



## 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

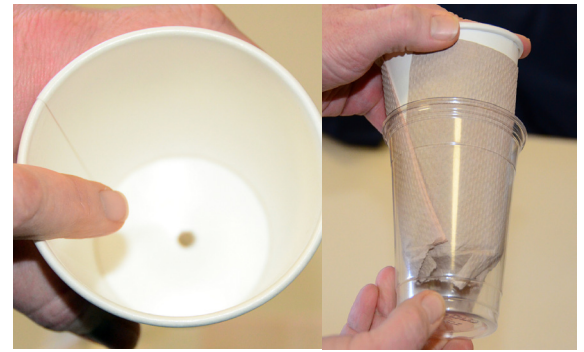
The species provided in AITC’s Seed, Soil, Sun kit are often used by farmers and gardeners alike to build soil structure and nutrient availability. Investigate, from the USDA Hardiness Zone chart available online, the specific water and nutrient requirements for each type of seed. What regions of Oregon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

**Bacterias:** Grupo de organismos microscópicos unicelulares que habitan prácticamente en todos los entornos, incluidos el suelo, el agua, la materia orgánica y los cuerpos de animales multicelulares.

**Dióxido de carbono:** El gas que exhalan los seres humanos y los animales y que utilizan las plantas verdes para ayudar a producir alimentos.

**Cotiledones:** A veces llamadas hojas de semillas; una hoja simple y embrionaria en plantas con semillas que, en algunas especies, forma la primera hoja verde después de la germinación.

**Germinación:** El proceso en el que una semilla inactiva comienza a brotar y convertirse en una plántula en las condiciones de crecimiento adecuadas.

**Cosechar:** La recolección de cultivos; la temporada en la que se recogen las cosechas maduras.

**Microscópico:** Demasiado pequeño para ser visto a simple vista, pero lo suficientemente grande para ser estudiado con un microscopio.

**Nutrientes:** Una fuente de alimento, especialmente un ingrediente nutritivo en un alimento; cualquier material que nutra un organismo.

**Organismos:** Cualquier ser biológico vivo, como un animal, una planta o una bacteria.

**Oxígeno:** El gas que los humanos y los animales deben respirar para mantenerse con vida y que las plantas verdes producen durante la fotosíntesis.

**Fotosíntesis:** El proceso en el que las plantas verdes, impulsadas por la energía de la luz solar, combinan dióxido de carbono y agua para producir azúcar dentro de sus hojas y liberar oxígeno al aire.

**Raíz:** La parte subterránea de una planta, como un rizoma; parte de la planta que se desarrolla y generalmente crece hacia abajo en el suelo, anclando la planta y absorbiendo nutrientes y humedad.

**Semilla:** Óvulo de una planta madura que contiene un embrión; la unidad de reproducción de una planta con flores, capaz de convertirse en otra planta similar.

**Disparo:** El crecimiento joven que surge de una semilla en germinación; un brote.

**Tierra:** La capa superior de la superficie terrestre, que consta de rocas y partículas minerales mezcladas con materia orgánica.

**Sol:** Una estrella que es la base de nuestro sistema solar y sostiene la vida en la Tierra, siendo la fuente de calor y luz; la energía radiante, especialmente calor y luz visible, emitida por el sol; luz del sol.

**Dibuja**

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**Registro de observación Día: \_\_\_\_\_**

**Preguntas:**

- 1) Enlista los tipos de semillas que plantaste.
  
- 2) Menciona cinco cosas que las plantas necesitan para crecer.
  
- 3) ¿Cuáles fueron las primeras semillas del grupo en dar raíz?
  
- 4) ¿Cuáles fueron las ultimas semillas del grupo en dar raíz?
  
- 5) ¿Crecieron tus semillas como pensaste que lo harían?

**Dibuja**

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**Registro de observación Día: \_\_\_\_\_**

**Registro de observación Día: \_\_\_\_\_**

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**Dibuja**

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Dibuja

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Registro de observación Día: \_\_\_\_\_

Dibuja

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Registro de observación Día: \_\_\_\_\_

fold on line

Este diario de germinación de semillas fue creado por **Oregon Agriculture in the Classroom Foundation** (Fundación agricultura en el salón de clase de Oregón, por sus siglas en inglés AITC).

AITC se dedica a ayudar a los estudiantes a expandir su conocimiento sobre agricultura, el medio ambiente y los recursos naturales para el beneficio de los Oregonianos, hoy y en el futuro.

AITC proporciona gratuitamente a los maestros de Oregón (K-12), material práctico integrado que cumple con los estándares estatales en ciencia, matemáticas, artes del lenguaje, historia y arte.

Aprende más en [adwa.org](http://adwa.org).



Oregon Agriculture in the Classroom Foundation

# Semilla, Suelo, Sol Diario de germinación



Nombre: \_\_\_\_\_

**Científico de semillas**

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