NEBRASKA AGRICULTURE IN THE CLASSROOM
NEBRASKA FARM BUREAU FOUNDATION

DIRT DETECTIVES

Germination & Seeds

Activity Level: 4-6 Grade | Time: 60 minutes

PURPOSE

Students will classify seeds and observe how a seed sprouts through the investigation of the conditions necessary for germination to occur.

NEBRASKA STATE STANDARD CONNECTION

- SC.4.6.3.B Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- SS 4.3.2.a Identify criteria used to define regions within the state of Nebraska (e.g., soil, climate, precipitation, population, vegetation, land and agricultural usage).
- SS 4.2.12.a Compare Nebraska with different regions and the goods and services each region produces (e.g., beef, wheat, telemarketing, cotton, coal).
- SC.5.8.2.B Support an argument that plants get the materials they need for growth chiefly from air and water.
- SS 8.3.5.b Identify and evaluate how humans utilize the physical environment (e.g., irrigation, levees,terraces, fertile soils, mechanized agriculture, changes in land use)

ACTIVITY SNAPSHOT

1. Organize and Prepare Supplies
2. Read Background Information
3. Dirt Detectives: Germination & Seeds PowerPoint
   a. Seed Sorting Activity
   b. Farming in a Glove

MATERIALS

- Dirt Detectives: Germination & Seeds PowerPoint
- Seed Sorting Worksheet
- A mixture of seeds for the seed sorting activity (sugar beet, corn, soybean, sunflower, grain sorghum, oats, dry edible beans, wheat)
- Clear plastic glove, 1 per student
- Black permanent marker to label gloves, 1 per student
- Yarn, roughly 6” long, to tie glove shut, 1 per student
- Cotton balls, 4 per student
- Small cup of water to moisten cotton ball
- “Farming in a Glove Packet”, 1 per student

- 4 different kinds of seeds for the Farming in a Glove activity (soybean, corn, wheat, and dry edible bean), 1 per student

WHAT'S THE CONNECTION TO AGRICULTURE?

We need crops to feed animals to provide many of our basic needs. Farmers strive to be good stewards of the land to produce food, fiber, and fuel. Understanding how plants work allows farmers to do their best in producing crops for us. Farmers know the best time to plant crops, how to keep them healthy, how to keep pests and weeds out of the fields, and the best time to harvest crops.

PROCEDURES:

1. Organize and Prepare Supplies
   See "Materials" on cover page.
   Prepare supplies and set up PowerPoint.

2. Background Information
   Sources: Nebraska Agriculture in the Classroom

   Seeds are important to the life of a plant because they allow for growth and reproduction. Seeds are an important part of the agricultural plant production process because farmers plant seeds for most crops in the spring such as wheat, corn, and oats. These seeds germinate or sprout and then growthroughout the summer with the correct amount of moisture, sunlight, and soil. In the fall, the mature plant produces grain, a cultivated seed harvested for food such as wheat, soybeans, rice, oats, and corn. These seeds are used in a variety of ways depending on the crop in addition to being used as food for livestock animals and humans.

   Plants produce seeds so their species will continue to exist in nature. The seeds are the storehouse for the beginning of a plant because it supplies the plant with needed nutrients to grow. Each seed contains a tiny plant embryo with one or two cotyledons or seed leaves, which supply the seed with energy and materials for growth until the young plant grows its first true leaves. At this stage it will make food for itself through a process called photosynthesis while using water, carbon dioxide, and sunlight. Without seeds, humans would not have essential products such as food, fiber, fuel, and byproducts.

   Livestock producers that raise animals for meat consumption such as beef cattle, chickens, turkeys, and hogs often use feed grains such as corn and soybean meal for the base of their animal feed. These grains provide the animal with a high protein diet needed for growth. The major feed grains in the United States include corn, sorghum, barley, and oats. Corn accounts for more than 95 percent of total feed grain production and use.

3. PowerPoint
   Slide 1: Dirt Detectives Lesson 5: Germination & Seeds

   Slide 2:
   - *Lesson 1: Our World and Soil – Technology Advances*

- *Lesson 2: Soil Types – Sand, silt, and clay; which is ideal for growing crops? A mixture of all three which is called loam. All have their advantages and disadvantages*
- *Lesson 3: Traits – Why are traits important? They provide a variety and different choices when selecting plants and animal genetics.*
- *Lesson 4: Choices – How can genetically modified seeds help farmers be more efficient? Insect and herbicide resistant, drought tolerant seeds allow farmers to use less weed and insect repellent and less water if seeds are drought tolerant.*

Slide 3:

- What are these? Record students' responses on a white board or poster paper. Use the responses to explain that you have displayed examples of seeds. Seed are produced on a plant once it is fully grown. Seeds have many purposes and some we enjoy eating like sunflower seeds, edamame, or pumpkin seeds. However, some seeds are used for planting by farmers and we don't eat them, but we eat the products they produce, such as bread, which is made from wheat.
- Where do you think seeds come from?
- Why don't they all look the same?
- Can we eat seeds? *Some seeds, pumpkin, sunflower, corn seeds when they are fresh, soybean seeds*.
- Do farmers use seeds on their farms? How?

Slide 4: Seed Sorting Activity

- Give each group a Seed Sorting worksheet. Place all seeds in the top circle.
- Have students sort their seeds in the boxes. Students can sort their seeds based on color, size, shape, or use.
- Have groups share why they sorted their seeds the way they did.

Slide 5: Ask Follow up questions:

- Are seeds all the same size? *Seeds come in various shapes and sizes.*
- What are examples of seeds that we eat? *Examples of seeds we eat include sunflower seeds, beans, corn, etc.*
- What do we grow with seeds? *Farmers grow plants with seeds.*

Slide 6:

- Plants are part of our everyday life. From the food we eat, to the clothes we wear, to the cars we drive; we can give credit to plants! Plants that are grown for human use, whether it is to eat, to wear, or to use as a power source, are called crops. Agriculture and farmers work to provide crops for us!

Slide 7: What do plants need to grow?

- Light (Sunlight)
- Air
- Water

- Nutrients
- Soil
- An easy way to remember that is L.A.W.N.S., like your front lawn.
- For seeds to germinate which means to sprout, seeds need water, air, and light.

Slide 8: Farming in a Glove Activity

- This activity has each student create a small "farm" where they can see different seeds germinate. The "farm" is a clear plastic glove with a cotton ball in each of the fingers. A seed gets placed on the moist cotton ball and the glove gets hung in a window. The students monitor the glove to watch as the seeds germinate.
  a. Distribute Farming in a Glove Packet to students.
  b. Distribute the supplies.
     - Per student: 1 glove, 4 cotton balls, 4 seeds, 1 piece of yarn, 1 permanent marker
     - Per every 4 students: 1 small cup of water
  c. Students follow procedure on page 1, "Instruction Sheet".
     - Write their name on the thumb of the glove in permanent marker.
     - Write the name of the seeds that will be planted on each finger of the glove in permanent marker (corn, soybean, dry edible bean, wheat).
  d. Carefully dip a cotton ball in water. Squeeze out the excess water and flatten it out. Do this for four cotton balls.
     - Place a wet cotton ball in each of the four fingers of the glove.
     - Carefully place one corn seed, one soybean seed, one dry edible bean, and three wheat seeds in the correct finger.
     - Tie the top of the glove with the piece of yarn to keep the moisture inside the glove.
     - Hang the glove in the window of the classroom. Monitor and assist students as needed.
  e. Students complete page 2, "Farming in a Glove—Worksheet"
  f. Students complete pages 3 and 4, "Farming in a Glove—Daily Journal", making one observation for the next twelve days.
  g. At the conclusion of twelve days, students complete page 5, "Farming in a Glove—What I Learned".

Slide 9: Next Lesson

- We will look at the importance of pollination in plants.

Review:

- Ask students to get out their scientific journal.
- What have you learned from today's lesson? Write down key concepts and ideas that will help us solve our problem: how we grow more food with less land?

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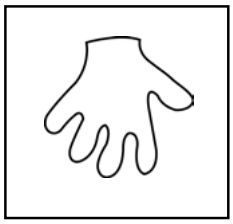
DIRT DETECTIVES

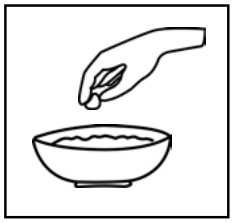
Farming in a Glove Packet

By: _____ Today is: _____

INSTRUCTION SHEET INSTRUCTION SHEET

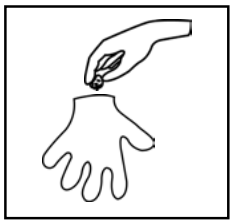


My farm is a clear, plastic glove.
I will use 4 different seeds, such as wheat, oats, sorghum, popcorn, white or yellow food grade corn.
I wrote the name of the seeds that I will plan on the fingers of my glove using a permanent marker.
I wrote my name on the thumb of the glove using a permanent marker

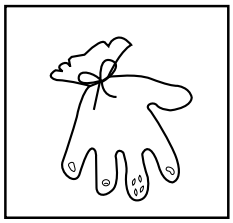


I carefully dipped a cotton ball in water. I squeezed out the excess water and flattened it out.

Next I will place a wet cotton ball in each of the fingers.
Then I will carefully place one corn seed, one soybean seed, one dry edible bean and three wheat seeds in the correct finger.



After placing the cotton ball and seeds in the glove, I tied the top of the glove with a ribbon or yarn to keep the moisture inside the glove.
Then, I hung my glove in a window or a special place in the classroom.



The glove will be alive with growing sprouts.
I will document each seed's growth by writing and drawing in my daily journal.

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Farming in a Glove–Worksheet

I planted 4 different kinds of seeds.
They are:

1. _____
2. _____
3. _____
4. _____

I will label this glove to match mine.

My preditions are:

1. think _____ seeds will start growing first.
2. I think it will take _____ days for the first seed to start growing.
3. I will draw what I predict the seeds will look like on day 12 below.

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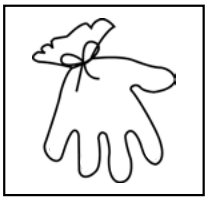
Farming in a Glove–Daily Journal

I will document each seed's growth by writing and drawing about their progress each day for 12 days.

Day #1 I planted _____ different seeds.



Day #2 _____

_____

_____

Day #3 _____

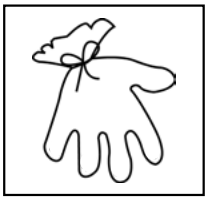
_____

_____

Day #4 _____

_____

_____



Day #5 _____

_____

_____

Day #6 _____

_____

_____

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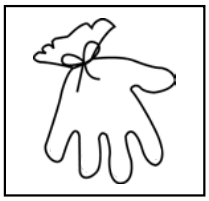
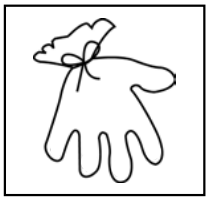
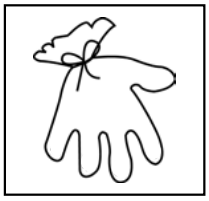


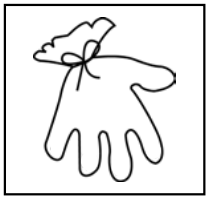
Day #7 _____



Day #8 _____

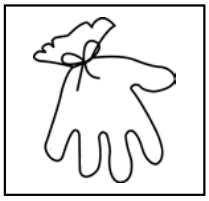


Day #9 _____



Day #10 _____

Day #11 _____



Day #12 _____

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Farming in a Glove–What I Learned

By: _____ Today is: _____

Three things I learned from my Farming in a Glove are:

1. _____
   _____
   _____

2. _____
   _____
   _____

3. _____
   _____
   _____

Here is what the results looked like:

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NEBRASKA AGRICULTURE IN THE CLASSROOM NEBRASKA FARM BUREAU FOUNDATION	SEEDS COLOR SHAPE SIZE TYPE OF SEED