ILLINOIS **AG MAG**
An Agricultural Magazine for Kids

SOYBEANS

COOL BEANS!

Soybeans are the seeds of the soybean plant. Just like peas and peanuts, soybeans grow in pods and are a part of the **LEGUME** family. Soybeans are found in all sorts of food products. They are a great source of protein and essential nutrients. Not only are soybeans a healthy part of our diet, they are also used in a ton of industrial products. This makes soybeans one of the most versatile plants there are!

WORDS TO KNOW

Biodiesel - a renewable fuel made from soybeans.

Cotyledon - the first food source for seed-producing plants; will become the first pair of leaves.

Germinate - when a seed sprouts and begins to grow.

Lateral Roots - roots that extend from the tap root and absorb water and nutrients from the soil.

Legume - a plant that grows its seeds in a pod.

Radicle - the little tail-like root that first grows after the seed germinates and will become the tap root.

Tap Root - the main root of the plant from which lateral roots branch out.

Trifoliate - groups of three leaves.

WATCH IT GROW

The soybean plant, just like every other plant, has a life cycle. Farmers understand this and work year-round to plant, grow, and harvest these super beans.

1. The seed **GERMINATES** and grows a **RADICLE**, which then becomes the **TAP ROOT**.
2. **LATERAL ROOTS** begin to branch out from the tap root.
3. The plant pops out of the ground and the **COTYLEDON** peeks through the topsoil.
4. **TRIFOLIATE** leaves begin to grow.
5. Small purple or white flowers begin to grow.
6. Pollinated flowers produce 3-4 seeds, which grow in a pod.
7. The plants turn brown, leaves fall off, and the seeds inside the pods harden.

LEGUME LOWDOWN

Many school districts across Illinois use **BIODIESEL** made from soybeans to fuel their school buses!

Illinois legislature passed the bill HB 4439 on January 6, 2025, which declares the soybean as Illinois' official state bean.

Soybean oil is the main edible oil used in the United States. Soybeans are the #1 ingredient in vegetable oil.

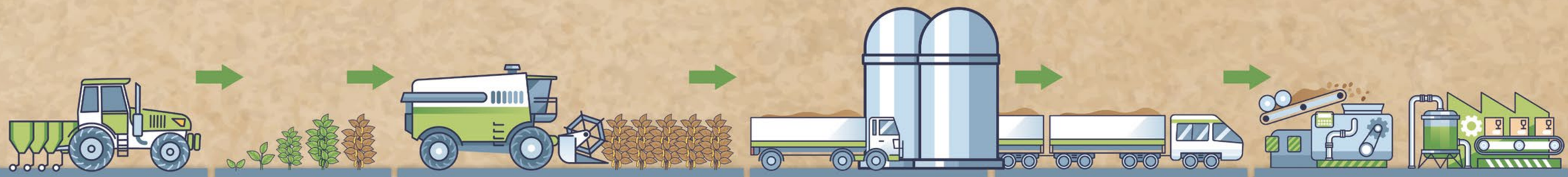
No other country grows more soybeans than the United States!

The average American consumes nearly half a cup of soybeans in some form every day.

50% of the soybeans grown in the United States are exported to other countries.

New soy products are being developed every day. A few examples include: building materials, plastics at John Deere, and foam in the seats of Ford vehicles!

FROM FIELD TO FOOD AND MORE!



PLANTING:

In the spring, farmers use a planting machine to plant soybeans in their fields. This machine digs the **FURROW**, holds the seeds, drops the seeds into the furrow, and covers the furrow back up with soil. Seeds are usually planted about 1.5 inches deep.

Soybeans need a lot of nitrogen to help them grow and produce seeds. Soybeans can absorb nitrogen that is already in the soil, but sometimes that is not enough. There is a good type of bacteria that grows on soybean plant roots. Soybean plants have a special relationship with these bacteria. They can take nitrogen from the air and 'fix' it by turning it into a form of nitrogen the soybean plant can use!

GROWING:

About four to seven days after the seeds are planted, the soybean plants start to grow. During the summer, farmers take care of the plants by keeping weeds and insects away. They also make sure the plants get enough nutrients, which helps them grow healthy and strong.

Drones, or Unmanned Aerial Vehicles (UAVs), can help farmers survey their fields in real-time and spot areas of flooding or drought, map the terrain of their fields, take pictures to collect data, and analyze crop health and soil health.

HARVESTING:

In the fall, soybean plants turn brown and the leaves fall off. This is one way farmers know their soybeans are ready to come out of the field! Farmers use a machine called a combine to harvest their soybeans. The combine picks the pods off the stems and shakes the soybeans out of the pods, keeping only the dry soybeans.

On average, Illinois produces over 698 million bushels on 10.7 million acres each year. That's around 65 bushels per acre!

STORING:

After farmers harvest the soybeans, they keep them in a special storage place called a grain bin or at a nearby grain elevator. Some grain elevators have machines called dryers that take out the moisture from the soybeans. This helps the soybeans stay fresh and safe for a long time.

TRANSPORTING:

For shorter trips, like taking soybeans from the farm to the grain elevator, farmers use tractors or semi-trucks. When they need to send soybeans farther away, like to different states or countries, they use trains, barges, or ships. One important way to transport soybeans is along the Mississippi River, which helps move them from Illinois to the Port of New Orleans.

A 110-car train can carry up to 403,000 bushels of soybeans – that's 84 billion soybeans!

PROCESSING:

Most soybeans grown in the United States are **PROCESSED** to make food, livestock feed, oil, fuel, and many other products. When soybeans are processed, the hull is removed and the soybeans are crushed and then rolled into flakes called soybean meal. Then, the soybean meal is separated from the oil.

One bushel of soybeans weighs 60 pounds and can produce 11 pounds of crude soybean oil or 47 pounds of soybean meal!

WORDS TO KNOW

Furrow – a long, narrow trench made in the ground.

Hull - or seed coat, the outside cover that protects the seed.

Processed – when a raw material has been changed (smashed, cut, heated, mixed, etc.) for its intended final product.

NUTRITION

Did you know that you eat soybeans?

They are found in foods in almost every food group, except for fruits. One of the best things about soybeans is that they provide high-quality protein. They also have all nine essential amino acids that we need to stay healthy. Plus, soybeans are packed with vitamins and minerals which help our bodies work properly. So, including soybeans in our diet can be very beneficial.

Nutrition labels are found on all food products we buy. The labels show the nutrient facts per serving, as well as the ingredients used to make the product. These ingredients are listed by the amount of each ingredient in the product from the most to the least. Check out your food labels and see if they contain soy! You might find soy oil, soy flour, soy protein isolates, or soy lecithin in the ingredient list. These ingredient names might sound weird, but they are just scientific words to describe what part of the soybean is being used as an ingredient.

INGREDIENTS: Oats, cane sugar, semi-sweet chocolate (sugar, chocolate liquor, cocoa butter, soy lecithin, vanilla extract), canola oil, tapioca syrup, brown rice, millet, honey, coconut, buckwheat, amaranth, molasses, brown rice flour, oat flour, gum acacia, quinoa, sea salt, brown rice syrup, vanilla extract, Vitamin E (tocopherols to maintain freshness).

Nutrition Facts

Serving size 1 bar (35g)

Calories per serving 150

Amount/Serving	% Daily Value	Amount/Serving	% Daily Value
Total Fat 5g	6%	**Total Carb.** 23g	8%
Sat. Fat 1.5g	8%	Dietary Fiber 2g	7%
Trans Fat 0g		Total Sugars 8g	
Polyunsaturated Fat 1g		Incl. 8g Added Sugars	16%
Monounsaturated Fat 2.5g		Sugar Alcohol 0g	
Cholesterol 0mg	0%	**Protein** 2g	
Sodium 65mg	3%		

Vitamin D 0% • Calcium 2% • Iron 6% • Potassium 2%

Allergen Information: Contains coconut and soy.
Made in a facility that processes peanuts, tree nuts and sesame seeds.

A typical snack bar nutrition label

SUPER SOYBEAN

Every part of the soybean can be used. The **HULL** can be used in pelleted form as animal feed. The oil is used in a variety of food and industrial products. Soybean meal is also used in a variety of human food and animal feed products. Keep reading to see what food and industrial products are made with soybeans!

HUMAN FOOD PRODUCTS:
cooking oil, salad dressing, tofu, breads, cheeses, peanut butter, baby food, soy milk, mayonnaise

INDUSTRIAL PRODUCTS:
auto care products, medicine, candles, paint, body lotion, fire extinguisher foam, sunscreen, crayons, glue, ink, plastics, biodiesel

ANIMAL FEED PRODUCTS:
Soybean meal is used in feed for livestock, pets, zoo animals, and fish.

Soybean Meal Use in IL:

A GLIMPSE OF HISTORY:

3000 BCE

Farmers in China began growing soybeans more than 5,000 years ago.

1765

Samuel Bowen plants the first soybeans in the North American British colonies, in what today is the state of Georgia.

1861–1865

Soybeans were used to brew a hot drink for soldiers during the Civil War.

1904

George Washington Carver began studying soybeans at the Tuskegee Institute in Alabama. Carver discovered a method of extracting soybean oil and invented a process for making paints and stains from soybeans.

B

1940

Henry Ford took an axe to a car trunk made with soybean plastic to demonstrate its durability. This increased the popularity of soybeans, and the United States began to export soybeans and soybean products.

C

1960s

Soybean meal became available to use as a livestock feed ingredient. It is high in protein and low cost.

Today

Farmers throughout the US produce 4 billion bushels of soybeans each year. Farmers in Illinois alone produce more than 600 million bushels yearly, which puts them first in the U.S.

A. U.S. National Archives and Records Administration, Warrenton, Fauquier County encampment, 1862, "What do I want, John Henry," NAID-533307.jpg • B. https://commons.wikimedia.org/wiki/File:George_Washington_Carver_c1910.jpg • C. https://ferdeurope.blogspot.com/2010/08/henry-ford-takes-swing-at-his-own-car.html

CAREER CORNER

STEPHANIE PORTER, CCA
IL Soybean Association
Outreach Agronomist

Why do farmers rotate growing corn and soybeans in the same field?
Farmers in Illinois grow different crops in the same field, but at different times. This is called crop rotation. These crops have different nutrient needs and roots, so rotating crops can help keep the soil healthy, hold it in place, and let water move through the soil better. Crop rotation also makes it harder for bugs, weeds, and plant diseases to thrive, so farmers don't have to use as many pesticides.

What decisions must farmers make as their crops are growing?
Farmers carefully watch over their crops to make sure they are growing and the soil is healthy. They always keep an eye on the weather, hoping they get enough rain to grow and harvest their crops. But too much or too little rain, as well as frost, wind, and hail can damage their crops. Sometimes, farmers will decide to apply a pesticide to stop weeds, bugs, or diseases from damaging their plants. When the crop is ready, farmers harvest their crop and decide when and where to sell their grain to make money.

Why are jobs like yours important to farmers who grow soybeans?
My job as an agronomist is like being a doctor for crops. It is important because I help farmers grow healthy soybeans and take care of the soil. I work with farmers to solve problems in their fields such as controlling bugs, weeds, and diseases. By helping farmers grow healthy soybeans, I help provide food, fuel, and feed for people all over the world.

BRADY HOLST
IL Soybean Association
Market Development Committee Chairman
Holst Farms
Corn, soy, and wheat producer

Tell us a little bit about your role with the IL Soybean Association.
I'm a farmer who helps make decisions about how Illinois soybean farmers' funds—small amounts pooled together from each farmer—are spent. Along with other farmers, I look for ways to improve farming for the future. We focus on helping sell soybeans to other countries, sharing farming research, and working with lawmakers on issues that affect farmers.

How do soybeans get from your farm and into our stores and pantries?
Soybeans leave the farm on trucks and are delivered to facilities where they're separated into oil and meal. The oil and meal are then shipped by river barges to different places, both in the U.S. and around the world, where they're used to make food, fuel, and other products.

What are some new products that soybeans could be used for?
Soybeans can be used to make plastic. This soybean-based plastic can be turned into many things because plastic is used in nearly everything.

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This Ag Mag complements and can be connected to the following educational standards:

Common Core State Standards: ELA-Literacy.RI.4.1; RI.4.3; RI.4.5; RI.4.7; L.4.3; L.4.4.A

Next Generation Science Standards: 3-LS4-3; 4-5.LS1.A-C; 4-EES3-1; 5-PS1-3; 5-PS3-1

IL Social Science Standards: SS.EC.1.3; SS.EC.1.4; SS.EC.2.4; SS.EC.2.5; SS.FL.1.4; SS.G.3.4; SS.H.1.3