

Experiment: What a Seed Needs

Introduction

The book *Green bean! Green Bean!* shows how seeds sprout and grow to mature plants, producing seeds themselves in a fascinating cycle, with each stage of the plant's life leading to the next. In this live experiment, students will learn how various elements in nature affect the development of the plant. (Grades 2-3)

Materials

- The book *Green Bean! Green Bean!*
- 18 Bean Seeds
- 6 clear glass cups
- Potting soil, enough to fill the cups



Procedure

1. Explain to students that they will do an experiment to see what conditions affect the growth of a bean seed. The variables are water, temperature, and light. Students may work in small groups for each variable.
2. Prepare the cups:
 - Label the cups: #1 water, #2 no water, #3 warm, #4 cold, #5 sunlight, #6 no sunlight.
 - Fill each cup with potting soil, leaving a little room at the top for watering. Plant 3 seeds in each cup.
 - Water all of the cups except #2 (which should be kept dry). The soil in cups 1, 3, 4, 5, and 6 should be damp, without any standing water. Keep the soil damp throughout the duration of the experiment.
3. Place the cups:
 - Place 1 and 2 next to each other on a sunny windowsill.
 - Place cup 3 in a warm location and cup 4 in a cold location, if possible, giving them about the same amount of light.
 - Place cup 5 in a warm sunny spot and cup 6 in a warm location without any sunlight, such as a closet.
4. Have students observe their cups for 2-3 weeks and record their observations in a nature notebook in sketches and words.
5. When finished, discuss their results noting which seeds sprouted and how they were affected by their various conditions. Have students draw conclusions based on their results. (Sunlight, temperature, and water are all factors in the way a seed sprouts and grows. The seeds that had water, warmth, and sunlight sprouted and grew the best.)
6. Read aloud the story *Green Bean! Green Bean!* Referring to both the illustrations and text, identify the dangers the plant faced while growing. Ask students what the gardener did to help her bean seed grow. Have students identify the green bean's growing cycle. How did he cycle continue even after the vine died.

Extension Activity: Brainstorm with students other questions they have about what plants need to grow. (For example, do bean vines grow longer if they are staked?) Give students time and materials to design and carry out their experiments.

Standards Alignment

Next Generation Science (K-3)

Disciplinary Core Idea: Life Science

- LS1.C: From Molecules to Organisms: Structure and Processes: Organization for Matter and Energy flow in Organisms.
- LS2: Ecosystems: Interactions, Energy, and Dynamics: Interdependent Relationships in Ecosystems.

Cross Cutting Concept: Cause and Effect

Practices: Planning and Carrying Out Investigations

Common Core (ELA K-3)

Reading Informational Text

- Key Ideas and Details: K.1, 1.1, 2.1, 3.1
- Integration and Knowledge of Ideas: K.7, 1.7, 2.7, 3.7

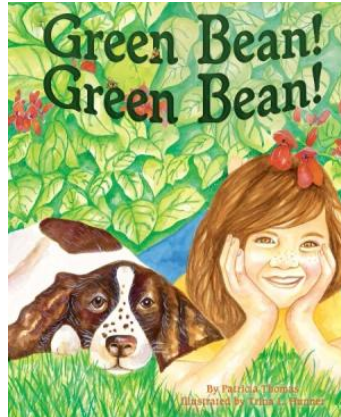
Rhyme Time

Introduction

Green bean! Green Bean! tells the story of a seed's life cycle using pairs of rhyming words. The use of rhyme promotes Phonological Awareness—the ability to recognize and produce similar word sounds. In this activity, students match pairs of rhyming words from the story to create a “Garden of Rhymes.” (Grades 2-3)

Materials

- The book *Green Bean! Green Bean!*
- Chart paper
- Construction paper in a variety of colors
- Popsicle sticks, 1 per student
- Small flower pot filled with rice or dried beans.
- “Rhyming Word Pairs List” (provided)



Procedure

1. Teacher Prep: Print the “Rhyming Word Pairs List.” Cut apart the words from Column A and tape one to each flower pot. Depending on the size of your class, some words may not be used. Place the flower pots around the room before children arrive. Cut apart words from Column B to give to students.
2. Read aloud *Green bean! Green Bean!* Briefly discuss the life cycle of the bean seed. Have students identify the things the gardener did to help the plant grow and survive.
3. Read each page again, having children identify the words that rhyme. Write the words on chart paper and underline or highlight the part of the word that makes the rhyme (the word family or phoneme). Note the different spellings of some of the rhyming pairs.
4. Have children create flowers using popsicle sticks for stems and colored construction paper for blossoms. Give one of the rhyming words from Column B to each student. Have them write it in the center of their blossom.
5. Tell students to look around the room to find the pot that has a word that rhymes with their flower. Once they find the matching pot, they can “plant” their flower in the pot (it will be held in place by the rice or beans) to create a “Garden of Rhymes.”
6. With the class, brainstorm additional words for each rhyming pair.

Standards Alignment

Common Core (ELA K-3)

Reading Informational Text

- Key Ideas and Details: K.1, 1.1, 2.1, 3.1
- Integration and Knowledge of Ideas: K.7, 1.7, 2.7, 3.7

Foundational Skills

- Phonological Awareness: K.2, 1.2

Rhyming Word Pairs List

Column A	Column B
freckles	speckles
root	shoot
sprout	out
bunch	lunch
they	stay
hoe	grow
curlicue	dew
roars	pours
tight	right
rabbit	grab it
threat	net
vine	line
nook	book
overhead	red
breeze	bees
lean	bean
quick	pick
high	dry
jumbled	tumbled
below	snow
sun	fun