PLANTS START FROM SEEDS

Vocabulary: bean, seed, grow, germinate, sprout, embryo

KINDERGARTEN

Description
In this lesson, students dissect bean seeds to learn the life cycle of the bean plant, what a seed is, and how a plant starts growing from a seed.

Guiding Question
Where do plants come from?

Big Idea
Plants are living things.

Learning Objectives
At the end of this lesson, students will be able to describe what is inside a bean seed, state how the seed is related to the plant that grows from it, and describe the life cycle of a bean plant.

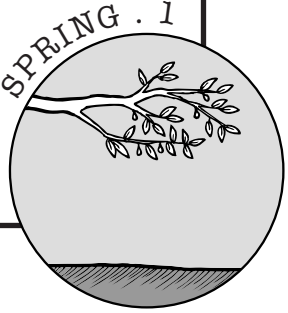
Materials
Large bean seeds such as corona, fava, or scarlet runner, at least one seed per student, plus a few for display.
Optional: Examples of other edible seeds: pea, corn, sunflower, pumpkin, etc.
Hand lenses or magnifying glasses.
Illustration KS1.
One Bean, by Anne Rockwell (1999, Walker Children's)
Plant Packages, by Susan Blackaby (2006 Picture Window Books)

Preparation
Soak enough bean seeds for each student to have one seed in water for 48 hours prior to lesson. Set aside some unsoaked seeds for display.
Print enough copies of Illustration KS1 for each student to have one.
Optional: Recruit and train volunteers to assist students in examining and identifying parts of a seed.

Introducing the Lesson
Activate students' prior knowledge and interest with a classroom discussion about edible plant parts. Review with students key concepts from Kindergarten Fall Lesson 3, *Fruits and Seeds, Roots and Stems, Flowers and Leaves*: Plants have different parts, and we can eat some parts of plants. Guide the discussion to focus on seeds. Ask students questions, such as, *What foods that we eat are actually seeds of plants?* (*Some possible answers:* beans, peas, corn, nuts, sunflower and pumpkin seeds, etc.) Tell students that today they are going to learn how seeds turn into plants and then take a very close look at one kind of seed that we eat: beans.

Lesson time: see additional time

Additional time: About two hours. One hour for introduction and steps 1 and 2, and one hour for steps 3-5.



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Procedure

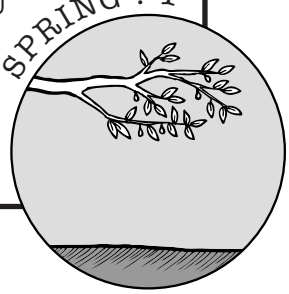
1. *Discover the principle of like plants from seeds.* Show students a bean seed and tell them that a bean seed can grow a bean plant. It can't grow into any other kind of plant. To help students discover that a seed grows the same kind of plant, ask questions such as, *What kind of plant would grow from a suflower seed? A pea? A pumpkin seed?* (If you have gathered examples of these other seeds, show them as you ask.)

2. *Introduce a plant life cycle.* Display again the bean seed you used in the introduction. Remind students that it can grow into a bean plant. Ask students how they think a little seed can grow into a big plant. What steps might need to happen? After students have given their predictions, show them Illustration KS1, and describe the steps in the picture (from left to right,1) the seed *germinates*, it opens up and sends out a root; 2) the tiny root stretches into a stem; 3) the seed *sprouts* up out of the soil, 4) the new plant develops leaves to help it get energy from sun and grow bigger; 5) the full-grown plant has lots of leaves and makes new seeds; 6) a plant which grows from just one bean can give us many more bean seeds—enough to eat some and use some to grow more new plants), If you have time and access, you may wish to read to students the book *One Bean,* by Anne Rockwell, which also shows the life cycle of a bean.

3. Introduce seeds as the source of a new plant. After they learn about the plant life cycle, remind students that just one little seed grows into a plant. Help students understand that inside every seed lives a tiny new plant, an *embryo*. Each seed also holds just enough food to get the embryo started growing until it turns into a new plant that can get its own food from the sun and soil. The embryo is *dormant*, just sitting and doing nothing, until the seed gets put into a place with the right mix of air, water, and temperature. Then, the embryo uses the stored food to grow until it explodes right out of the seed. If you have time and access, you may wish to read to students the book *Plant Packages,* by Susan Blackaby or show students animations or time-lapse photography of a seed sprouting (See Books and Resources for some possible sources).

4. *Look inside bean seeds:*

- Before examining bean seeds, encourage students to predict what they'll find by asking them questions such as these: *If we open up a bean seed, do you think we'll be able to see a tiny new plant? What else will we find?* Record predictions to revisit later.
- Demonstrate how to open a bean seed and how to use a hand lens to look at the structures inside the seed.
- Hand out the previously soaked beans and a hand lens to each student. Instruct students to carefully open their bean seed and examine the inside of the seed with the hand lens.
- Have volunteers help students to identify what they find inside, including the embryo and the *endosperm*, or temporary food supply. If you have time, encourage students to draw and, with the aid of volunteers, label the inside of the bean seed they opened.



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5. *Wrap up.* After students have finished examining the seeds, have them clean up their work areas. Collect the beans for composting and gather the hand lenses. Then hold a full-class discussion. During the discussion, revisit students predictions, comparing them to results, and conduct informal assessment of students' learning.

Assessing Student Knowledge

During full-class discussion, conduct informal assessments of your students' learning by asking them questions such as the following: *What was inside your seed? Are all seeds the same inside? Will all bean seeds become bean plants? What would our bean seeds need to grow into plants?*

You can also use students' drawings of their seeds to evaluate their understanding of the contents of seeds.

Extensions

Soak extra bean seeds and have students plant their own bean seeds in small pots or rinsed milk cartons from the cafeteria to transplant into the garden or take home and plant.

Make or buy hummus and serve with vegetable sticks as a healthy snack.

Books & Resources

One Bean, by Anne Rockwell (1999, Walker Children's)

Plant Packages, by Susan Blackaby (2006 Picture Window Books)

Web Sites:

The Germination of a Bean http://www.botanical-online.com/animation4.htm

This short animation shows roots, stem, and leaves appearing from a bean seed.

Time-lapse photograph of beans sprouting can be found in two videos on YouTube:

http://www.youtube.com/watch?v=9wWNUewPaP0

http://www.youtube.com/watch?v=udYPDYkc37Y&feature=autoplay&list=PLE96908B77A59C7FB&lf=results_main&playnext=2

OR. Dept. of Ed. Key Standards

Oregon State Board of Education Science Content Standards:

K.3S.1 Explore questions about living and non-living things and events in the natural world.

K.3S.2 Make observations about the natural world.

Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects:

K.RI.10 Actively engage in group reading activities with purpose and understanding.

K.W.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.