



Crop Science Investigation Workshop Series Lesson Plans

Subject: Introduction to Crop Production

Grade Level(s): 4th – 12th grades

Lesson Title: What is the importance of crop production in Nebraska and how do crops grow?

Time period: 1-3 hours (depending on activities conducted)

This lesson can easily be adapted to address as few as one learning objective or all. Objectives and corresponding learning activities are numbered accordingly.

These lessons can be adapted for youth of any age depending on level of technical content taught. When working with youth of varying ages, it is suggested to have older youth help the younger ones.

Lesson Objectives:

1. Learn about end uses of crops as well as crop production in Nebraska.
2. Identify careers related to crop production.
3. Become familiar with how plants grow.
4. Understand the difference between monocot and dicot plants.
5. Understand the importance of germination rates and calculate germination percentages.
6. Be familiar with the process of plant emergence and dissect seedlings that have emerged.
7. Identify stages of growth in soybeans and corn.

Materials, audio-visual aids:

Several plant containers/pots
 Potting Soil for containers
 Plant marker/popsicle stick
 Marker
 Ruler
 Variety of seeds including at least corn and soybean seeds
 Paper towels
 Magnifying glasses
 Tweezers
 Pocket knife or knife to cut plants
 Suggested: Whiteboard, flipchart, something to write on so all youth can see or to illustrate any points

** Should start several activities for this lesson ahead of time!

Resources Used & Handouts

ISU Curricula Used:
 Crops 1: Seedy Business – Chapter 1: Importance of Soybeans & Corn
 Crops 1: Seedy Business – Chapter 2: Stages & Ages of Plants
 Crops 1: Seedy Business – Chapter 5: Careers
ISU Crops books for all youth or copies of pages in Crops 1: pgs. 9-10, 38-40, 11-23, 41
 Pictures of ways crops can be used (following lesson)
 Potted Container Experiment sheet (on web)

Solving the Problem

Interest Approach

Discuss with youth:

- What is corn and soybeans are used for?
- What kinds of crops are grown in the area?
- Who in the community does your farm depend on (businesses)?

Show youth pictures of end-uses of corn and soybeans. (Have some that might surprise youth.)

Problem statement

What is the importance of crop production in Nebraska and how do crops grow?

1. Objective 1:

Learn about end uses of crops as well as crop production in Nebraska.

By the end of this lesson, you should be able to answer the following problem statement and more.

Discussion

1.1 What kinds of corn are grown?

- Flint- very hard, range from white to red, Also known as Indian corn, used for industrial purposes & livestock feed
- Popcorn- hard small kernels, natural moisture inside kernels turns to steam when heated, but outer coat of kernel is so hard that moisture is trapped
- Dent- has a dent in each kernel, yellow or white, livestock feed or processed foods
- Flour corn- very soft starchy kernel, easily ground & used in baked goods
- Sweet corn- more natural sugar than others

1.2 What kinds of beans are grown in Nebraska?

- Soybeans
- Dry Edible: Great northern, pinto, black, pink, garbanzo beans, light red kidney

1.3 Provide information on Nebraska Agricultural statistics

- Ranks 1 in great northern beans
- Ranks 2 in pinto beans
- Ranks 3 in corn for grain production
- Ranks 4 for all dry edible bean production
- Ranks 4 in grain sorghum
- Ranks 5 in alfalfa hay
- Ranks 6 in soybean production
- Ranks 7 in winter wheat production
- Cash receipts from farm marketing contributed over \$12 billion to NE's economy in 2006, ranking 4th in the nation.

1.4 Hold up corn and soybean products picture sheets (each sheet separately) & ask what they have in common. Do any of them surprise you?

1.5 *Variation of above activity:* Conduct a scavenger hunt around the room, give youth 3-5 minutes to write down as many items as possible that were produced through use of corn/soybean product. Go over them as a group. Could reward winner with small award. Handout following this lesson.

<p>2. Objective 2: Identify careers related to crop production.</p> <p>3. Objective 3: Become familiar with how plants grow.</p> <p>4. Objective 4: Understand the difference between monocot and dicot plants.</p> <p>5. Objective 5: Understand the importance of germination rates and calculate germination percentages.</p> <p>6. Objective 6: Be familiar with the process of plant emergence and dissect seedlings that have emerged.</p>	<p>1.6 Hand out fun facts on corn/soybeans to youth and discuss. (pgs. 9-10, book 1) Discussion</p> <p>2.1 Ask youth to list all jobs related to crop production in the area. (Some youth, especially younger ones won't make the connection that bankers and other agribusiness professionals are knowledgeable and affected by crop production; once they realize that, their list will become much larger.</p> <p>2.2 Hand out careers in agronomy from ISU curricula and discuss a more examples in the community. (pgs. 38 – 40, book 1) Discussion: Do any of these careers interest you? Talk about college majors available in various ag careers.</p> <p>3.1 <u>PREP REQUIRED</u>: Soak different types of seeds in paper towels the day before.</p> <p>3.2 Conduct seed dissection activity, pgs. 11-12</p> <p>4.1 Discuss difference between monocot and dicot. 4.2 Can you see the difference on the seeds that you dissected? 4.3 Which crops are monocots? Dicots? 4.4 How does this affect their growth?</p> <p>5.1 <u>PREP REQUIRED</u>: Have one example of seeds that have germinated and some that have not in paper towels at least 5 days before lesson. (book 1, pgs.15-16)</p> <p>5.2 Have youth calculate the germination rate for all examples. Is that rate acceptable?</p> <p>6.1 If all seeds germinate, will they all emerge? Why or why not? What is meant by emergence and why is it important? What factors influence seed emergence? 6.2 Discuss germination & emergence factors.</p>
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<p>7. Objective 7: Identify stages of growth in soybeans and corn.</p>	<p>7.1 Explain how plants grow and basic development of a corn and soybean plant as shown on ISU Crops 1, pgs. 19-20.</p> <p>7.2 <u>PREP REQUIRED</u>: Have youth conduct “how do plants grow” on pgs. 19-20.</p> <p>3.3 Go over corn and soybean plant stages. (pgs. 11-23, book 1).</p> <p>7.3 <u>PREP REQUIRED</u>: Ahead of time, plant corn and soybean seeds in containers or locate plants in the field if available and have youth stage the growth of each crop.</p> <p>7.4 <u>PREP REQUIRED</u>: Hand out the <i>Potted Container Experiment handout (on website)</i>; have youth put soil into each container and plant the same type of seeds in each container, but ask youth what they’d like to experiment with. i.e. plant one container deeper, one shallow, and one at a normal depth. If you have workshops later in the season, observe and track these plants throughout the growing season as a group. AND/OR Have youth complete the Potted Container Experiment on their own.</p> <p>7.5 Encourage youth to keep track of rainfall with the “crop rainfall worksheet” on pg. 41 of ISU Crops 1 manual. How did the amount rainfall affect the crops growth?</p>
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Summary (Closure) – Conclusion to the Problem:

What is the importance of crop production in Nebraska and how do crops grow?

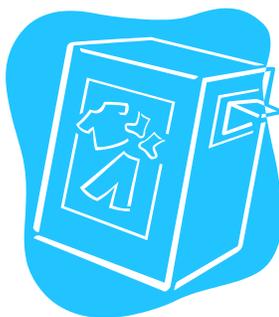
Review:

1. What are some products or ways that crops are used?
2. What are some careers in the community that are related to crop production?
3. How are plants able to grow?
4. What is the difference between a monocot and a dicot? How can you tell which one a plant is?
5. What is a germination rate; why is it important and how do you calculate it?
6. What are the parts of a seed?
7. How do you identify a corn plants stage of growth? Soybeans?

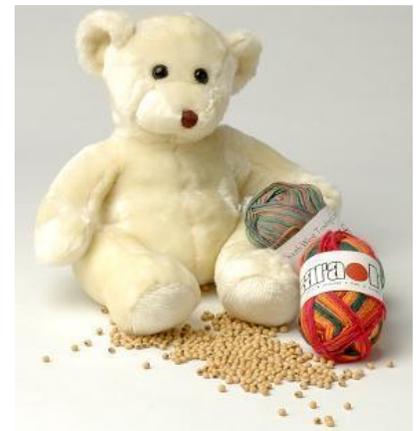
References:

Schwab, D. L., Levings, J., & Creswell, J. (2004). *Seedy Business, Manual One*. Iowa State University Extension.

What do all of these products have in common?



What do all of these products have in common?



I SPY Corn and Soybeans

Purpose: Identify products/uses of corn and soybeans to understand the importance of Nebraska farmers and the agricultural industry within Nebraska.



Activity: Scavenger hunt for about 10 minutes at the site you are hosting this activity. Youth can work individually or in teams to determine products throughout the room made from corn and soybeans (you can also adapt this to use other commodities which better fit your location). You should have at least 15-20 products “hidden” in the room. You may not have to hide them that much because they may not realize that some of our everyday products are made from these commodities!

At the end of the scavenger hunt, spend at least 5 minutes discussing what the youth found. Discuss all the items they didn’t find which actually contain corn or soybeans. (This is really fun as they can’t believe how much they missed!) Have them look at ingredient labels and discuss the different terms which provide clues as being made from corn, soybeans or wheat. i.e. *Modified food starch* can refer to either corn or wheat starch in food products to help bind the food together.

Project: Create an educational display to showcase the information you learned. This is easily done with poster board, crayons, cool scissors, markers, color pencils, stencils, etc. They may wish to start this project there and complete at home with more materials such as computer words, etc. They can also choose to work in teams at the site and then create their own displays at home. In addition to the poster, they will need to write a one page essay about what they learned in order to show at fair. Please see the State Fair guidelines regarding these crops educational displays for further information.

Materials needed:

- Poster board or wooden board (24” X 24”)
- Crayons, markers, color pencils, paints
- Glue, glue sticks, tape
- Pictures, product labels, magazine cut outs, etc. of products containing corn or soybeans i.e. cereal boxes, soup labels, sucker wrappers, pop cans, soap wrappers, toothpaste box, etc.
- Colored paper and any other materials to create a colorful, fun, and educational display.

Nebraska State Standards: CR.5.A.1, LA.12.3.2, LA.12.1.6.k, LA.12.1.6.j