

Teacher's Guide

Seeds Sprout!

Introduction

This teacher's guide helps you teach young children about seeds and how they grow new plants. The cycle from seed to new plant is a fascinating one for children to observe. A seed is a traveler that is equipped with everything it needs. Once it lands in the right conditions it grows a new plant, much like the one it originated from.

National Standards

This series supports Science, and Language Arts. Go to www.enslowclassroom.com and/or www.enslow.com and click on the Curriculum Correlations tab. Click on your state, grade level, and curriculum standard to display how any book in this series backs up your state's specific curriculum standard.

Classroom Activities

Activities for teaching the five curriculum areas: Reading/Language Arts; Math, Science; Social Studies; and the Arts, can be found in this teacher's guide. Students will explore the size, properties and travels of seeds.

Guided Reading Level: M

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40 Industrial Road, Box 398
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I like Plants! Teacher's guide For Seeds Sprout!

Seeds come in many shapes and sizes. Given the right combination of water, soil, temperature and light a seed goes to work, growing into a plant.

Seeds—seed coat, and more

A seed is made up of three main parts: the seed coat, the endosperm and the embryo. The seed coat protects the inside of the seed. It is especially important while the seed is dormant. Dormancy is the period when the seed waits for the right conditions to sprout. The endosperm is the food source for the growing plant until it grows leaves and can make its own food. The embryo is the basis for the new plant. Within the embryo there are also two very important parts: the primary root and the cotyledon (embryonic leaves).

Sprouting (Germination)

Seeds usually begin to sprout (germinate) when exposed to water. The embryo absorbs water. It swells and splits the seed coat. The primary root emerges and rapidly grows into the soil. The cotyledon takes over from the endosperm, providing food for the growing plant. The embryonic leaves are the first leaves seen growing from the seed and also the first leaves seen above ground. They supply food for the growing plant until regular leaves take over.

Fruit

Once a flower is successfully pollinated a fruit grows. There is a difference between the common usage definition and the botanical definition of a vegetable and a fruit. Scientifically, if it has an enclosed seed and develops from a flower it is classified as a fruit. The fruit is the ripened ovary of the flower. It houses, and protects, seeds for new plants. A cookbook considers several botanical fruits as vegetables. A botanist would classify cucumbers, tomatoes and peppers as a fruit. Cookbooks, and the local grocery store, list them as vegetables. For some advanced investigation of the different kinds of fruit visit http://userwww.sfsu.edu/~biol240/labs/lab_14plantenvir/pages/14fruittype.html

Seeds Travel

Seeds, unlike people, cannot walk to a new home. Once the fruit is ripe the plant has done its job and it's time for the seeds to find new homes. Some fruits attract animals when they are ripe. The fruit, along with the seed is eaten and then deposited when the animal defecates. Birds eat cherries, possum enjoy grapes and monkeys enjoy ripe bananas. This fruit wrappers video <http://www.teachersdomain.org/resource/lsp07.sci.life.oate.cgfruitwrap/> explores how animals are attracted to different fruit.

Seeds may also travel as hitchhikers. They stick to the fur of an animal or on human clothing and are carried far from their starting point. Burdock and Queen Anne's Lace seeds have small hooks that attach to animals and clothes. Plantains, a plant found in some lawns, have seeds that are sticky when they get wet. They easily stick to animal fur (rabbits, dogs) and clothing (socks, pants, sneakers). Some seeds (acorns) are gathered by animals (squirrels, chipmunks) and buried. Some are never retrieved, so they sprout.

Wind and water are extremely effective in seed spreading (dispersal). Dandelion seeds are spread with a gust of wind. Seeds from maple and ash trees have special wings that help them float and twirl like helicopters. Water can carry floating seeds. During heavy rains seeds may be washed into ditches and plant themselves once the water dries up. A coconut is waterproof,

floats and can travel over 1200 miles before reaching dry land. The lotus flower grows in water. Its flat seedpods can float far away from the parent flower.

Some plants have exploding fruits. When violet fruit splits open it scatters seeds several feet. Witch hazel is a large shrub with exploding seedpods. Some varieties of geranium also shoot their seeds when the pod is ripe.

Activities The Five Curriculum Activities

SAFETY WARNING:

Before any activity, make sure your students do not have any allergies to items that you might use. Never use anything that is sharp or may cut a student. Do not use anything too hot or cold which might injure any student. Always have an adult supervise all activities to ensure the safety of your students.

Reading/Language Arts activity:

Beginning readers will find easy words and repetitive phrases throughout the book. Almost all the words used in this book can be found in the Dolch word list. To learn more, visit www.dolch-words.com. Additional words, which may be specific to this book, can be found in the Words to Know on page 3. Have students write a paragraph from the perspective of a dandelion seed on page 11. Where does it fly? Does it land on the ground and start to grow? What does it need to grow well? What dangers does it face?

Math activity:

Buy bags of three different kinds of dried beans. Pinto, black and kidney beans are good choices if available. Have students form groups of three. Give each group three small paper cups and have them fill them with the three different beans. Students should tape one of each bean to a sheet of paper. Have them measure the length, height and width of the bean. Then they should estimate how many beans are in each cup. Write the estimate next to the bean. Have the students count the actual number of beans. How far off was their estimate? Which kind of bean had the most beans in the cup? Which bean had the least? How close were the totals for all of the groups? Save the beans in their cups for the science activity.

Science activity:

Have students work in groups of three. Give each group 4 clear plastic cups. Have them make a mark on the cup 3 inches from the bottom. Fill the cup with water up to the line. Take a cup of beans and pour it into the plastic cup. Mark a line to note the new water level. Measure the distance between the two lines. Do this with the remaining two kinds of beans. In the 4th cup add a paper cupful of water. Mark a line measuring the new water level. Ask why the water went up different amounts even though they added a "cupful" each time? Which addition from the paper cup increased the water volume the most? What difference did the air pockets between the beans make? (This is a simple exercise of finding volume by displacement. The amount of water moved is equal to the volume of the beans. When the water is added it raises the level the most because there are no air gaps.)

Social Studies activity:

Look at a map of your town. How can plant seeds be transported in your area? What kind of animals might carry them? Does it get windy? Are there any bodies of water that could spread seeds? List all the ways that seeds might spread. Based on the map, are there any places that might show evidence of seed travel? A riverbank or lake edge? A farmer's fence or under power lines (birds love to perch here!)? Looking at a larger map of the entire state, ask the same questions.

Arts activity:

Find a picture of a plant, or draw your own on a half sheet of white paper. Glue it on poster board and then cut it into ten pieces. Have students initial the back of each puzzle piece. Place in a small plastic sandwich bag. Trade puzzles and put them together.

Reproducible

Solve these math problems. Use the letter for that answer in the seed fact sentences below.
One problem is done for you

$0 + 1 = \underline{\quad} S$	$7 + 2 = \underline{9} P$	$4 - 2 = \underline{\quad} E$
$5 + 5 = \underline{\quad} O$	$6 + 6 = \underline{\quad} M$	$10 + 4 = \underline{\quad} N$
$7 - 4 = \underline{\quad} D$	$4 + 1 = \underline{\quad} R$	$8 - 1 = \underline{\quad} V$
$6 + 5 = \underline{\quad} U$	$3 + 10 = \underline{\quad} K$	$5 + 10 = \underline{\quad} W$
$1 + 3 = \underline{\quad} T$	$5 + 1 = \underline{\quad} A$	$7 + 1 = \underline{\quad} L$

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							P						.
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14	2	15		9	8	6	14	4	1	