



Soybean Growth: AeroGarden® Observations

Objectives: Students will grow soybeans using an AeroGarden® and keep accurate data and records related to the stages of soybean growth.

Oklahoma Academic Standards:

Science: PK.S.3 N; K.LS1.1; K.ESS3.1; 5.LS1.1

English: Critical Reading and Writing: K.3.W; 1.3.W.2

Teacher Background:

Hydroponics is the process of growing plants in sand, gravel, or liquid, with added nutrients but no soil. This provides flexibility in where a plant is grown, and takes away some of the limitations of growing plants such as land, greenhouses, large amounts of space, etc. The AeroGarden® is a deep water culture hydroponic system. In this system, the plant's roots are always in a deep tank of water and nutrient solution. This provides flexibility in growth location, stability in nutrients, and low maintenance making this system a good choice for classrooms. For this lesson, students will be able to observe soybean growth through all stages, right from their classroom!

Important Vocabulary:

Seed: a flowering plant's unit of reproduction, capable of developing into another such plant.

Seed Coat: protects the seed when it is dormant (not growing)

Embryo: the part of the seed that grows into the plant

Cotyledon: first food for the soybean seedling and the first two leaf-like parts of the plant when it emerges

Dormancy: the state of being temporarily inactive

Germination: the development of a plant from a seed or spore after a period of dormancy

Emergence: when the cotyledons (first leaves) are pushed up through the soil

Vegetation: when leaves develop along the stem

Reproduction: when flowers begin to bloom and pollination occurs

Maturity: fully developed seeds are present and harvest can occur

Deep Water Culture: a hydroponic system where a plant's roots are suspended in a solution of water and other nutrients

Hydroponics: the process of growing plants in sand, gravel, or liquid, with added nutrients but without soil.

Materials:

- AeroGarden® Harvest or Harvest Slim Kit - 1 (or more) per class
- Hoyt Soybean Seeds
- [Aerogarden Observation Book](#) - 1 per student
- [Aerogarden Soybean Growth Stages Slides](#) (optional)

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Lesson:

1. Project an image of plant or have a live plant at the front of the room. Ask students: What do plants need to grow? Allow students to brainstorm and answer aloud.
 - a. Answers: sunlight, water, air, warmth (proper temperature), and nutrients (food).
2. Tell students that they will be looking at the life cycle of a soybean plant and making observations about its growth over time.
3. Pass out pages 1 and 2 of the [AeroGarden® Observation Book](#) to each student.
4. Show students a soybean seed. Have them draw and describe the seed in their observation book.
5. Discuss the basic parts of the seed: seed coat, embryo, and cotyledon and their roles. You may use the [optional slides](#) to help you, or draw it on the board. Have students label the parts of the seed in their observation book.
6. Ask students what a soybean seed would need to grow and have them write their answers in their observation book.
7. Show students the AeroGarden® and explain how it works. Add water and the nutrient solution to the reservoir. Then have students work with a partner to determine how the AeroGarden® will provide the light, water, and nutrients to the plant.
8. Place the soybean seeds into the sponges of the AeroGarden® baskets and put them in the unit, turn the light on. Have students observe and draw the soybeans in the AeroGarden® in their observation book.
9. Carefully watch your soybean plant as it grows. When a new stage begins (emergence, vegetation, reproduction, or maturity) hand out the corresponding page in the observation booklet and have the students fill them out. Students should focus on observations by drawing and describing their plant and think about how it has changed over time (you may project a picture of the previous stage to help them).
 - a. Note: The stages of growth were covered in the Lego Life Stages Lesson and they can be seen in the [Aerogarden Soybean Growth Stages Slides](#).

Extensions:

- Students could research and create a poster of soybeans and their uses.
- Students could use the AeroGarden® and soybean growth as an experiment. You could discuss the scientific method, have students come up with an independent and dependent variable, and keep records in a blank science journal.



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Information Sources:

Haggard, B. (2022, July). *Introducing AeroGardens Into Your Programs*. Lecture, Stillwater, Oklahoma; Stillwater, Oklahoma.

Espiritu, K. (2021, May 18). *Deep water culture (DWC): What is it and how to get started*. Epic Gardening. Retrieved July 17, 2022, from <https://www.epicgardening.com/deep-water-culture-get-started/>

Image Sources:

Soybean Emergence: Image by [Julio César García](#) from [Pixabay](#)



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