



North Carolina's Top Five Commodities (Soybeans) - Second Grade

Purpose

To introduce students to one of the major North Carolina Commodities (soybeans). Students will learn the many uses of soybeans, how soybeans are grown, and the scientific properties of soybeans.

Subject Area(s)

English Language Arts, Science, and Social Studies

Common Core/Essential Standards

ELA

- **CCSS.ELA- Literacy RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate an understanding of key details in a text.
- **CCSS.ELA- Literacy RI.2.4** Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.

Science

- **2.LS.2.1** Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Social Studies

- **2.G.2.1** Give examples of ways in which people depend on the physical environment and natural resources to meet basic needs.

Agricultural Literacy Outcomes

Science, Technology, Engineering & Math

- Provide examples of science being applied in farming for food, clothing, and shelter products.

Plants and Animals for Food, Fiber & Energy

- Explain how farmers work with the lifecycle of plants and animals (planting/breeding) to harvest a crop.

Agriculture and the Environment

- Explain how the interaction of the sun, soil, water, and weather in plant and animal growth impact agricultural production.



Essential Questions

1. What are the characteristics of a soybean?
2. How and when are soybeans harvested?
3. What are some of the uses of soybeans?
4. Where are soybeans grown?
5. What are some of the ways farmers use soybeans?

Vocabulary

Soybean: a leguminous plant which produces edible seeds.

Legume: a type of plant with seed that grow in long cases, called pods.

Pods: the case that holds seeds of leguminous plants.

Protein: a compound found in foods that helps build, maintain and replace tissues in the body.

Cotyledon: the first leaf or pair or leaves that emerges from the seed first.

Seed Coat: protective outer cover of the seed.

Embryo: part of the seed that develops into a plant.

Radicle: a small tail-like root; one of the first to emerge from the seed.

Taproot: the main root; what the radicle becomes as it grows larger.

Student Motivator

Print the *KWHL chart* provided in the Essential Files. This should be kept on chart paper so that it can be used and posted throughout the entire lesson. Ask the students the following questions and place their answers in the first three columns. The fourth column will be filled in at the conclusion of **Activity 3**.

1. *What I Know.*
 - a. *What do you know about soybeans?*
 - b. *Do you know where soybeans are grown?*
 - c. *Have you ever eaten a soybean (edamame, Tofu, soymilk, miso, soysauce, etc.)?*
2. *What I Want to Know.*
 - a. *What did you learn about soybeans?*
 - b. *What are the uses for soybeans?*
 - c. *What makes soybeans healthy to eat?*
 - d. *What are some of the characteristics of a soybean?*
3. *How Can I Learn More?*
 - a. *Where can you find information about soybeans?*
 - b. *Who can you ask about soybeans?*

Background Knowledge

Soybeans are bushy green plants from the legume family (peas, and most beans are also in this family). Legume plants can use their roots to get nitrogen from the soil and air. They use the nutrient nitrogen for growth. This helps reduce the cost of fertilizers for farmers. This also can be used in a crop rotation to replenish nitrogen in the soil. Crop rotation is the method of switching crops from year to year in keeping the soil productive, or to help replenish nutrients into the soil. Soybeans and pods have a high protein content because of their ability to acquire nitrogen from the soil and air.

Soybeans have many uses. Soybean plants and seeds can be crushed or pressed to create oil which has many uses: cooking oils (shortening, mayonnaise, margarines, salad dressings), cosmetics, lubricants, and biodiesel. Soybean plants and seeds can also be served fresh (green) or dried in various food products such as tofu, soy sauce, soymilk, imitation meat, etc.

Soybeans are grown in 99 North Carolina Counties. They are planted in late spring (May/June) and harvested about five or six months later. Soybeans require very little care; however, sometimes as the plants are emerging after being planted, they can be covered by weeds. This is because weeds tend to grow faster than the soybean plants are able to sprout after planting.

Materials

- *Soybean Worksheet* (provided)
- *Soybean Fill-in-the-Blank Riddle* (provided)
- *Soybean Wordsearch* (provided)
- Illinois Soybean Ag Mag
- Shampoo bottle, soap, crayons, lipstick/cosmetics, edamame (optional for the students to taste)
- Small zip-lock bags (jeweler's bags work best)
- Yarn
- Soybeans (not dried)
- Moistened cottonballs

Procedures

Activity 1

1. Assign the students into groups of 3 or 4 per group. Give each student a copy of the Illinois Ag in the Classroom [Ag Mag](#) on Soybeans.
2. Assign one of the following pieces of information to each group from the Ag Mag: planting time for soybeans, harvest time for soybeans, uses of soybeans, ways farmers use soybeans.

3. Once they have read the texts and found their assigned information, student groups can report the information to their classmates found in the in the Ag Mag.
4. Add new information that they learned to the *KWHL chart* in the last two columns.
5. Ask the following questions to deepen the learning, *What products do you use that contain soybeans? When would soybeans be best harvested in North Carolina? What animals eat soybeans in their feed?*
6. Pass out the *Soybean Fill-in-the-Blank Riddle* and have students fill in the blanks. Discuss their answers for clarification.

Activity 2

1. Assign the students into groups of 3 or 4 per group. Give each student a copy of the Illinois Ag in the Classroom [Ag Mag](#) on Soybeans.
2. Assign one of the following vocabulary words to each group: radicle, seed coat, embryo, cotyledon, and taproot.
3. Have each group find the definition for their assigned word in the Ag Mag.
4. Once they have read the texts and found the definitions, have each group report the information to their classmates.
5. Show the time lapse [video](#) of the growing bean plant. Ask the students to identify the vocabulary words they just learned in the video.
6. Give each student the *Soybean Worksheet*. Ask the students to identify the resources needed to grow soybeans using the words and pictures provided.
7. Each student will write their answers in the blanks. Then, have the student draw a star next to each of the resources needed in their daily lives.
8. Have students complete the *Soybean Wordsearch* using the words they learned on the *Soybean Riddle*, and *Soybean Worksheet*.

Activity 3

1. For the Beanie Baby experiment, each student will need one small jeweler's bag with a hole punched in the top of the bag, above the seal.
2. Dip cotton balls in water, and give it three flat squeezes to wring out excess moisture.
3. Have students put one cotton ball in their bags. Then, they will place two soybeans inside, one on each side of the dampened cotton ball, and seal their bags.
4. Thread the yarn through the hole punched in the bag and tie the ends. The students can wear the bags around their necks or hang them around the classroom.
5. Have the students predict what they think might happen with their seeds. Discuss ways they could record the results, such as drawing a picture of their Beanie Baby each day in a journal.

6. Discuss other environmental variables for the Beanie Babies, such as wearing it inside the shirt or outside the shirt, more moisture or less moisture, and how each would affect the Beanie Babies.
7. The soybean should swell up from the moisture and germination should take place in about three days.
8. Once the soybean has germinated, you can remove the other soybean from the bag. The soybean plant can be removed from the bag by cutting the bottom of the bag and gently sliding the plant out. This plant can be transplanted into a pot with soil.
9. Ask the students if they can identify the vocabulary they learned in **Activity 2**.
10. Refer students back to the *KWHL chart* and fill in the last column from their responses, making sure to receive comments from each group and/or student.
11. While filling in the last column ask students questions found in the **Essential Questions** for clarification and knowledge.

Suggested Companion Resources

- *The World of the Wonder Bean* (Booklet)
<http://ncsoy.org/education/>
- *Soybeans in the Story of Agriculture*, written by Susan Anderson and JoAnne Buggey (Book)

Essential Files

- [Soybean KWHL Chart](#)
- [Soybean Worksheet](#)
- [Soybean Riddle](#)
- [Soybean Wordsearch](#)
- [Beanie Baby Experiment Guide](#)
- [Soybean Wordsearch Extension](#)

Essential Links

- Growing Soybeans
<http://ncsoy.org/media-resources/growing-soybeans/>
- Illinois Ag in the Classroom Soybean Ag Mag
<http://www.agintheclassroom.org/TeacherResources/AgMags/Soybean%20Ag%20Mag%20for%20Smartboard.pdf>
- Stop Motion Video of Growing Beans
<https://www.youtube.com/watch?v=YeUDbxJToB4>

- County Overview
<http://www.ncagr.gov/stats/>

Ag Facts (Did you know)

- 1982 was a record year for North Carolina soybeans, with 2.1 million acres harvested.
- Soybean production in North Carolina ranks 15th nationally.
- Each soybean pod produces three to four beans. Occasionally, they will produce 5 beans, but this is very rare.
- The main use of soybeans in North Carolina is for feeding swine and poultry farm populations.

Extension Activities

- Have students collect labels from their favorite foods to see if any of them contain soy or beans.
- Have students visit the statistical page for the North Carolina Department of Agriculture and Consumer Services by using the following [address](#). Scroll down to “County Overview,” and have them select their county. Then, have them determine where soybeans rank in their county’s commodity crops.
- Have students complete the *Soybean Wordsearch Extension* using the definitions to find the words in the Wordsearch.

Sources & Credits

- http://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=79&lesson_states=34&grade=0&search_term_lp=Soybeans
- <http://www.americasfarmers.com/learn-about-farming/soy/>
- <http://ncsoy.org/media-resources/uses-of-soybeans/>
- <http://www.ncagr.gov/stats/general/overview.htm>
- <http://www.ncagr.gov/agscool/commodities/soykid.htm>
- <http://www.iasoybeans.com/sites/default/files/education/second.pdf>
- <http://www.agintheclassroom.org/TeacherResources/AgMags/Soybean%20Ag%20Mag%20for%20Smartboard.pdf>
- <https://www.youtube.com/watch?v=YeUDbxJToB4>
- <http://www.ncagr.gov/stats>
- https://www.mda.state.mn.us/news/publications/kids/maitc/bookbundle/soy_boy.pdf