



# Soybean Growth Stages



OSU EXTENSION  
4-H YOUTH DEVELOPMENT

Image: Image by [Charles Echer](#) from [Pixabay](#)

# Soybeans

What do you know about soybeans?



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

# Soybean Uses:

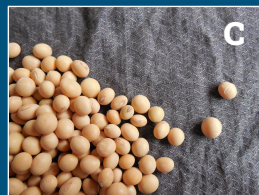


Circle Image: Image by [Gerd Altmann](#) from [Pixabay](#)

Soybean Image: Image by [Євген Литвиненко](#) from [Pixabay](#)

# Soybean Growth Stages...

Your group is receiving the following picture cards...



**Work together to put them in order from first-last.**

Soybean Image: Image by Julio César García from Pixabay

Soybean Growth Stages Information Source:

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

## Soybean Growth Stages...

Put simply, the stages of growth are:

- Germination
- Emergence
- Vegetation
- Reproduction
- Maturity

However...

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

Soybean Growth Stages Information Source:

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

# Soybean Growth Stages...

Agronomists use two methods to determine the stage of soybean growth:

- the Hybrid Method
- the Fehr and Caviness Method



Both methods recognize germination, vegetative, and reproductive stages.

\*Emergence and Maturity/Senescence are considered milestones within the stages above.

Germination Illustration: Image by [OpenClipart-Vectors](#) from [Pixabay](#)

# Soybean Seed Parts...

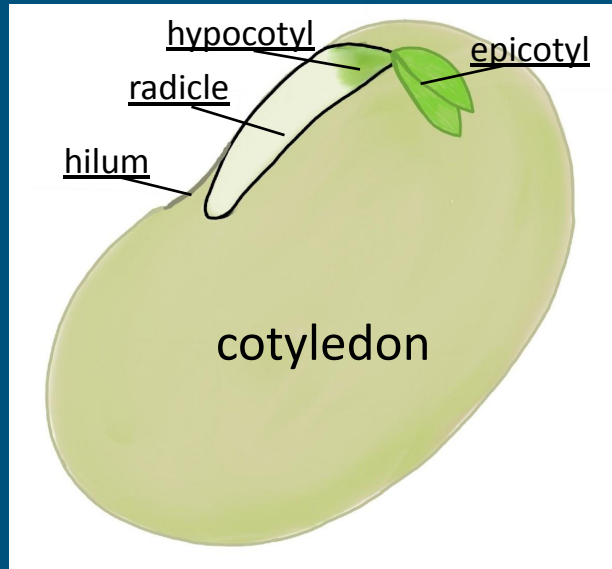
**Cotyledon:** Soybeans have two cotyledons that are the first food for the seedling and are the first two leaves of the plant when it emerges.

**Epicotyl:** contains small leaves, buds, and the main growing point of the plant.

**Hilum:** connects the pod wall with the seed coat

**Hypocotyl:** pushes the seed upward toward the soil surface and becomes the first part of the plant's stem

**Radicle:** (primary root) grows downward from the seed



Info:

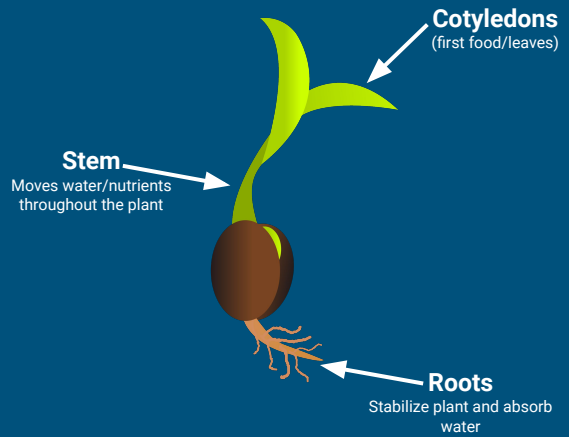
<https://extension.psu.edu/programs/4-h/opportunities/programs/at-home-activities/diss-ect-a-seed>

# Germination



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

When a seed is exposed to appropriate temperatures and water, its period of rest (dormancy) is broken and a plant can begin to develop.



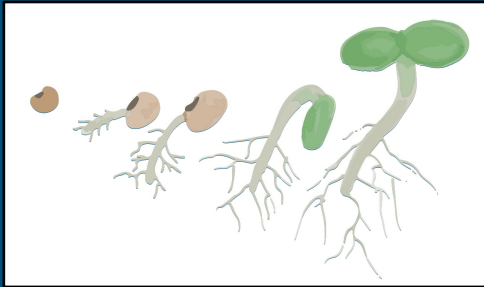
Soybean Seed Image: Image by [Jing](#) from [Pixabay](#)

Bean Seed Illustration: Image by [Ciker-Free-Vector-Images](#)

Germination Illustration: Image by [OpenClipart-Vectors](#) from [Pixabay](#)



# Germination



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

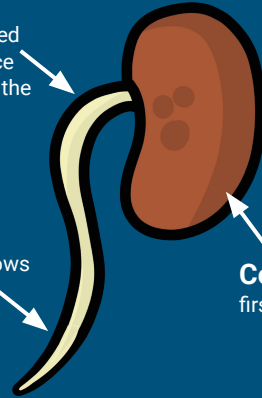
Soybean germination begins when **IMBIBITION** occurs.

**IMBIBITION:** when the seed absorbs 50% of its weight in water

**Hypocotyl:** pushes the seed upward toward the soil surface and becomes the first part of the plant's stem

**Radicle:** (primary root) grows downward from the seed

**Cotyledons:** first food/leaves



Soybean Seed Image: Image by [Jing](#) from [Pixabay](#)

Bean Seed Illustration: Image by [Ciker-Free-Vector-Images](#)

Germination Illustration: Image by [OpenClipart-Vectors](#) from [Pixabay](#)

Bean Sprout: Image by [Katherine Ab](#) from [Pixabay](#)

# Vegetative Stages



The vegetative stages are when leaves grow along the stem.

## Soybean Vegetative Stages...



<b>VE</b> <b>Vegetative Emergence</b>	Cotyledons appear above the soil surface (5-14 days after planting)
<b>VC</b> <b>Vegetative Cotyledon</b>	Unifoliate leaves unroll sufficiently (leaf edges are not touching)
<b>V1</b> <b>Vegetative Stage 1</b>	Fully developed leaves at unifoliate nodes Nitrogen fixing root nodules form on roots
<b>V(n)</b>	"n" represents the number of nodes on the main stem with fully developed leaves

Soybean Vegetation Image- singular row: Image by [Julio César García](#) from [Pixabay](#)  
<https://extension.umn.edu/growing-soybean/soybean-growth-stages#reproductive-phase-%28table-2%29-539861>

[https://coolbean.info/library/documents/2017\\_Soybean\\_GrowthDev\\_Guide\\_FINAL.pdf](https://coolbean.info/library/documents/2017_Soybean_GrowthDev_Guide_FINAL.pdf)

Bean Seed Illustration: Image by [Ciker-Free-Vector-Images](#)

Germination Illustration: Image by [OpenClipart-Vectors](#) from [Pixabay](#)

Bean Sprout: Image by [Katherine Ab](#) from [Pixabay](#)

# — VE Vegetative Emergence

Cotyledons appear above  
the soil surface

(5-14 days after planting)



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

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

[https://coolbean.info/library/documents/2017\\_Soybean\\_GrowthDev\\_Guide\\_FINAL.pdf](https://coolbean.info/library/documents/2017_Soybean_GrowthDev_Guide_FINAL.pdf)

Bean Seed Illustration: Image by [Ciker-Free-Vector-Images](#)

Germination Illustration: Image by [OpenClipart-Vectors](#) from [Pixabay](#)

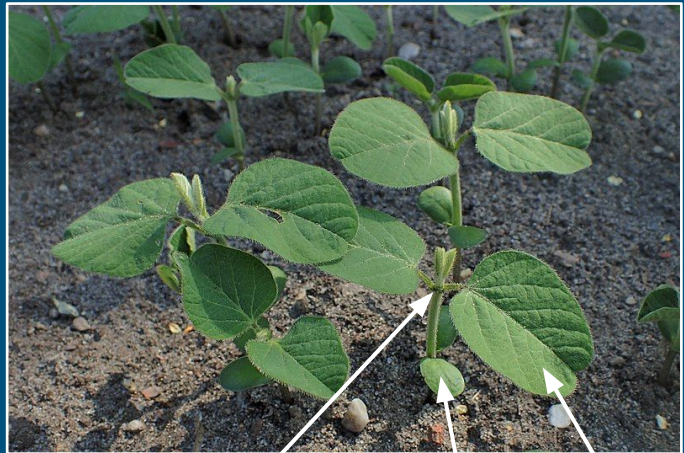
Bean Sprout: Image by [Katherine Ab](#) from [Pixabay](#)

Soybean Growth via the United Soybean Board:

[https://commons.wikimedia.org/wiki/File:Soybean\\_Sprouts\\_During\\_Early\\_Growth\\_\(9629676267\).jpg](https://commons.wikimedia.org/wiki/File:Soybean_Sprouts_During_Early_Growth_(9629676267).jpg)

# VC Vegetative Cotyledon

**Unifoliate** (single leaf blade) leaves  
**unroll sufficiently**  
(leaf edges are not touching)



1st leaf node

Cotyledons

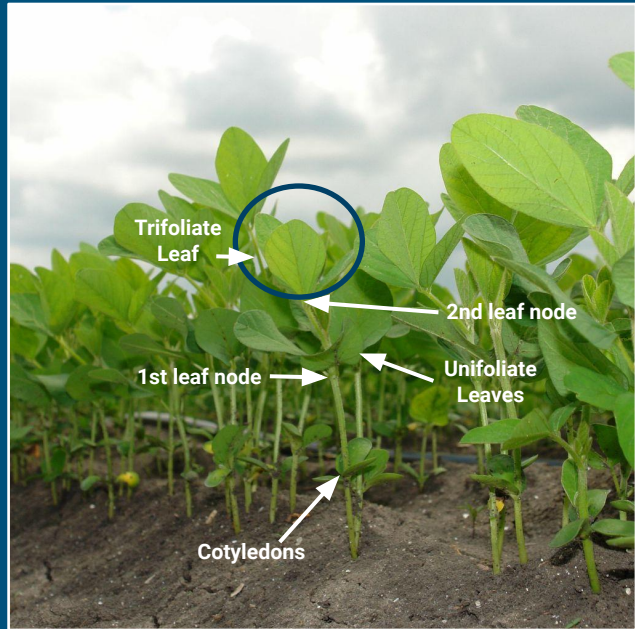
Unifoliate  
Leaves

Image: [https://commons.wikimedia.org/wiki/File:Glycine\\_max\\_kz02.jpg](https://commons.wikimedia.org/wiki/File:Glycine_max_kz02.jpg)  
<https://creativecommons.org/licenses/by-sa/4.0/deed.en>

# V1 Vegetative Stage 1

Fully developed leaves at  
unifoliate nodes

(One open trifoliate- leaf with 3 leaflets)



Soybean Vegetation Image- singular row: Image by [Julio César García](#) from [Pixabay](#)

# V “n” Vegetative Stages

“n” represents the number of  
nodes on the main stem with  
fully developed leaves  
OR  
“n” = # of open trifoliates



United Soybean Board via <https://creativecommons.org/licenses/by/2.0/deed.en> and  
[https://commons.wikimedia.org/wiki/File:Soybean\\_Research\\_\(9621838333\).jpg](https://commons.wikimedia.org/wiki/File:Soybean_Research_(9621838333).jpg)

# Vegetative Stages: Knowledge Check!

With your group...

Draw the image to your right on a sheet of paper, then label the following...

- Cotyledons
- Unifoliate Leaves
- Trifoliate Leaves
- Leaf Nodes

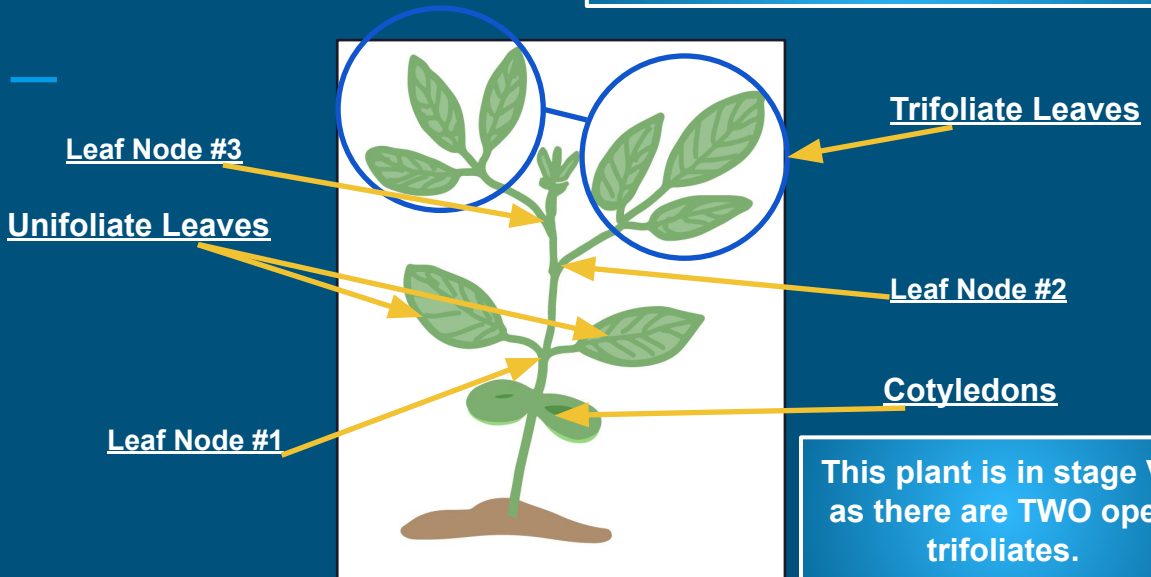
Which vegetative stage of growth is shown?



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# Vegetative Stages:

# Knowledge Check Key



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# Reproductive Stages



Occur from flowering-maturation

## Soybean Reproductive Stages...



R1	<b>Beginning bloom:</b> one open flower at any node on the main stem
R2	<b>Full bloom:</b> open flower are one of the two uppermost nodes
R3	<b>Beginning pod:</b> 3/16th inch long pod at one of the four uppermost nodes on the main stem with a fully developed leaf
R4	<b>Full pod:</b> 3/4 inch long pod at one of the four uppermost nodes on the main stem with a fully developed leaf
R5	<b>Beginning seed:</b> 1/8th inch long seed in a pod at one of the four uppermost nodes on the main stem with a fully developed leaf
R6	<b>Full seed:</b> Pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem with a fully developed leaf
R7	<b>Beginning maturity:</b> one normal pod on the main stem has reached its mature pod color
R8	<b>Full maturity:</b> 95% of the pods have reached their mature pod color

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

## Reproductive Stages: Pod/Seed Development



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

## Maturity/Senescence (R8)



The pods now have fully developed seeds and mature pod color.

After R8 is reached, 5-10 days of drying weather are needed to lessen the moisture content, then harvesting can occur!



Mature Soybean Image w/sky: Image by [Alex Norris](#) from [Pixabay](#)

Mature Soybean Image: Image by [Joao Batista Moraes de Oliveira JB](#) from [Pixabay](#)

Soybean Pod Open: <https://commons.wikimedia.org/wiki/File:Soybean.USDA.jpg>

What have you learned?



**Use the building bricks provided to create a model of each stage in the growth of a soybean plant.**

**Include:** germination, emergence (VE), vegetation (V1 or V2), reproduction (R2 and R4), and maturity (R8).

**Label your models.**

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