

Kernel Kids

Science

Materials

Jewelry-sized resealable plastic bags (found in craft stores)
Crystal soil (found at most garden centers) - water holding polymer
Hole punch
Water
Measuring spoons
Eye dropper
Wheat kernels
Yarn

Grade Level: 4-5

Time: 50 min.

Standards:

Science: Plant Growth & Development; Germination Study

Math: Applied Fractions and Percentages

For Kansas standards, visit www.ksde.org

Overview

Wheat is the number three crop commodity in Kansas but we are known for being the “Wheat State.” Wheat products are found in hundreds of items we buy at the grocery store. Students will make their own “kernel kid” necklace so that they are able to watch their wheat germinate and grow.

Objectives

1. Students will understand the value of the wheat kernel.
2. Students will create a “kernel kid” necklace that will allow them to watch their wheat germinate and grow.

Background Information

Wheat hasn't always looked the way it looks today. It is a member of the grass family. The two ancient forms of wheat were called einkorn and emmer. Scientists over the years have bred wheat to become the plant it is today.

The first wheat on record for being planted was around 8,000 B.C. The first area we know where wheat was grown was Southwest Asia in countries such as Iraq, Turkey, Syria, and Iran. In the late 1400s, the explorer Christopher Columbus brought wheat to North America when he discovered the West Indies. In the 1500s, Spaniards brought wheat to Mexico by boat. In the 1600s, Mexican settlers continued to explore north by covered wagon and finally, wheat was introduced and grown in the United States. The first record of wheat being grown in Kansas was in 1839 in the current day Johnson County area.



Germination

Germination is the process of a seed beginning to grow. For germination to occur you need water to soften the seed coat, warm temperature to come out of dormancy, and oxygen to help with respiration.

The Kansas Crop Improvement Association tests seeds for farmers and seed dealers to determine percent germination, purity, and noxious weed exam. This informs the farmer on how much seed to plant per acre depending on the environment they are planting into. This is important because the farmer wants his new plant population to be able to survive until harvesting a new crop of seeds.

Vocabulary

Germination: Process when a plant begins to grow or develop.

Germ: The living part of a seed from which a new plant may develop. It is the inner part of the seed.

Dormancy: The period where the plant does not grow because of unfavorable conditions.

Respiration: Taking in oxygen and giving off carbon dioxide

Endosperm: Part of the kernel that is made up of mostly protein and carbohydrates. It makes up 83% of the kernels total weight.



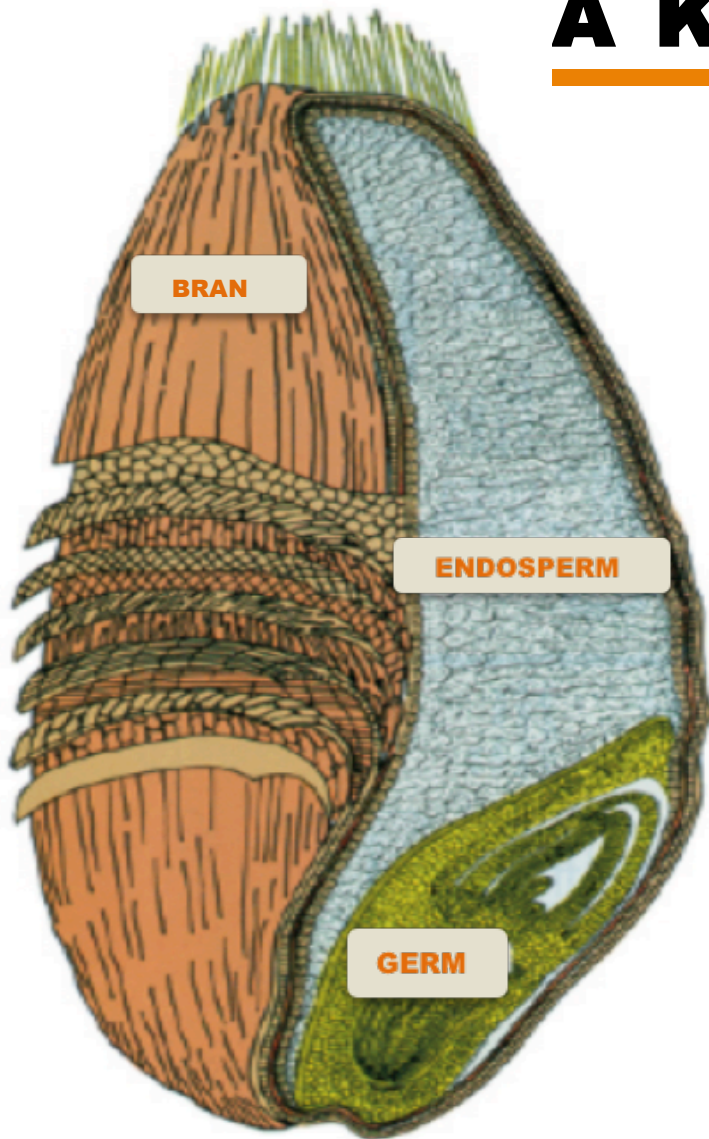
This is what it will look like in your necklace.



When it reaches this size, transplant to a cup of soil.



A Kernel of Wheat



The Kernel of Wheat...sometimes called the wheat berry, the kernel is the seed from which the wheat plant grows. Each tiny seed contains three distinct parts that are separated during the milling process to produce flour.

Endosperm...about 83 percent of the kernel weight and the source of white flour.

Bran...about 14 ½ percent of the kernel weight. Bran is included in whole wheat flour and can also be bought separately.

Germ...about 2 ½ percent of the kernel weight. The germ is the embryo or sprouting section of the seed, often separated from flour in milling because the fat content limits flour's shelf life.

Whole Grains...whole grain products are made with the whole kernel of grain. The bran (outer layer) contains the largest amount of fiber(insoluble), B vitamins, trace minerals and a small amount of proteins; the endosperm(middle layer) contains mostly protein and carbohydrates along with small amounts of B vitamins, iron and soluble fiber; and the germ(inner part) is a rich source of trace minerals, unsaturated fats, B vitamins, antioxidants, phytochemicals and a minimal amount of high quality protein.

Enriched Grains...enriched white flour is the finely ground endosperm of the kernel. Some of the nutrients that are milled out are replaced through enrichment. Slice for slice, enriched white bread as well as other enriched grain products, are a good source of iron and or B vitamins (thiamin, riboflavin, niacin and folic acid) as well as complex carbohydrates. Enriched grain products have over twice the amount of folic acid as whole wheat. Compare a slice of enriched white bread with 37mcg to a slice of whole grain bread at 17.5 mcg

Grain-based Foods...provide complex carbohydrates-the best fuel for our bodies. These foods are often low in fat and contain fiber. Grain foods provide vitamins – especially the four key B vitamins (thiamin, riboflavin, niacin and folic acid) and iron. During the milling process, white flour is produced by removing the bran and germ portions of the wheat. Most (95%) products made from white flour are enriched. Whole grain foods are made with flour that contains all three parts of the kernel. Nutrition experts recommend that at least half of our daily grains come from whole grain products. The total number needed each day depends on age, gender and activity level. Visit www.choosemyplate.gov/food-groups/grains-amounts.html to determine the appropriate amount of grains needed.

Wheat Foods Council

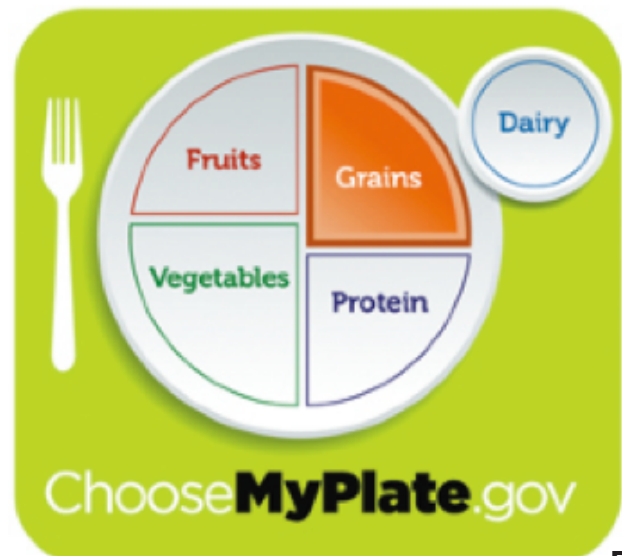
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Kernel Kids

Instructional Format

1. Share background information with students.
2. Students will follow procedures to make a Kernel Kid.
3. Upon completing the lesson, students will discuss the activity and observe their wheat for germination and growth for 7-10 days.

Procedures

1. Punch a hole in the top of a small plastic bag, above the seal.
2. Place $\frac{1}{4}$ teaspoon of polymer into the bag.
3. Add one tablespoon or two droppers full of water.
4. Gently push in two wheat kernels.
5. Seal the bag firmly.
6. Insert the yarn to make a necklace.
7. Encourage students to wear the Kernel Kids around their necks and under their shirts to keep the kernels in a warm, dark place.
8. Check your Kernel Kid each day for germination and record the growth.
9. If you desire, transplant the sprout to a soil-filled cup and continue to watch the growth.

Want More Extensions?

This activity can also be done with other seeds. Try using a variety of seeds and compare germination rates over the same period of time for each seed used.

Terra Nova Lesson Plan: *Wheat News*

http://www.agintheclassroom.org/TeacherResources/TerraNova/clr_wheatnews.pdf

Utah State University Publication: *Crop Physiology Laboratory*

http://cpl.usu.edu/files/publications/factsheet/pub__6823289.pdf

Celebrate Wheat Lesson Plan

http://www.ksagclassroom.org/teachers/lesson/celebrate_wheat.pdf



Kernel Kids

Name: _____ Date: _____

Instructions: Answer questions thoroughly.

1. If each class member has two wheat kernels in their necklace, how many total seeds are there in the classroom?

2. How many seeds in the classroom germinated or sprouted within a week?

a. What percent germination is there in the classroom?

formula - # of seeds that germinated in the classroom divided by total seeds in the classroom.

$$\frac{\text{\# number of seeds germinated in the classroom}}{\text{total seeds in the classroom}} = \text{percent germination}$$

For Example:

$$\frac{32 \text{ seeds}}{48 \text{ seeds}} = 66\%$$

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