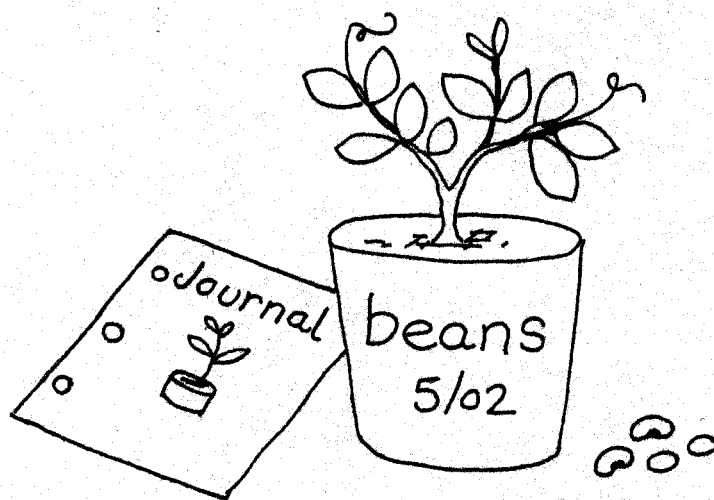


Everything But the Kitchen Sink

Science Investigations
for
Grades K-5



Alabama Agriculture in the Classroom
Summer Institute 2002
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Everything But the Kitchen Sink...



A recipe for classroom learning and fun

Children enjoy watching plants grow and develop. Plant this simple garden on a well-lighted windowsill or under an inexpensive plant light and watch students' sense of wonder grow as simple kitchen scraps turn into sprouting plants.

Try planting a few of the seeds or roots listed below. They can be easily gathered from cafeteria lunch trays, kitchens, or a quick trip to your neighborhood grocery store. Most of them are common enough for children to be familiar with them, yet never fail to elicit surprise when they GROW!!!

WARNING: This project can be dangerous to your health if you should stand in the way of excited students rushing in to check out their plants each morning.

| | |
|---|-----------------------------------|
| Gather seeds from the following: | |
| Apple | Avocado |
| Grapefruit | Mango |
| Mustard | Orange |
| Pear | |
| Plus a few of these: | |
| Dried beans | Garlic cloves |
| Ginger root | Sweet potato |
| Unroasted peanuts | |
| And..... | |
| Tops cut from carrots, beets, turnips, radishes, | |
| You'll also need | |
| Potting soil | |
| Pebbles | |
| Toothpicks | |
| Finally, containers for planting- any of the following will work well: | |
| Margarine tubs | Cafeteria milk or juice container |
| Deli containers | 2-liter bottles |
| Liquid detergent caps | Yogurt cups |
| Egg cartons | Plastic cups |

Before you begin. ..

Discussion, Predictions and Graphing

1. Display the foods and seasonings on a table and ask the class to name them.
(Assist with the less common items)
2. Ask the students, "Do you think that any of these can grow into plants?" Accept all reasonable answers. Discuss.
3. Develop a two-column chart (yes, no) to track answers. As the class reaches a consensus on each item, write the name of that item in either the *yes* or *no* column. The names can be moved to the other column as the need arises.

Assign students the task of copying the chart in their plant journals. Allow time for them to record their predictions either with words or illustrations.



Tracking progress with a journal. ..

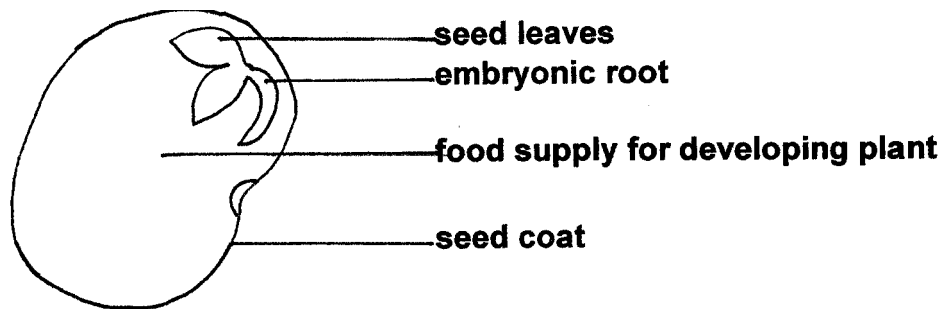
Having students write about and illustrate their experiences throughout the germination and growing process serves the following three purposes:

- ~ It requires students to reflect on the growing process as they record and illustrate the changes they notice in the developing plants.
- ~ Journaling provides students with opportunities to practice writing skills in a context that differs from the one typically used in the language arts classroom.
- ~ It gives teachers a way of evaluating students' level of understanding while at the same time providing a potential source of daily grades.

What's Inside that Seed?

Objective: Students will identify, draw and label the parts of a bean seed.

Place several paper towels in a flat pan or dish and add enough water to soak them. Top with lima (or other large dried beans) and cover with several more wet paper towels. The following day distribute the soaked beans to the students, instructing them to gently separate the two halves. Assist students in locating the seed coat, embryonic root, seed leaves, and food supply for the developing plant.



Vocabulary:

Seed coat -protective outer layer of the seed

embryonic root -immature root

Seed leaves -first leaves

Journal: Direct students to illustrate the bean seed, labeling the parts identified and writing a sentence that explains the purpose of each one.

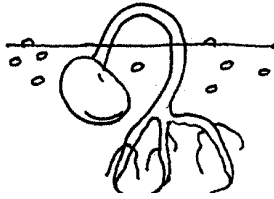
Amazing Growth

Do seeds really need soil to grow?

You'll need: large sponge, radish or grass seed, plate, water, a light source.

Directions:

1. Soak the sponge in water, squeezing out the excess, and place on a plate.
2. Carefully sprinkle seeds into the holes of the sponge.
3. Place the plate near a light source (windowsill or plant light)
4. Watch. Illustrate and write about observations in plant journals.



Germinating Seeds. . .

Objective: Students will compare and contrast the germination rate of different types of bean seeds.

Plastic Glove Nursery

A different and very visible way for students or groups to compare rates of germination

Materials: clear plastic glove (one per student or group)
Cotton balls
Seeds -five different varieties of beans
pinto, lima, lentil, soybean, black-eyed pea, etc. duct
tape or wide masking tape
Fine-point permanent marker
Plant light or windowsill (indirect light)
Hand magnifiers

Procedure:

1. Distribute seed varieties to students. Identify seeds and observe with hand magnifiers.
2. Ask students to predict which type of bean might germinate first and why. Record predictions.
3. Moisten cotton balls and push one into each fingertip of the plastic glove.
4. Place one bean seed on each moistened cotton ball (a different variety in each finger).
5. Label each finger of the glove with the variety of bean it contains.
6. Gently press glove to force air out. Seal the opening with duct tape or wide masking tape.
7. Label the taped end of the glove with the date. Place in well-lighted location out of direct sunlight.
8. Observe for signs of germination and record data. Have students illustrate changes they notice.

Evaluation:

- Which variety of bean germinated first? How do you know?
- How long did it take for the first seed to germinate? The last seed?
- If the activity were repeated, do you think the results would be the same? Why or why not?
- Illustrate your "handful of seeds" and write 3-5 sentences describing the activity.

Ziploc Success

Materials: medium *Ziploc* bag (one per student or group)
paper towels
seeds -different varieties of beans (I buy the 15-bean soup mix)
pinto, lima, lentil, soybean, black-eyed pea, etc.
fine-point permanent marker
plant light or windowsill (indirect light)
hand magnifiers

Procedure:

1. Identify seeds and observe with hand magnifiers. Have each student or group chose a variety to work with.
2. Ask students to predict which type of bean might germinate first and why.
Record predictions.
3. Fold paper towel, moisten and place in the *Ziploc* bag.
4. Place several dried beans on each moistened paper towel (a different variety in each bag).
5. Label each bag with the date and variety of bean it contains.
6. Gently press to force air out and close the bag.
7. Place in well-lighted location out of direct sunlight.
8. Observe for signs of germination and record data. Have students illustrate changes.

Evaluation:

Which variety of bean germinated first? How do you know?
How long did it take for the first seed to germinate? The last seed?
If the activity were repeated, do you think the results would be the same?

Why or why not?

Illustrate your *ziplock* nursery and write 3-5 sentences describing the germinating seeds.



Sprouting With Cotton

Materials: 6 oz. clear plastic cup (one per student or group)
cotton balls
seeds -different varieties of beans (I buy the 15-bean soup mix)
pinto, lima, lentil, soybean, black-eyed pea, etc. fine-point
permanent marker
plant light or windowsill (indirect light)
hand magnifiers

Procedure:

1. Identify seeds and observe with hand magnifiers. Have each student or group chose a variety to work with.
2. Ask students to predict which type of bean might germinate first and why. Record predictions.
3. Fill the plastic cup with cotton balls and moisten them.
4. Place several bean seeds in each cup between the cotton balls and the side of the cup. (a different variety in each cup).
5. Label each cup with the date and variety of bean seed it contains.
6. Place in well-lighted location out of direct sunlight.
7. Moisten the cotton balls as needed, but do not allow water to stand in the cup.
8. Observe for signs of germination and record data. Have students illustrate changes.

Evaluation:

Which variety of bean germinated first? How do you know?

How long did it take for the first seed to germinate? The last seed?

If the activity were repeated, do you think the results would be the same?

Why or why not?

Illustrate your *cotton-ball* nursery and write 3-5 sentences describing the germinating seeds.



Planting the Conventional Way. ..



The following seeds are ideal for this method: grapefruit, orange, mustard, or any of the dried beans from a package of 15-bean soup mix.

You'll need:

potting soil
small containers
windowsill or plant light
water

Directions:

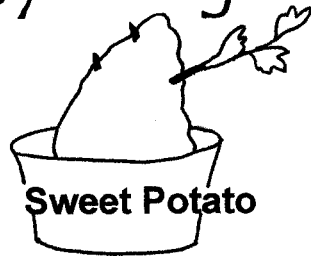
1. Fill cups with potting soil and direct students/groups to plant the seeds. Label each container with the variety of seed and the date.
HINT: Remind the students not to plant too deeply as the seeds will not germinate.
2. Add water until the soil is quite moist but not soaked. A plastic COKE bottle with a nail hole in the cap is ideal for this.
3. Place on a well-lighted windowsill or under a plant light.
4. Observe for signs of growth, illustrating and writing about changes in students' journals.

Apple, peach, plum, and pear seeds, readily available from cafeteria trays or lunch boxes, require some special attention prior to planting. You have to trick the seeds into thinking they have had a nice winter's nap.

In a process called stratifying, you:

1. Wash and dry the seeds thoroughly.
2. Place them in a Ziploc bag of potting soil.
3. Add a little water and place in the refrigerator for 6-8 weeks.
(Be sure the soil remains moist but not wet)
4. Place in containers of potting mix, covering with a thin layer of soil.

Other ways of growing. . .



1. Fill a deep container 3/4 full of clean pebbles. Add water to cover the rocks.
2. Cut a 2-3" piece off the rounded end of a sweet potato (one that has buds or roots works best).
3. Place the cut end down on the rocks and place in a sunny window or under a plant light.
4. Check daily and add water as need to keep the end of the sweet potato under water.

Avocado

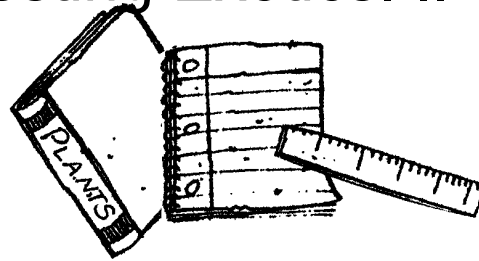
1. Remove the pit from the inside of the avocado. Wash it thoroughly and scrub to remove the brown skin from the seed.
2. Place three toothpicks around the middle of the seed.
3. Balance the avocado seed on the edge jar of water so that the flat end is facing down and covered with water. Place in a well-lighted spot out of direct sunlight.
4. Add water to maintain the level and change the water as needed.
5. The growing plant can be transplanted to soil when the roots are at least three inches long. Be certain to leave the top half of the seed uncovered by soil.

Russet or Blue Potato

1. Place potato on a shallow tray and add water.
2. Keep tray filled with 1/2" of water and out of direct light.
3. After several weeks you should notice root and stem growth.
4. When both the roots and stems are well-established, plant the potato in a large pot. Cover with an inch of potting soil. Place in well-lighted spot and water when dry.
5. With proper care and a large enough pot, your potato will grow other little potatoes you can eat.

NOTE: Be sure to keep the potato covered with soil so that it doesn't spoil.

Interesting Exotics. ..



Mango

1. Place a layer of stones at the bottom of a large pot. Fill almost to the top with potting soil. Set aside.
2. Remove the seed from a mango and wash it well. Scrap off as much of the fruit pulp as you can and wash it again.
3. Let the seed dry for 5-6 hours or overnight.
4. Remove the hard husk from the seed by looking for a small dent and using a knife or scissors to pry it open. Work very carefully so that you don't damage the seed inside.
NOTE: the seed inside resembles a large lima bean.
5. Lay the seed on its side on top of the potting mix and cover with about 1/2 inch of soil. Water until the soil is moist but not soaked.
6. Cover the pot with a large *Ziploc* bag and place on a sunny windowsill or under a plant light. Keep the soil moist.
7. After several weeks the first shoots should appear and the plastic bag can be removed.

Garlic

1. Place a layer of stones at the bottom of a large pot. Fill to within 2 inches of the top with potting soil. Set aside.
2. Separate cloves of garlic from the bulb and remove the papery covering.
3. Place individual cloves (pointed end up) in the potting mix and cover with about an inch of soil. Water until the soil is damp but not soaked and place on a sunny windowsill or under a plant light.
4. Let the soil dry out between waterings and apply fertilizer 1-2 times a month.
NOTE: Each little clove will turn in large bulb of garlic you can use.



An Alabama Favorite. . .

What could be better than peanuts right in your classroom?

You'll need:

potting soil
large container
(clear 2-liter drink container with top 4 inches cut off)
brown paper grocery bag, tape
peanuts -unroasted
water
light source

Directions:

1. Place a layer of stones in the bottom of your container and fill to within 2 inches of the top with soil.
2. Remove the peanuts from their shells and place in the pot, covering with about 1/2 inch of soil.
3. Cut paper bag to fit around the outside of the plastic container. Secure with tape.
4. Water until moist but not soaked.
5. Place on a sunny windowsill or under a plant light.

NOTE: As your plant matures, flowers will develop and falloff the plant. The stems supporting the flower will bend into the ground and you'll be able to remove the brown paper and observe the peanuts forming through the clear container. Rewrap after viewing.

Experiment with peanuts:

Does fertilizer have an effect of the growth of peanut plants?

When your peanut plants have reached a height of three inches, divide them into two groups. One group will receive a water/fertilizer mix and the other group will receive plain water. Observe, measure growth, and record data.

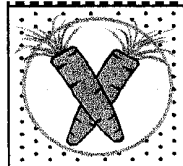
Does soil type affect the growth of peanuts?

Plant peanuts in several different types of soil to find out. Soil types might include sandy loam, clay, and potting mix. Observe, measure growth and record data.

Thank you Mr. Carver!

George Washington Carver, working to assist farmers, developed hundreds of uses of this Alabama commodity. Assign your students the task of researching his life, and challenge them to list as many peanut products as they can. HINT: Many of its uses don't involve food.

Gardening on the Rocks



Children enjoy watching plants grow and develop. Plant this simple garden on a well-lighted windowsill and watch their sense of wonder grow when simple kitchen scraps turn into sprouting plants.

You'll Need:

- A windowsill that gets plenty of light but not direct sun
(a plant light will work if you don't have windows)
- A shallow dish
- Pebbles
- Carrots, turnips, radishes, beets, or a pineapple
- Water
- Knife
- Paper or oilcloth to cover the work area

Directions:

1. Cover the table with paper or oilcloth.
2. Wash the shallow dish and fill it with a layer of clean pebbles.
3. After removing the leaves and stems from the vegetables, cut off the top inch of each vegetable and place it on the pebbles (cut side down).
4. Fill the dish with enough water to cover the pebbles.
5. Place the dish on a windowsill or in a plant lab where it will receive light but not direct sun.
6. Continue to add water each day to replace that lost through evaporation.
7. Have a tasting party with the leftover vegetables.
8. Enjoy the children's amazement when the garden begins to grow.
9. Direct students to write about and illustrate their observations.

You are what you eat

Objective: Students will be able to identify and categorize edible plant parts.

You'll need:

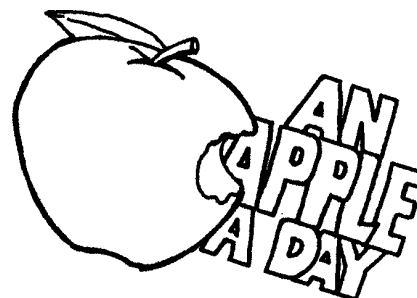
large chart divided into the following categories:

stem, root, leaves, fruit

wide point marker

white paper -8.5x11 (one sheet per student) crayons

or colored pencils (for each student)



Directions:

Day One

1. Read Tops and Bottoms by Janet Stevens.
2. Divide the chart paper into four columns.
3. Print the words *stem*, *root*, *leaves*, and *fruit* on the chart paper as column headings.
4. Ask students to name their favorite vegetables and fruits. After each response, ask students to name the part of a plant it comes from: stem, root, leaves, or fruit.
5. Record each response in the appropriate category (this may require some guided discussion).
6. After several examples have been named for each category, review the listed vegetables and fruits with students.

Day Two

7. Review previous day's chart with students, reading the categories and examples. Discuss any remaining misconceptions.
8. Distribute white paper and demonstrate how to fold it into four sections. (one box for each of the following four categories: stem, root, leaves, fruit)
9. Print a category heading in each box.
10. Direct students to illustrate and label several examples for each of the categories: stem, root, leaves, fruit.
11. Discuss the importance of having foods from this major group each day. Tell them, "You are what you eat."

For the very young: Introduce and discuss edible plant parts slowly. You might begin with one category each day. Have students search through old magazines to find examples of foods in that particularly category. Create a class chart.

| Examples | | | |
|-----------------|--------------|---------------|--------------|
| stems | roots | leaves | fruit |
| celery | potato | spinach | tomato |
| broccoli | radish | lettuce | apple |

My Plant Journal

Children's Literature Selections

Carle, Eric. The Tiny: Seed. Natick, MA: Picture Book Studio, Distributed in USA by Alphabet Press, 1987.

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Ehlert, lois. Eating the Alphabet. San Diego: Harcourt, Brace, Jovanovich, 1989.

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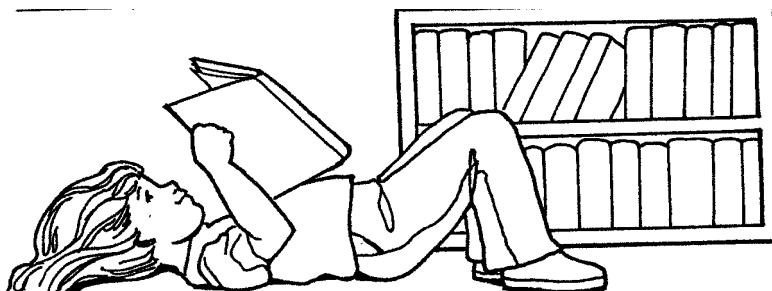
Gibbons, Gail. From Seed to Plant. New York: Holiday House, 1991.

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Stevens, Janet. Tops and Bottom. San Diego: Harcourt Brace, 1995.

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Wonderful Websites

www.kidsgardening.com

<http://aggie-horticulture.tamu.edu>

www.urbanext.uiuc.edu/firstgarden