

# Sunflower House

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**Overview:** This unique garden feature can be an ideal outdoor space for students to sit, work, read, and observe. A **Sunflower House** is a group of sunflowers planted in a crescent or box shape. As the flowers grow, the ‘house’ will take shape. Students can explore the growing sunflowers through literature, observation and hands-on inquiry. **Sunflower House** is an ideal project for lower, mid- and upper grades to collaborate on, while meeting their own level’s standards.

**Targeted Grade: K**

**Additional Connections: 3, 5**

| NGSS Standard(s)  | CT Social Studies Standards  |
|---|--|
| <b>K-PS3-2</b> Warming effect of sunlight<br><b>K-LS1-1.</b> Patterns of plants & animals | <b>GEO K.2</b> Using maps, graphs and photographs to describe places<br><b>GEO K.4</b> Explain environmental characteristics impact on people.   |
| Common Core Math Standard(s)  | Common Core ELA Standard(s)  |
| <b>K.MD.A.1-A.2</b> Measurable Attributes<br><b>K.CC. 4-6</b> Counting and comparing      | <b>RI.K.1-k.3</b> Key Ideas and Details<br><b>W.K.7.</b> Shared research projects<br><b>SL.K.3</b> Asking and Answering questions<br><b>SL.K.5</b> Use of visual displays<br><b>L.K.5</b> Word relationships |

*The standards presented here are suggestions only; you may identify others! Please refer to your grade level at Next Generation Science Standards (<http://www.nextgenscience.org/search-standards>) and Common Core State Standards (<http://www.corestandards.org/>).*

**This lesson has been designed to scaffold student learning using the following to connect students’ understanding of science:**

| Scientific and Engineering Practices of NGSS   | NGSS Crosscutting Concepts  |
|--|---|
| Asking questions and defining problems<br>Planning and carrying out investigations<br>Analyzing and interpreting data<br>Using mathematics and computational thinking<br>Constructing explanations and designing solutions<br>Obtaining, evaluating, and communicating information | Patterns<br>Cause and effect<br>Systems and system models<br>Structure and function |

## Suggested Implementation

### Prior Knowledge & Activities (If applicable)

- Read the book *Sunflower House* by Eve Bunting aloud to the class, focusing on the structure of the sunflower as you read it. (CCSS RI.K.1-k.3)
- Label parts and structure of a sunflower. For a kindergarten-friendly diagram look at “Building Content with Diagrams and Labels.”  
<https://nonfictionmentortexts.wordpress.com/2014/06/26/chapter-3-your-turn-lesson-1-building-content-with-diagrams-and-labels/> .

### Materials needed

- Space to plant
- Sunflower seeds ( a variety of tall, medium height, and shorter types)
- Dixie cups and soil to start seeds
- Watering cans
- Wood and string for support after transplanting
- Check with librarian for books about sunflowers

**Activity Suggestions-** This activity can be broken down to use in all seasons and can be continuously used for many years.

### Spring

- Students can review reading and the structure of the sunflower (a sample flower from a florist might be used).
- Planting Sunflowers should be started inside in mid to late April. You will want to wait to plant the seedlings outdoors until after the last frost. Students can compare things like seed sizes and predict how the flowers will grow. The teacher might aid discussion by using a word wall with descriptive words to talk about seeds shape, color, size and features. (L.K.5).
  - Students can count the seeds in each packet, and count out cups needed for planting. (K.CC. 4-6)
  - Students can photo journal to document growth and for comparisons. (SL.K.5.)
  - Use a sunflower from a florist to review the parts of a flower. Keep a dried sunflower as a cool item to add to you classroom “fun science space.”
  - Students can dissect a sunflower to understand where the seeds come from and which part of the flower will provide shade for their sunflower house.



- Students can follow the growth of their sunflowers, comparing them to others in the classroom. (Make sure to put more than one seed in a cup so no one is disappointed!)
- You might plant several extra cups and compare root growth at different times -- emptying a seedling cup to see the roots.
- Plant a sunflower house and watch it grow. Through this process students can keep a journal about growth and development observations. (W.K.3) The photo journal can also be used to document growth. 5<sup>th</sup> grade students might help with the bed design to maximize the shade (see detail in the 5<sup>th</sup> grade connections section).

**3<sup>rd</sup> grade collaboration** could help to enhance the sunflower house project by having 3<sup>rd</sup> graders look at traits of different sunflower seeds to determine which will be the best fit to make a good shady house. **(3-LS3-1)**

**5<sup>th</sup> grade collaboration** Older students could help with the actual planting bed design to maximize the amount of shade in the Sunflower House. **(5-ESS1-2 and 3-5-ETS1-2)**

#### Summer

- Keep in mind that sunflowers are in full bloom during the summer months.
  - Consider having a watering schedule, especially during hot, dry summers. Students and their families might help with watering and care during summer months.
  - As sunflowers grow tall, they tend to bend. It may be necessary to hold them up with wooden stakes and string supports.
  - Visit by students to the sunflower house a few times during the summer to document the growth can be a great addition to the photo journal.

#### Fall/Winter

- With a new class of students, the sunflower house can be used for observations and as a learning area. (Graduated kindergarteners might also visit as first graders!)
- Students can use the photo journal created by the previous class to learn about the process of sunflower growth. Students can make observations and use description words to explain the differences and similarities they see between the photos and the full-grown sunflower house. (GEO K.2)
  - Students can practice asking and answering questions about what they observe. (SL.K.3)
  - Students can identify and describe shapes from the parts of sunflowers (K.G.1.)



- Students can determine if the sunflower house shape provides shade and document what they observe to later be used in the spring when they recreate their own sunflower house.
- Students can count sunflowers to answer questions of “how many.” For example they can answer the questions: how many sunflowers are there? How many seeds are in sunflowers? How many petals are on a sunflower? (K.CC. 4, K.CC.5).
  - Students can also compare sunflowers and quantities using terms of greater than, less than and equal to. (K.CC.6)
- Students can add to their photo journal by observing how the cold weather effects the sunflowers. Students can watch as the sunflowers begin to decompose/break down during the winter months.
- Standing sunflowers are a great source of food for visiting birds and animals. Make trips to the Sunflower House throughout the winter to inspect the house for evidence of animal visitors—particularly with tracks left in soft snow.

**Standards-Based Curricular Connections: Sunflower Houses** can support your curricular goals in many ways including, but not limited to, the example below.

- **Physical Science: K-PS3-2.** Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
  - Students can investigate the sun and shadows in a schoolyard and design a sunflower house that provides shade from the sun. Students can use inquiry to learn how sunflowers provide shade and why they are a good choice for a house.
    - Students can measure sunflower head sizes to determine best type for the house. (K.MD.A.1; K.MD.A.2)
  - Students can read books about sunflowers, so they can decide which sunflower will be best for their structure. (W.K.7.)
- **Life Sciences: K-LS1-1.** Use observations to describe patterns of what plants and animals (including humans) need to survive.
  - Students can observe how fast sunflowers grow. They can look at patterns of weather that may impact how the plant grows.
  - Students can have discussions about what sunflowers need to survive such as water and sun.
  - Throughout fall and winter students can observe the types of animals that visit the sunflowers. The teacher can ask questions related to animals such as birds and chipmunks, bees, and butterflies. Questions can include how these animals use sunflowers as a way to survive.
  - Students could also explore how weather and other environmental characteristics affect people’s lives and compare them to plants and animals (GEO K.4)



**Other Potential Connections:** The following list provides a general overview of other possible uses for **Sunflower House**. Check your NGSS and CCSS standards documents (links provided on page one) to explore how these suggestions may assist in achieving your grade-specific curricular goals.

ELA- Students can learn and use new words that they acquire through reading about sunflowers and learning the parts of a sunflower. (L.K.6). Use sunflower house as a reading area for students to read or listen to stories. (RL.K.10)

Art- Students can learn about artists who paint sunflowers such as Vincent Van Gogh. Students can draw or paint their sunflower in stages as it grows.

Food-Students can learn how sunflower seeds are used for food. They can make trail mix, learn about sunflower oil and see which animals use sunflower seeds for food. Students could use sunflower seeds for birdfeeders to observe types of birds attracted by sunflower seeds.

Community Involvement-Some of the most meaningful learning activities are ones that allow for community and parental involvement.

- Visit a local sunflower farm
- Have a farmer come in and talk about sunflowers and offer tips on growing healthy plants.
- Harvest sunflower seeds and sell them to parents
- Share photo journal with school and parents to see the great work students accomplished.

### Additional Connections: Grades, Topics, and DCIs

This investigation was written on a Kindergarten-grade level. You could also apply this investigation in other grades, to support your curricular goals. The Disciplinary Core Ideas appear in other grades, allowing similar investigations discussed above to be conducted at other grade levels. You may also use this concept to connect your lesson with other grade-specific standards. Some additional examples to consider are presented here:

| NGSS Standard(s)  | CT Social Studies Standards   |
|---|---|
| <b>3-LS3-1</b> Evidence of Traits<br><b>3-LS3-2</b> Traits & Environment<br><b>3-LS4-4</b> Biodiversity | <b>HIST 3.11</b> Explore cause and effects of events or developments                              |
| Common Core Math Standard(s)  | Common Core ELA Standard(s)   |
| <b>3.MD.B.4</b> Measurements and Data   | <b>W.3.2-3</b> Writing explanatory texts and narratives<br><b>W.3.7</b> Conduct research projects |



- **Life Sciences 3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organism.
  - Students could study patterns of similarities and differences of same or multiple varieties of sunflowers.
    - As sunflowers grow, students can make observations to identify traits that are present in all sunflowers then make comparisons to other similar flowers. They can then write about their findings (W.3.2)
    - Students can measure and compare the heights of sunflowers and other traits (leaf size, etc.) Measurement differences can be represented on a line plot (3.MD.B.4)
  - Students can use the study of traits to understand a sunflower’s life cycle (3-LS1-1.) Students could use what they know about the traits of the parent sunflower to make inferences in the development of the new sunflowers. This could include answering questions and participating in conversation about how traits such as height and size will impact the life cycle of the “baby” sunflowers. (SL.3.1).
  - Look at different seed traits. Questions to explore include: Will bigger seeds grow taller sunflowers? Are there any visible differences between seeds?
  - Open some seeds and identify the parts. Sprout some soaked seeds to chart the growth of the seedling.
  - **Collaboration with Kindergarten**
    - Students might “buddy” with kindergarten students starting seeds in their classroom, studying them and then helping with the planting. Students can document their findings through writing and pictures to add to the kindergarten photo journal. (W.3.2).
- **Life Sciences 3-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment.
  - Students could research how certain traits of a sunflower can be impacted by environment.
    - Students could set up experiments in which they alter the amount of water or sunlight a sunflower gets to observe how these environmental factors influences the growth of the plant.
    - Using measurements, compare and contrast the plant’s growth over time. (3.MD.B.4) Students can present their findings using evidence and observations,(SL.3.4) with groups using each other’s findings to compare results.
- **Life Sciences 3-LS4-4** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change (biodiversity).

- Students can make observations in the changes to the flora and fauna of the newly planted sunflower site. Students can answer questions about changes in biodiversity (e.g. an increase in pollinators that may not have been there before.)
  - Students can research using non-fiction texts (pollination and pollinator texts, etc.) to understand cause and effects of changes within the environment and write about their findings. (W.3.2-3) (W.3.7)
  - Students could also explore this in terms of cause and effect. They could hypothesize how this could change the environment overtime. (HIST 3.11)

| NGSS Standard(s)  | CT Social Studies Standards  |
|---|--|
| <b>5-LS1-1</b> Argument for plant growth<br><b>5-ESS1-2</b> Shadows<br><b>3-5-ETS1-2</b> Generate & Compare solutions | <b>CIV 5.2.</b> Challenges of working amongst multiple groups  |
| Common Core Math Standard(s)  | Common Core ELA Standard(s)  |
| <b>5.G.2</b> Graphing points  | <b>RI.5.7.</b> Using print and digital sources<br><b>RI.5.9.</b> Integrate Information<br><b>W.5.1.</b> Write opinion piece<br><b>W.5.7.</b> Short research projects<br><b>SL.5.1</b> Collaborative Discussion<br><b>SL.5.5</b> Multimedia component |

- **Life Sciences: 5-LS1-1** Support an argument that plants get the materials they need for growth chiefly from air and water.
  - Students can construct arguments based on information drawn from readings about how plants and sunflowers specifically use air and water for growth. (RI.5.9). Students can use those arguments to write opinion pieces on plant growth (W.5.1).
  - Students can support their arguments with experiments (light/little/no light; water/little/no water, etc.)
- **Earth Systems: 5-ESS1-2** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night and the seasonal appearance of some stars in the night sky.
  - Students can measure the shadows of sunflowers at different times of the day and over time to understand patterns that could help explain the position of the earth in relation to the sun.
    - Students can observe how the shadows of sunflowers change as time changes and the sun moves. Students can measure and take note of the shadows. They can later use those measurements to graph points on a coordinate plane. (5.G.2)
    - Students can monitor how the sun’s position changes as the seasons change and how that impacts the length and measurement of the



shadows. During winter months students can use long wood stakes that represent the height of a sunflower to measure shadows.

- With a known length of shadow of a sunflower that is standing straight, the height can be determined (right angle formula of  $A^2 + B^2 = C^2$ ) This formula could be practiced at different times of the day with different shadow lengths.

Students may help kindergarteners by planning the best shape possible in relation to the sun to get the most shade in their sunflower house.

- **Engineering Design: 3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
  - Students can be given the task of creating the best possible shape for a sunflower house that will give the most shade possible.
    - Students can research using information from readings and digital sources about shadows, shade, shapes, etc. to start generating ideas. (RI.5.7.) (RI.5.9) (W.5.7)
    - Bring students outside on a sunny day. Use umbrellas or sunflower head sized “parasols” made by students to experiment with creating shade. Decide what size and shape and the sunflowers should be planted in to create the best house. This may involve asking additional questions about having multiple rows of sunflowers, how many seeds should be planted in each row and which sizes of sunflowers should be planted in each row.
    - Working in groups, students can compile the information they found and present their best idea for the sunflower house design using multimedia components to share their solution with the class. (SL.5.1.)(SL.5.5)
    - As a class, students can evaluate and compare the solutions and choose a design for the sunflower house. Students may also explore how their class decision relates to the challenges of working together with different groups of people to come to a decision. (CIV 5.2)

*These suggestions are examples only, and may require adaptation. Check your grade-specific standards to determine whether or not the suggestions provided meet your individual curricular needs.*

*A Sunflower House was seen in action at: Moriarty Environmental Sciences Magnet School 2015.*

*For more information, contact [ctgreenleaf@ctgreenschools.org](mailto:ctgreenleaf@ctgreenschools.org)*

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