

SOYBEANS

Shape
the World



Teacher's Guide

Guided, standard-connected instruction for **5th-grade** students.

***Want help with this activity?** Invite an AITC Education Specialist to your classroom to teach a Competitive Farming or Soybeans Shape the World lesson. A specialist will visit and bring all of the supplies free of charge!*

Learn More: <https://nefbfoundation.org/classroomvisits/>

Activity Idea

'GUESS WHO' SOY PRODUCTS

SC.5.3.3.B | Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Players ask yes-or-no questions and use clues from classmates to figure out which soy-based product is taped to their headband!

Materials:

- Small notecards with names or pictures of consumer products made from soybeans
(Tip: Use cutouts from the NEFBF Soybeans A to Z poster)
- Construction paper or lightweight recycled cardboard for headbands
- Stapler and staples
- Masking tape or rolled tape
- Pens or markers

Prepare for the game:

- **Make Headbands** - Cut paper into strips about 2" wide and staple the ends to create a circular headband that fits snugly on each student's head.
- **Set Up Product Cards** - Lay the soy product cards face-down on a table.
- **Attach Products Without Peeking** - Each student selects a card without looking at it, tapes it to the front of their headband, and wears it so others can see it but not them!

"Product Headbands" Game Instructions:

1. Move Around & Share Clues

Walk around the room and talk to classmates. Give each other clues about the products on each other's headbands. Clues should be descriptive but not obvious.

Examples for upholstery:

- "It covers something that you sit on."
- "It comes in many colors and is soft or flexible."

2. Ask Yes/No Questions

To figure out what your product is, ask questions that can be answered with a 'yes' or 'no.'

Examples for questions:

- "Is it something people eat?"
- "Would I find this in a house or at school?"

3. Guess Your Product

Based on the clues and questions, try to name the soy-based product on your headband!

After the game, come back together to discuss:

- What was the hardest product to guess and why?
- Did anything surprise you about the product or game?
- Which product did you not expect to be made from soybeans?

Answers

Fill-in-the-blank soybean parts - page 1

NATURE'S SOIL HELPERS FILL-IN-THE-BLANK

1. Seeds are held inside the **seed pods**.
2. Soybean plants can grow up to **three feet** tall.
3. The **roots** of the soybean plant grow underground.
4. Roots in the ground bring water from the soil into the central **stem**, then up to the many **leaves** at the top of the plant to collect sunlight.
5. On the roots are **nodules**, a plant organ where rhizobia bacteria live.
6. The pod holds three to five **seeds** inside.
7. Because it collects nitrogen from the air and releases it back into the soil, the soybean is classified as a **legume**.

WORD BANK

Fill in the blanks using the word bank.

leaves	seed pods	seeds	three feet
stem	roots	nodules	legume

1. Seeds are held inside the _____ .
2. Soybean plants can grow over _____ tall.
3. The _____ of the soybean plant grow underground.
4. Roots in the ground bring water from the soil into the central _____ , then up to the many _____ at the top of the plant to collect sunlight.
5. On the roots are _____ , a plant organ where rhizobia bacteria live.
6. The pod holds three to five _____ inside.
7. Because it collects nitrogen from the air and releases it back into the soil, the soybean is classified as a _____ .

Activity Idea

LEARN ABOUT EMULSIONS AND EMULSIFIERS

SC.5.3.1.C | Make observations and measurements to identify materials based on their properties.

SS.5.3.1.d | Identify how supply and demand impact goods and services.

Watch and Learn: What Is Soy Lecithin and Why Is It in Our Food?

Introduce students to the science behind emulsions and the role of soy lecithin, a common soy-based food ingredient used to keep ingredients from separating.

Soy Lecithin Explained

A clear, educational video with visuals and diagrams to explain emulsifiers, how soy lecithin works, and why it's added to common foods. <https://www.youtube.com/watch?v=7I8GXmpKrVg>

Visual Demonstration: Oil, Water, and Egg Yolk Emulsion

A hands-on science video showing what happens when oil, water, and an emulsifier (like egg yolk) are combined, great for visual learners. <https://www.youtube.com/watch?v=x3EtkkmchjY>

Real-World Example: Baker's Candies in Nebraska

See how a local Nebraska candy company uses soy lecithin in its chocolate making process. Great for connecting science to real-world food production. <https://nebrasCASoybeans.org/learn/meet-a-business>

Activity Idea

DIVISION OF LABOR PUZZLE

SS.5.2.6.a | Describe how international trade promotes specialization and division of labor and increases the productivity of labor, output, and consumption.

Objective:

Students will explore how soy-based products move from farm to table or shelf through the roles of production, processing, and distribution, and how each stage includes specialized jobs that contribute to the whole system.

Set-Up:

- Prepare notecards or paper puzzle pieces labeled with partial words and job titles (see list below).
- Each piece represents one part of a full word and one career connected to soybeans.
- Students will find others with pieces that complete their word: PRODUCTION, PROCESSING, or DISTRIBUTION.

Steps:

1. Opening Discussion:

- Ask: What have you eaten, worn, or used today that came from a soybean?
- Students share examples (e.g., soy milk, biodiesel, crayons, tofu, snacks, etc.)

2. Concept Intro:

- Ask: How do these products get to us so we can use them?
- Briefly explain:
- Soybeans go through three main stages:
- o Production – where they are grown
 - o Processing – where they are broken down or turned into ingredients
 - o Distribution – how they are transported and sold

Many jobs and careers are involved at each stage to make these products available to us.

3. Puzzle Role Match Game:

- Give each student a piece of a word and a career (see next page).
- Students walk around and find others who complete their word: PRODUCTION, PROCESSING, or DISTRIBUTION

Group Reflection:

After forming groups, discuss:

- Which careers were new to you?
- Which roles depend on each other?
- Does the order of production - processing - distribution matter?
- What happens when one of these jobs takes place in another country (e.g., importing U.S. soybeans)?

Highlight how specialization and trade affect the flow and availability of products.

Optional Extension:

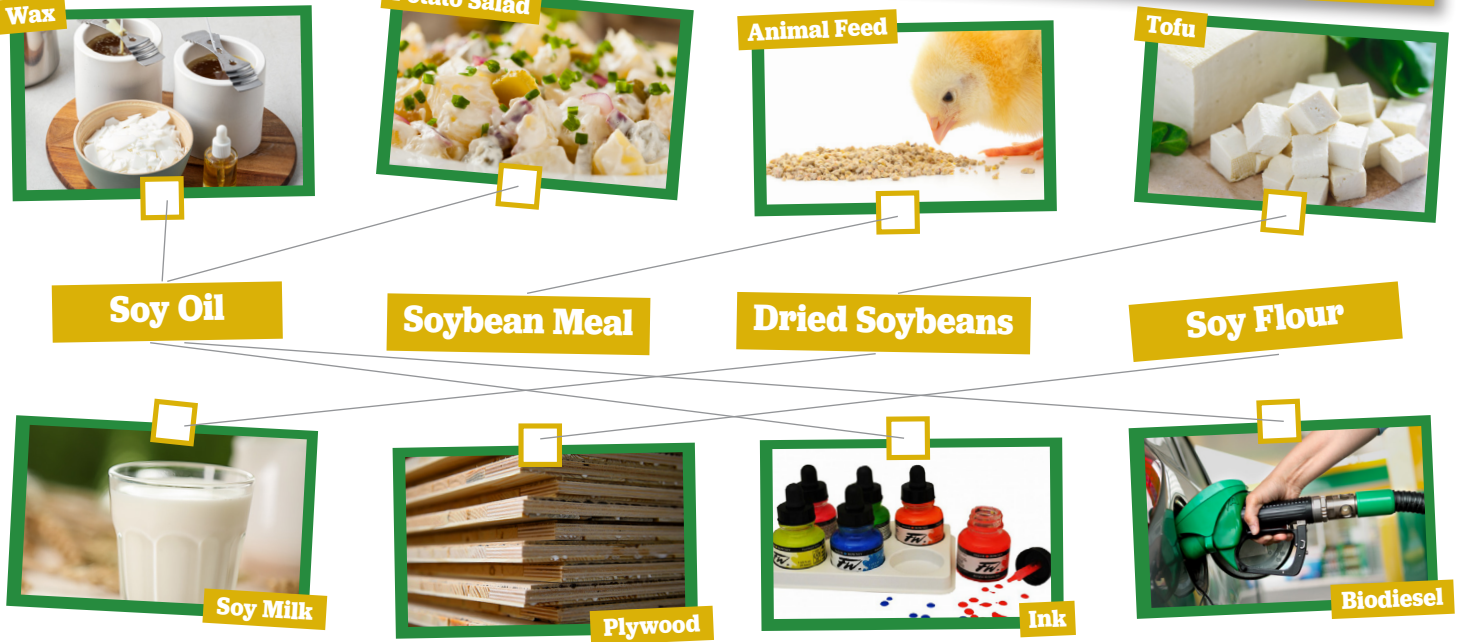
Video of the ADM Lincoln soy processing facility to provide a real-world example of the processing stage.

<https://nebrasCASoybeans.org/learn/meet-a-business>

PRO-	Soybean Farmer
-DUCT-	Agronomist
-ION	Seed Corn Salesperson
PROC-	Crush Machine Operator
-ESS-	Chemical Engineer
-ING	Food Scientist
DIS-	Grocer
-TRIB-	Truck Driver
-UT-	Commodity Manager
-ION	Grain Elevator Attendant

SOY PRODUCT MATCH

Draw lines to show which soybean parts make each product. Some parts are used more than once.



Activity Idea

SOYBEANS TRAVEL THE WORLD

SS.5.2.6.b | Explain how trade impacts relationships between countries.

Class Discussion Prompt:

How does trade impact relationships between countries?

1. Why do countries trade with each other? What are the benefits?
2. How might trading soybeans with other countries help build strong relationships?
3. Can trade also cause problems between countries? What kind of issues might come up?
4. How do you think it feels for a farmer in Nebraska to know their soybeans are being used in another part of the world?
5. Why is it important for countries to trust each other when it comes to trade?
6. What happens if a country suddenly stops trading with another, how might that affect both sides?
7. What do you think is more important: making money from trade or building peaceful relationships? Why?
8. How can learning about global trade help us become better citizens or future leaders?

WHERE DO SOYBEANS GO?

Match each place to the
descriptions below.

PLACES

Egypt
Mexico
Southeast Asia
China
European Union

ANSWERS

DESCRIPTIONS

1. **China**

This large Asian country is the biggest importer, using soybeans for feeding pigs, cattle, and poultry, and for cooking oil for its large and dense population.

2. **Mexico**

This major importer borders the USA, using soy for food, livestock feed, and industrial applications.

3. **Egypt**

This North African country is a rising importer due to its dairy cows and increasing poultry and aquaculture production.

4. **European Union**

While this region is famous for its innovative use of renewable fuels, it uses most of its soy imports for livestock feed.

5. **Southeast Asia**

This area between the Indian Ocean and the Pacific Ocean is buying more soybeans for soy-based food and aquaculture – feeding fish that are grown for food.

Classroom Enrichment Opportunity

Invite an AITC Education Specialist to lead an activity on selling soybeans or discover more on trade!

Sign up at <https://nefbfoundation.org/classroomvisits/>

COMPETITIVE FARMING

SS 5.2.6.a | Describe how international trade promotes specialization and division of labor and increases the productivity of labor, output, and consumption.

Overview:

Trade increases competition and lowers prices, but who sets those prices? Predicting the price of the futures market can be both complicated and risky. In this lesson students will learn farmers seek to earn a profit when they sell their crop, markets can influence trade relationships with other countries, and the necessity of keeping positive relationships with other countries who purchase Nebraska commodities. Students will gain an understanding of the futures market and how Nebraska soybean farmers trade and export soybeans through an interactive guessing game using critical thinking and M&Ms.

SOYBEANS SHAPE THE WORLD

SS 5.2.4.a | Describe the historical role of innovation and entrepreneurship in a market economy.

Overview:

How many miles does food travel to get to your dinner table? In this hands-on lesson, students explore agricultural commodities from around the globe and trace them to their plate. The lesson includes a trading activity that connects Nebraska soybeans to different regions of the world.

Activity Idea

HOW GOVERNMENT AFFECTS SOYBEANS

SS.5.1.1.b | Identify and explain the structure and functions of the three branches of government.

Introducing basics of government:

Ask “How do the three branches of government affect soybeans on local, state, and national levels?”

Quick Recap of the Branches:

- **Legislative (L)** – Makes laws and decides which issues to focus on.
- **Executive (E)** – Enforces laws, collects taxes, and runs programs.
- **Judicial (J)** – Interprets laws and resolves disagreements.

Explore how soybean-related decisions happen at each level of government!

Check it out! Here’s a helpful chart on how the branches keep each other in check:

<https://bensguide.gpo.gov/images/Branches-of-Government.jpg>

Check it out! This is an infographic showing checks and balances between branches of government:

<https://bensguide.gpo.gov/images/Branches-of-Government.jpg>

Student Worksheet:

HOW GOVERNMENT AFFECTS SOYBEANS

Name: _____

Directions:

Each of the following actions affects how soybeans are grown, moved, or sold. Decide which branch of government is involved.

Use:

L = Legislative (Makes laws)

E = Executive (Spends budget)

J = Judicial (Settles disputes)

There is **one of each (L, E, J)** for every level: local, state, and national.

Local Government Actions (Town or County)

- ___ Decide what land can be used for farms or buildings (zoning).
- ___ Interpret local laws and settle disagreements about land use, permits, or zoning.
- ___ Take care of local roads and bridges used by farm trucks.

State Government Actions (Like Nebraska)

- ___ Decides cases involving water rights or disputes between landowners and state agencies.
- ___ Keeps track of how farmers use water and chemicals.
- ___ Passes laws for tax breaks for companies making soybean products in sustainable ways.

National Government Actions (United States)

- ___ Build big systems like ports, highways, and railroads.
- ___ Rule on national laws about agriculture, trade, and environmental protection in the court system.
- ___ Pass the Farm Bill to support farmers and protect the land.

Wild card!

Trade & Soybeans

Two branches of government work together to help sell U.S. soybeans around the world.

Who does what?

- The executive branch sets U.S. foreign and trade policy.
- The legislative branch reviews and approves trade agreements.

So many people around our country and our world work together to use Nebraska soybeans!

Answers and further examples:

Local Government Actions (Town or County):

- (Legislative) Decide what land can be used for farms or buildings (zoning).
- (Judicial) Interpret local laws and settle disagreements about land use, permits, or zoning.
- (Executive) Take care of local roads and bridges used by farm trucks.

Further examples:

- (Executive) Approve permits for soybean processors like biodiesel plants.
- (Executive) Help farmers use soil and water wisely (conservation programs).
- (Executive) Support local food through farmers markets or school lunch programs.

State Government Actions (Like Nebraska):

- (Judicial) Decide cases involving state environmental laws, water rights, or disputes between landowners and agencies.
- (Executive) Keeps track of how farmers use water and chemicals.
- (Legislative) Passes laws for tax breaks to companies making soybean products.

Further examples:

- (Executive) Give grants and training to help farmers and processors.
- (Executive) Build and repair highways and train lines for transporting soybeans.
- (Executive) Promote “Nebraska Grown” soybeans in and out of the state.

National Government Actions (United States):

- (Executive) Build big systems: ports, highways, railroads.
- (Judicial) Rule on national laws about agriculture, trade, and environmental protection in the court system.
- (Legislative) Pass the Farm Bill to support farmers and protect the land.

Further examples:

- (Executive) Set rules about food safety, environment, and biotech crops.
- (Executive) Fund research on new soybean uses like biofuel and soy plastics.
- (Executive/Legislative) Make trade deals to sell U.S. soybeans around the world.
- (Executive) Help farmers recover from natural disasters

Class Wrap-Up Prompt:

“Why do we need all three branches of government working together to support agriculture like soybeans?”

Activity Idea

FARMING WITH VALUES

SS.5.3.3 | Explain how human and natural forces have modified different environments in the United States and how humans have adapted.

SS.5.3.3.a | Identify examples of ecosystems and analyze issues related to the natural setting in the United States. For example: forests, deserts, grasslands, deforestation, wildfires, urban sprawl, flooding, erosion, strip mining

SC.5.13.4.C | Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment

LA.5.W.4 | Write opinion pieces that explain a perspective with supporting reasons and evidence.
b. Use facts and details to support reasons and/or evidence.

Objective:

Students will explore how Nebraska farmers use science and technology to care for land and grow soybeans. Through mapping, discussion, and a values-based group activity, students will reflect on how farming choices affect ecosystems and how values like stewardship and innovation guide those decisions.

Interest Approach:

Begin by displaying a map of Nebraska's ecosystem zones highlighting:

- Grasslands
- Forested areas
- The Ogallala Aquifer

https://museum.unl.edu/collections/botany/nebraska_vegetation.html

Prompt students:

"What do you notice about where soybeans might grow best in Nebraska?"

Use this Nebraska Interactive Map to see where soybeans grow.

<https://www.nefbmap.org/map.php?HomeBanner=I&P=50&PV=I>

Essential Questions:

- Why is this land important for growing soybeans?
- What could happen to this land if it's not treated with care?
- What makes Nebraska's land and water special, and how do farmers use these natural resources?
- How does erosion happen, and what can farmers do to prevent it while growing crops like soybeans?
- Should all land be used for farming if it can grow crops? Why or why not?

PART 2: GROUP ACTIVITY – MATCHING TECHNOLOGY TO VALUES

Now that we’ve explored Nebraska’s environment and its importance, let’s learn how farmers use technology to care for the land—and how their values guide those decisions.

Mini-Lesson: What Is Technology?

Read aloud to students:

We hear so much about technology, but what does the word mean? Drones and robots are part of technology, but not all technology is drones and robots! Technology refers to using science and studying how things work to create tools or ways of doing things that help solve problems or make life easier.

Which problems, and easier in what way? That depends on what values are driving your work. For example, a farmer might strive to be more efficient, environmentally responsible, and profitable by asking an agronomist to help them decide how many seeds to plant and how much fertilizer to use. The agronomist might be innovative by asking lots of questions, using data, and helping farmers find new solutions.

Step 1: Group Assignment

Divide students into small groups or pairs. Give each group a real-world soybean farming tech scenario:

Group	Scenario
1	Using sensors to monitor soil moisture
2	No-till planting to reduce erosion
3	Using GPS to plant in precise patterns
4	Asking agronomists for input on fertilizer amounts

Note: If you have more than four groups, repeat scenarios or assign each group to explore a different value–tech connection.

Step 2: Group Work with Worksheet

Provide the “Farming with Values” Worksheet. Students work collaboratively to answer:

- Which values does this technology support?
- Which environmental issue does it help solve?
- Could this technology cause any problems?
- What value would you add to the list, and why?
- How does technology make it easier or harder to live these values?

Part 3: Whole-Class Discussion & Reflection

After group work, bring students back for class discussion. Each group shares their scenario and key takeaways.

Revisit the essential questions. Encourage respectful debate, evidence-based reasoning, and connecting back to values:

- What makes Nebraska’s land so valuable to protect?
- Why might a farmer care about erosion?
- Is it always a good idea to turn more grasslands into farms?
- Do you think all land that can grow crops should be farmed? Why or why not?

Use one of these as an exit ticket or writing response prompt, asking students to support their opinions using at least one value from the lesson.

Optional Extension:

Watch a short video about Baptista Farms, where a Nebraska farmer discusses:

- Running a small agricultural business
- Treating animals with care
- Stewardship of the land

Student Worksheet:

FARMING WITH VALUES

Name(s): _____

Group #: _____ Scenario: _____

Step 1: Understand Your Scenario

Briefly describe your assigned technology scenario in your own words:

Step 2: Match Technology to Values

Which value(s) does this technology support?

Check the 1–2 values you think fit best:

- ☐ Stewardship – Taking care of the Earth and its gifts
- ☐ Integrity – Doing what's right, even when no one's watching
- ☐ Innovation – Finding new ways to solve real problems
- ☐ Curiosity – Asking questions and exploring answers
- ☐ Responsibility – Owning your choices and their effects
- ☐ Efficiency – Using just what you need, nothing more
- ☐ Respect – Valuing people, animals, and nature
- ☐ Teamwork – Working together for a shared goal
- ☐ Hope – Believing your actions help build a better world

Explain why you chose these value(s):

Step 3: Think About the Environment

What environmental issue does this technology help solve?

Could this technology also cause any problems?

Step 4: Reflect and Write

What value would YOU add to the list above? Why?

How does technology make it easier—or harder—to live out these values?

Do you think all land that can grow crops should be farmed? Why or why not?

Use at least one value from today's activity in your answer.

CAREERS CONNECTED TO SOYBEANS



1. Dairy Nutritionist



2. Commodities Buyer



3. Plant Technician



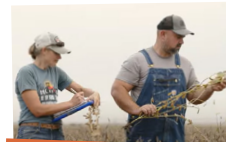
4. Chef



5. Crop Farmer



6. Grain Elevator Operator



7. Agronomist



8. Plant Scientist

Match each description to the correct job title using the word bank. Write the correct number on the line.

3

I make sure the machines in our plant run properly while we turn soybeans into useful products like oil.

2

I buy soybeans to make biodiesel fuel and place orders to keep our factory supplied and running.

5

I grow soybeans, take care of my crops and equipment, and use technology to improve each season.

4

I cook tasty meals using ingredients made from soybeans like tofu and soy oil. I enjoy making food that surprises people.

1

I feed our cows a healthy diet, including soybean meal, to help them produce high-quality milk.

6

I help move soybeans from storage to trucks or trains so they can be sent to places around the world.

7

I figure out the right mix of nutrients in the soil so soybean plants can grow strong and healthy for farmers.

8

I study soybeans to help them resist pests, tolerate drought, and grow stronger and healthier in the field.

Discussion topic from Reader:

1. What personal values or goals can be fulfilled by working in agriculture?
2. How do people in agriculture make a difference beyond growing food?

Activity Idea

PURPOSE OF CIVIC GROUPS

SS.5.1.2.a | Explore and communicate the constitutional rights and civic responsibilities of U.S. citizens. For example: freedom of speech, voting, staying informed of issues, respecting the rights, opinions, and beliefs of others, joining a civic group

SS.5.2.5.c | Identify goods and services funded through federal taxes. For example: military and armed forces, parks

SC.5.1.2.d | Explore models of group and individual actions that illustrate civic ideas in the founding of the United States.

Discussion on rights and responsibilities of U.S. citizens, and opportunities for involvement in civic groups, including ones related to agriculture.

Objective

Students will discuss civic rights and responsibilities and explore how civic groups, especially in agriculture, help people stay informed, make decisions, and act as responsible citizens.

Discussion Questions

- What are civic groups?
- Why should I care about them?
- How do civic groups help communities and individuals?
- How do civic groups connect to agriculture or soybeans?

Explaining Key Concepts

Civic groups help citizens stay informed of current events and issues. In gatherings and meetings, people respect others' rights and practice listening and sharing opinions together. They also inform each other and debate the benefits and costs of items we will vote on during elections.

Civic groups can be specific to agriculture, even to soybeans! They differ based on what purpose they hope to achieve. Project the table below to the class and explain a short partner activity: "With a partner, read through the organization descriptions and guess which purpose label belongs with which set of organizations. We will reconvene as a class in 5 minutes." Answers below.

Group Activity

Instructions:

1. Distribute the Civic Groups and Agriculture Worksheet.
2. Students work with a partner to read through the group descriptions and match each to its purpose.
3. After 5 minutes, reconvene and review the answers as a class.

Purpose Categories to Match:

- Groups for Farmer Support
- Groups for Sharing Information
- Groups That Help Farmers Buy and Sell

Matching Set:

Set 1: Nebraska Soybean Association (NSA), Nebraska Soybean Board (NSB)

- Groups for Farmer Support

Set 2: CommonGround Nebraska, Nebraska Farm Bureau Promotion & Engagement Committee

- Groups for Sharing Information

Set 3: Agricultural Cooperatives (Farmers Cooperative, AGP, CPI, Aurora Cooperative)

- Groups That Help Farmers Buy and Sell

Class Share-Out

Review student answers. Then introduce a few more civic groups/events from U.S. history to expand their understanding.

Introcution: Civic groups are not new -- people have formed them throughout U.S. history.

Civic Group or Event	Purpose
Boston Tea Party	A protest against British taxation, symbolizing colonial resistance.
Continental Congress	The governing body for colonial resistance declared independence and acted as the temporary government during the Revolutionary War.
Federalist Papers	A series of essays arguing in favor of the United States Constitution and establishing a strong federal government.
Mayflower Compact	The first framework of government written and enacted by the Plymouth colonists, establishing a foundation for self-governance

Dig Deeper: Agriculture and Civic Funding

Introduce the Soy Checkoff Program, established by the 1990 Farm Bill:

- A small fee from each soybean sale supports:
 - o Farmer education
 - o New soy product research
 - o Marketing and promotion of soybeans

Optional Extension Lesson:

OER Commons - Soy Checkoff Lesson

<https://oercommons.org/courseware/lesson/118770/overview>

Student Worksheet:

CIVIC GROUPS AND AGRICULTURE

Name: _____

Match the Group to Its Purpose

Read the following group descriptions and decide which purpose best fits each set. Choose from the purpose categories listed below.

Purpose Categories (Use these to label each set)

- Groups for Farmer Support
- Groups for Sharing Information
- Groups That Help Farmers Buy and Sell

Set 1:

- Nebraska Soybean Association (NSA): Advocates for soybean farmers and fair laws and rules.
- Nebraska Soybean Board (NSB): Uses funds from soybean sales to support farmer education and research.

Purpose: _____

Set 2:

- CommonGround Nebraska: A group of women farmers who educate the public about how food is grown.
- Farm Bureau Promotion & Engagement Committee: A committee that serves as an active, statewide voice promoting a positive public perception of agriculture to consumers of all ages.

Purpose: _____

Set 3:

- Agricultural Cooperatives: Farmer-owned businesses that help with supplies and marketing.
- Examples: Farmers Cooperative, AGP, CPI, Aurora Cooperative Elevator Co.

Purpose: _____