

# Soybean Lifecycle

# Target Grade Level / Age Range:

K-2

### Time:

- 15 minutes as a group activity using the soybean cut-outs as a visual aid.
- 60 minutes plus to make.

### Purpose:

This lesson is designed to introduce or review the lifecycle of plants. The paper soybean lifecycle model will help them visualize each stage of the lifecycle. The soybean plant is an excellent plant to use when teaching lifecycles because it has a very typical plant lifecycle and it is grown throughout lowa.

### Materials:

- Construction paper or cardstock in green, white, and brown. You can also use only white paper and have students color each part of the lifecycle.
- White yarn (One 2 inch piece, three 3-inch piece, and four 4-inch pieces per student)
- Glue
- Scissors
- Large envelope (9x 12"), paper bag, or 11"x 17" piece of construction paper (folded in half and stapled to make an envelope).
- Crayons or markers

# Suggested Companion Resources

- Beans Life Cycles by Julie Murray
- Soybeans an A-to-Z Book by Susan Anderson & JoAnne Buggey
- Soybeans in the Story of Agriculture by Susan Anderson & JoAnne Buggey
- The Super Soybean by Raymond Bial
- Auntie Yang's Great Soybean Picnic by Ginnie Lo

# Vocabulary

- **Germination** The process of a plant emerging from a seed and beginning to grow.
- **Sprout** A young plant, just emerged from the ground.

### Interest Approach or Motivator

Ask the students the following questions:

- What plants do farmers in Iowa grow?
- What season do Iowa farmers plant crops?

# Background – Agricultural Connections

Farmers in Iowa are the country's biggest producers of corn and soybeans. These plants germinate in the ground the same way they do in the seed germination necklaces. Farmers care for them from planting until harvest. Corn and soybeans are found in many items that we use every day, including plastics, corn chips, and even cake! They can also be feed to livestock and used for ethanol and biodiesel production.

lowa is one of the top two soybean producing states in the nation. Soybeans are used to make many products that we eat or use every day. Some of these products include feed for animals, food products, biodiesel, vegetable oils, cleaning products, and crayons.

lowa farmers plant soybeans in late April and May. They buy soybean seed in 50-60 pound bags that hold 140,000 seeds, or in very large bulk seed bags that are over four feet tall weigh about 3,000 pounds. When the seeds have matured in the fall, the upright plant begins to shrivel and the leaves fall away. All harvesting is done by machines. Farmers use combines that cut the stalk, thresh the plant residue, and separate the beans from the pod. After harvesting the beans, farmers either transport their crops to a commercial grain elevator or store the beans in their own grain bins to sell later. After the soybeans are sold, they are transported to processing plants or sold to other countries.

### Procedures

- 1. Use the patterns to trace each shape on the appropriate color of construction paper, or copy the shapes directly on cardstock.
- 2. Cut out the plant part shapes. If desired, draw details such as veins, flower parts, and ridges on the shapes.
- 3. If the stage has more than one piece glue the pieces together, use the picture key to determine what pieces go together.
- 4. Add the yarn for the roots onto the appropriate stage. (One two-inch piece on the germinating seed, three three-inch pieces on the sprout, and four four-inch pieces on the growing soybean plant)
- 5. Using makers or crayons, decorate the envelope to look like a bag of seeds.
- 6. Stack the shapes neatly and place them inside the envelope.
- 7. If desired you can connect the stages in order with yarn, so that they come out of the envelope in the correct order.



Example of a prop-sized soybean lifecycle made out of felt.

8. In front of the class, pull one life cycle stage out of the envelope at a time using the questions below to spark discussion.

#### Soybean Stages and Guiding Questions:

Planting/Seed Bag or Envelope

- When do farmers plant soybeans? (spring, mid-April to late May)
- What do farmers plant to grow soybean plants? (seed)

Soybean Seed

- Where do farmers plant soybean seeds? (in soil, usually planted in farm fields that are rich and fertile, typical of the Midwest)
- What does the seed need to grow? (water and warmth from the sun)
- What happens next? (the seed starts germinates and starts to grow underground)

Germinating Seed

- What is the white part that is coming out of the seed? (the roots of the plant)
- How does the root come out of the seed? (the seed splits in half at the hilum and the root comes out)
- What happens next to the two seed halves? (they become the cotyledon leaves that sprout above ground)

#### Sprout

- What is this tiny plant called? (a sprout)
- What do the white strings at the bottom represent? (roots)
- What do roots do? (They take water and food from the soil to the plant. They also act like an anchor to hold the plant in the ground).
- What does the plant need to grow bigger? (sunlight, nutrients or food from the soil, and water)
- How have the roots changed since the roots of the germinating seed? (there are more of them and they have grown in length)
- What are the two leaves called on the sprout? (Cotyledon leaves which are formed from the two halves of the soybean seed)
- What happens next ?(the soybean plant grows taller)

Growing Soybean Plant

- How have the roots changed on the plant since it was a sprout? (they are bigger because the plant has grown and needs more water and nutrients)
- How tall do you think soybean plants grow? (three to four feet tall)
- What is the center part of the plant called that the leaves are attached to? (stem)
- What are the stems called that branch from the main stem and each hold three leaves? (petioles or leaf stems)
- How many leaves are on each leaf stem or petiole? (Each leave stem has three leaflets called a trifoliate leaf)
- What comes next after the plant has grown many stems and leaves? (flowers form)

#### Flower

- What color are soybean flowers? (they can be purple or white)
- How big are soybean flowers? (about the size of your pinky fingernail)
- What do the flowers contain? (pollen)
- Why do insects visit the soybean flowers? (Insects drink the nectar and as they drink the nectar they collect pollen on their bodies. This pollen is then transferred to another flower)
- What forms after the flowers? (small green bean pods)

#### Small Growing Soybean Pod

- What color are the pods when they are little? (green)
- What happens next? (the small green pods grow larger)

Large Green Soybean Pod

- What color are the pods as they grow? (green)
- What is growing inside of the green pod? (soybean seeds)
- What color are the soybean seeds when the pod is green? (light green)
- How many seeds are usually in each pod? (three to four)
- What shape are the green soybean seeds? (round or oval and flat)
- What happens next? (the flat, round soybeans become spheres and the pods turn brown).

Large Brown Soybean Pod

- Why are the soybean pods brown? (because they have dried up and stopped growing)
- Why do soybean plants dry up and turn brown? (The season changed. The days get shorter while the weather is getting colder)
- What season does this happen? (Fall)
- What is inside the brown pod? (tan soybean seeds)
- What do farmers do when the soybean plants have dried up and the pods have turned brown? (They harvest them.)

# Essential Files (maps, charts, pictures, or documents)

• Soybean lifecycle patterns

### Did you know? (Ag facts)

- Soybeans are the second most common crop grown in Iowa.
- Iowa usually ranks #1 in the production of soybeans each year.
- Soybeans are used in many common household items, including plastic, crayons, inks, and more!

- The soybean or bean is a species of legume native to East Asia, widely grown for its edible bean which has numerous uses.
- Soybeans are used to feed livestock, make biodiesel, and processed into many food and household products.

### **Extension Activities**

- Practice sequencing by placing the life cycle in the correct order and making it into a hanging mobile.
- Use the classroom version of the soybean lifecycle to present the soybean lifecycle to the class and have kids hold each stage in front of class.
- Use the growing soybean plant stage to identify the parts of the plant.
- Journal or discuss the changes in stages of the lifecycle.
- Breakdown the soybean lifecycle so that each day the class discusses and talks about one stage, making it into a unit lesson.
- Teach students that the soybean lifecycle or any plant lifecycle forms an endless circle by displaying the lifecycle in the classroom or on a bulletin board. Discuss that lifecycles never start or end.
- Use the lifecycle to write a creative story about a soybean and how it changes during its lifecycle.
- Identify what each stage's purpose is in the life of a soybean plant; reproduction, survival, structure, growth, storage.
- Assign small groups to each stage of the lifecycle and have the student's research to find out how long each stage takes. Have the students present to the class what they learned about their stage. After groups have made their stage it can be put together to represent the entire lifecycle. Graph the length of time each stage takes and compare. Make a year timeline of the soybean lifecycle.
- Conduct research on how other environment factors and organisms such as environment, insects, weather, soil, water; affect each stage of the soybean lifecycle.

# Author(s)

Cindy Hall

# Organization Affiliation

#### Iowa Ag Literacy Foundation

#### Agriculture Literacy Outcomes

- Explain how farmers/ranchers work with the lifecycle of plants and animals to harvest a crop.
- Identify the importance of natural resources in farming.