



Seed, Soil, Sun & See Them Sprout

Grade Level: K-4

Essential Skills: 3, 5, 9

NGSS: Partially meets 2-LS2-1, Extension Activities 4-LS1-1, 5-LS1-1

CCSS: W.2.7, W.2.8

Social Sciences: 3.12, 4.12

Math: Extension Activities MD.K, MD.1, MD.2.1, MD.3.3, MD.4.4, MD.5

Time: 45 minutes

Materials:

For every set of 4-5 students you will need a clear plastic cup, a paper cup, a variety of seeds, a paper towel; and water.

*Order a pre-made kit with all materials from AITC's [Free Loan Library](#).

Additional AITC Resources:

Books: *Seed, Soil, Sun, Earth's Recipe for Food*

Plant Plumbing;

Oh Say Can You Seed Planting a Rainbow

Oregon Quality Grass Seed

Watch Them Grow

How a Seed Grows

From Seed to Pumpkin

From Seed to Plant

Corn in the Story in Agriculture

Videos: Oregon Seed Council

More Lessons: Living Necklace,

Garden in a Glove, Growing Bracelets, Turf Buddies

Description:

This lesson investigates the miraculous process of air and water combining with seeds, soil and sunlight to create nearly all the food we eat. By having students observe different types of seeds, this lesson takes plant germination one step further by having students record the differing growth rates and other observations in germination journals (template provided). Order the pre-made kit online from [AITC's Free Loan Library](#).



Directions:

For all grades, a great way to begin is to read and age-appropriate book on plant germination (see list at left). Ask the students to hypothesize what they think is needed to successfully sprout seeds and grow plants that make our food, and record answers. For younger grades, consider a brief movement activity to emphasize the ingredients for growing plants: Seed = put thumb and finger together as if holding a small seed; soil = cup hands as if holding some soil; sun = arms overhead in a circle like the sun; rain = hands coming down like rain; air = softly blow towards your hand. This helps engage younger students more than older ones.

1) Divide students into groups of 4-5. Each group will receive a set of cups (one paper, one plastic), a paper towel and a packet of seeds. Students will need to work together and share in making the germination cups. Do students know what types of the seeds by looking at them? Have students hypothesize which will germinate fastest, and record guesses.

2) Wrap the paper towel around the paper cup; making sure there is a hole poked in the bottom of the paper cup (a pencil works well). The excess paper towel folds under the bottom. The paper cup is then set into the plastic cup.

3) Pour 1/2 cup water into the stacked cups. The water will drip through the hole in the bottom of the paper cup and wicks up the paper towel, moistening it.

4) Take the seeds from the packet and place them on the outside of the wet paper towel wrapped around the cup. Space seeds evenly, half way down the cup. A pencil can help slide seeds into place (see picture).

5) Add another 1/2 cup water to keep the seeds moist and set cups where the class can watch the seeds germinate. Water the cups daily to keep the seeds moist. Seeds need water to germinate.

Extension Activities: Germination Journals

A template for making student journals to record the germination process is attached. To make the journals, print copies front to back. Have students fold and cut them to make a five day journal where they can record

Note: Identify what seeds you are using and write them on your Germination Journal. Some may be good *cover crops*, or crops that help keep soil from eroding and put nutrients back into the soil. Radish, buckwheat and clover are common cover crops, grown in the late fall to keep soil from washing away.

daily observations and track the germination process.

Planting in Soil

After the plants have germinated for at least a couple of weeks, they will need soil for rooting structure. Depending on your materials on hand, you may plant them in pots or buckets of garden soil to continue monitoring growth. If you have a school garden, they can be used as cover crops or “green manures” to enrich the soil. Green manure is a cover crop that not only covers bare ground reducing erosion, but is a crop that is chopped up and mixed back into the soil. This provides a source of nitrogen and organic matter to garden soil, thus “feeding” the soil with fresh carbon and food.

Oregon Zone Map

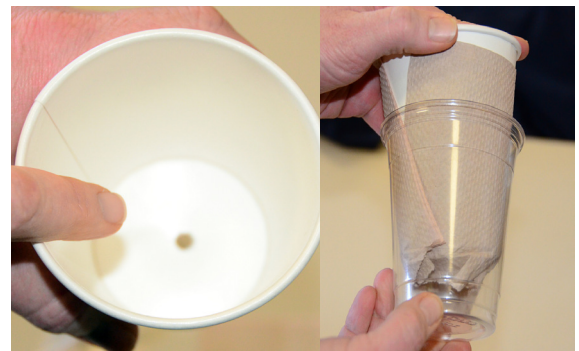
The species provided in AITC’s Seed, Soil, Sun kit are often used by farmers and gardeners alike to build soil structure and nutrient availability. Investigate, from the USDA Hardiness Zone chart available online, the specific water and nutrient requirements for each type of seed. What regions of Oregon would be best for each type of seed you germinated?

Graph It!

On your germination journal, write down how long each **shoot** or sprout is from root to top during each observation using a ruler. It works great to record growth directly on the plastic cup using a permanent marker. To make a graph on paper, using grid or lined paper, make marks for possible lengths for each shoot in half-centimeter increments on a y-axis. Then draw an x-axis for time since germination in day increments. Make pencil points for each height on your graph, and connect them to form the graph curve! You can make graphs for each type of seedling and compare their growth.

Mini-experiments

What if one group used a liquid other than water? Would the plants germinate in the same way? Have the students ask questions about what they think will happen. After the seeds have grown for approximately 14 days, have them measure and analyze growth data to construct a written argument for what plants need and don’t need for germination.



The paper cup has a hole punch for water to seep through. Wrap a paper towel around the paper cup, place it inside plastic cup, fill with 1/2 cup water. The paper towel wicks up the water.



Place seeds on the paper towel, half way down cup. A pencil can help slide seeds into place.



If you order AITC’s pre-made kit for this lesson vary slightly due to availability, but most likely include radish, garbanzo or kidney beans, wheat, buckwheat, and rye grass seeds.

Seed, Soil, Sun Vocabulary

Bacteria: A group of microscopic, single-celled organisms which inhabit virtually all environments, including soil, water, organic matter and the bodies of multi-cellular animals.

Carbon dioxide: The gas humans and animals breathe out and which green plants use to help make food.

Cotyledons: Sometimes called seed leaves; a simple, embryonic leaf in seed-bearing plants, which, in some species, forms the first green leaf after germination.

Germination: The process where a dormant seed begins to sprout and grow into a seedling under the right growing conditions.

Harvest: The gathering of crops; the season when ripened crops are gathered

Microscopic: Too small to be seen by the unaided eye, but large enough to be studied under a microscope.

Nutrients: A source of nourishment, especially a nourishing ingredient in a food; any material that nourishes an organism.

Organisms: Any living biological being, such as an animal, plant or bacteria.

Oxygen: The gas humans and animals must breathe in order to stay alive and which green plants produce when during photosynthesis.

Photosynthesis: The process where green plants, powered by the energy of sunlight, combine carbon dioxide and water to produce sugar inside their leaves and release oxygen into the air.

Root: The underground part of a plant, like a rhizome; part of the plant that develops and typically grows downward into the soil, anchoring the plant and absorbing nutrients and moisture.

Seed: A ripened plant ovule containing an embryo; a flowering plant's unit of reproduction, capable of developing into another such plant.

Shoot: The young growth arising from a germinating seed; a sprout.

Soil: The top layer of the earth's surface, consisting of rock and mineral particles mixed with organic matter.

Sun: A star that is the basis of our solar system and sustains life on Earth, being the source of heat and light; the radiant energy, especially heat and visible light, emitted by the sun; sunshine.

Draw

Observation Log Day: _____

Questions:

- 1) List the types of seeds you planted.

- 2) List five things plants need to grow.

- 3) Which seeds in the group were the first to have roots appear?

- 4) Which seeds in the group were the last to have roots appear?

- 5) Did your seeds grow the way you thought they would? Why or why not?

Draw

Observation Log Day: _____

Observation Log Day: _____

Draw

Draw

Observation Log Day: _____

Draw

Observation Log Day: _____

fold on line

This seed germination journal was created by **Oregon Agriculture in the Classroom Foundation (AITC).**

AITC is dedicated to helping students grow in their knowledge of agriculture, the environment and natural resources for the benefit of Oregonians today and in the future.

AITC provides Oregon teachers (K-12) free, integrated hands-on materials that meet state standards in science, math, language arts, history and art.

Learn more at adwa.sfu.edu.



Oregon Agriculture in the Classroom Foundation

Seed, Soil, Sun Germination Journal



Name: _____

Seed Scientist

fold on line