Planting (12.5 minutes)
- III. Closing (5 minutes)



A bamboo trellis is used as a trellis for pole beans.



KEY TERMS AND CONCEPTS

Āina - Land; that which feeds, nourishes, and sustains us (e.g., food, water, air)

Flower - The colorful part of a plant that attracts pollinators and produces seeds

Life Cycle - The series of changes occurring in an organism between one developmental stage and the identical stage in the next generation

Seed - A tiny plant (embryo) and a food supply to nourish its first growth

Sprout - A small/young plant whose first leaves and stem have emerged from the ground and whose roots have begun to grow

Thrive - To grow or develop vigorously, to flourish

Wither - To lose freshness and moisture; to shrivel and fade

LESSON MATERIALS

Community Supplies:

- Ball of twine
- Scissors
- 2 plastic wash bins (for mixing soil and vermicast)
- Vermicast (about 1 cup per class)

Lesson Supplies:

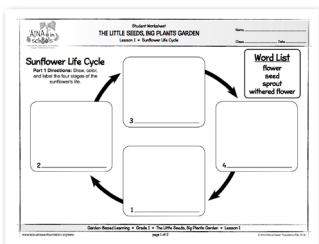
- Book: *Sunflower House* by Eve Bunting
- Garden Agreements Sign
- Sunflower seeds (non-hybrid mammoth sunflowers, 20+ per class; Note: Hybrids will not produce viable seeds)
- Pole bean seeds (20+ per class)
(Note: Bush beans do not require a trellis and therefore are not appropriate for the Bean Trellis.)
- Flower seeds (marigolds, cosmos, zinnias; about 1 Tbs. per class)
- Water key with lanyard
- Student Workbook

Teaching Team To Provide:

- Prepared milk cartons (1 per student; see Advance Preparation)
- Trellis poles (bamboo sticks or other poles; 6-8 per trellis; about 1/2" thick and 7' tall)

School To Provide:

- White board
- Dry erase pens
- 12 child-safe garden tools to loosen soil
- 5-gallon bucket and 5+ plastic cups for daily watering (and/or small watering cans)
- Optional: Cover cloth (sheet, burlap or other) to cover newly planted seeds



Student Worksheet: Sunflower Life Cycle

ACCOMPANYING DOCUMENTS

- ĀINA Pre-Unit Survey
- Take Home Letter
- Student Worksheet: Garden Agreements
- Student Worksheet: Sunflower Life Cycle

ADVANCE PREPARATION

- Discuss lesson preparation and presentation plans with your teaching team.
- Confirm teachers have administered ĀINA Pre-Unit Surveys prior to the first lesson.
- Make copies of the Student Worksheet and Take Home Letter, one per student if not using the Student Workbook.
- Collect, wash, and make holes in the bottom of small milk cartons (1 per student; for planting sunflower seeds).
- Gather trellis poles (see Lesson Materials).
- Construct 1 or more "Trellises" in the garden beds before the lesson begins. For 1 to 3 classes, build 1 trellis. For 4 to 6 classes, build 2 trellises. The Trellis will be created by erecting bamboo sticks in the shape of a Trellis (cylindrical cone shape). Sink the bottom end into the soil, and secure the tops of the poles with twine. Create lines of twine spaced 6" to 12" apart around each side of the Trellis, all the way to about 3" from the ground. Leave open spaces for doors where students can enter the trellis (on both long sides of the bed); place stones on the soil over the door areas as a reminder.
- Place stones where the Sunflower House "doors" will be (about 1' long spaces on both short ends of the garden bed).
- Get to know the garden! Allow students to explore their garden soil by having them dig with hands and tools and make careful observations. How does the soil feel and smell? What creatures live in our garden? In preparation for planting, loosen the soil and remove any weeds. Water the soil thoroughly one day before the lesson.

INTRODUCTION

15 MINUTES

“Aloha! We are... (state docents' names) with the 'ĀINA In Schools program. The 'ĀINA In Schools program connects us to our food and land so we can live healthy lives and be great stewards of the environment. 'ĀINA is an important Hawaiian word that means land and that which feeds, nourishes, and sustains us all, including food, water, and air.”

“When we come to visit you we will learn to take care of the 'āina and our garden plants.”

Get to know which 'ĀINA components are being implemented at your school so you can briefly refer to them in this section.

For example, “Some other classes are exploring nutrition and food choices, some are reducing waste through composting, and some are visiting local farms to learn about where our food comes from.”



“In the garden today we will plant sunflower and pole bean seeds in order to create a Sunflower House and Bean Trellis!” Show the two different types of seeds. “These tiny seeds grow into very large plants and we will measure the plants as they grow.”

WHAT DO PLANTS NEED?

“Before we plant our garden we need to know what plants need in order to survive and THRIVE.” Ask students to raise their hands and share the things that plants need. Desired answers: Sunlight, water, soil, air, love.

What people need: “Do we need the same things that plants do?” Accept a few student answers. “Yes, we need air, water, sunlight and love. Do we need soil?” Let the students ponder this question. “What do we eat?” Desired answer: Plants! “Where do plants grow? Plants grow in the soil so we need soil too!”

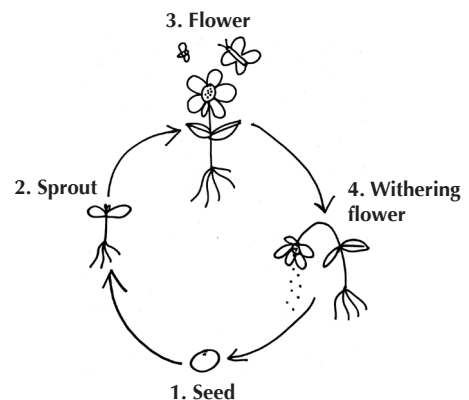
Ask the students to name some food plants that grow in the soil. “Some edible plant parts grow above ground (leaves, stems, seeds), while others grow below ground in the soil (roots).”

SUNFLOWER LIFE CYCLE DRAWING

Using the white board and dry erase pens, ask a different student to draw each stage of a sunflower's life cycle, according to the procedure below. Label each stage and draw an arrow after each stage is added, in order to make the shape of a circle (see diagram below).



1. How does the life of a sunflower begin? As a SEED.
2. If the seed has everything it needs, what does the seed become? A SPROUT.
3. When the sprout grows up it becomes: A FLOWER.
 - What types of insects visit the flower? Bees and butterflies.
 - Do you know what forms inside the flower? Seeds.



INTRODUCTION

CONTINUED

4. What happens when the flower gets old? It will **WITHER** (shrivel, fade, and turn brown) and the seeds will fall to the soil.
- What happens next? The seeds begin to grow and the **LIFE CYCLE** begins again!

“What does this shape look like?” A circle. “This is called a life cycle, or the circle of life, and it goes around and around and around!”



GROUP ACTIVITIES OVERVIEW

“Today in the garden we will have two groups. One group will read the book *Sunflower House* and the other group will plant sunflower seeds and pole bean seeds. Then the groups will switch. These seeds are very small, and their life cycles are just beginning! Please help them by handling them gently and with love, and visiting them every day to make sure they have everything they need in order to thrive.”

Garden Agreements

Have students take a deep breath, then repeat and discuss the Garden Agreements as listed on the Garden Agreements Sign. Spend some time during this first lesson to review with students the examples on page 2 of the sign.



- I will be SAFE
- I will be KIND
- I will have an OPEN MIND
- I will use my TIME WELL

Divide the students into two groups before going outside.



GROUP ACTIVITIES

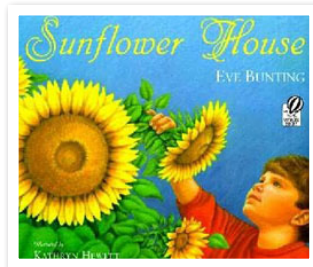
25 MINUTES

Gather in a circle around the garden. Share gratitude for the garden, our seeds, the sun, air, water, soil, and each other. Optional: Sing a garden/planting song. Note: Developing a routine protocol for entering the garden helps to cultivate a sense of respect and appreciation.

Direct students to their assigned group area. The *Sunflower House* book group will find a shady spot in the garden to read. The planting group will plant sunflower seeds in milk carton pots and then plant pole bean seeds around the Bean Trellis. Groups will switch. Regroup for closing so that each group can share and observe each other's work.

SUNFLOWER HOUSE (12.5 minutes)

Read the *Sunflower House* book by Eve Bunting. Provide your own narration if desired. Allow students to ask and answer questions about key details.



SEED PLANTING (12.5 minutes)

Sunflower House: "First we are going to plant a Sunflower House just like the kids in the book. First we will get the seeds started by planting them in milk carton pots in order to protect them from garden creatures that might like to eat the seeds and sprouts. When the sprouts are big enough they will be transplanted around the inside edge of our garden bed so they will grow up to become the walls of the Sunflower House. If they receive everything they need, these small seeds will grow into very tall plants!"



- Practice the Garden Agreements:** Help students to practice the Garden Agreements while they are outside in the garden.
- Observe:** Allow time for students to explore the garden soil and make observations with their many senses. Encourage them to share and ask questions about what they observe.
- Loosen the Soil:** Have students loosen the soil with their tools. Students may crumble soil chunks with their hands to make the soil soft and smooth.
- Soil and Vermicast Mix:** Have students use their tools to transfer several scoops of garden soil into the plastic wash bins. Add about 1/2 to 1 cup of vermicast to the wash bins and have students gently mix the soil and vermicast together. Have students put their tools away.
- Demonstrate:** Show students how to use their hands to fill a milk carton pot with the soil mix from the wash bins. Show them how to create a hole in the soil inside the pot using your finger (about 1" deep or 1/2 the length of your finger). Then show students how to carefully place a sunflower seed inside the hole and gently cover it with soil.
- Planting:** Give one milk carton pot to each student and have them fill the pots with the soil mix from the wash bins, then create a hole as demonstrated. Give one sunflower seed to each student. Encourage them to look closely at their seed before planting it, observing its appearance and thinking of the tiny life inside. They may compare their seed to that of their neighbor, noticing the different shapes, sizes, and patterns. Ask students to describe the seeds. Have students hold the seeds in their hands to give them the energy and love they need to grow.



GROUP ACTIVITIES

CONTINUED

- Repeat:** Students may each plant another seed in another milk carton pot, or groups may switch if time allows.
- Watering:** Have students take turns watering the soil inside their milk carton pots gently with their watering can or cups (like rain, not waterfalls; allowing the soil to “sip and swallow”). Mention that young plants need lots of water and care. Be sure that the soil is thoroughly moist and drains out through the holes at the bottom of the pots.

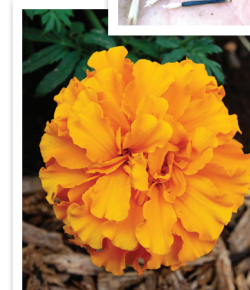
Bean Trellis: Gather all the students around the Trellis. “This structure is called a Trellis. Some people use a similar design for their homes; they cover the wood with cloth and sleep inside. Today we will plant pole bean seeds that will climb their way up to the top of our Trellis. This is the ‘door’ where we will enter our Trellis” Rocks should mark this area.

- Practice the Garden Agreements:** Help students to practice the Garden Agreements while they are outside in the garden.
- Observe:** Allow time for students to explore the garden soil and make observations with their many senses. Encourage them to share and ask questions about what they observe.
- Loosen the Soil:** Have students loosen the soil with their tools so that the new plant roots will have air and room to grow. Students may crumble soil chunks with their hands to make the soil soft and smooth. Level the surface of the soil and have students put their tools away.



Plant bean seeds about 6” apart from each other and not more than 4” away from the Trellis so they will grab on as they grow.

- Demonstrate:** Use your finger to show students how to create the hole for a bean seed, about 1” deep. All bean seeds should be planted close to the Trellis where young bean plants can reach the string for climbing. Show students how to place a seed in the hole and cover it firmly but gently with soil.
- Planting:** Have students make their holes (verify depth and placement), then give one seed to each student. Encourage them to look closely at their seed before planting it, observing its appearance and thinking of the tiny life inside. They may compare their seed to that of their neighbor, noticing the different shapes, sizes, and patterns. Ask students to describe the seeds. Have students hold the seeds in their hands to give them the energy and love they need to grow. Plant one seed per hole, about 6” apart. **BE SURE SEEDS ARE PLANTED CLOSE TO THE TRELLIS WHERE BEANS CAN REACH THE STRING FOR CLIMBING** (not more than 4” away). Be sure not to plant seeds where the ‘doors’ are located (there should be stones over these areas, and no string).
- Flowers:** Have students sprinkle the flower seeds (marigolds, cosmos, zinnias) at the edges of the garden bed around the Trellis and lightly cover them with soil. “These flowers will bring pollinators to your garden that will help the sunflowers and beans grow seeds to make new plants!”



- Repeat:** Students may plant more than one seed, or groups may switch if time allows.

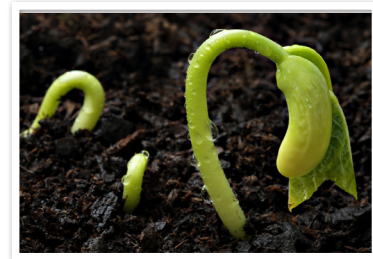
GROUP ACTIVITIES

CONTINUED

8. **Vermicast:** Add about 1 cup of vermicast to the garden. If the vermicast is moist, dissolve it in water and water the soil with the nutrient-rich water. If the vermicast is dry, sprinkle it over the soil and mix it in lightly.



9. **Watering:** Have students take turns watering the soil gently with their watering can or cups (like rain, not waterfalls; allowing the soil to “sip and swallow”). Mention that young plants need lots of water and care. Be sure that the soil is thoroughly and adequately moist.
10. **Cover Cloth (optional):** Cover the soil with a cover cloth after all seeds have been planted in order to protect them from the sun and birds. Be sure that the soil is thoroughly and adequately moist.



CLOSING

5 MINUTES

Gather all the students in the garden. Ask them to share about their experience.

Together with students, act out the sunflower life cycle, from sprouting seeds to tall plants and blooming flowers, to withered flowers with seeds!

Discuss with students:

- What do plants need in order to survive and thrive?
- What are the stages in the sunflower life cycle?
- What are our Garden Agreements?

“Please take good care of your gardens and make sure to water and visit them every day. It is very important that the soil stays moist so the seeds will sprout and grow!”

“When the sunflower sprouts are big enough you will transplant them around the inside edge of the garden bed so they will grow up to become the walls of the Sunflower House.

All students must wash their hands thoroughly with soap and water after working in the garden. Demonstrate the proper hand washing method: Wet, lather, and scrub hands and wrists with soap for 15 seconds (sing the ABC’s), then rinse thoroughly. Be conscious of keeping hands clean after washing.



FOLLOW UP GARDEN CARE

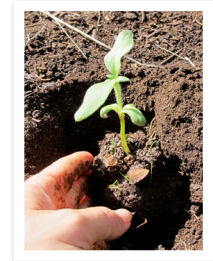
Follow Up Garden Care is the responsibility of the classroom teacher and students.

- Assign one or more **Garden Monitors** to water the garden and check for sprouts every day. Supplement as needed; it is critical that the soil stay evenly moist during sprouting. Feel the soil with your hand to a depth of about 2-3" to ensure that the soil is adequately moist.
- If the soil is covered with a cover cloth, remove it as soon as the first sprouts appear (within about 4 to 10 days). Hang to dry and store for future use.
- **Sunflower Care:** Keep the milk carton pots in a sunny location and make sure the soil stays constantly moist, and that water is allowed to drain out of the pots. As soon as the sunflower sprouts grow their first set of true leaves, carefully transplant them into the garden around the inside perimeter of the garden bed so that they form the walls of the Sunflower House. Be sure to leave spaces for the "doors" (there should be stones over these areas at each short end of the bed). Before letting the students plant, do a demonstration. Transplanting must be done properly, according to the directions at right.



• Transplanting Directions:

1. Use small tools to dig a hole for each plant. Find the correct depth of the hole by placing the potted plant in the hole. The soil level inside and outside the pot must match. Adjust depth as needed. Put the tools away.
 2. Gently tear away the milk carton OR, if necessary, gently squeeze the pot and turn it upside down as you place your hand around the plant and over the potting soil in order to support the plant as it comes out. Do not pull the plant out of the pot. Squeeze the pot gently if needed.
 3. Hold the plant and potting soil with two hands and place them gently in the hole. Make sure the plant is upright and not leaning to the side. Take your time filling in the garden soil. Press downward with your fingers to fill in any loose soil.
 4. Water the newly transplanted seedlings.
- Remove weeds from in and around the garden bed.
 - Students must wash their hands thoroughly with soap and water after working in the garden.



FOLLOW UP ACTIVITIES

Follow Up Activities are the responsibility of the classroom teacher.

- Have students complete the Garden Agreements and Sunflower Life Cycle Student Worksheet.
- Have students make daily or weekly garden observations and journal entries including notes, drawings, poems, stories, etc.
- Count with students how many days go by before the first sprout appears.
- Send home Take Home Letter.

Preparation for Lesson 2:

- Collect garden labels: popsicle sticks, plastic knives/spoons/forks, yogurt containers cut to approximately 1"x6" (anything that can be written on and used as a label in the garden).
- Create one label per student by writing their name on the label with a permanent marker.
- Have your students select a sunflower plant of their choice before Lesson 2 by placing their label next to the plant. Each plant may have more than one label next to it.

LESSON EXTENSIONS

Garden Creatures

(1.NBT.1, 1.MD.4, Obtaining, Evaluating, and Communicating Information, Analyzing and Interpreting Data)

1. Introduce students to the concepts of observation and data collection by having them observe the different types of creatures that live in the garden soil.
2. Have students take a scoop of soil, place it in a shallow bin, and discover and record:
 - How many different kinds of creatures are there? Have students draw and label each one.
 - How many of each creature are there? Have students tally the number of creatures found by type.
3. Create a data table and bar graph as a class to record and observe the types and numbers of creatures found in the garden soil.
4. Discuss with students the role of these creatures in helping plants grow by recycling nutrients in the soil.

The Garden Trellis:

A Useful Technological Device

(1.SL.5, FA.1.1.1, Constructing Explanations and Designing Solutions, Patterns)

1. Discuss with students:
 - Technology means 'the practical application of knowledge.'
 - A trellis is a frame or structure (or plant) that can support the growth of vining/climbing plants.
 - Trellises are useful garden structures and great examples of technology. What are we using as a trellis in our garden?
 - Different types of plants have different characteristics which dictate their needs, growing abilities, and uses.
 - A tendril is a threadlike part of climbing plants, often growing in a spiral form, that helps the plant climb by attaching itself to objects (such as a trellis).
2. In the garden, observe the characteristics and growing styles of plants. For a closer look, have students draw and describe the tendrils on bean plants and other parts of plants in the garden.
3. Discuss with students:
 - "What have you observed about the differences between sunflower plants and pole bean plants in how they grow?" Sunflower plants stand on their own and pole bean plants climb on a trellis.
 - "What would happen if there was no trellis for the beans to climb on?" They would grow along the ground.
 - "Why is it important to have the trellis?" So the beans will stay clean, and not get eaten by slugs or other garden creatures (decomposers).
 - "What materials were used to make our garden trellis?" Bamboo and string.
 - "Bamboo is a plant (a type of grass). What are some of its characteristics?" Very hard stem, hollow center.
 - "What tools may have been used to make the trellis?" Saw to cut the bamboo, clippers to cut off the side branches and leaves, scissors to cut the string.
 - "What characteristics (including plant structures, like tendrils) allow the bean plants to climb up the trellis?"
 - "What natural objects could be used as trellises?" Trees, sunflowers, corn plants, etc.
 - "What other materials could be used to make trellises?" Metal bars, wood pallets, etc.
 - Walk around the campus noticing: 1) Other interesting structures; 2) Other examples of technology; 3) Other interesting plants and their characteristics.





Student Worksheet
THE GARDEN AGREEMENTS

Name

Class Date

Directions: Draw a picture of you in the garden following the Garden Agreements.
Color the Garden Agreements on page 2.

I WILL BE SAFE

*

I WILL BE KIND

*

**I WILL HAVE
AN OPEN MIND**

*

**I WILL USE
MY TIME WELL**

Sunflower Life Cycle

Part 1 Directions: Draw, color, and label the four stages of the sunflower's life.

Word List

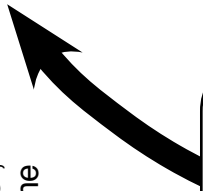
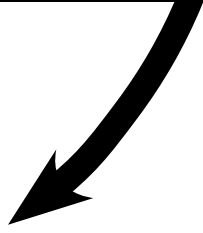
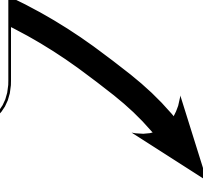
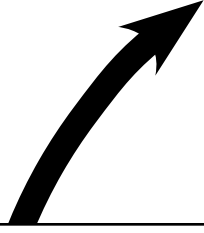
- flower
- seed
- sprout
- withered flower

3 _____

2 _____

1 _____

4 _____



What Do Plants Need to Survive and Thrive?

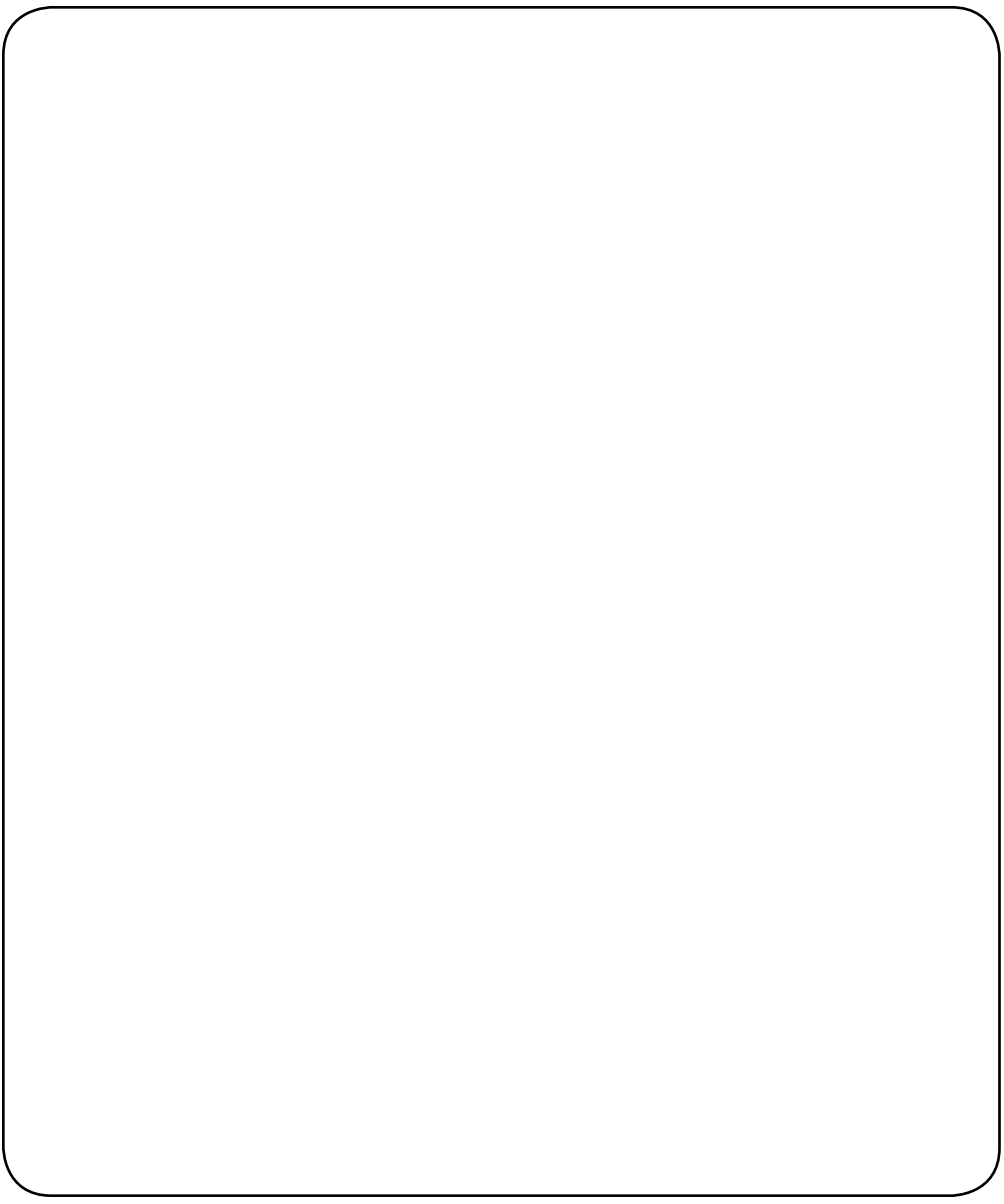
Part 2 Directions: List the five things that a plant needs to survive and thrive. Choose words from the list in the box.

WORD LIST

WATER	MILK	CAR	CANDY	HAT
TOYS	SOIL	LOVE	AIR	SUN

1. _____
2. _____
3. _____
4. _____
5. _____

Part 3 Directions: Draw a picture of what you think your Sunflower House and Bean Trellis Gardens will look like when the plants grow up:



DESCRIPTION

Students will act out the life cycle of a sunflower plant and discuss data collection and the use of tools for measuring. They will collect and record data and observations about a sunflower plant of their choice and care for their garden by adding vermicast fertilizer.

TIME: 45 minutes

SUBJECTS: Fine Arts, Health, Language Arts, Math, Science

LEARNING OBJECTIVES

After this lesson students will be able to:

- Describe and act out the life cycle of a sunflower.
- Use tools, observation skills, and a data table to collect and record data in the garden.
- Recognize that people can help gardens grow by giving them love and feeding the soil.



ACADEMIC STANDARDS*

CCSS, Language Arts: 1.W.3, 1.W.8 **CCSS, Mathematics:** 1.MD.1, 1.MD.2, 1.MD.4 **HCPS III:** HE.K-2.1.7, FA.1.4.4, **NGSS:** LS3.A, LS3.B, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Constructing Explanations and Designing Solutions, Developing and Using Models, Patterns, Systems and System Models **Lesson Extensions:** 1.OA.1, 1.NBT.1, 1.MD.4, 1.W.1, 1.W.2, 1.W.3, 1.SL.4, 1.SL.5, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Patterns

*A detailed list of the Academic Standards can be found in the Unit Overview document

LESSON OUTLINE

- I. Introduction (15 minutes)
 1. Sunflower Life Cycle Review
 2. Data Collection
 3. Measuring Tools
 4. Group Activities Overview
- II. Group Activities (25 minutes)
 1. Data Collection and Observations (12 minutes)
 2. Garden Care (12 minutes)
- III. Closing (5 minutes)

KEY TERMS AND CONCEPTS

Data - Information; a collection of facts, measurements, and observations

Life Cycle - The series of changes occurring in an organism between one developmental stage and the identical stage in the next generation

Scientist - A person who studies or practices any of the sciences (e.g. biology) or who uses scientific methods (e.g. making observations and collecting data)

Thrive - To grow or develop vigorously, to flourish

LESSON MATERIALS

Community Supplies:

- Tape measure
- Twine (optional, see Advanced Preparation)
- Clothespins or other clips (1 per student, to hold papers onto clipboards)
- Vermicast (about 1 cup per class)

Lesson Supplies:

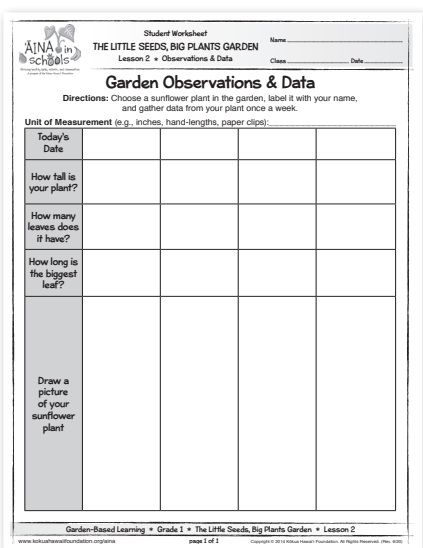
- Garden Agreements Sign
- Seeds: Extra sunflower and pole bean seeds to fill in gaps
- Student Workbook

Teaching Team To Provide:

- Garden labels (see Advance Preparation); be sure to use a permanent marker
- Paper clip ruler (see Advance Preparation)

School To Provide:

- Yardstick
- Ruler
- Clipboards (1 per student)
- Pencils (1 per student)
- Bucket and cups for watering



Student Worksheet
THE LITTLE SEEDS, BIG PLANTS GARDEN
Lesson 2 * Observations & Data

Name _____
Class _____ Date _____

Garden Observations & Data

Directions: Choose a sunflower plant in the garden, label it with your name, and gather data from your plant once a week.

Unit of Measurement (e.g., inches, hand-lengths, paper clips):

Today's Date			
How tall is your plant?			
How many leaves does it have?			
How long is the biggest leaf?			
Draw a picture of your sunflower plant			

Garden-Based Learning * Grade 1 * The Little Seeds, Big Plants Garden * Lesson 2
page 1 of 1

Student Worksheet:
Garden Observations & Data

ACCOMPANYING DOCUMENTS

- Student Worksheet: Garden Observations & Data

ADVANCE PREPARATION

- Discuss lesson preparation and presentation plans with your teaching team.
- Make copies of the Student Worksheet, one per student if not using the Student Workbook.
- Collect garden labels: popsicle sticks, plastic knives/spoons/forks, yogurt containers cut to approximately 1"x6" (anything that can be written on and used as a label in the garden).
- Create one label per student by writing their name on the label with a permanent marker.
- Have students select a sunflower plant before Lesson 2 by placing their label next to a plant of their choice. Each plant may have more than one label next to it.
- Create a paper clip ruler by linking 10 small paper clips together. Twine can also be used as a tool for measurement, if desired. After measuring with the twine, the length of the twine can be placed next to the paper clip ruler and students can count how long the twine is in paper clips.
- Have each student ready with a clipboard, pencil, and Student Workbook with their name and today's date written at the top of the Garden Observations & Data Student Worksheet.

INTRODUCTION

15 MINUTES

SUNFLOWER LIFE CYCLE REVIEW

"In our last lesson we drew the LIFE CYCLE of a sunflower plant. Let's act out the stages of the sunflower life cycle using our bodies! How does the life of a sunflower begin?" Desired answer: As a seed!

Act Out: Lead the students through the sunflower life cycle: seed, sprout, flower, pollination (buzz around and lightly touch them on the head as if pollinating), seeds developing inside the flower, flower head getting heavy, withering and dropping seeds. "What happens to the seeds?"



Desired answer: They fall to the ground and begin to grow again! "What sound do seeds make? Seeds are very quiet and still when they reach the soil. This is the LIFE CYCLE that goes around and around!" Have students be seated.

DATA COLLECTION

"Today we will go into the garden to collect data and make observations in nature, just like SCIENTISTS do. Do you know what the word DATA means?" Accept a few student answers. "Data is information, including something you can measure or count. For example, when I count the number of leaves that a plant has, I am collecting data about the plant. What other data can we collect in the garden?" Examples may include the height of plants, length of the longest leaf, number of pollinators observed, number of worms in a cup of garden soil, etc.

"Have you chosen your sunflower plants to observe? Today each of you will collect data about your chosen plant. You will record your data every week on your worksheet. Be sure to take good care of your plant by visiting it regularly and making sure it has everything it needs in order to grow and THRIVE. You can help your plant, just like plants help us by giving us food, beauty, and fresh air."

MEASURING TOOLS

"In order to help us collect data, we can use different tools to make measurements, including rulers, yard sticks, tape measures, paper clip rulers, and even your hands." Show measuring tools. Consult with teachers on which unit of measurement to use.

"In the garden today the adults will help you make measurements that you can record as data."

Show the Garden Observation & Data Student Worksheet to students and explain that they will record their data in the table on the data sheet. Read the types of data that they will record: 1) Today's date; 2) Plant height (in your chosen unit of measurement); 3) Number of leaves; 4) Length of the biggest leaf; 5) A drawing of their plant. Each week students will gather and record their garden observations in a new row on the Garden Observation & Data Student Worksheet.

GROUP ACTIVITIES OVERVIEW

"It is very important that we give love to our garden by feeding the soil and the plants so that they will THRIVE and produce lots of seeds and beans for us to eat and plant. Today we will water and give vermicast fertilizer to the soil in order to keep our garden healthy."

Garden Agreements

Have students take a deep breath, then review the Garden Agreements:

- I will be SAFE
- I will be KIND
- I will have an OPEN MIND
- I will use my TIME WELL



Divide the students into two groups before going outside. Have students bring their clipboards, pencils, and Student Worksheets to the garden. Bring the measuring tools of choice.

GROUP ACTIVITIES

25 MINUTES

All students will go out to the garden together.

DATA COLLECTION AND OBSERVATIONS

(12 minutes)

Encourage students to think like SCIENTISTS by making observations and collecting data in order to learn more about their garden plants, soil, and more!



Data Collection:

- On their Garden Observations & Data Student Worksheets have students record the number of leaves on their chosen sunflower plant.
- Help students to measure the height of their plant and length of the largest leaf using the chosen tools and unit of measurement.
- Students may also compare the measurements to the size of their finger, hand or foot.

Observations:

- Students may record additional data and observations (words and drawings) on the back side of their Garden Observation & Data Student Worksheets.
- Suggested observations include:
 - Counting, measuring, and drawing flowers, stems, bean pods, etc.
 - Look for pollinators and other garden creatures.
 - Feel and describe the garden soil.
 - Observe the weather and the presence of wildlife (birds, etc.).
 - Observe the similarities and differences between sunflowers and pole bean plants.
 - Notice that every plant is different!



GARDEN CARE (12 minutes)

Caring for the Garden:

- **Vermicast:** Add about 1 cup of vermicast to the garden. If the vermicast is moist, dissolve it in water and water the soil with the nutrient-rich water. If the vermicast is dry, sprinkle it around the base of plants and gently mix it into the soil.
- **Watering:** Have students take turns watering the soil gently with their watering can or cups (like rain, not waterfalls; allowing the soil to “sip and swallow”). Add more water as needed to keep the soil evenly moist.
- Show students how to carefully pull out weeds (students may use sticks as weeding tools).

In-between and After Lessons:

- Have adults plant extra sunflower seeds if necessary to fill in any gaps.
- Have adults plant more pole bean seeds at the Bean Trellis for staggered harvest (space permitting).



CLOSING

5 MINUTES

Gather all the students in the garden. Ask them to share about their experience.

Discuss with students:

- How did you practice being SCIENTISTS today?
- What changes have you observed in the garden?
- Share about the measurements you made today.
- What does the word DATA mean?
- How did you help the garden today?

“Please take good care of your gardens and make sure to water and visit them every day. Remember to collect data and observations about your sunflower plants once a week! In our next lesson we will learn how to harvest beans to eat!”

All students must wash their hands thoroughly with soap and water after working in the garden.

FOLLOW UP GARDEN CARE

Follow Up Garden Care is the responsibility of the classroom teacher and students.

- Continue to have Garden Monitors and other students water and visit the garden daily.
- Remove weeds from in and around the garden bed.
- Have students harvest, wash, count and eat any available fresh green beans. You may want to record the data (number of green beans harvested) on the Class Data Sheet from Lesson 3.
- Students must wash their hands thoroughly with soap and water after working in the garden.

FOLLOW UP ACTIVITIES

Follow Up Activities are the responsibility of the classroom teacher.

- **Data Collection:** Allow time each week for students to make observations and gather and record data about their chosen sunflower plant on their Garden Observation & Data Student Worksheets.
- Have students make daily or weekly garden observations and journal entries including notes, drawings, poems, stories, etc.



LESSON EXTENSIONS

More Science, Math, and Language Arts in the Garden

(1.OA.1, 1.NBT.1, 1.MD.4, 1.W.1, 1.W.2, 1.W.3, 1.SL.4, 1.SL.5, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Patterns)

1. Have students make other quantitative and qualitative observations on the back of their Garden Observation & Data Student Worksheets or in their journals. For example:
 - Draw and count the different types of garden creatures and the number found by type. Add the numbers to find the total.
 - Notice how the plants change. What makes them grow? (Sunlight, water, soil, air, and love.)
 - Do a weather study. Create a rain gauge or observe the movement of the sun across the garden throughout the day. Relate this to the growth patterns of the garden plants.
 - Observe, describe and draw or trace symmetrical and non-symmetrical shapes found in the garden.
 - Find patterns in the garden; describe and draw them.
 - Utilize the “suggested observations” under the “Data Collection and Observations” section in this lesson.
2. Visit the garden to get inspired. Have students draw pictures, write a story, poem, or song about their plant and/or other aspects of the garden and schoolyard.





Name

Class Date

Garden Observations & Data

Directions: Choose a sunflower plant in the garden, label it with your name, and gather data from your plant once a week.

Unit of Measurement (e.g., inches, hand-lengths, paper clips): _____

Today's Date				
How tall is your plant?				
How many leaves does it have?				
How long is the biggest leaf?				
Draw a picture of your sunflower plant				



Student Worksheet
THE LITTLE SEEDS, BIG PLANTS GARDEN
Lesson 2 * Observations & Data

Name

Class Date

Part 2 Directions: Draw a picture of you next to your sunflower.

1) How tall do you think your sunflower will grow?

2) Who do you think will be taller at the end of the semester? You or your sunflower?

DESCRIPTION

Students will learn how to properly harvest and wash green beans for eating and for saving seeds. In the garden they will read *A Bean's Life* and explore, harvest, count, and wash their green beans. They will continue data collection on their sunflower plants and care for the garden. During the Closing they will act out the green bean life cycle and enjoy their green bean snack, or take them home to share with their families.

TIME: 45 minutes

SUBJECTS: Health, Language Arts, Math, Science

LEARNING OBJECTIVES

After this lesson students will be able to:

- Describe and act out the life cycle of a green bean.
- Properly harvest green beans for eating and saving seeds.
- Properly wash their hands before harvesting and their vegetables before eating.
- Care for their gardens by adding compost, mulch, and vermicast fertilizer.

ACADEMIC STANDARDS*

CCSS, Language Arts: 1.RI.1, 1.RI.2, 1.RI.7, 1.W.2, 1.W.3, 1.W.8, 1.SL.4, 1.SL.5; **CCSS, Mathematics:** 1.MD.4 **HCPS III:** FA.1.4.4, HE.K-2.1.7, **NGSS:** LS3.A, LS3.B, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Constructing Explanations and Designing Solutions, Developing and Using Models, Patterns, Systems and System Models
Lesson Extensions: 1.RI.1, 1.RI.2, 1.RI.7, HE.K-2.1.8, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Patterns

*A detailed list of the Academic Standards can be found in the Unit Overview document

LESSON OUTLINE

- I. Introduction (15 minutes)
 1. Sunflower Life Cycle Review
 2. Growth, Harvest, and Seed Saving
 3. Group Activities Overview
- II. Group Activities (25 minutes)
 1. *A Bean's Life* and Green Bean Harvest (12 minutes)
 2. Sunflower Data Collection and Garden Care (12 minutes)
- III. Closing and Snack (5 minutes)



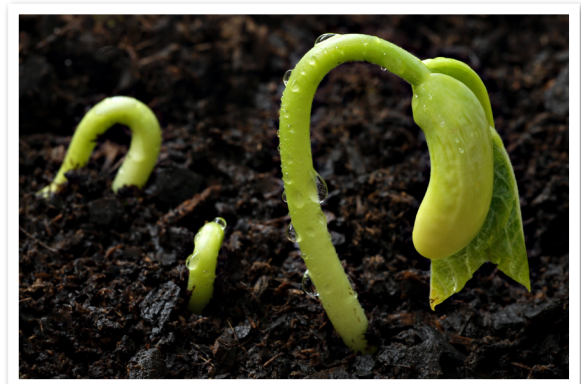
KEY TERMS AND CONCEPTS

Harvest - To pick or gather edible crops and seeds

Life Cycle - The series of changes occurring in an organism between one developmental stage and the identical stage in the next generation

Mature - Complete in natural growth or development

Trellis - A frame or structure (or plant) that can support the growth of vining/climbing plants



LESSON MATERIALS

Community Supplies:

- Tape measure
- 2 garden clippers (for adult use)
- Harvest basket
- Colander
- Large bowl
- Soap
- 2 plastic wash bins (for washing hands)
- 2 plastic wash bins (for shelling green bean seeds)
- Clean scissors (for cutting green beans)
- Optional: Blue painter's tape (for marking beans for seed saving, see Advance Preparation)
- Vermicast (about 1 cup per class)

Lesson Supplies:

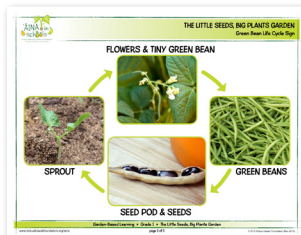
- Book: *A Bean's Life* by Nancy Dickmann
- Green Bean Life Cycle Sign
- Green Bean Harvest Sign
- Harvest Song Sign
- Garden Agreements Sign
- Green bean seed
- Student Workbook

Teaching Team To Provide:

- Green beans and flower for demonstration (see Advance Preparation)
- Newspaper for drying seeds
- Envelope for saving seeds

School To Provide:

- 1 clipboard
- 1 pencil
- Ruler
- Paper clip ruler (see Advance Preparation)
- Bucket and cups for watering
- Compost (about 1/2 bucket per class)
- Mulch (about 1 bucket per class)
- Bucket to collect snack waste



Green Bean Life Cycle Sign



Green Bean Harvest Sign

ACCOMPANYING DOCUMENTS

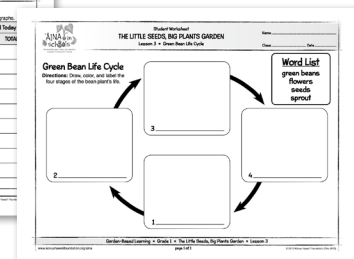
- Class Data Sheet: Green Bean Harvest
- Student Worksheet: Green Bean Life Cycle

ADVANCE PREPARATION

- Discuss lesson preparation and presentation plans with your teaching team.
- Make copies of the Class Data Sheet, one per class.
- Make copies of the Green Bean Life Cycle Student Worksheet, one per student if not using the Student Workbook.
- Locate the Garden Observations & Data Student Worksheets from Lesson 1 for students to continue sunflower data collection.
- Harvest a green bean flower and green beans of different sizes (e.g. too small, just right for eating, 'bulging', and just right for seed saving). See the Green Bean Diagram for reference.
- Create a paper clip ruler by linking 10 small paper clips together.
- Optional: Mark several pods on the vine that are 'bulging' (see Green Bean Harvest Sign) with a small piece of blue painter's tape so the students will know not to pick them.
- Optional: Set up a handwashing station in the garden using the plastic wash bins (2 wash bins with soap and water; rinse hands with the hose).



Class Data Sheet:
Green Bean Harvest



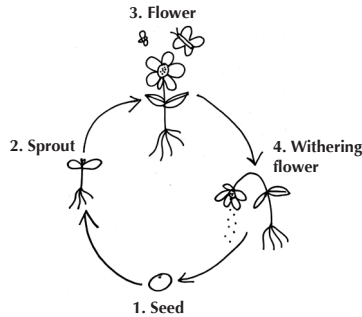
Student Worksheet:
Green Bean Life Cycle

INTRODUCTION

15 MINUTES

SUNFLOWER LIFE CYCLE REVIEW

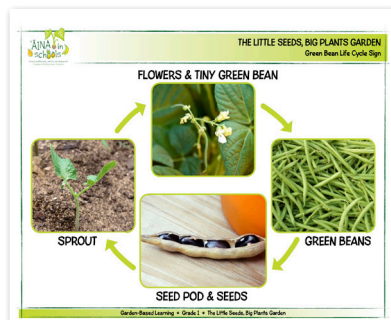
“In our last lesson we collected data in our garden. We made observations. Let’s react out the stages of the sunflower LIFE CYCLE using our bodies! How does the life of a sunflower begin?”
 Desired answer: As a seed!



Act Out: Lead the students through the sunflower life cycle: seed, sprout, flower, pollination (buzz around and lightly touch them on the head as if pollinating), seeds developing inside the flower, flower head getting heavy, withering and dropping seeds. “What happens to the seeds?” Desired answer: They fall to the ground and begin to grow again! “What sound do seeds make? Seeds are very quiet and still when they reach the soil. This is the LIFE CYCLE that goes around and around!” Have students be seated.

GROWTH, HARVEST AND SEED SAVING

Show students a green bean seed. “What kind of seed is this? What type of plant will it become if we plant it in the garden and make sure it has everything it needs?”
 Desired answer: A bean plant! Point to the seeds on the Green Bean Life Cycle Sign. “This is the first stage of the bean plant’s LIFE CYCLE.”

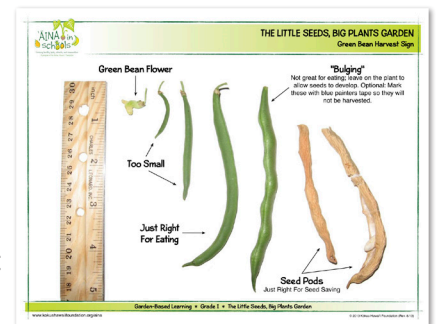


Green Bean Life Cycle Sign

Seed to Plant: “The little pole bean seeds that you planted in your garden have grown into very tall plants! They have grown up the TRELLIS which is the

structure that gives them support and keeps them off of the ground as they grow.” Ask students to share about the similarities and differences between the way that pole beans and sunflowers grow.

Flowers: “As the green bean plants have grown, flowers have begun to form. Have you seen flowers on your bean plants in the garden? How big are they? What color are they?” Show the green bean flower or point to it on the Green Bean Harvest Sign.



Green Bean Harvest Sign

Point to the flower on the Green Bean Life Cycle Sign.

Green Beans: “Next a tiny green bean starts to grow.” Show a tiny green bean or point to it on the Green Bean Harvest Sign. “Is this green bean ready for us to HARVEST, or to pick, and eat? No! Please leave it on the plant so it will receive nourishment and grow bigger until it looks like this.” Show ‘just right for eating’ green bean or point to it on the Green Bean Harvest Sign. “How long is this bean?” Measure it with a ruler (about 3 to 5 inches long) or other unit of measurement. “This green bean is just right to harvest, wash, and eat!” Point to both stages on the Green Bean Life Cycle Sign.

Young Seeds: “If we leave our green beans on the plant, the little seeds that are inside the green bean will continue to grow.” Show ‘bulging’ bean (pod is green but seeds are bulging) or point to it on the Green Bean Harvest Sign. “This bean is no longer very yummy to eat. Should we pick it? No, because if we leave it on the plant, the seeds will continue to grow until they are ready to be planted.” Optional: Explain that some of these pods have been marked with blue tape in the garden so the students will know not to pick them.

INTRODUCTION

CONTINUED

Mature Seeds: Show the 'seed pod' (yellow/brown with mature seeds inside) or point to it on the Green Bean Harvest Sign. "This bean has seeds inside that are MATURE, which means they are finished growing and are ready to be harvested and planted!" Point to the seed pod and seeds on the Green Bean Life Cycle Sign.

GROUP ACTIVITIES OVERVIEW

"In the garden today one group will explore the green bean life cycle and harvest green beans to eat and seeds for saving. The other group will measure sunflowers, record data, and care for the garden, then we will switch."

"Please ask an adult if you are unsure about which beans to harvest." Sing the Harvest Song twice with students so that they will remember to use two hands while harvesting and to wash their vegetables before they are eaten.

"It is also important that we wash our hands well with soap and water before harvesting and eating."



Harvest Song Sign

Garden Agreements

Have students take a deep breath, then review the Garden Agreements:

- I will be SAFE
- I will be KIND
- I will have an OPEN MIND
- I will use my TIME WELL



Divide the students into two groups. Have the garden group wash their hands well before going outside in preparation for harvesting.



Bring the harvest basket, measuring tools (for measuring edible green beans and sunflower plants), Student Worksheet, and Class Data Sheet with clipboard and pencil to the garden. Students should wash their hands thoroughly with soap and water before harvesting.

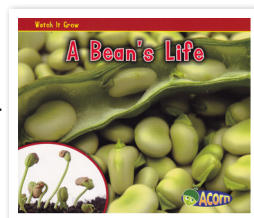
GROUP ACTIVITIES

25 MINUTES

Rotate groups after 12 minutes. Regroup for closing.

A BEAN'S LIFE AND GREEN BEAN HARVEST
(12 minutes)

Book: Read *A Bean's Life* by Nancy Dickmann to explore the green bean life cycle with students. Have students wash their hands in preparation for green bean observations and harvesting.



Life Cycle Exploration: Move to the garden and have the students explore the green bean trellis, looking for green beans at different stages of the LIFE CYCLE.

Harvest: Help students as they locate and harvest the edible beans and the seed pods. Collect them in the harvest basket. Note: In order to keep the basket and produce clean do not place the harvest basket on the ground. Take turns holding the basket.

GROUP ACTIVITIES

CONTINUED

Count and Wash Edibles: Together with the students, count the number of edible green beans and record the number on the Green Bean Harvest Class Data Sheet. Wash them in the colander and put them in the large bowl. Optional: Have an adult use the clean scissors to cut some of the green beans into smaller pieces for the tasting during the Closing and Snack.

Shell and Count

Seeds: Use the dry plastic wash bins as a seed saving station where mature seeds can be removed from their pods. Help students count how many seeds there are and record the data on the Green Bean Harvest Class Data Sheet. Seeds may be taken home or saved in the classroom for future planting. Lay them to dry on sheets of newspaper in the classroom for several days before putting them into an envelope for future planting. Be sure to label the envelope with the harvest date and type of seed.



Garden Care:

- **Vermicast:** Add about 1 cup of vermicast to the garden. If the vermicast is moist, dissolve it in water and water the soil with the nutrient-rich water. If the vermicast is dry, sprinkle it around the base of plants and gently mix it into the soil.
- **Watering:** Have students take turns watering the soil gently with their watering can or cups (like rain, not waterfalls; allowing the soil to “sip and swallow”). Add more water as needed to keep the soil evenly moist.
- **Compost and Mulch:** Add compost to the soil around the base of plants and mix it in lightly. Shake it off of the leaves if necessary. Place mulch over the soil to protect it from the sun, preserve moisture, and discourage weeds.
- Show students how to carefully pull out weeds (students may use sticks as weeding tools).

All students must wash their hands thoroughly with soap and water after working in the garden and before eating their snack.

SUNFLOWER DATA COLLECTION AND GARDEN CARE

(12 minutes)

Data Collection: “In the garden today the adults will help you make measurements that you can record as data.” Show the Garden Observation & Data Student Worksheet from the previous lesson to students. Remind students the types of data that they will record: 1) Today’s date; 2) Plant height (in your chosen unit of measurement); 3) Number of leaves; 4) Length of the biggest leaf; 5) A drawing of their plant.



CLOSING AND SNACK

5 MINUTES

Gather all the students in the garden.

Act Out: Lead students through this activity:

- Curl up as if you are a little bean seed and close your eyes because it's dark inside!
- When rain falls and the sun warms the soil, you begin to sprout! Your roots grow down into the soil and your stem and leaves emerge from the soil and slowly grow taller and taller!
- Flowers start to form all along the bean plants.
- Then tiny green beans form where the flowers were, and they grow bigger until the gardeners come along to harvest them!
- Some green beans are still on the plants and the seeds inside them grow bigger and bigger!
- When the pods are dry the seeds fall to the soil and begin to grow again!



Ask the students to share about their experience.

Discuss with students:

- What are the stages in the green bean life cycle?
- Describe a green bean that is ready to be harvested, washed, and eaten.
- How do you know when the green bean seeds are ready to be harvested?

Have students share what they are thankful for before eating the fresh green beans.

“In our next lesson we will harvest and count sunflower seeds! Please remember to visit and water your gardens every day and continue to make observations and collect data from your garden.”

Have students place snack waste in a bucket and then add it to the school's compost pile when finished.



FOLLOW UP GARDEN CARE

Follow Up Garden Care is the responsibility of the classroom teacher and students.

- Continue to have Garden Monitors and other students water and visit the garden daily.
- Remove weeds from in and around the garden bed.
- Continue to have students harvest, wash, count and eat any available fresh green beans. Harvest green bean seeds from yellow or brown pods as available; dry and save for planting. Record the data on the Green Bean Harvest Class Data Sheet.

- Harvest fresh and withered flowers (marigolds, cosmos, zinnias) from the garden. Dry and save seeds for future planting, or replant the seeds.
- Students must wash their hands thoroughly with soap and water after working in the garden.



FOLLOW UP ACTIVITIES

Follow Up Activities are the responsibility of the classroom teacher.

- Have students complete the Green Bean Life Cycle Student Worksheet.
- Have students make daily or weekly garden observations and journal entries including notes, drawings, poems, stories, etc.

Data and Observations:

- Have students continue to make observations and gather and record data about their sunflower plant (make more copies of the Garden Observations & Data Student Worksheet from Lesson 2).
- Have students count the number of fresh green beans and green bean seeds harvested and record the data on the Green Bean Harvest Class Data Sheet.



Data Discussion:

- Have students share about their data from their Garden Observations & Data Student Worksheets (sunflower data) with the class.
- Collect student data from one or more data categories on the whiteboard in a data table. Visualize the comparison with students by creating graphs.
- Help students use the data collected on the Green Bean Harvest Class Data Sheet to create bar graphs (e.g. Number of green beans and seeds harvested per day or week) in order to visualize the results. As a class discuss any observations about the data and results.
- Discuss the fact that each plant is different from the other plants of the same kind. Why are there differences? Some answers may include:
 - Every living individual is unique due to their inherited traits/genes.
 - Plants in the same garden bed or area may be exposed to different conditions (i.e. sun or shade, lots of water or little water, soil drainage, more or less attention and care, etc.).

Sunflower House and Bean Trellis Experience:

- Allow students to experience being inside the Sunflower House and Bean Trellis.
- Normally we do not walk in garden beds in order to keep the soil soft for plants, but these themed gardens are the exception!
- Ask students to imagine that they are garden creatures like birds, bees, and other pollinators or tiny insects in nature.
- Supervise the students so that everyone gets a turn and they are careful with the plants and the garden.

LESSON EXTENSIONS

A Closer Look at Sunflowers and Beans

(1.W.2, 1.SL.4, 1.SL.5, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Patterns)

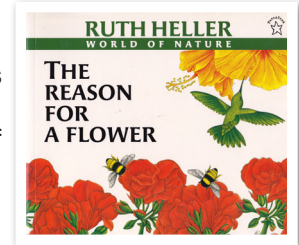
- Ask students to observe, compare, and record (through informative text and drawings) the similarities and differences between their sunflower and pole bean plants:
 - Stem: Size and strength. Can it stand on its own? Why or why not?
 - Leaves: Size, shape, and number per plant. What are the similarities and differences?
 - Flowers: Size, shape, number, color. If you were a bird, bee, or butterfly, which flower would you visit? Why?
 - Seeds: Where do they form on each plant?
Sunflower: Inside the flower head. Beans: Inside the pod, after the flowers fall off.
- Have students share their observations as a class.



Flowers, Seeds, Fruits, and Vegetables

(1.RI.1, 1.RI.2, 1.RI.7, HE.K-2.1.8)

- Read *The Reason For A Flower* by Ruth Heller and discuss with students the important role of flowers in the formation of seeds, fruits, vegetables, and other useful items. Talking points may include:



- Discuss which plants produce fruit with seeds inside (apple, orange, watermelon, etc.). Talk about where the fruits grow (on a tree or vine, etc.).
- Talk about why plants make fruits. E.g. When fruits are eaten by animals or birds, the seeds can be dispersed away from the parent plant. This way, the young plants aren't shaded by the parent plant and they have more room to grow.
- Discuss the concept of "close to the source" foods (foods that come directly from nature) and how they are much healthier for our bodies than processed/refined foods. Have the students think of examples of "close to the source" and processed/refined foods. E.g. potato vs. potato chip, strawberries vs. strawberry-flavored ice cream, apples vs. apple-flavored cereal.





Name

Class Date

Green Bean Harvest

Directions: As a class, harvest, tally, and total the number of items in each category. Use the data to create bar graphs.

Today's Date	Number of GREEN BEANS Harvested Today		Number of GREEN BEAN SEEDS Harvested Today	
	TALLY	TOTAL	TALLY	TOTAL

Green Bean Life Cycle

Part 1 Directions: Draw, color, and label the four stages of the bean plant's life.

Word List

- green beans
- flowers
- seeds
- sprout

3 _____

2 _____

1 _____

4 _____



Student Worksheet
THE LITTLE SEEDS, BIG PLANTS GARDEN
Lesson 3 * Green Bean Life Cycle

Name

Class Date

Part 2 Directions: Draw a picture of you eating your green bean.
Describe how it tasted.

DESCRIPTION

Students will review the sunflower life cycle, discuss pollination, and read *From Seed to Sunflower*. They will harvest mature sunflower heads and bean pods, then harvest and save the seeds. They will draw two life-sized sunflower charts, experience being inside the Sunflower House and Bean Trellis, care for their gardens, and enjoy a sunflower seed and green bean snack.

TIME: 45 minutes

SUBJECTS: Fine Arts, Health, Science

LEARNING OBJECTIVES

After this lesson students will be able to:

- Understand that pollination occurs when pollen is transferred between flowers, and that seeds are formed as a result.
- Understand that pollinators are important because they help plants create seeds.
- Harvest sunflower and green bean seeds for counting, saving, and replanting.
- Work collaboratively to produce artistic representations of nature.

ACADEMIC STANDARDS*

CCSS, Language Arts: 1.RI.1, 1.RI.2, 1.RI.7, 1.W.3, 1.W.8
HCPS III: FA.1.1.1, FA.1.1.5, HE.K-2.1.7
NGSS: LS3.A, LS3.B, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information, Constructing Explanations and Designing Solutions, Patterns, Systems and System Models
Lesson Extensions: 1.OA.1, 1.NBT.1, 1.MD.4

*A detailed list of the Academic Standards can be found in the Unit Overview document

LESSON OUTLINE

- I. Introduction (10 minutes)
 1. Life Cycle Review and Pollination
 2. *From Seed to Sunflower*
 3. Group Activities Overview
- II. Group Activities (25 minutes)
 1. Sunflower Drawing
 2. Garden Activities
- III. Closing and Snack (10 minutes)



KEY TERMS AND CONCEPTS

Pollen - A fine powdery substance, typically yellow, produced by “male” flower parts and important for pollination and the creation of seeds

Pollination - The transferring of pollen between flower parts (from stamen to stigma); a process required for fertilization and the creation of seeds

Pollinators - Insects, animals, and people that pollinate plants

Seed Saving - The practice of harvesting, drying, and saving seeds for future planting



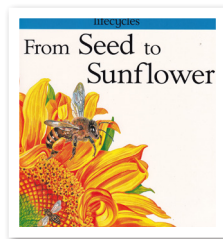
LESSON MATERIALS

Community Supplies:

- Tape measure
- 2 garden clippers (for adult use)
- Harvest basket
- Colander
- Large bowl
- Soap
- 2 plastic wash bins (for washing hands)
- 2 plastic wash bins (for the seed harvest)
- Clean scissors (for cutting green beans)
- Blue painter's tape
- Vermicast (about 1 cup per class)

Lesson Supplies:

- Book: *From Seed to Sunflower* by Gerald Legg and Carolyn Scrace
- Pollination Sign
- Bee With Pollen Sign
- Green Bean Harvest Sign
- Harvest Song Sign
- Garden Agreements Sign
- Sunflower seed
- Paper rolls (2 per class, approx. 6' long by 12" wide for the sunflower growth chart drawings)
- Student Workbook



Teaching Team To Provide:

- A blanket big enough for 10-12 students to sit on
- Newspaper for drying seeds
- Envelope for saving seeds
- Optional: Sunflower seeds for snacking

School To Provide:

- Bucket and cups for watering and snack waste
- Markers

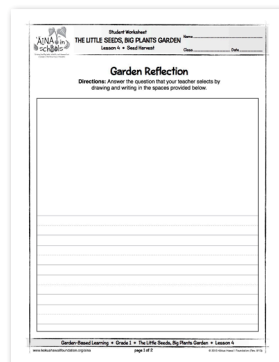


ACCOMPANYING DOCUMENTS

- ĀINA Post-Unit Survey
- Student Worksheet: Garden Reflection

ADVANCE PREPARATION

- Discuss lesson preparation and presentation plans with your teaching team.
- Make copies of the ĀINA Post-Unit Survey and Student Worksheet, one per student if not using the Student Workbook.
- Optional: Purchase sunflower seeds for the snack (e.g. roasted, with shell). Otherwise, use sunflower seeds harvested from the garden for the snack.
- Optional: Set up a handwashing station in the garden using the plastic wash bins (2 wash bins with soap and water; rinse hands with the hose).



Student Worksheet:
Garden Reflection



INTRODUCTION

10 MINUTES

“Today is our last garden lesson of the semester. We will go to the garden to harvest mature sunflower seeds and pole bean seeds!”

LIFE CYCLE REVIEW AND POLLINATION

Show a sunflower seed. “What kind of seed is this? What type of plant does it become? Do you remember planting the seeds? Do you remember when the sprouts came up? Now those tiny seeds and sprouts have grown into tall sunflowers! Today we will measure the tallest one and then you will draw a life-sized picture of it together.”

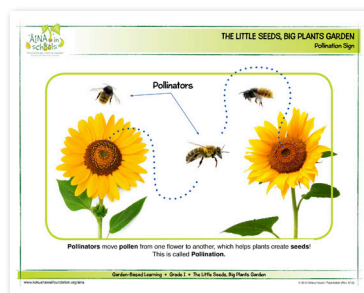
“Have you noticed any insects that have visited your sunflowers?” Desired answer: Bees!

“Do you know what the fine yellow powder is called that comes from the flowers and sticks to the bodies of the bees?” Desired answer: POLLEN! Show the Bee With Pollen Sign.



Bee With Pollen Sign

“When the bees move from flower to flower and pollen is transferred, what begins to form inside the flower?” Desired answer: Seeds! Show the Pollination Sign.



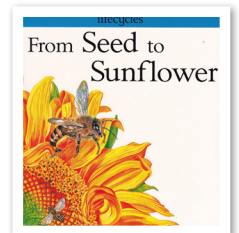
Pollination Sign

“This is called POLLINATION! Creatures that help plants create seeds are called POLLINATORS.”

“When the head of the sunflower becomes filled with seeds, what happens to the plant?” Desired answer: The flower begins to wither and bends over and seeds fall to the soil. Eventually the plant will die and the seeds will grow into new plants! “The sunflower life cycle goes around and around!”

FROM SEED TO SUNFLOWER

Read *From Seed to Sunflower* by Gerald Legg and Carolyn Scrace to the students, illustrating pollination and the sunflower life cycle. Provide your own narration if desired.



GROUP ACTIVITIES OVERVIEW

“In the garden today we will harvest the sunflower seeds that have developed on our plants, thanks to the help of pollinators. We will also collect mature bean pods that are filled with seeds. This is called SEED SAVING. What can we do with the seeds?” Desired answers: Plant them again, or dry and save them to plant later and share with family and friends.

Show the Green Bean Harvest Sign as a reminder to students about which beans to harvest for eating and seed saving.

Sing the Harvest Song twice with students so that they will remember to use two hands while harvesting and to wash their vegetables before they are eaten.

“One group will harvest and care for the garden and the other group will create their sunflower drawing, then we will switch.”

Garden Agreements

Have students take a deep breath, then review the Garden Agreements:

- I will be SAFE
- I will be KIND
- I will have an OPEN MIND
- I will use my TIME WELL



Divide students into two groups before going out to the garden. Bring the harvest basket, garden clippers, plastic wash bins, tape measure, paper rolls, markers, blanket, and sunflower seeds for eating (if purchased).

GROUP ACTIVITIES

25 MINUTES

Rotate groups after 12 minutes. Regroup for the closing and snack.

SUNFLOWER DRAWING (12 minutes)

- Have students help unroll the chart paper and use the blue painter's tape to tape the edges of the paper to the classroom floor (not on the carpet, if possible). Have students bring their markers to the drawing area.
- Each group will create their drawing together. Use the tape measure to mark the height of the tallest sunflower on the chart and then have the children draw one big sunflower together as a group. Be sure the sunflower has all its plant parts: roots, stem, leaves, flower, seeds. Have students include pollinators and other garden creatures and elements (rain, sun, soil, etc.) in their group drawing.
- If students need more time to complete their drawing, allow time for this after the lesson.
- Tape the finished charts to the wall so the students can see how big their plants grew. Measure and mark students' height on the growth chart so they can compare their height to the height of the tallest sunflower!



GARDEN ACTIVITIES (12 minutes)

Sunflower House and Bean Trellis Experience

Allow students to experience being inside the Sunflower House and Bean Trellis. "Normally we do not walk in garden beds in order to keep the soil soft for plants, but these themed-gardens are the exception!" Ask the students to imagine that they are pollinators, birds, or tiny insects in nature.

Supervise the students so that everyone gets a turn and they are careful with the plants and the garden. You may want to have everyone link up (like a large caterpillar, millipede, or garden train) and lead students through the gardens.

Sunflower Seed Harvest

With students, use the tape measure to determine the height of the tallest sunflower in the garden.



Help students look for one or more mature sunflower seed heads to harvest (filled with seeds and drooping). Be sure to express gratitude to the plants, gardens, sun, soil, and rain, etc. before harvesting. Use the garden clippers (adults only) to cut the stem just below the seed head. Note: Be sure to leave enough sunflower seed heads for the other group and classes to harvest.

Place the wash bins in the shade to create a seed saving station. Using the wash bins to contain the harvest, have students remove the sunflower seeds from the seed heads.

The seeds will need to be dried completely before being stored. Lay them out on sheets of newspaper inside the classroom for several days before putting them into the envelope for future planting. Be sure to label the envelope with the harvest date and type of seed. The seeds may also be planted right away or sent home with students.

GROUP ACTIVITIES

CONTINUED

Flower Seed Harvest

Use the garden clippers (adults only) to harvest any available withered flowers (marigolds, cosmos, zinnias). Have students use the seed saving station (plastic bins) to open up their withered flowers and harvest the seeds inside. Dry the seeds before storing, according to the before-mentioned procedure.



Bean Harvest, Garden Care, and Observations

Have students check the green bean plants for any fresh green beans as well as mature pods from which to harvest seeds. Each group may collect, count, dry, and store any available pole bean seeds for planting at school or at home. The seed saving station (wash bins) may also be used for shelling and collecting the seeds.

Encourage students to observe flowers, pods, seeds, pollinators, garden creatures, and other important elements in the garden. Students may water, weed, and feed the gardens with vermicast.

All students must wash their hands thoroughly with soap and water after working in the garden and before eating their snack.

CLOSING AND SNACK

10 MINUTES

Gather all the students in the garden. Ask them to share about their experience.

Discuss with students:

- What is pollination and why is it important?
- Why is it important to harvest and save seeds from the garden?
- What did you observe in the garden today?

Have students wash their hands and rinse any of the fresh green beans they harvested. Adults may use clean scissors to cut up green beans for the snack for students.

Have students sit on the blanket and eat the green beans and sunflower seeds (harvested or purchased seeds) as a snack. You may wish to have students share what they are thankful for before eating; be sure to thank the pollinators! Show students how to eat sunflower seeds by opening them with your teeth and eating the seed inside. Shells may be buried

in the garden soil or placed in the compost pile to become soil again. Some shells may be empty, which means the tiny flower was not pollinated, or perhaps the embryo is not yet mature. If none of your sunflower seeds have seeds inside the shells, it is likely that a hybrid variety of sunflower was planted (no viable seeds produced).

“Thank you for taking such good care of your Sunflower House and Bean Trellis gardens! Over the next few weeks you can visit the garden and watch for birds and see if they eat any remaining sunflower seeds. You can also continue to harvest any fresh green beans, and collect pole bean, sunflower, and flower seeds to be planted again!”

Have students place snack waste in a bucket and then add it to the school’s compost pile when finished.

All students must wash their hands thoroughly with soap and water after working in the garden.

FOLLOW UP GARDEN CARE

Follow Up Garden Care is the responsibility of the classroom teacher and students.

- This is the final lesson of the semester. Continue to have your students water and visit the gardens daily to help keep the soil alive. Use mulch materials to cover the soil, protecting it from the sun, preserving moisture, and discouraging weeds.
- Continue to harvest and dry seeds from sunflowers, pole beans, and withered garden flowers. Save the seeds for future plantings or for the students to take home and start their own gardens. For long term storage it is best to store seeds in a sealed container in the refrigerator or freezer.
- Students must wash their hands thoroughly with soap and water after working in the garden.

FOLLOW UP ACTIVITIES

Follow Up Activities are the responsibility of the classroom teacher.

- Review this semester's garden experience, including the key concepts for the unit, which are 'āina, the sunflower and green bean life cycles, measuring and counting, garden data collection, harvesting for food and seeds, pollination, and seed saving.
- Administer the 'ĀINA Post-Unit Survey immediately following the final lesson and review.
- Have students complete the Garden Reflection Student Worksheet.
- Have students create a final journal entry about their garden experience this semester. Have them share their work with the class.
- Save and submit examples of student work to Kōkua Hawai'i Foundation.

LESSON EXTENSIONS

Counting Sunflower Seeds
(1.OA.1, 1.NBT.1, 1.MD.4)

1. Individually or as a group or class, have students estimate the number of sunflower seeds that were harvested from the garden. Record the estimates (predictions).
2. Divide the seeds into piles that will be counted by individual students or groups.
3. Have students count the number of sunflower seeds in their pile. You may want to have them count the pile three times using three different methods; for example, count by 2's, 5's, 1's. Do they reach the same number each time?



4. Record each pile's count on the board. Work together to add the numbers and determine the total number of sunflower seeds harvested. Is this number close to or far from the predictions that students made in the beginning?
5. Spread out the seeds to dry on sheets of newspaper for several days. Label and store them in an envelope, sealed jar, or sandwich bag, preferably in the refrigerator, until you are ready to plant them.
6. Have students replant beans and/or sunflower seeds in milk carton pots (rinsed and with holes made in the bottom for drainage). Send the sprouted plants home with students at the end of the semester.



Student Worksheet
THE LITTLE SEEDS, BIG PLANTS GARDEN
Lesson 4 * Seed Harvest

Name

Class Date

Garden Reflection

Directions: Answer the question that your teacher selects by drawing and writing in the spaces provided below.

A large rectangular box containing a drawing area at the top and several sets of primary-ruled writing lines (solid top and bottom lines with a dashed middle line) for student responses.



For Teachers: Choose one of the following opinion questions for students, or create your own, regarding their gardening experience this semester.

**Do you like having a garden?
List three reasons why.**

**What did you enjoy most
about the garden?**

**What other types of plants would you
like to grow in the garden?**

**What is your favorite kind of
pollinator?**

**What is your favorite kind of garden
creature that lives in the soil?**

**What did you like best about the
garden lessons this semester?**

I have been at this school since grade: K 1 (circle one)

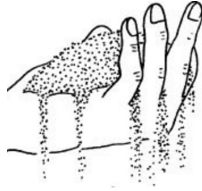
1. Draw a **circle** around what is missing in #3
on the picture of the sunflower life cycle:



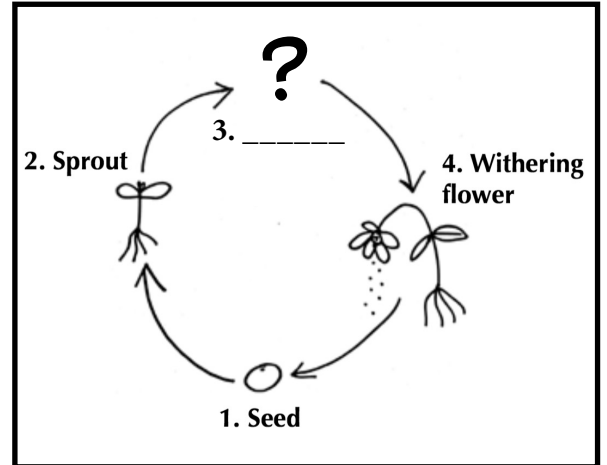
Bee



Flower



Soil



2. Draw a **circle** around what a flower makes as a result of pollination:



Leaf



Seeds



Bee

3. Draw a **circle** around the pollinator:



Sow Bug



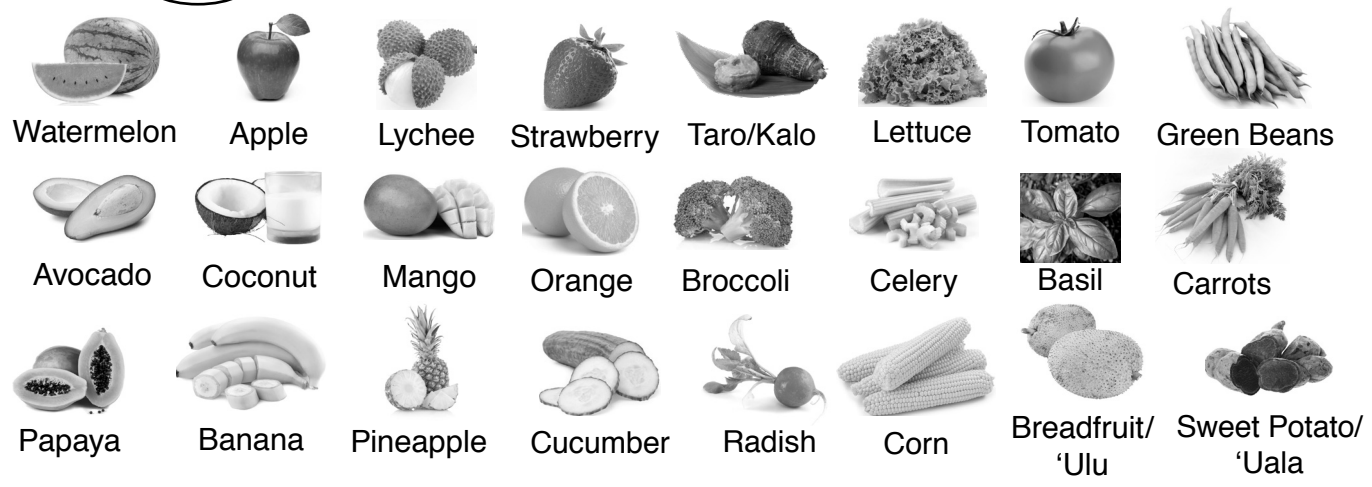
Butterfly



Worm

5. Do you like gardening? **Circle** ONE answer: Yes I don't know No
6. Do you like eating fruits and vegetables? **Circle** ONE answer: Yes I don't know No
7. Do you like cooking? **Circle** ONE answer: Yes I don't know No
8. Do you like 'ĀINA Lessons? **Circle** ONE answer: Yes I don't know No

9. Draw a **Circle** around all the fruits and vegetables you like to eat:



10. Draw a picture of what 'āina means to you.