Germination Observations

Objective

The student will germinate seeds under a variety of conditions.

Background

Archaeologists believe that in many ancient cultures, gardening was a woman's specialty. Most men had to spend their time away from home—hunting or working in fields far away. Women stayed close to home to care for the children. Because they spent so much time in one place, women got to know the plants growing in the areas surrounding their homes. Often they would spend part of each day collecting plants. They would experiment with the plants until they discovered what plants were best to use for what purpose. Strong grasses could be woven into baskets. Large gourds could be dried and used for carrying water and other things. Some plants were good for taking the sting out of insect bites; others helped ease an upset stomach or a headache.

Eventually some people began cultivating small gardens. They would prepare small plots near their encampments by clearing out unwanted plants and cultivating the soil with digging sticks. Then they would go out and dig up the plants they found most useful and transplant them to their plots. Some of the plants were easier to transplant than others. Some would survive better if they were transplanted in the spring. Others would do better in the fall. Some grew best from seeds. Others were best transplanted as seedlings.

Today, we can go to the store to buy all the things the first gardeners had to grow themselves. Despite that fact, gardening has continued over the centuries to be a favorite pastime among women and men, young and old.

Home gardening is very popular in Oklahoma. A large number of people tend flowers and grow vegetables. Some have large gardens on rural acreages where they grow enough corn, squash, beans and other vegetables to feed their families for several months. Many Oklahoma gardeners live in cities and have only small yards with flower beds and small garden plots. Oklahoma has a long growing season, so a wide variety of plants can be grown here.

Science

1. Read and discuss background and vocabulary. Explain that prehistoric people had to experiment over thousands of years to discover the best techniques for growing the plants

Oklahoma Academic Standards

KINDERGARTEN
Life Science: 1-1. Earth Science: 3-1
Phonological Awareness: 5. Critical Reading and Writing: W. Vocabulary: R.1; W.1.
Research: R.1,2; W.1,2
Measurement: 2.1

GRADE 1
Life Science: 1-1; 3-1
Critical Reading and Writing: W.2.
Vocabulary: R.1,5; W.1,2. Research: R.1,2,3; W.1,2
Measurement: 2.1,4,5

GRADE 2
Life Science: 2-1; 4-1
Critical Reading and Writing: W.2.
Vocabulary: R.1,5; W.1,2. Research: R.1,2,3; W.1,2,3
Measurement: 2.3,4

GRADE 3
Life Science: 1-1; 3-1,2; 4-2,3. Earth Science: 3-1
Critical Reading and Writing: W.2.
Vocabulary: R.1,5; W.1,2. Research: R.1,2,3,4; W.1,2,3
Measurement: 2.4,5

Materials

potting soil

vermiculite

peat moss

sand

other potting medium

assorted vegetable and flower seeds

empty egg cartons

empty, clean milk cartons from the cafeteria

they needed to fill their needs.

2. Review germination and the basic steps of the scientific method.
   —Discuss the difference between a control group and a test group and the role of variables in an experiment.
   —Students will list the conditions necessary for plants to grow.
   —Ask the class to develop three or four hypotheses having to do with germination, and write them on the chalkboard. Some possible hypotheses follow:
   Plants need light to germinate.
   Plants need moisture to germinate.
   Plants germinate best in light materials like peat moss, compost, potting soil, etc.
   Temperature affects a seed's ability to germinate."
   Large seeds sprout more quickly than small seeds.
3. Divide the class into groups of four or five.
   —Assign one hypothesis to each group.
   —Show the class the available materials.
   —Each group will determine what materials it will need to test its hypothesis and what procedure to follow.
   —Students will use worksheets to record what materials they used, what procedures they followed, what they predict will happen and what they observe.
   —After five days, students will report on their results and develop classroom procedures for germinating seeds, based on their results.
   —Students will repeat the experiment, using the classroom procedures.
   —After seedlings have developed two true sets of leaves, students will transplant them to milk cartons.
   —Keep the plants in the classroom. Students will chart growth, or send them home for transplanting there.

English Language Arts

1. Students will write reports summarizing the process their seed went through to become plants.
2. Students will create a germination vocabulary seed booklet, as follows. (See illustration included with this lesson.)
   —Fold a dark green piece of construction paper in half and cut it to represent a seed pod.
   —Cut out light green circles for seeds.
   —Choose vocabulary words from the vocabulary list. Define each word using your own words.
   —Illustrate the words.
   —Students will determine how many syllables are in each vocabulary word.
   —Students will identify the initial phoneme in each

vocabulary word.
—Students will determine which vocabulary words begin with the same sound.

3. Students will research and report on the difference between annual, biennial and perennial plants.

Math

1. Students will measure their seedlings as they grow using non standard or standard units of measurement.
2. Students will convert the measurements from one unit to another—centimeters to inches.
3. Students will chart the growth of the seeds.
   —Which seeds sprouted first?
   —Which seeds grew the tallest?
   —Which seed had the best percentage of seeds sprout?
   —What fraction of the seeds did or did not sprout?
4. Students will order plants as they grow from tallest to shortest. Discuss how this order changes as the plants grow.

Extra Reading

Barry, Frances, *Big Yellow Sunflower*, Candlewick, 2009.
Brown, Peter, *The Curious Garden*, Little, Brown, 2009.
Burnie, David, *Plant*, Eyewitness Books, DK, 2011.
Carle, Eric, *The Tiny Seed*, Little Simon, 2009.
Edom, Helen, *Science With Plants,* Usborne, 2007.
Kenin, Justine, *We Grew It, Let's Eat It!*, Tenley Circle, 2010.
Peterson, Cris, and David R. Lundquist, *Seed, Soil Sun: Earth's Recipe for Food,* Boyds Mills, 2010.

Vocabulary

archaeologist—someone who looks for and studies material evidence from past human life and culture
cultivation—the planting, tending, harvesting, and improving of plants
germination—the process by which a seed swells up, begins to sprout, and develops a stem and roots
plant—a living thing that has roots and cannot move from place to place
seed—the first stage in a plant's life cycle
seedling—a young plant that has grown from a seed **sprout—**when a seed sends out new growth
transplant—to transfer from one place to another; to uproot and replant a growing plant

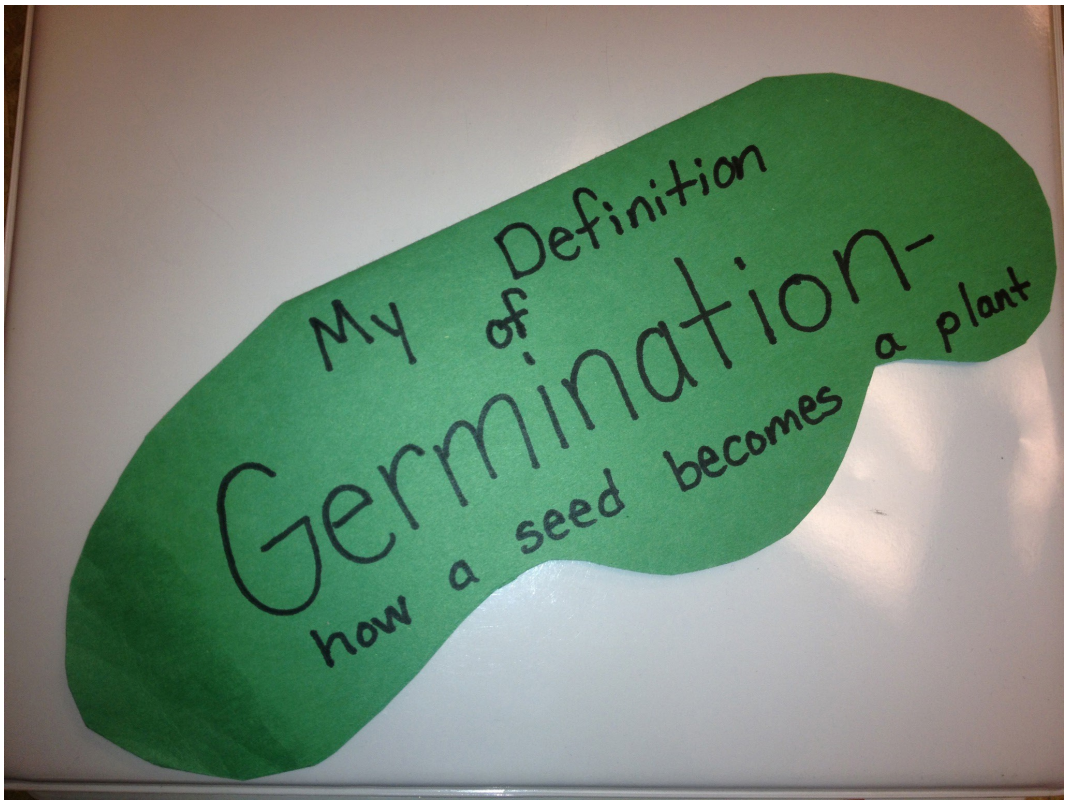
Ag in Your Community

Invite a landscape architect or Master Gardener to your class to discuss plants that are native to Oklahoma. Contact your county's OSU Cooperative Extension Service office to find a Master Gardener.

Sow, Hoe, Grow

(Sing to the tune of "The Barney Song.")

Sow Hoe Grow
Sow Hoe Grow
Plant your seed in the ground below
With raindrops, sunshine and a little time
You'll have a garden that's mighty fine.


My Definition of
Germination-
how a seed becomes a plant


Seed-
1st stage
Sprout-
Begin to grow.
Seedling-
young plant
Plant-
Living thing with roots.
Transplant-
To replant in a new place

Name_____

Germination Observations

Use the space below to record your experiments in germinating seeds.

Question (problem statement)

Materials used:

Kind of seed(s)

Planting medium

Other materials

Hypothesis (prediction)

Procedures (Write down your group's plan for conducting this experiment.)

Seed Group 1

Seed Group 2

Observations (Write and draw what you see.)

Seed Group 1

Seed Group 2

Variables :

Seed Group 1

Seed Group 2

Conclusion (Write what you learned.)

Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.

Name_____

Germination Observations

Use the chart below to record the progress of your sprouting seeds.

Days after seeds were sown	Number of seeds sprouted in SEED GROUP 1	Number of seeds sprouted in SEED GROUP 2
DAY 1		
DAY 2		
DAY 3		
DAY 4		
DAY 5		
DAY 6		
DAY 7		
DAY 8		
DAY 9		
DAY 10		

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