

Sprouting an Interest in Seeds and Plants

Science, Math, Writing

Materials

2-liter plastic soda bottles (one per student)
Small clear plastic cups (two per student)
Potting soil
Soybean seeds
Mailing labels with students names on them
Spray bottle
Copies of Student Handout A: KWL Chart
Copies of Student Handout B: Daily Observations

Grade Level: 1-2

Time: 50 min. + daily observations

Standards:
Science as an Inquiry
Life Science

For Kansas standards, visit www.ksde.org

Overview

This lesson will familiarize students with growing plants and will allow students to experiment with different growing conditions.

Objectives

1. Students will observe the growth of soybean seeds.
2. Students will learn about many different kinds of seeds and how they travel and grow in different places.
3. Students will conduct a simple investigation to see if the 2-liter bottle top/ mini green house will help or change the rate of growth the seed will sprout.

Background Information

The top five crops grown in Kansas are wheat, grain sorghum (milo), sunflowers, corn and soybeans. All of these crops grow from seeds. Each seed is unique, but all have the same basic parts and growth process.

The outermost part of the seed is the **seed coat**. This is a protective outer covering that surrounds the entire seed. The **endosperm** is inside the seed coat. It is the largest section of the seed and serves as the food source for the **embryo** until it can produce its own food. The embryo, or **germ**, is the only living part of the seed. It looks like a miniature plant. The germ is where the plant first starts from.

All seeds are **dormant**, or inactive, for a period of time. Dormancy is a natural part of seed life and allows the seed to delay growth until the proper growing conditions exist. The four essential components of plant growth are soil, air, sunlight and water. When these reach proper levels, the



Sprouting an Interest in Seeds and Plants

seed will **germinate**.

The germinating process starts when the seed begins to absorb moisture from the soil. The moisture softens the seed coat and eventually breaks it. This allows the embryo to get water and air so that it can grow using its stored food.

One end of the embryo grows down, with gravity, to form roots. **Root hairs** grow into the soil and absorb nutrients and moisture. The roots also anchor the plant in the soil. The other end of the germ grows up, against gravity, toward warmth or sunlight. The first leaves to appear above the soil are the cotyledons.

Preparation

1. Rinse, remove label, and cut off bottoms of the 2-liter bottles.
2. Make mailing labels with students' names on them. Each student will need two. Stick labels on small cups
3. Organize supplies so that they are easily accessible by all students.

Instructional Format

1. Students complete the 'K' and 'W' part of the KWL chart (Student Handout A) with what they know about plants and plant growth and what they want to know.
2. Share and discuss background information with students.
3. Students follow the procedures to plant the soybean seeds.
4. Students answer conclusion questions and complete the 'L' on the KWL chart.

Procedures

1. Students get soybeans and two clear cups with their name on them.
2. Fill the cups with potting soil.
3. Poke holes in the soil with fingers about as deep as the first knuckle
4. Put the seed in the hole, and cover it with soil (do not pack the soil).
5. Moisten the soil with a spray bottle, but do not water too much!
6. Set the cups in the window in the classroom.
7. Students place a 2-liter bottle over the chosen one cup to create a mini greenhouse and make a prediction which plant will grow faster.
8. Students observe their plants daily to see root and plant growth and water daily, as needed.

Conclusion Questions (Assessments)

1. Which seed cup grew better, the one in the mini greenhouse or the one without?
Seeds in cups in the mini greenhouses should germinate faster. The warmth from the greenhouse and the captured moisture make the conditions favorable for germination earlier.
2. Why are greenhouses especially important in Kansas?
Although farmers don't use greenhouse to start their crop seeds, many horticulture



Sprouting an Interest in Seeds and Plants

business use greenhouses to start plants (flowers and produce plants) in late winter or early spring that can be transplanted when the weather gets warmer. Greenhouses also help in the production of poinsettias, which are a popular plant in the cold month of December.

3. What are the major important things a seed/plant needs to grow? If your seed didn't grow discuss why.

Seeds need four essential components to grow, which are soil, air, sunlight and water. Reasons a seed may not grow may include it was planted too deep, it was watered too much, there was too much heat, etc.

4. What is the (vocabulary word)?

Reference Appendix A.

Resources

Exploring Kansas Crops Educator's Guide (2004). Unit 2 – Growing Kansas Crops (27-52). Kansas Foundation for Agriculture in the Classroom. To order, visit www.ksagclassroom.org.

Adapted from lesson plan created by Stacie Lantz, Harper, KS.

Want More? Extensions

Try manipulating a variable and see what happens. For example, move cups to a closet or drawer where there isn't any light – but keep one of the cups in a greenhouse. Record observations and discuss results.



Sprouting an Interest in Seeds and Plants

Plant Growth Vocabulary

Dormant: Inactive

Embryo: The only living part of the seed; develops into the new plant; also called the germ

Endosperm: Largest section of the seed; serves as the food source for the seed until the plant can produce its own food

Germ: The part of the seed that develops into a new plant; also called the embryo

Germinate: To begin to grow

Root hairs: Tiny structures that grow from the roots much like hair grows from your head; root hairs help absorb water and nutrients from the soil for the plant to use

Seed coat: Protective outer covering of a seed



