



POLK COUNTY FARM BUREAU

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AG IN THE CLASSROOM

## Soybean Lifecycle Cut-outs

**Purpose:** This activity designed to help elementary students visualize the lifecycle of plants. The soybean plant is an excellent plant to use when teaching lifecycles because it has a very typical plant lifecycle and it is abundantly grown in Iowa.

The soybean lifecycle cut-outs can be used in many ways. Each student, or small group, can make a set out of construction paper over the course of several days. The templates can be enlarged on a copier and traced on a variety of materials, like felt or fun foam, to make a large version for a prop or bulletin board. The soybean lifecycle cut-outs can also be adapted and modified to fit the classroom setting and ability level of the students. It is great review after reading *Bean Lifecycles* by Julie Murry or another book that portrays the lifecycle of a bean plant.

**Background:** Iowa leads the nation in the production of soybeans by producing over 400 million bushels of soybeans each year. Soybeans are used to make different products that we use everyday in the United States. Some of these products include feed for animals, food goods, biodiesel, vegetable oils, cleaning products, and crayons.

Soybeans are one of the oldest farm crops to date. The first records of soybeans where in China, they then spread to Japan and Korea in 2838 B.C. Soybeans were first brought to America in the early 19<sup>th</sup> century. Soybeans were planted by some U.S. farmers in 1829 and used for soy sauce. Today soybeans are one of the most widely grown crops in America, and the U.S. leads the world in soybean production.

Iowa 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 sell their crop directly 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.

### Instructions for Making Soybean Lifecycle Cut-outs:

#### 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)
- Scotch tape or glue sticks
- 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

#### Instructions:

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 then 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.



**Activity:** After reading one of the recommended books or discussing plant lifecycles, use the lifecycle cut-outs as a way to review the plant lifecycles. In front of the class, pull one item out of the packet at a time. Hold the item up and ask the students questions about this stage and what comes next in the soybean lifecycle. Use the guided questions below to direct and lead a class discussion about each stage in the soybean lifecycle.

❖ **Soybean Stages and Guided Questions:**

1. Planting/Seed Bag or Envelope
  - When do farmers plant soybeans? (spring, mid April to late May)
  - Why do farmers plant soybeans? (to sell and be used in many different things, food, fuel, and everyday products such as crayons, cleaners, soaps, and plastics )
  - What do farmers plant to grow soybean plants? (seed)
2. Soybean Seed (Pull the soybean seed out of the bag or envelope)
  - Where do farmers plant soybean seeds? (underground or in soil, usually planted in farm fields that are rich and fertile, this soil is common in the Midwest region of the United States)
  - What is the black line on the soybean? (hilum)
  - What does the seed need to grow? (water and warmth from the sun)
  - What happens next? (the seed starts germinates and starts to grow under ground)
3. 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)
4. 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 now 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)

#### 5. 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 can soybean plants grow? (three to four feet tall)
- What is another name for the main part of the soybean plant that gives the most support for the plant? (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? (After the cotyledons, and each leaf stem has three leaflets called a trifoliate leaf)
- What comes next after the plant has grown many stems and leaves? (flower)

#### 6. Flower

- What color are soybean flowers? (they can be purple or white)
- What size does the soybean flower grow to? (soybean flower is about the size of the tip of your pinky finger)
- What do the flowers contain? (pollen)
- Who visits the soybean flowers? (insects)
- 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 does the flower (specifically the ovary of flower) turn into after it has been pollinated? (small green bean pods)

#### 7. Small Growing Soybean Pod

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

#### 8. 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).

#### 9. 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 change and the days get shorter while the weather is getting colder)
- What season does this happen in? (Autumn)
- What is inside the brown pod? (tan soybean seeds)
- Are the mature soybean seeds hard or soft? (hard)



- What do farmers do when the soybean plants have dried up and the pods have turned brown? (They harvest them.)

**Adaptations/Modifications for Grade Levels** Each grade can use this activity to learn about plant lifecycles at a different level. Listed below are some ideas for adapting and modifying this activity to better suit the students in each grade.

#### Kindergarten

- 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.
- Simplify the lifecycle by decreasing the number of stages to three or four.
- Discuss and identify of each stage and what season and time of the year they occur in.
- As a class or small groups sort each of the stages in the correct order.

#### First Grade

- 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.

#### Second Grade

- Have students make their own soybean life cycle packet out of construction paper or cardstock.
- 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.
- Connect the lifecycle together with ribbon. Use ribbon color to represent what the plant needs during each stage. Connect the stages with yellow (sun), blue (water), or green (both).
- Print the stages on white paper and have students color the different stages in with what colors [yellow (sun), blue (water), or green (both)] the plant needs to grow and mature.
- Use the lifecycle to write a creative story about a soybean and how it changes during its lifecycle.

#### Third Grade

- Split the class in half, asking half of the students make a soybean lifecycle and the other half to make the corn lifecycle.
- Discuss or journal about the differences in lifecycles of the two plants.
- Identify what each stage's purpose is in the life of a soybean plant; reproduction, survival, structure, growth, storage.

#### Forth Grade

- Assign small groups to each stage of the lifecycle and have the students research to find out how long each stage takes.
- Have the students present to the class what they learned about their stage
- Have each group make a visual of their stage for the class.
- 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.

#### Fifth Grade

- Have partners research each stage 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.





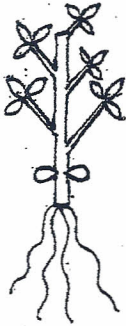
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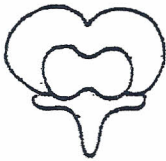
2. Germinating Seed



3. Sprout



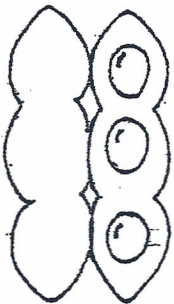
4. Growing Soybean Plant



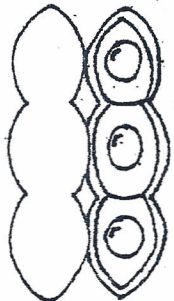
5. Flower



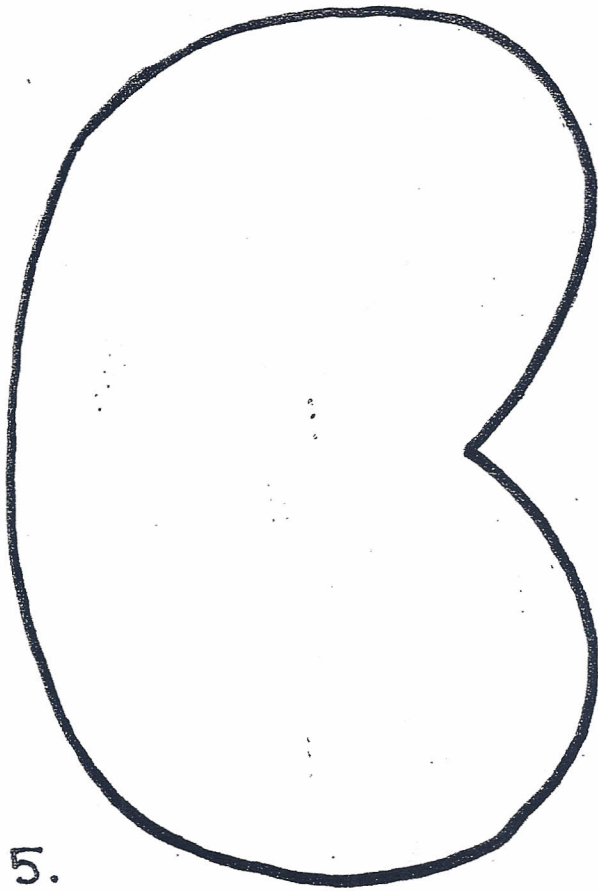
6. Small Green Pod



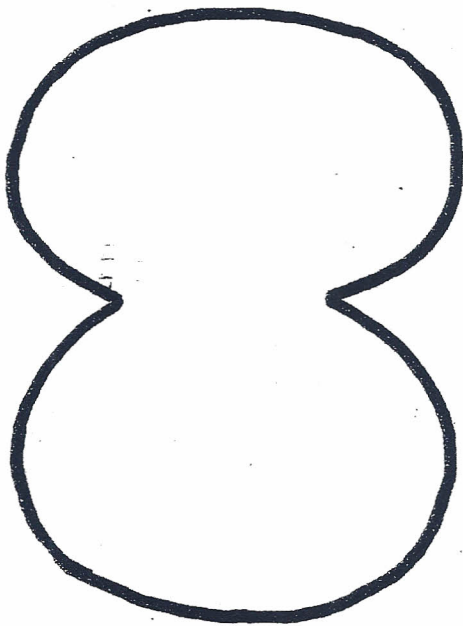
7. Large Green Pod



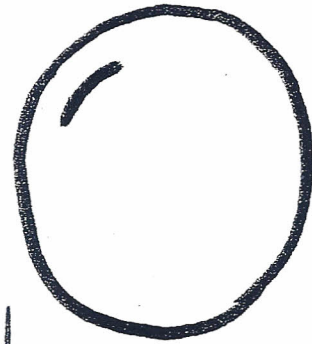
8. Large Brown Pod



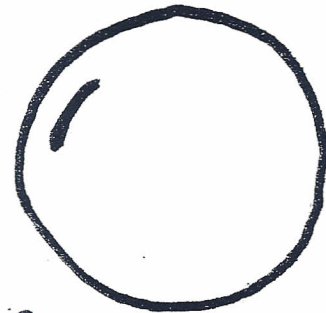
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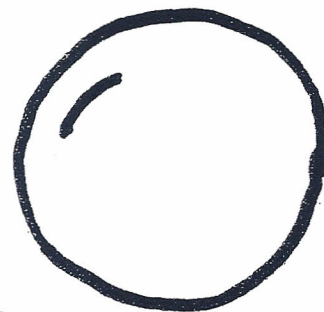
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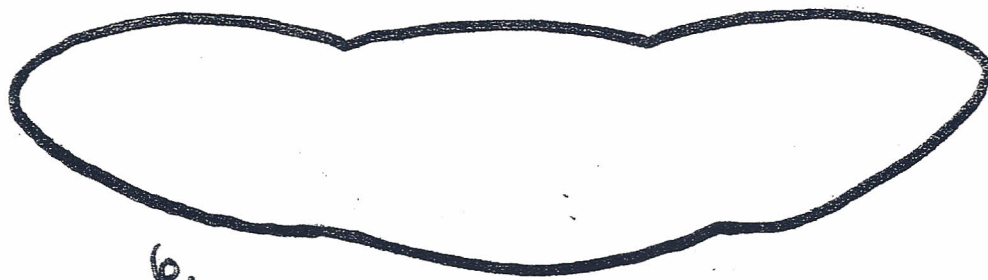


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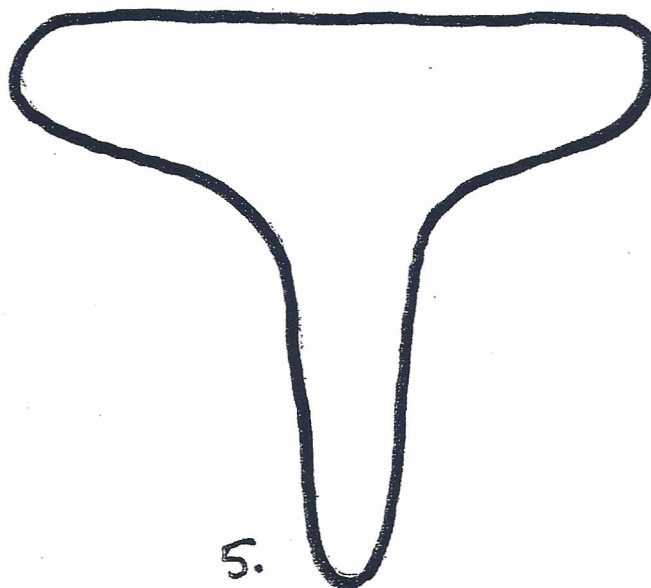
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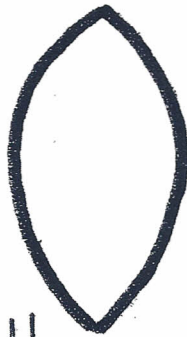
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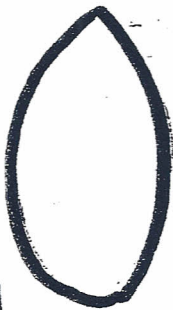
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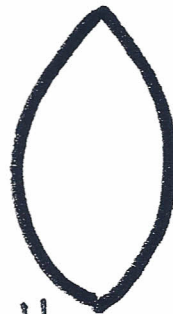
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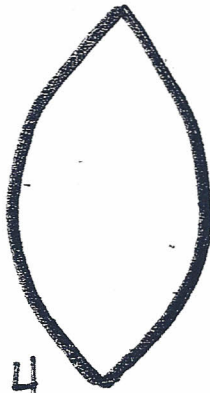


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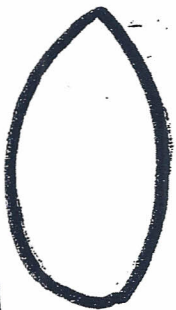
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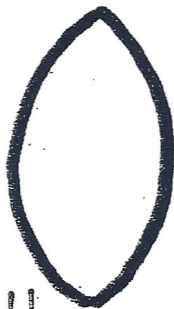
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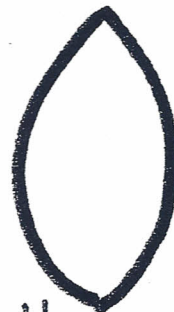
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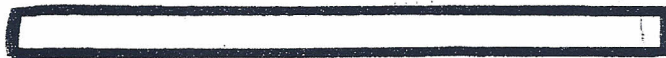
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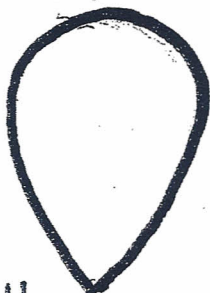
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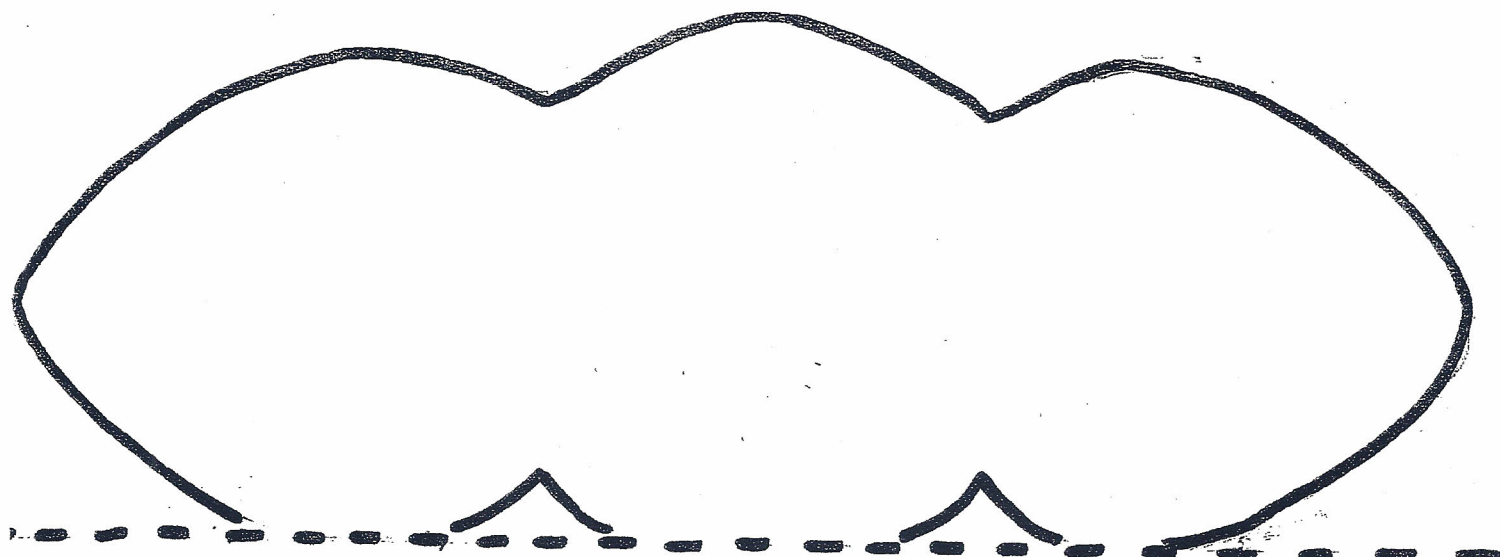


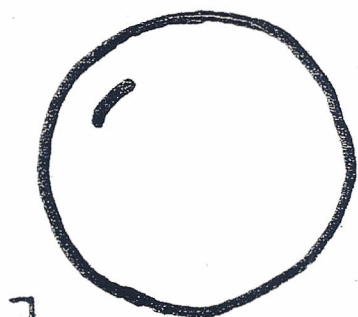
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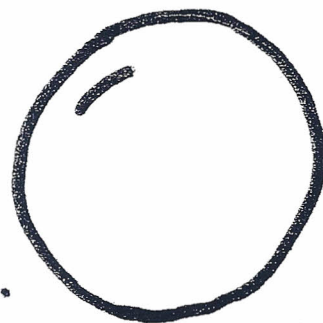
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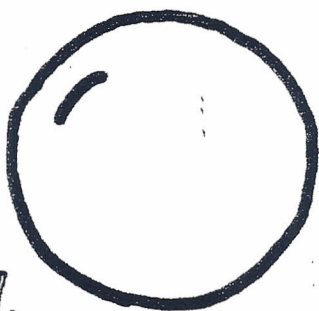




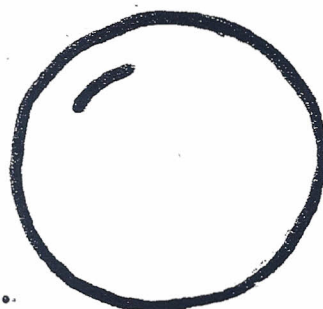
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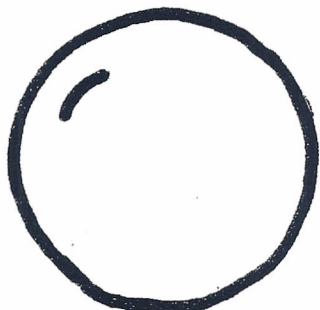
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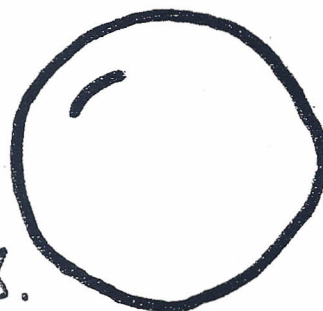
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## Soybean Lifecycle Cut-outs

**Purpose:** The Soybean Lifecycle Cut-Outs lesson plan is designed to help elementary students visualize the lifecycle of plants. The soybean plant is an excellent plant to use when teaching lifecycles because it has a very typical plant lifecycle and it is abundantly grown in Iowa.

The soybean lifecycle packet can be used in many ways. The templates can be enlarged on a copier and traced on a variety of materials, like felt or fun foam, to make a large version for classroom use. The soybean lifecycle cut-outs can also be adapted and modified to fit the classroom setting and ability level of the students. It is great review after reading *Bean Lifecycles* by Julie Murry or another book that portrays the lifecycle of a bean plant.

**Background:** Iowa leads the nation in the production of soybeans by producing over 400 million bushels of soybeans each year. Soybeans are used to make different products that we use everyday in the United States. Some of these products include feed for animals, food goods, biodiesel, vegetable oils, cleaning products, and crayons.

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Iowa 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 sell their crop directly 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.

### Instructions for Making Soybean Lifecycle Cut-outs:

#### 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)
- Scotch tape or glue sticks



- 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

*Instructions:*

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 markers 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.

**Activity:** After reading one of the recommended books or discussing plant lifecycles, use the lifecycle cut-outs as a way to review the plant lifecycles. In front of the class, pull one item out of the packet at a time. Hold the item up and ask the students questions about this stage and what comes next in the soybean lifecycle. Use the guided questions below to direct and lead a class discussion about each stage in the soybean lifecycle.

❖ **Soybean Stages and Guided Questions:**

1. Planting/Seed Bag or Envelope
  - When do farmers plant soybeans? (spring, mid April to late May)
  - Why do farmers plant soybeans? (to sell and be used in many different things, food, fuel, and everyday products such as crayons, cleaners, soaps, and plastics )
  - What do farmers plant to grow soybean plants? (seed)
2. Soybean Seed (Pull the soybean seed out of the bag or envelope)
  - Where do farmers plant soybean seeds? (underground or in soil, usually planted in farm fields that are rich and fertile, this soil is common in the Midwest region of the United States)
  - What is the black line on the soybean? (hilum)
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3. 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)

#### 4. 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 now 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)

#### 5. 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 can soybean plants grow? (three to four feet tall)
- What is another name for the main part of the soybean plant that gives the most support for the plant? (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? (After the cotyledons, and each leaf stem has three leaflets called a trifoliate leaf)
- What comes next after the plant has grown many stems and leaves? (flower)

#### 6. Flower

- What color are soybean flowers? (they can be purple or white)
- What size does the soybean flower grow to? (soybean flower is about the size of the tip of your pinky finger)
- What do the flowers contain? (pollen)
- Who visits the soybean flowers? (insects)
- 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 does the flower (specifically the ovary of flower) turn into after it has been pollinated? (small green bean pods)

#### 7. Small Growing Soybean Pod

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

#### 8. 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).

#### 9. 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 change and the days get shorter while the weather is getting colder)
- What season does this happen in? (Autumn)
- What is inside the brown pod? (tan soybean seeds)
- Are the mature soybean seeds hard or soft? (hard)
- What do farmers do when the soybean plants have dried up and the pods have turned brown? (They harvest them.)

**Adaptations/Modifications for Grade Levels** Each grade can use this activity to learn about plant lifecycles at a different level. Listed below are some ideas for adapting and modifying this activity to better suit the students in each grade.

#### Kindergarten

- 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.
- Simplify the lifecycle by decreasing the number of stages to three or four.
- Discuss and identify of each stage and what season and time of the year they occur in.
- As a class or small groups sort each of the stages in the correct order.

#### First Grade

- 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.

#### Second Grade

- Have students make their own soybean life cycle packet out of construction paper or cardstock.
- 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.
- Connect the lifecycle together with ribbon. Use ribbon color to represent what the plant needs during each stage. Connect the stages with yellow (sun), blue (water), or green (both).
- Print the stages on white paper and have students color the different stages in with what colors [yellow (sun), blue (water), or green (both)] the plant needs to grow and mature.
- Use the lifecycle to write a creative story about a soybean and how it changes during its lifecycle.

### Third Grade

- Split the class in half, asking half of the students make a soybean lifecycle and the other half to make the corn lifecycle.
- Discuss or journal about the differences in lifecycles of the two plants.
- Identify what each stage's purpose is in the life of a soybean plant; reproduction, survival, structure, growth, storage.

### Forth Grade

- Assign small groups to each stage of the lifecycle and have the students research to find out how long each stage takes.
- Have the students present to the class what they learned about their stage
- Have each group make a visual of their stage for the class.
- 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.

### Fifth Grade

- Have partners research each stage 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.