

Soybean Life Stages Models



Objectives: Students will learn about the life cycle of a soybean plant and exhibit their knowledge through the creation of building brick models of each life stage.

Oklahoma Academic Standards:

Science: 8.LS1.5; 8.LS3.2

Teacher Background:

Soybeans are a common and high-use crop in the United States. Soybeans are used for both human and animal feed, plastics, and biofuels (along with many other things). In 2021, the value of soybean production in Oklahoma was 146 million dollars with over 530,000 acres of soybeans being harvested. Soybeans are one of the main crops used for biofuels, a form of bioenergy, which is a topic of growing interest and importance for environmental sustainability and to reduce our reliance on fossil fuels and foreign oil imports. This lesson serves to introduce students to what soybeans are, their use, and how they grow.

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

Agronomist: an expert in the science of soil management and crop production

Unifoliate: leaf bearing only one leaflet although compound in structure

Trifoliate: compound leaf with three leaflets

Hypocotyl: the part of a plant embryo directly below the [cotyledons](#), forming a connection with the radicle

Radicle: the lower part of the axis of a plant embryo or seedling

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Materials:

- [Soybean Growth Stages Image Cards](#)
- [Soybean Growth Stages Slides](#)
- [Soybean Growth Stages Labels](#) (optional)
- Interactive building bricks
 - Note: It is also possible to use alternative materials.

Lesson:

1. Tell students that they will be looking at the life cycle of a soybean plant today. Ask students: What do you know about soybeans? Have you seen soybeans?
 - a. If you have soybean seeds or products made from soy, show them some examples.
1. Group students into groups of 3-4. Pass out pre-printed [image cards](#) of the soybean growth stages: germination, emergence, vegetation, reproduction, and maturity. Have students work within their group to put the cards in consecutive order from first-last based on the image alone.
1. Once complete, discuss the parts of the soybean plant and stages of growth presented in the [Soybean Growth Stages Slides](#) as a class.
 - a. Note: Instead of discussing all slides, you could print the stages slides and have students read themselves, complete a jigsaw method with the stages of soybean growth, and/or use the print out as a reference for the activity.
1. To wrap up, pass out the building brick sets to each group of students. Have them create models of the stages of soybean growth. Due to the large number of sub-stages. Focus on: **germination**, **emergence** (VE), **vegetation** (V1 or V2), **reproduction** (R2 and R4), and **maturity** (R8). By hitting these, flowering and pod development are included. You may let them verbally explain their models to you, physically label the models themselves, or use [pre-printed labels](#) based on their abilities.
 - a. Variations/Extensions:
 - i. Use alternate materials to the building bricks for their models
 - ii. Follow up this activity with the Aerogarden lesson to see the stages of soybean growth in your classroom!

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Information Sources:

2021 State Agriculture Overview. USDA/NASS 2021 State Agriculture Overview for Oklahoma. (n.d.). Retrieved June 29, 2022, from

https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=OKLAHOMA

A visual guide to soybean - cool bean. (n.d.). Retrieved July 11, 2022, from

https://coolbean.info/library/documents/2017_Soybean_GrowthDev_Guide_FINAL.pdf

Naeve, S. L. (n.d.). *Soybean growth stages*. UMN Extension. Retrieved July 11, 2022, from

<https://extension.umn.edu/growing-soybean/soybean-growth-stages#reproductive-phase-%28table-2%29-539861>

Nancy Zenger-Beneda, A. and Y. M. G. (n.d.). *Soybean growth stages*. Kansas Foundation for Agriculture in the Classroom. Retrieved June 28, 2022, from

<https://ksagclassroom.org/ksresource/soybean-growth/>

Pennsylvania State 4-H Youth Development. (n.d.). *Seed dissection: What does the inside of a seed look like?* PennState Extension. Retrieved June 28, 2022, from

<https://extension.psu.edu/programs/4-h/opportunities/programs/at-home-activities/dissect-a-seed>

Soybean uses. Oklahoma Soybean Board. (n.d.). Retrieved June 29, 2022, from

<https://www.oksoy.org/soybean-uses>

Image Sources:

Building Block Image: Image by [Francis Ray](#) from [Pixabay](#)

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



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