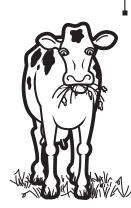


- 1900 Many American farmers were growing soybeans as a forage crop for cattle.
  - 1907 23 varieties of soybeans in the United States.
- **1920 -** Combines were first used to harvest soybeans, making them as easy to harvest as they were to grow.
  - 1929 United States soybean production had grown to 9 million bushels.
- 1940 The United States soybean crop had grown to 78 million bushels, and the United States was a net exported of soybeans and soybean products.

1900 1910 1920 1930 1940 1950

1898 - The United States Department of Agriculture (USDA) began introducing varieties of soybeans from Asia, and research into the bean's potential began in earnest.



1904 - At the Tuskegee Institute in Alabama, noted botanist and chemist George Washington Carver began studying the soybean. His discoveries changed the way people though about the soybean; no longer was it just a forage crop. Now its beans provided valuable protein and oil.

1919 - William Morse, director of forage crop investigations at the Arlington Experimental Farm in Virginia, led USDA's efforts to gain acceptance of the soybean as a potentially major agricultural crop in America. He goes on to help form the American Soybean Association and becomes the first president.

1922 - Staley Co. built the first major United States soybean processing plant in Decatur, Illinois.



1940s - This was a major turning point for soybeans in the United States.

American farmers and soybean processors were ready to fill the gap when revolution in China and World War II disrupted soybean production and put traditional sources of protein and edible oils in short supply.



### A few amazing

#### **PLANTING**

Most soybeans are planted in May or June, in rows that are 7 to 30 inches apart. Seeds are planted 1 to 1-1/2 inches apart and 1 to 2 inches deep. Fertilizers are used to provide additional nutrients to those of the soil. Herbicides and pesticides also are used to control weeds and bugs that could harm the tender seedlings. Farmers use fertilizer, herbicides and pesticides sparingly due to their expense and the risk that excess application of these chemicals poses to the environment.

#### **CULTIVATION**

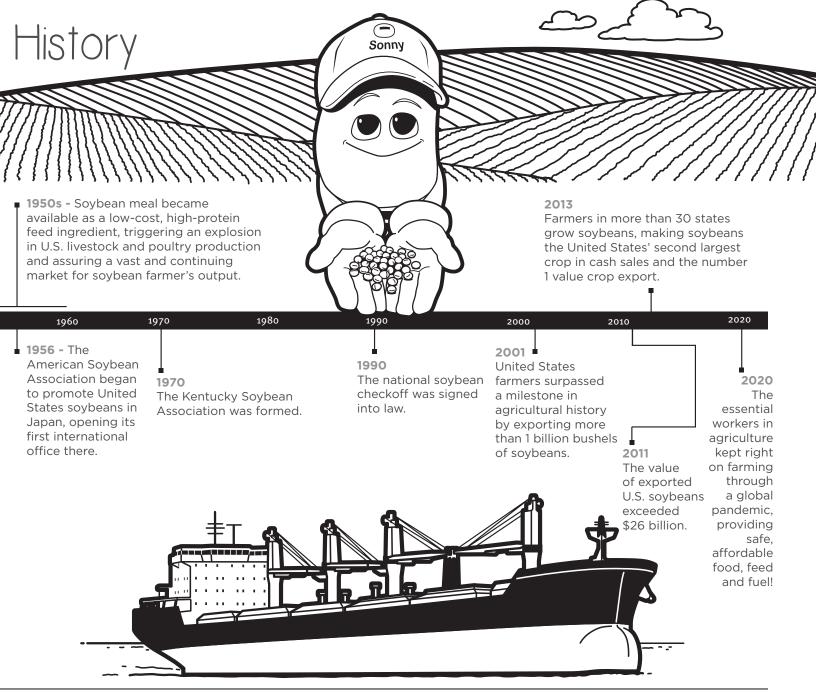
Soybean sprouts need fertile soil and plenty of rain alternating with periods of sun. The American Heartland provides ideal conditions for soybean cultivation. The United States produces approximately 30 percent of the world's soybeans.

Most of the soybeans are grown in the Heartland — Iowa, Illinois, Indiana, Minnesota, Missouri, Nebraska and Ohio. Other countries in South America, Asia and Europe also produce soybeans.

#### **MATURATION**

It takes about 75 to 80 days for soybeans to fully mature. At maturity, the soybean plant may reach a height of three feet or more. Flowers appear 6 to 8 weeks after planting and develop for two weeks before producing pods. These flowers can be pink, purple or white. Beans take 30 to 40 days to develop and mature as the plant's leaves turn yellow and drop to the ground. The beans are found in hairy pods that grow in clusters of 3 to 5. Each pod contains 2 or 3 beans.





### soybean facts

#### **HARVESTING**

In the Midwest, soybeans are generally ready to harvest in September or October. When the seeds are mature, the upright vine and foliage begin to shrivel and the leaves fall away. Harvest must be completed before the pods shatter and "spill the beans." All harvesting is done by machine. Farmers use a combine that cuts the stalk, threshes the plant residue and separates and cleans the beans in one operation.

#### FROM THE FARM TO THE MARKET

After harvesting the beans, farmers either sell their crop directly to a commercial grain elevator or store the crop in their own bins until they are ready to sell them. After the soybeans are sold, they are transported to a processing plant or they are exported to another country.

#### PROCESSING AND PRODUCTS

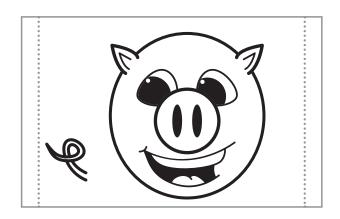
In processing, soybeans are cleaned, cracked, dehulled and rolled into flakes. Rolling allows the beans' oil to be extracted. Soybean oil is refined and then used in margarine, salad dressing, and cooking oils. It also has numerous industry applications, including biodiesel, printing ink, and paints.

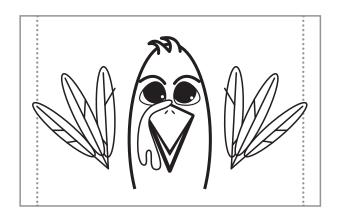
Lecithin, extracted from soybean oil, is used in pharmaceuticals and as an emulsifier in foods, candy bars, for example, it keeps the chocolate and the cocoa butter from separating.

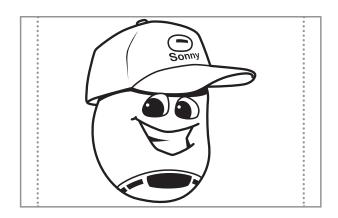
The dry portion of the bean is processed into soy flours, fiber, bran and grits used in baking, and to produce animal feed. Soy hulls are used as a high-fiber ingredient for breads, crackers and snacks.

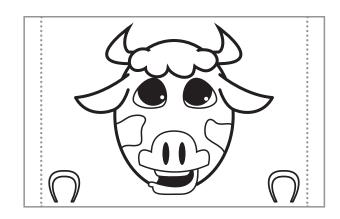


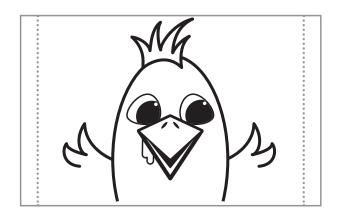
# Finger Puppets

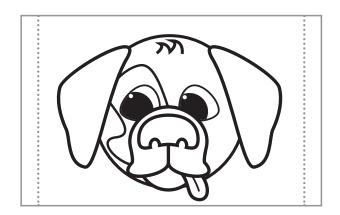








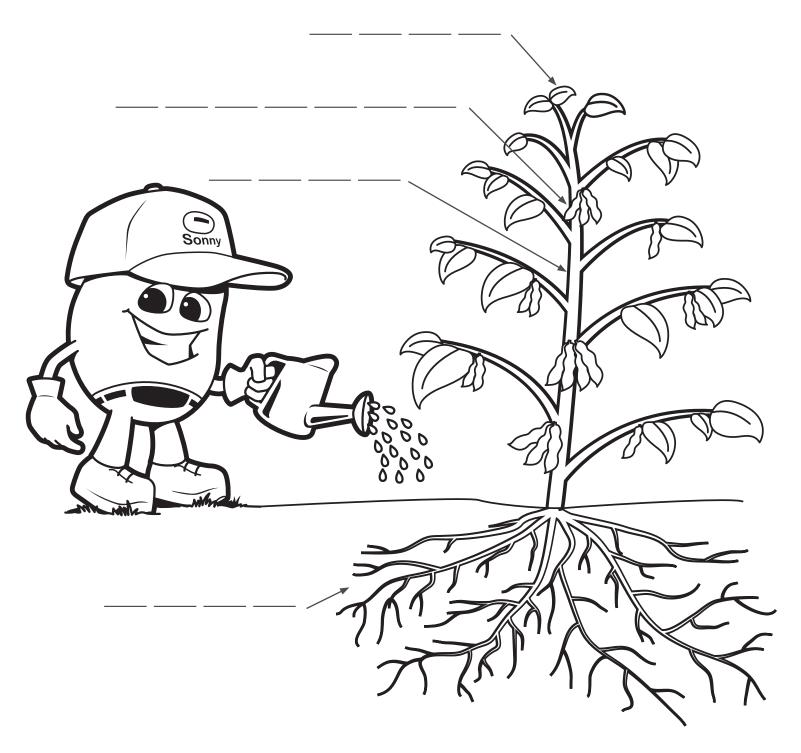


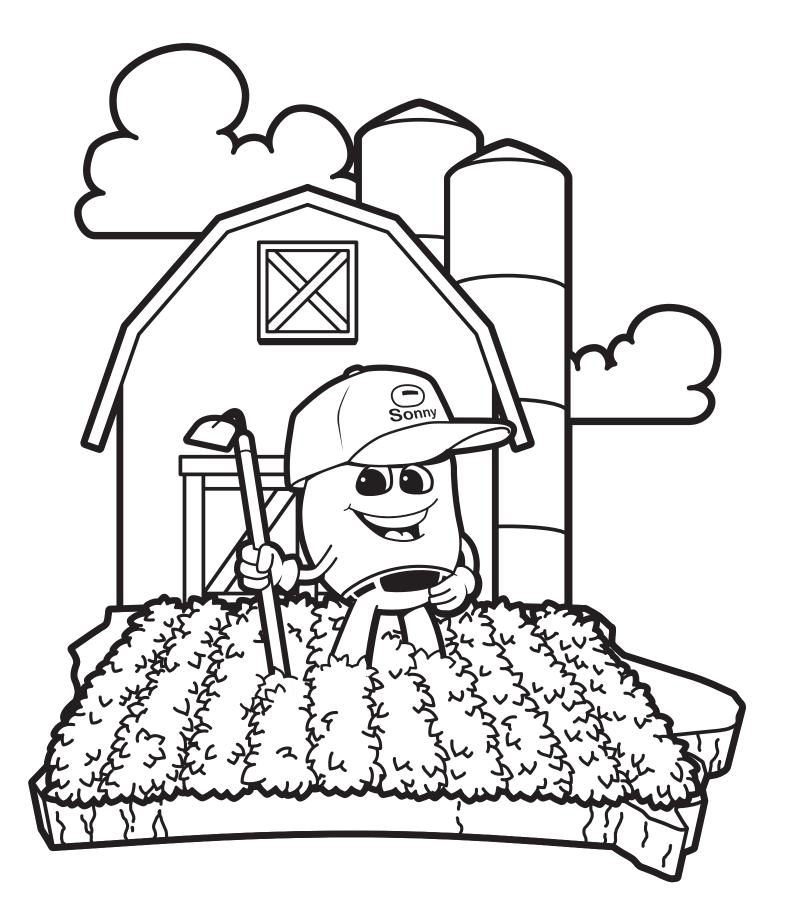


Name:

# Parts of a soybean plant

ROOT SEEDPOD STEM LEAF





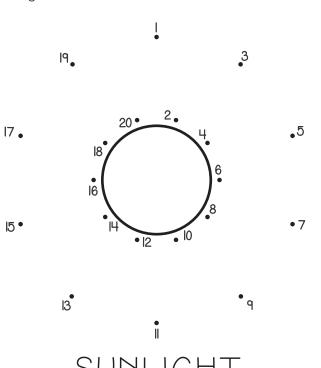
Farmers in Kentucky grow soybeans!



Farmers store or haul soybeans to help keep them clean and dry. After harvest, the soybeans will be made into many useful things.

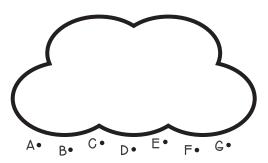
# 

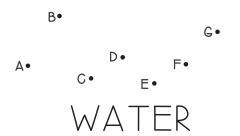
Air a combination of gases that surround the Earth. Soybean plants need the gas carbon dioxide in order to survive. Connect the same letters to create air being moved from the fan.



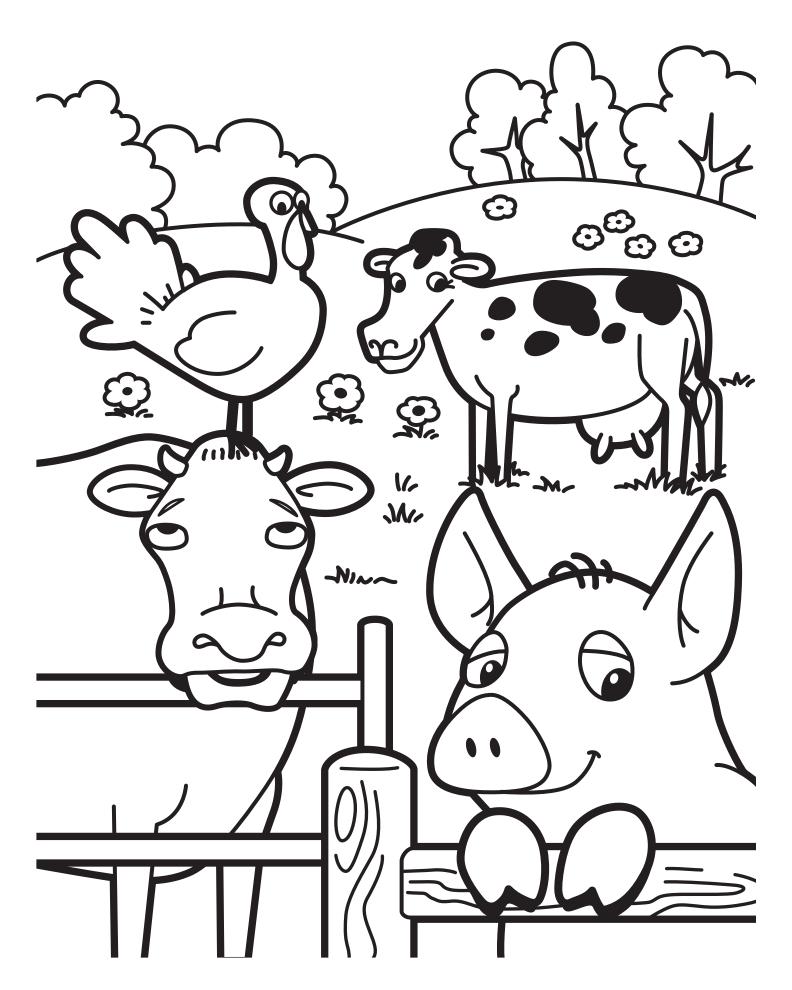
Sunlight is needed to heat the Earth and is a key factor in photosynthesis. Plants can convert the light energy into chemical energy that helps soybean plants stay healthy. Connect the dots to see the sunlight rays.

Soil has the minerals and nutrients that a soybean plant needs to grow. It is a thin layer over the Earth's crust and is abundant in Kentucky. Connect the dots above to find the soil.

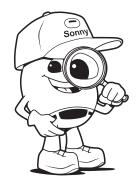




Water is vital for many forms of life on Earth, including you! Soybeans need lots of water to fill the soybean pods so we can turn them in to many useful products for everyone. Connect the same letters to create rain that falls from clouds.



Name: \_\_\_\_\_



### Word Find

A farmer plants seeds in the soil in late spring. With the help of sunlight, air and water, small plants grow from the land. During the summer, these plants grow flowers. The flowers make pods, each holding small beans. In the early fall, the farmer will harvest the crops with a combine to get these beans!

В	Α	G	Q	Α	Ν	V	Ε	С	W	S	Т	0	R	Р
W	Р	G	С	I	I	0	D	L	Α	Ν	D	Н	1	J
V	G	1	S	R	Q	М	F	R	Т	1	X	Α	Ν	Р
0	I	В	Ν	Α	Т	U	R	Е	Е	В	S	R	U	J
S	Н	M	S	Ε	Ε	D	S	R	R	K	F	V	Т	Z
0	Z	С	Н	F	Ε	R	Т	I	L	I	Z	Ε	R	Ν
1	F	Α	R	М	Ε	R	Α	Z	Т	С	R	S	1	L
L	V	1	Α	Т	S	Q	K	Z	F	Ν	0	Т	Е	Р
С	D	U	Ν	Α	Α	Z	D	Р	Υ	0	J	X	Ν	S
R	В	Α	S	U	Ν	L	I	G	Н	Т	F	K	Т	M
0	L	Α	F	S	0	0	Е	R	В	W	0	Υ	S	J
Р	I	Z	S	R	D	Α	K	Z	Ν	Q	W	W	0	С
S	M	L	U	Ε	Р	М	С	0	M	В	I	Ν	Е	Т
Z	J	Р	Υ	В	Ε	М	W	S	U	L	J	J	Α	D
Н	Т	R	F	L	X	L	0	D	G	С	Р	Α	X	X

AIR
COMBINE
CROPS
FARMER
FERTILIZER

HARVEST LAND NATURE NUTRIENTS PLANTER SEEDS SOIL SUNLIGHT WATER

Name:

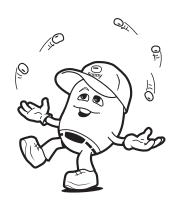
### Word Find

Farms are often home to many animals. Farm animals can help feed and clothe people! Did you know the fur of a sheep is called wool, and we can make warm clothes from it? Or that it takes a chicken's egg 21 days to hatch? Soybeans help feed some farm animals.

Т M Z S Α S R Ε G K X X D В C S Ε R L K Ν S Q U D C Т Α S Ε G Т R В L L 0 Z X Ε W В D L G M 0 F S Н Α R D В Н П M K 0 Α M 0 K Р K Y Ζ Ν M Ε G D 0 В C C 0 Ε В Α Т Т L Ε U Z Α S A R W G G C K Q Y V Н C Ε Ν Т Ζ X S K 0 C Н L X В Α K D Ν Т X Н S V J E 0 Н X П 0 Н L Н K В R Α J Т Ε Ε M C Т G F E Ε 0 S Н В G K Т Ν Ν R K Ε G U P F M Y Ε 0 S Т Ε R Ε R 0 N T Т G U R Y X D

BILLYGOAT
BULL
CALF
CATTLE
CHICKEN
COW
DOG

DUCKLING HEIFER HEN HORSE KITTEN PIG PIGLET POULTRY ROOSTER SHEEP SWINE TOMCAT TURKEY



Name: \_\_\_\_\_

# How do soybeans grow?

Use the following words or numbers to fill in the blank. Each is used once.

AUTUMN FLOWERS RAIN SEEDS
BIODIESEL LEAVES ROOTS SPRING
COMBINES PODS ROWS

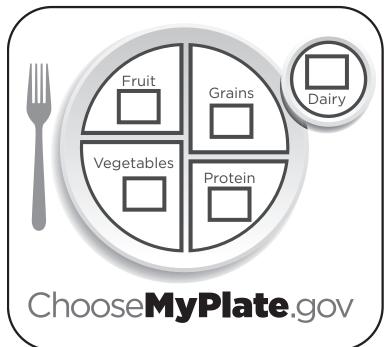
the ground is usually ready for planting soybeans in									
First, the farmer digs long in the soil.									
Then are dropped into these rows, evenly spaced.									
About a week after planting, the seed grows its									
With the help of sunshine and, a plant sprouts									
above ground. In the summer, the plants will grow purple									
flowers. These turn into hairy little,									
each with three small beans inside. By mid-August or early									
, the soybeans have ripened and will turn from green									
to yellow or brown. Farmers use to harvest the									
soybeans. The machine pops open the pod, keeping the beans									
and discarding the pods and The different parts of									
the soybeans are now ready to be made into food for animals,									
for trucks and many other amazing products!									

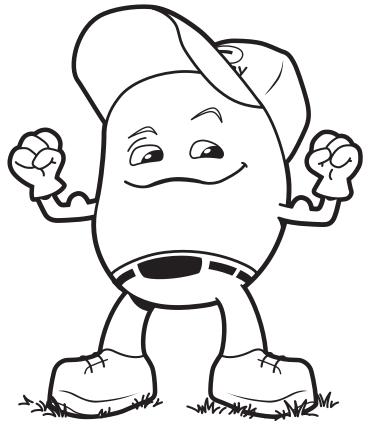
# Sonny Strong

Soyfoods are healthy and nutritious. Soy is a complete protein, and a great alternative for people with food allergies like dairy, peanuts and gluten. Soy protein helps build strong muscles.

Sonny is hungry! Can you help Sonny pick out a healthy meal to order from the menu?

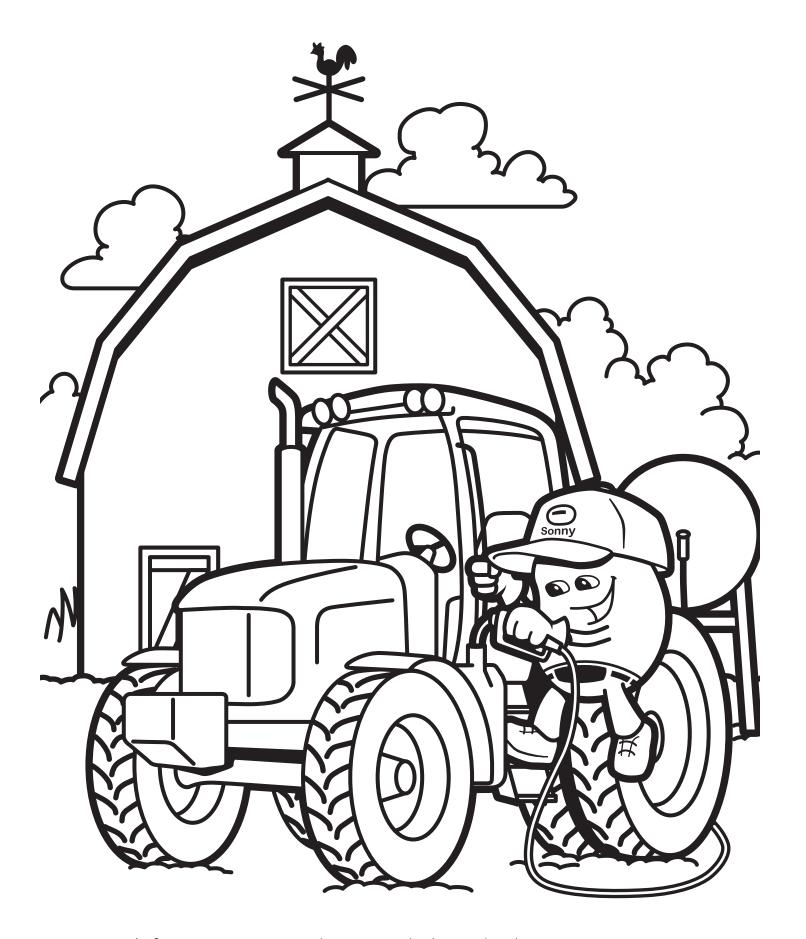
Be sure to pick an item from each category in the menu below and write the number in the box below.



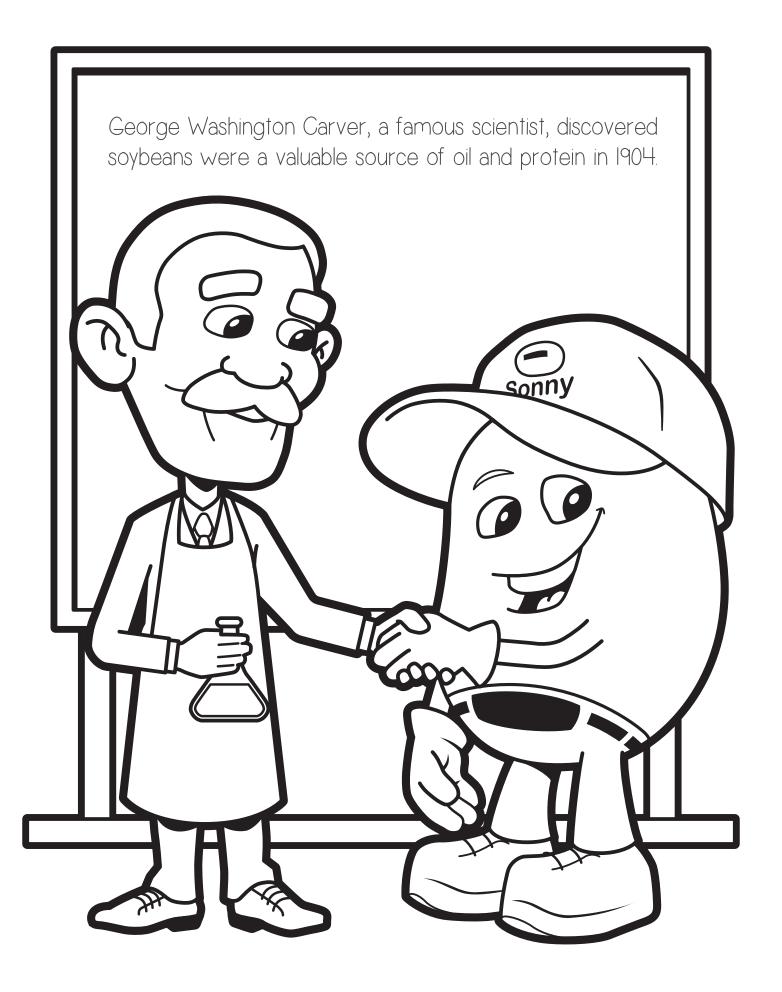


Soybeans = Protein Protein = Strong Muscles

<ol> <li>Soy cereal</li> <li>Soy waffles</li> <li>Granola</li> <li>Soy bread</li> </ol>	<ul><li>6. Soy burger</li><li>7. Soy hot dog</li><li>8. Soy Nuggets</li><li>9. Tofu</li></ul>	11. Soy milk 12. Soy cheese 13. Soy yogurt 14. Soy ice cream	15. Edamame 16. Broccoli
5. Soy pasta	10. Soynuts	15. Eggs	17. Strawberries 18. Blueberries



A farmer grows soybeans to help make his tractor move.



### Help Wanted

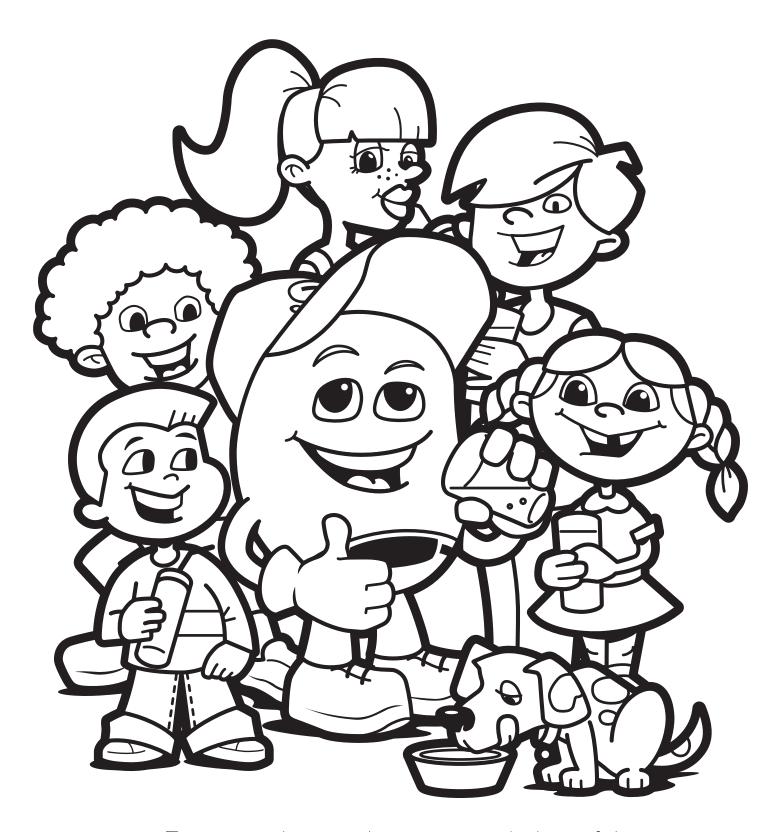
Ag is much more than farming. Take a look at the ag-related careers below. Write the answers in the blank...and think about these careers for your future!

RANCHER AGRONOMIST ECONOMIST ENTOMOLOGIST

VETERINARIAN
AG JOURNALIST
BEEKEEPER
ACCOUNTANT
LANDSCAPE ARCHITECT

METEOROLOGIST MECHANIC TRUCK DRIVER FORESTER

1. Specializes in crop production and soil management:
2. Provides a service by transporting products and materials:
3. Raises livestock including horses, cattle, sheep:
4. Tends hive of insects that produce honey:
5. Studies the production and distribution of goods and services:
6. Studies insects:
7. Predicts weather conditions that help farmers plan:
8. Maintains financial records:
9. Specializes in the medical care of animals:
10. Repairs farm machinery and equipment:
11. Writes newspaper and magazine articles about agriculture:
12. Manages forests to benefit wildlife, people and the environment:
13. Uses plants and other natural resources to create beauty, sound barriers, energy
savings and more:



Farmers make sure the water you drink is safe!

Farmers grow soybeans to help make all these products.

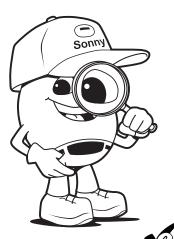
Help Sonny find the items on his shopping list.



### Word Find

Farmers grow soybeans to use as fuel for their equipment. Many cars, buses, farm machines and other engines use fuel made from corn and soybeans! What type of farm machines do farmers need?

Р	L	0	W	0	Q	C	С	В	Е	R	0	G	Н	R
L	0	X	S	R	S	F	U	Ε	L	Q	R	Ε	L	L
F	G	Р	0	K	Ε	Н	В	K	Ν	Т	U	G	U	N
D	С	X	С	G	С	Z	U	Ε	X	В	Υ	Ν	F	S
K	K	U	G	Α	S	0	L	1	Ν	Ε	Α	В	Α	Р
Q	R	1	L	Е	S	0	Υ	U	D	J	R	I	R	R
Т	G	Α	R	Т	K	L	X	Z	V	Н	Т	0	М	Α
G	R	D	J	M	1	L	Н	Р	Υ	V	Z	D	Р	Υ
X	Α	F	Е	С	L	V	С	Р	Р	L	U	1	Н	Ε
U	1	S	K	W	Н	Е	Α	0	Е	D	L	Ε	G	R
Α	Ν	Α	Р	F	Α	V	С	Т	M	Ν	V	S	K	D
R	В	Ν	U	U	1	G	U	F	0	В	R	Ε	Α	L
Z	1	K	Z	G	M	G	0	W	V	R	1	L	V	L
Т	Ν	В	Υ	F	Е	Р	F	Ν	V	С	X	Ν	0	J
Т	R	Α	С	Т	0	R	Т	V	J	Е	М	L	Е	С



AUGER BIODIESEL COMBINE CULTIVATOR FARM

FUEL
GAS PUMP
GASOLINE
GRAIN BIN
PLOW

SPRAYER TRACTOR TRUCKS WAGON

### It's a Soyworld

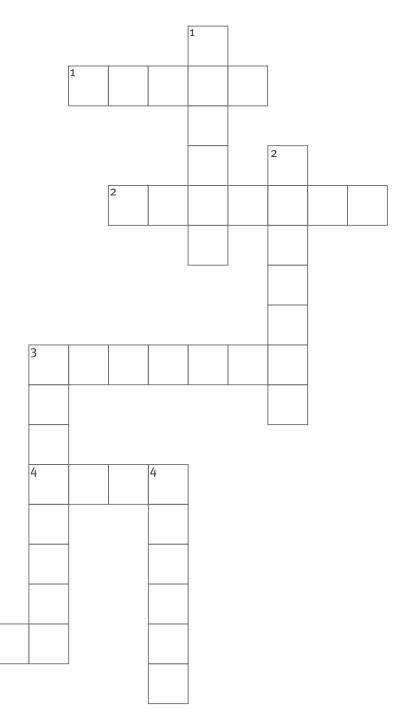
LOTION COMBINE GLUE SUNSHINE WATER SOYBEAN CRAYONS CEREAL SOIL

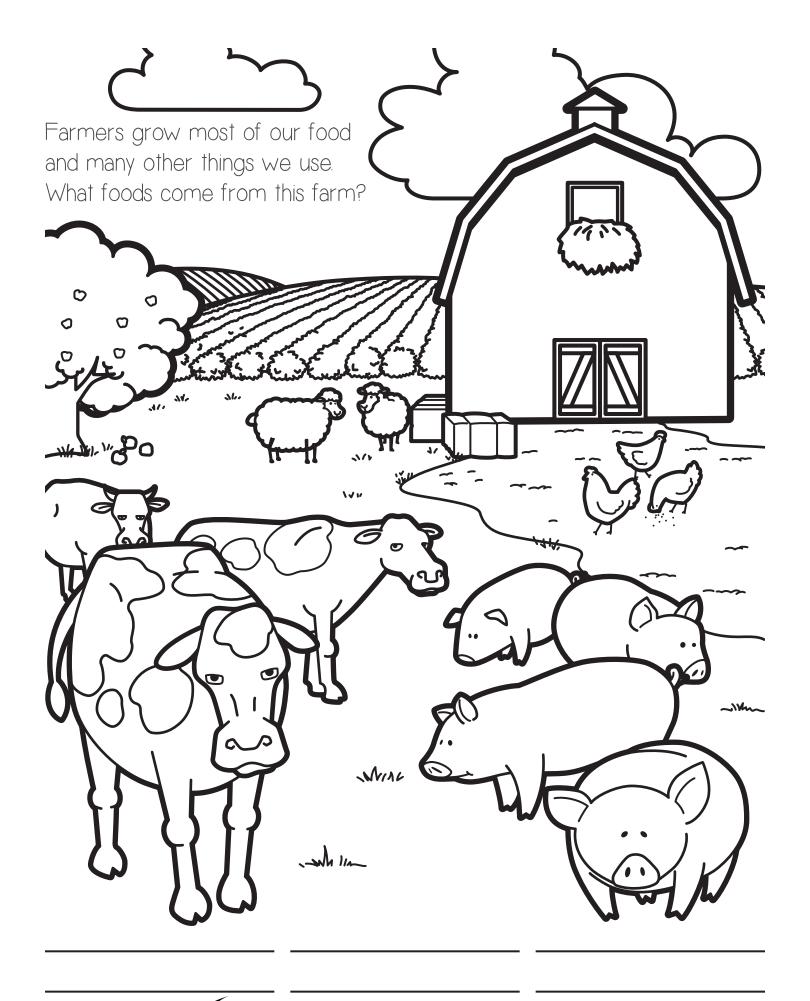
#### **Across**

- This makes the ground wet and gives the soybean plant a drink.
- 2. Some of these are made with soybeans. Kids make pictures colorful with them.
- 3. A small, round vegetable that has many uses.
- 4. This holds the soybean's roots. It sticks to your shoes when it's wet.

#### **Down**

- This is normally a breakfast food that can be made with soy ingredients.
- 2. This machine harvests the soybeans.
- 3. This gives the soybean plant light.
- 4. This product can be made with soybeans. It keeps our hands smooth.
- 5. This product can be made from soybeans. It makes things stick together.





# Water Challenge

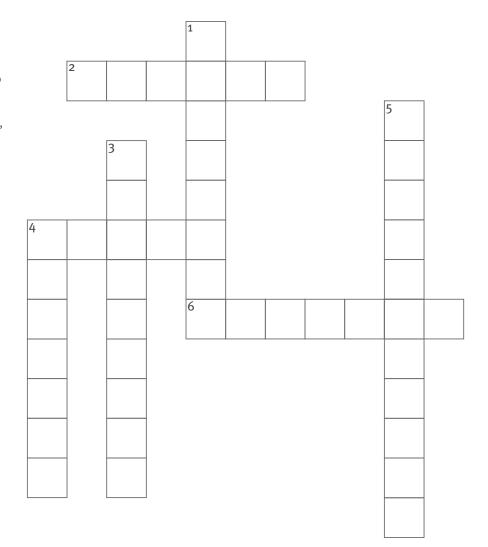
BASIN DROUGHT EROSION RUNOFF WATERSHED
CONSERVE ENVIRONMENT NATURAL RESOURCE WATER WETLAND

#### **Across**

- 2. Water from rain or snow that flows over the surface of the ground into streams.
- 4. People, homes, industries, wildlife, recreation, and transportation all depend on clean sources of this.
- 6. The movement of small soil, sand and rock particles carried by water or wind.

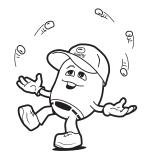
#### Down

- To keep something safe from being damaged or destroyed.
- 3. An area of land where all the water drains to a common point.
- 4. An area of land, such as a marsh or swamp, that is covered with shallow water.
- 5. The area in which something lives.



. A	ic anything	noonlo can	uso which	comes from nature.
. A	is allytilling	Deoble Call	use willeli	comes nom nature.

- 2. A river \_\_\_\_\_\_ is the land that water flows across or under on its way to a river.
- 3. A long period of dry weather is called a \_\_\_\_\_\_.



### Word Find

Soybeans are "legumes" like peas, lentils and garbanzo beans. Soybeans feed large numbers of people throughout the world, and have been part of the Chinese diet for 5,000 years. The benefits of eating soy include keeping your heart healthy and building strong muscles!

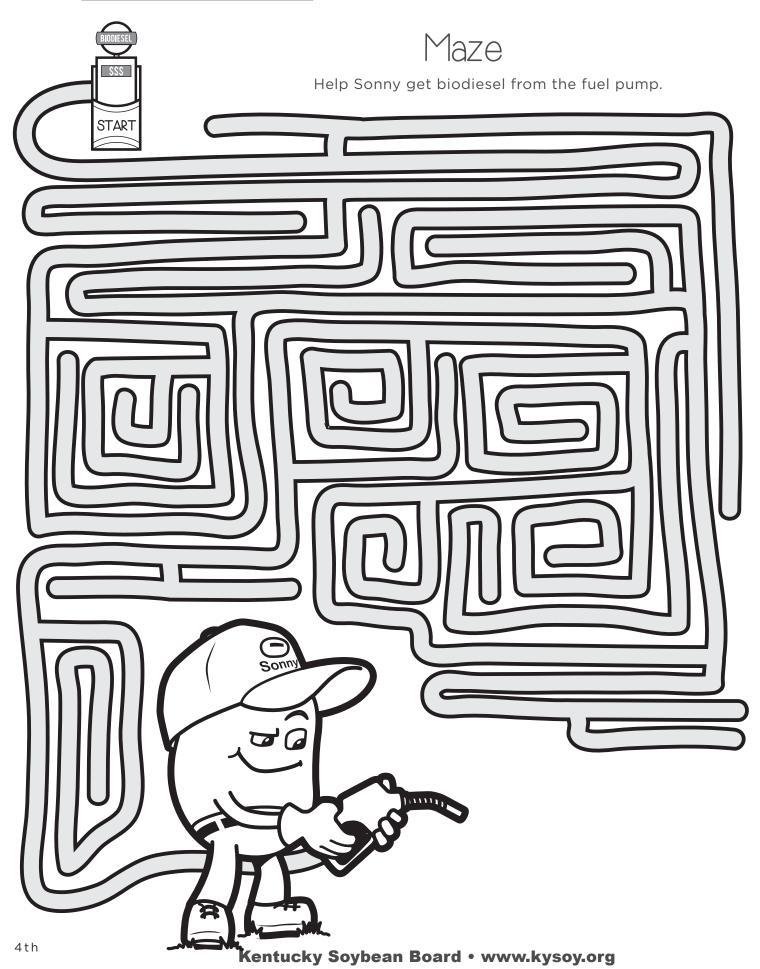
We find soy in all kinds of everyday foods like pizza and cereal! Soy is used in products like lotion and crayons. How many can you find below?



MAYONNAISE
SOY MILK
BABY FOOD
SOY NUTS
TOFU
KETCHUP
SALAD DRESSING
CRACKERS

PIZZA
GRANOLA BARS
POTATO CHIPS
CEREAL
MAKE UP
LOTION
ICE CREAM
CANDLES

DOG FOOD
CRAYONS
NOODLES
EDAMAME
CEREAL
CAKE
BREAD



### A Day in the Life of a Soybean Farmer

The following story outlines a typical day for a soybean farmer. Circle or underline the different jobs performed throughout the day.

This morning at 5:00, my alarm clock buzzed. I checked the weather for the day from my smart phone, and grabbed a quick bite of breakfast before heading out to meet my seed dealer. During our meeting, we reviewed soybean yield potential, overall plant health in my growing zone, drought tolerance, recommended soil type and the growth time-frame for the seed I had purchased.

After picking up my seed, I headed back to the farm to review the soil samples that I took last fall. I chose which fertilizer to apply to my soybean crop based on the results of the samples.

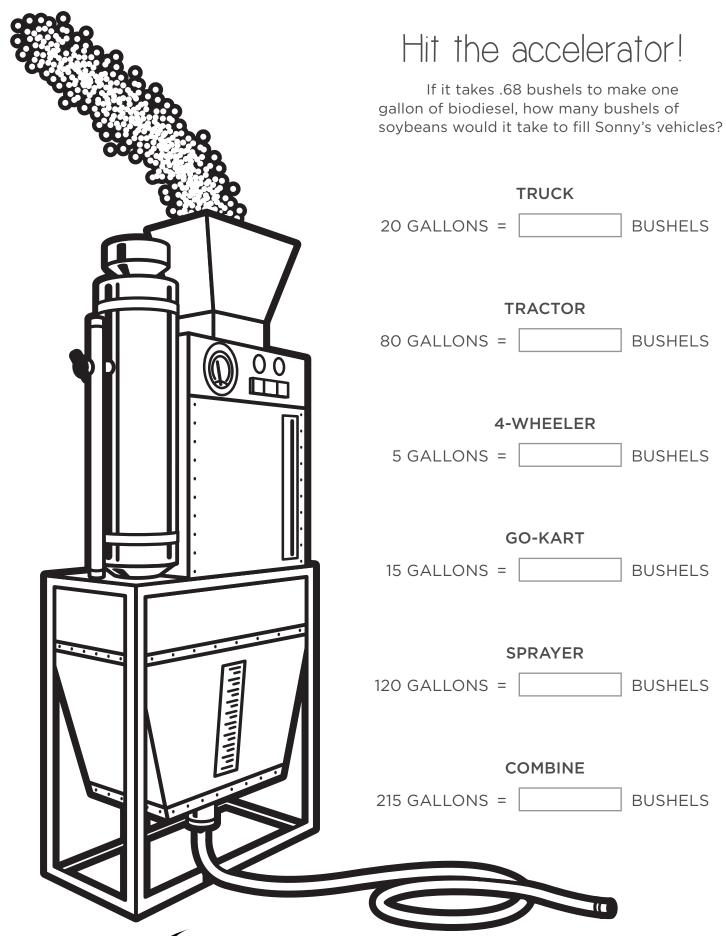
During lunch I checked the grain market to see the price soybeans were selling for. While inside, I also balanced the checkbook, checked my email, and called my banker to give him an update on the planting

season.

Then I headed back outside. After loading the seed into the planter, I began planting the season's crop. I stopped the tractor after the first pass through the field to double check that the spacing and depth of the seed was correct. I finished planting my soybeans just before sunset.

I headed back to the house to feed my dogs and eat dinner with my family. After everyone was asleep, I jotted down notes from my day including

what soybean seed variety I used, which farm field I planted and the fertilizer that I needed to apply to the crop. This helps me track the progress of each field and to prepare for the next day's tasks.





### Word Find

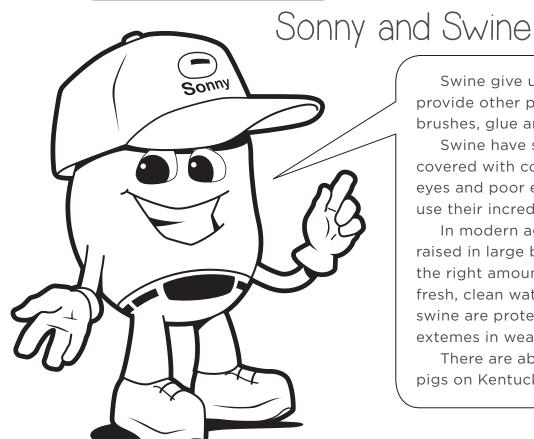
Farmers plant cover crops to help prevent erosion and protect the watershed from runoff nutrients such as nitrogen, phosphorous and potassium that come from heavy rain. This fosters a quality ecosystem for aquaculture in rivers, streams and wetlands.

J F П S Н D V В C D Н P S Μ Ε S Υ S C Ε Т 0 Т P P J L W P U L L C Α Ν 0 Т 0 Р E R 0 F S Т Ν Ε 1 Т U N Α Т Т Y F J R U L S N Ε П Р Α Ν Ε M Т Ν C S Т D W Q Μ C C V R Α S D 0 D V R 0 Z D J H Ν Ε L Ε P R K Ε U L L 0 S D Α Т R X Ε Ν F Т U Ν Ν Α Н R Ν R Т J G Α M U S Т Н G U 0 R D S U 0 U X L Н Q R Α D S Н F J F K L Т G R Ε Т F X Q Р 0 Ν W A S W Н Ε D Т Ε R Т 0 R Α Ζ S Α X В W Z Ν В Р Α L Н Q G Ε G Α Ν Α R D J Р W N

BASIN
DRAINAGE
DROUGHT
ECOSYSTEM
EROSION
FISH
FLOOD

FLOW
HEADWATERS
NUTRIENTS
PLANTS
POLLUTION
PRECIPITATION
QUALITY

RIVER
RUNOFF
STREAM
WATER
WATERSHED
WETLAND



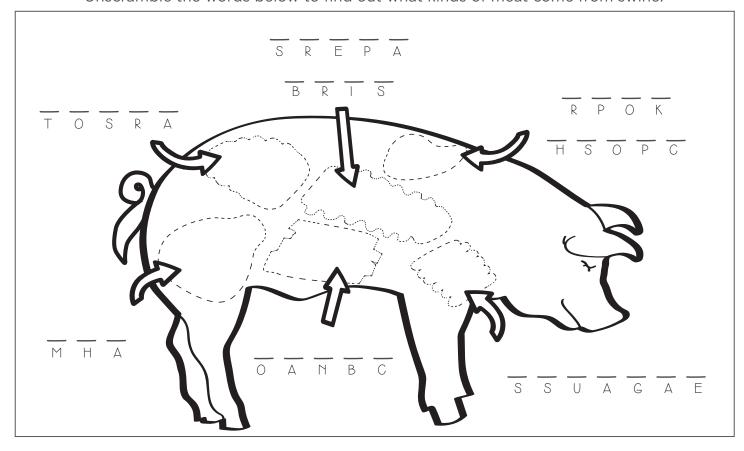
Swine give us a lot of meat. They also provide other products, like lard, leather, brushes, glue and even medicines.

Swine have stout, heavy bodies covered with coarse hair. They have small eyes and poor eyesight. To find food, they use their incredible sense of smell!

In modern agriculture, most swine are raised in large barns. There, they get just the right amount of feed and plenty of fresh, clean water. When raised indoors, swine are protected from predators and extemes in weather.

There are about 385,000 hogs and pigs on Kentucky farms!

Unscramble the words below to find out what kinds of meat come from swine.



### Dairy vs. Beef Challenge

BEEF CALCIUM COWS EARTAG PROTEIN
BULL CALF DAIRY HEIFER STOMACH

#### **Across**

- 4. Milk products are important to us because they contain \_\_\_\_\_.
- 6. Beef cattle have four parts to their .
- 9. There are six major breeds of these types of cows.
- 10. The meat from an adult cattle.

#### Down

- One way to identify cattle animals is to put this on the animal.
- 2. An adult male that is kept to provide natural breeding for a herd of cows.
- 3. Adult female dairy animals are referred to this after they have given birth.
- Soybeans are used as an ingredient in cattle feed because they are high in \_\_\_\_\_.
- 7. A young female that has not given birth.
- 8. A cattle baby.

		1			2	
3	4					
5						
6				7		
					0	
					8	
9						
			10			

List Four or More Dairy Products	List Four or More Beef Products

# How do farmers fight weeds and pests?

Use the words from the key to complete the story. Match the numbers of the letters in the story to the numbers below to complete the two hidden messages.

DISEASES	EROSION	GROWING	HERBICIDES	PESTS	SUNLIGHT	YIELD	

Weeds compete with soybeans for soil nutrients and available —  $-\frac{1}{9}$   $-\frac{1}{8}$  —  $-\frac{1}{13}$  making harvest more difficult and potentially reducing the quality of the harvested grain. Insects can also damage soybean plants, reducing yield and reducing the quality of the harvested grain by introducing  $-\frac{1}{7}$  —  $-\frac{1}{1}$  —  $-\frac{1}{4}$  — that destroy or discolor it.

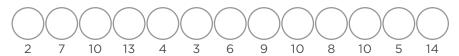
Scientists have developed cost-effective techniques to modify the genetic makeup of the soybean to make it resistant to herbicides, that would normally kill the plant. These herbicides provide soybean growers with a low-cost method of controlling weeds and reducing soil  $\frac{1}{12} = \frac{1}{10} = \frac{$ 

Because the  $\frac{1}{6}$   $\frac{1}{2}$   $\frac{1}{3}$   $\frac{1}{3}$   $\frac{1}{3}$   $\frac{1}{3}$  used today are applied at very low rates and help reduce soil erosion into our rivers and streams, they are called "environmentally friendly."

Advances in science will soon produce soybean plants that also deter insects from feeding on the roots and on the developing grain. This will reduce the amount of pesticides that would normally be applied to control the damage caused by insects. Insects feeding on the roots of the plant or on the developing grain can lower  $\frac{1}{14} - \frac{1}{8} = \frac{1}{8}$  by as much as 50 percent. Lowering or eliminating the amount of pesticides used in producing each acre of soybeans is also considered "environmentally friendly."

Diseases and insects that attack soybeans normally do not attack other major crops such as corn. Rotating a field from the production of soybeans to corn and then back to soybeans again is another way to reduce the risk of damage from insects and diseases.

By  $\frac{}{5}$  —  $\frac{}{}$  —  $\frac{}{}$  — soybeans in a field every other year instead of every year, the producer can reduce the buildup of certain diseases and  $\frac{}{11}$  —  $\frac{}{}$  — that harm soybeans. One such pest is the soybean cyst nematode, a pest that feeds and reproduces on the root of the soybean plant. Soybean producers must practice crop rotation to help control this yield-robbing pest, because trying to control it with chemicals is not cost effective.



... is a new tool to help soybean farmers fight weeds and insects.



... is a sure way to reduce the plant's exposure to insects and diseases.

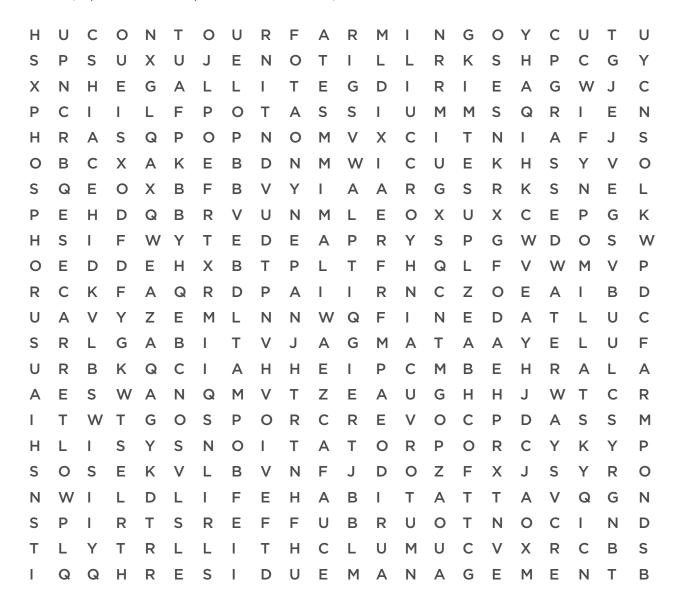


Name:
-------

### Word Find

Farmers do many things to protect their valuable soil and ground water resources. Most farm families live on or near the land they farm, so farmers understand how important it is to keep groundwater clean and free of pollutants.

This word find contains practices and inputs farmers use to protect and enrich their soil and water. (Tip: Some are spelled backwards.)



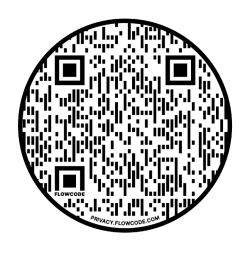
CHEMICAL APPLICATION
CONTOUR BUFFER STRIPS
CONTOUR FARMING
COVER CROPS
CROP ROTATIONS
FARM PONDS

MULCH TILL
NITROGEN
NOTILL
PASTURE PLANTINGS
PHOSPHORUS
POTASSIUM
GRASSED WATERWAYS

RIDGE TILLAGE
RESIDUE MANAGEMENT
TERRACES
WATER BASINS
WILDLIFE HABITAT
WIND BREAKS



# We hope you've had "SOY" much fun! There's more to learn.



For soybean videos and access to our social media outlets, or to download this booklet, use the QR code or visit https://flow.page/kysoybean

Follow us on social media



@kysoybean



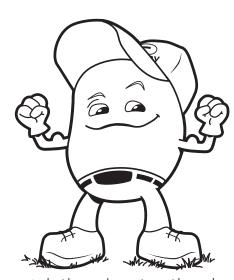
@kysoybean



@kysoybean

This book is compliments of the farmers of the





Special thanks to the lowa Soybean Association for sharing content.