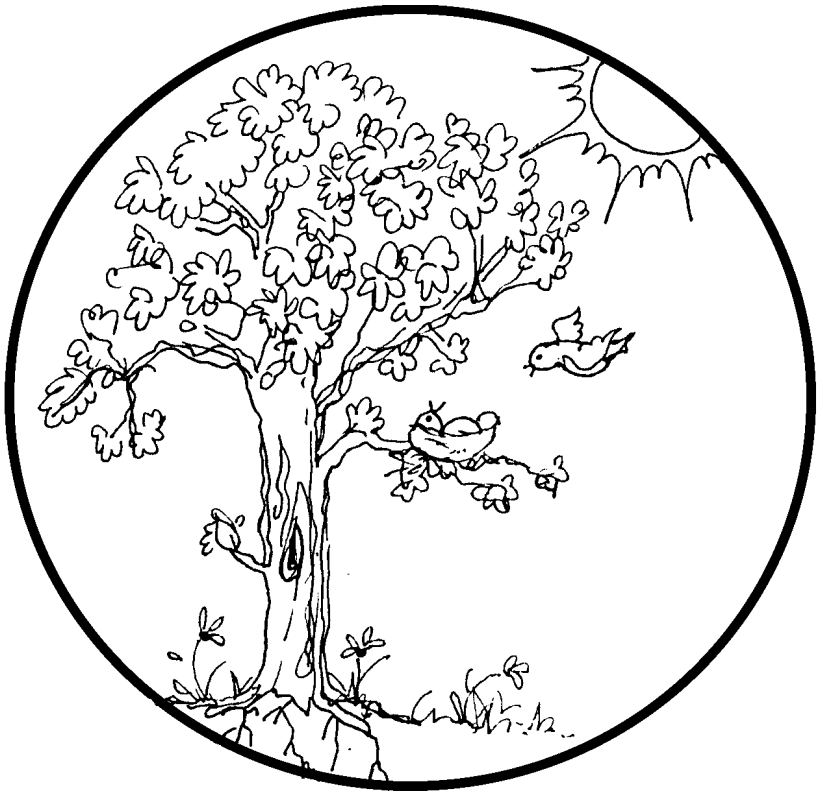
Life Cycle

Diversity in a Balance

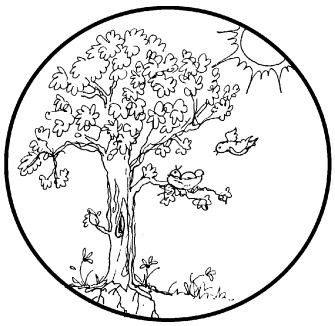
FIRST GRADE

PLANT LIFE



2 WEEKS
LESSON PLANS AND
ACTIVITIES

LIFE CYCLE
OVERVIEW OF FIRST GRADE



ORGANISMS

WEEK 1.
PRE: *Distinguishing non-living from living objects.*
LAB: *Discovering requirements of living objects.*
POST: *Comparing invertebrates and vertebrates.*
WEEK 2.
PRE: *Comparing animals with backbones.*
LAB: *Discovering characteristics of vertebrates.*
POST: *Exploring the uses of animals.*

HUMAN BIOLOGY

WEEK 3.
PRE: *Discovering the human senses.*
LAB: *Exploring involuntary and voluntary reactions.*
POST: *Exploring the central nervous system.*
WEEK 4.
PRE: *Comparing body systems.*
LAB: *Experimenting with blood circulation.*
POST: *Distinguishing between healthy and junk food.*

PLANT LIFE

WEEK 5.
PRE: *Comparing different types of seeds.*
LAB: *Examining a seed by finding the 3 basic parts.*
POST: *Distinguishing the parts of a flower.*
WEEK 6.
PRE: *Growing two kinds of plants from seeds.*
LAB: *Exploring stems and flowers.*
POST: *Analyzing if an item is made from a plant.*

NATURAL ENVIRONMENT

WEEK 7.
PRE: *Comparing land and water environments.*
LAB: *Distinguishing characteristics of land and water organisms.*
POST: *Discovering how organisms live.*
WEEK 8.
PRE: *Discovering how birds eat.*
LAB: *Comparing different birds.*
POST: *Exploring habitats of birds.*

LIFE CYCLE - PLANTS (1A)

PRE LAB

Students use a worksheet to examine the parts of a seed.

OBJECTIVES:

1. Comparing different types of seeds.
2. Distinguishing the components of a bean, corn, and fern.

VOCABULARY:

germination
seed coat
seed
spore

MATERIALS:

bean and corn seeds (optional)
crayons
worksheet

BACKGROUND:

Plants are an important food source for animals. Plants, like all other organisms, have developed unique strategies for reproduction. Most plants produce seeds, which are plants waiting to grow but which have the capacity to wait a long time before they begin the growth cycle.

Seeds may be scattered by wind, water, animals, or propulsion. Animals may spread seeds by a variety of ways such as by eating hard seeds which pass through the animal's digestive system unharmed or by picking up seeds on their coats and feathers. The propulsion method results when the seed covering opens in such a way that the seed shoots out. In many cases it is possible to look at a seed and figure out which method is used. For instance, if a seed has feathery extensions (like dandelions), then it can be sail through the wind, looking for a suitable place to germinate (grow).

The first step in seed germination is the absorption of water through a small opening called the micropyle. The introduction of water through the pore causes the seed to swell. Placing a bit of candle wax over the pore will demonstrate that the seed will not swell when introduced into water. Many seeds will swell dramatically as the water enters, and you will notice a sweet, almost fermenting odor in the water after seeds have been soaked overnight (this is from enzyme action).

Ferns reproduce through primitive "seeds" called spores which are produced by the small pumps on the back of older leaves. The dark brown, tiny spores are single cells that will develop into plants if they land in the perfect environment. Seeds are more likely to produce plants in environments that are less than perfect. Spore producing plants produce

tremendous numbers of spores in order to have just a few develop into plants.

PROCEDURE:

The protective seed coat, food storage area and partially developed plant can all be seen reasonably well in a pea, bean, or peanut. A corn seed is constructed differently and should be discussed to illustrate that not all seeds are the same.

1. Instruct students to color the roots brown, food storage yellow, and leaves green on the worksheet (this will help when you discuss each of the pictures.)

2. Instruct students to look at the bean seed. The first step in seed germination is the absorption of water through a small opening called the micropyle (hole that water penetrates the seed through). If you have bean seeds available show your students where this hole is located. Explain that the rest of the bean functions as food storage to help the seed make a leaf, which in turn will produce its own food.

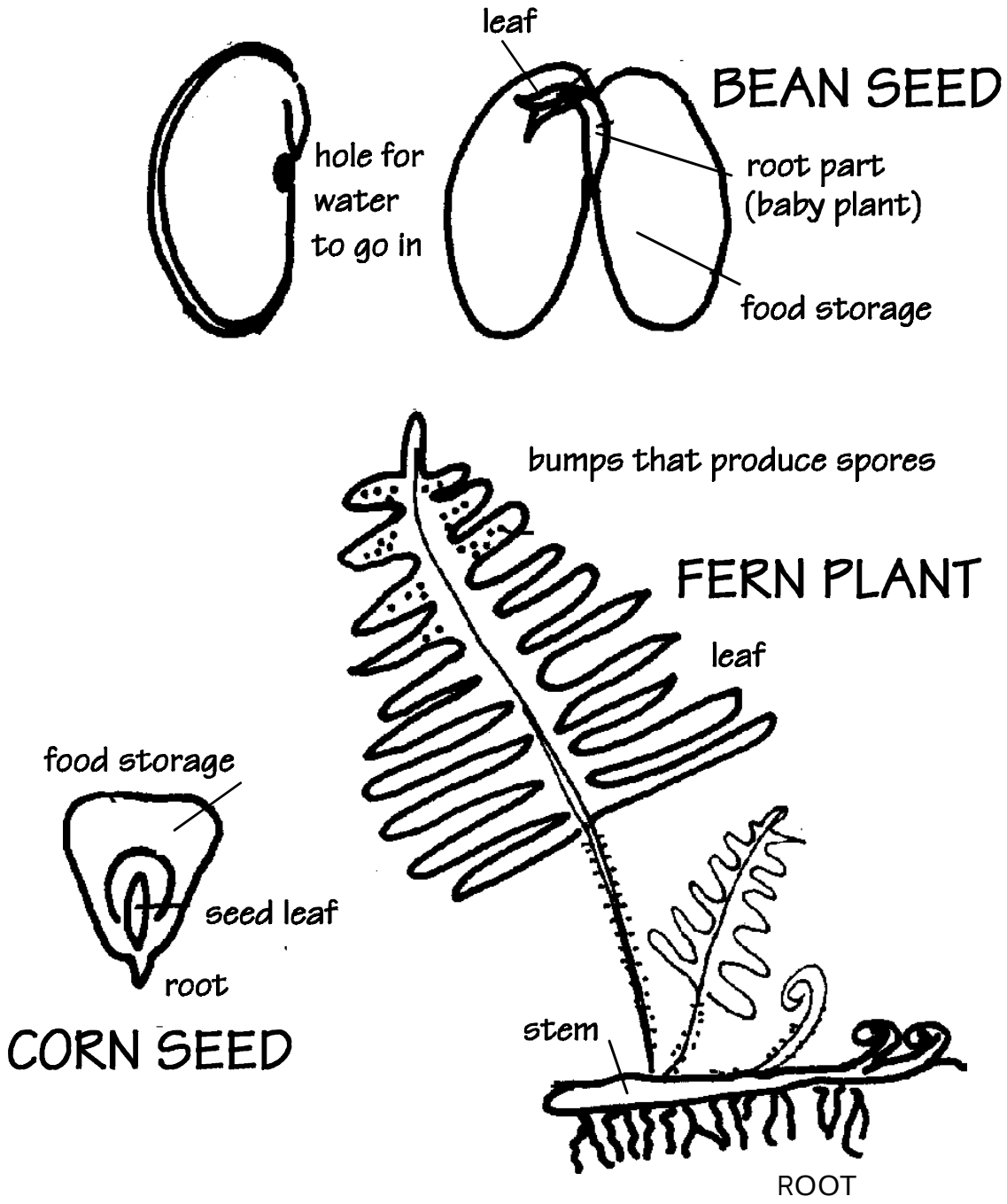
3. You may want to put the beans in water and have the students observe that the bean actually gets larger because of the water entering through the micropyle.

4. Show the students a corn seed. Note that the shape of the corn seed is different from the other seeds. The water is absorbed near the root area of the seed.

5. The fern is very different because its seeds are not exactly like the corn and bean seeds. Ferns produce spores on the back of the plant.

LIFE CYCLE - PLANTS (1A) PRE

Color the roots (brown), food storage (yellow), and leaves (green).



LIFE CYCLE - PLANTS (1A)

LAB

Students dissect different seeds.

OBJECTIVES:

1. Examining the 3 basic parts of a seed.
2. Comparing different seeds.

VOCABULARY:

food storage
root
seed
seed coat

MATERIALS:

LIFE CYCLE - PLANTS (1A) or examples of seeds
pinto beans (soaked)
corn kernels (soaked, canned or fresh)
fern leaf or plant with spores
magnifying glasses
toothpick

BACKGROUND:

Seeds insure that plants will continue to live on this Earth. It may take years before a seed will germinate, but this is a survival strategy. Plants have developed different methods to make sure their seeds find a suitable location to grow. Since plants themselves are not mobile they must have a mechanism to disperse, otherwise, all plants would grow in one area.

There are four basic methods of seed dispersal including by wind, by attachment to fur or feathers, by passing through an animal's gut, or by animals moving the seeds. Wind dispersal allows seeds to travel with the wind. Sometimes the distance that seeds travel can be long. For instance, if a seed gets into the upper atmosphere it can travel along the jet stream and travel hundreds, if not thousands of kilometers. Attachment to the fur of mammals or the feathers of birds helps seeds to “walk” or “fly” to a new location. The seeds may drop and fall into a suitable location to grow. When an animal eats a seed, sometimes its stomach cannot digest the outer portion of the seed and the seed is passed through the animal’s digestive system intact. Some animals move seeds purposely for storage and later consumption. Animals can drop seeds by mistake resulting in germination at that spot.

PROCEDURE:

1. Seeds require water for growth. Discuss with students this need for water and if you'd like, you can fill a jar with seeds add water and seal this tightly. At some point, if the glass is not too thick, it will break due to the pressure of the expanding seeds. Another way to make the same point is to measure the level of dry seeds in a jar, and measure how high they reach after soaking overnight. In any case, the seeds to be examined need to be soaked overnight. Have the children compare the size of a dry seed and of a wet seed and ask the students to figure out how the water got into the seeds. The PRE LAB worksheet illustrates the micropyle which is where water penetrates the seed coat.

2. Soak the beans and corn (if dried) prior to the lab. Give students a toothpick and have them dissect the seed. Let each child take a pinto bean apart and identify the three parts of the seed (seed coat, root, food storage). The corn seed will be trickier. The important thing for them to notice is that the corn seed appearance is different. With help, they should be able to find the root, the food storage and the seed coat, but they may have trouble finding the leaf in the root portion.

3. Discuss the fact that ferns produce spores instead of seeds. Have the students examine the back of the fern with their magnifying glasses.

4. Discuss the four methods of seed dispersal including by wind dispersal, by attachment to fur or feathers, by passing through an animal's gut, or by animals moving the seeds. Give the children at least one seed using each method of dispersal and see if they can guess which one uses which method.

corn seed

dandelion or other fuzzy seed (wind dispersal)

spores (wind dispersal)

maple, sycamore, conifer (food for animals, wind, gut)

elm seeds (wind dispersal)

burrs or other seeds that can attach to fur or feathers (or socks)

berry, cherry, apple and/or orange seeds (pass through animals, or stick to beak of birds, like berries)

acorns, other nuts (squirrels hide them and forget)

dried pea pods and other propulsive seeds (the two sides of the pod dry unevenly, so that the pea flips out)

LIFE CYCLE - PLANTS (1A)

POST LAB

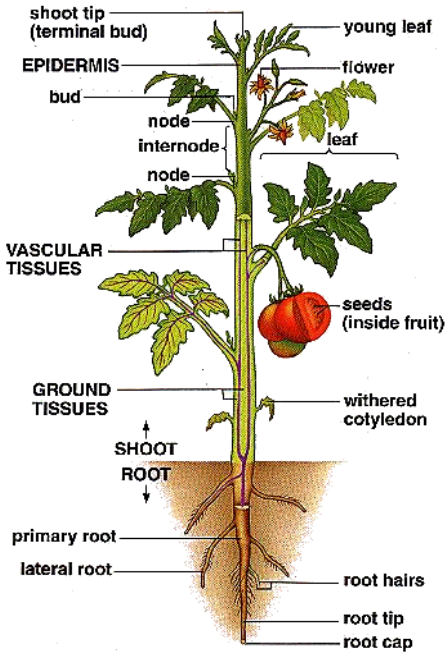
Students learn which parts of a plant are edible.

OBJECTIVES:

1. Distinguishing the parts of a flower.
2. Comparing fruit and vegetables.

VOCABULARY:

bark
flower
fruit
seed
stem
vegetable



MATERIALS:

worksheet

BACKGROUND:

Flowering plants are normally divided into roots, stems, leaves, flowers, and fruit. It is also useful to discuss buds (flower, leaf and stem), seeds, trunks and branches. Roots serve to anchor plants and absorb water and minerals from the soil and some roots function in food storage. Stems may be found above or below ground and provide support for the plant and transport fluids. Some stems have been so specialized for food storage and reproduction that they no longer look like a normal stem (for example potato tuber, iris rhizome, crocus or gladiolus corn). They can be distinguished from roots by the presence of buds and leaf scars. Both stems and roots may have small roots on them, but only the stems will have buds.

Leaves absorb sunlight and produce the plant's food through photosynthesis. Flowers are the main reproductive organs, producing pollen and eggs which unite in the ovary to produce seeds. The ovary turns into a fruit. Seeds may also be found below ground (peanut).

There is no scientific distinction between a fruit and a vegetable. To a botanist, a fruit is the plant part produced from the ovary of a flower; the fertilized eggs develop into seeds. Thus tomatoes, green peppers, avocados, squash, cucumbers, corn and other "vegetables" are really fruits. The grains, such as rice, wheat, barley, and oats, are also considered fruits. It is probably best just to explain that the way we define plant parts does not correspond well with the way we usually see the terms "fruit" and vegetable." If young children can understand that a fruit is a plant part with seeds, it will be a good start.

PROCEDURE:

1. You may want to bring examples from home for demonstration. Discuss the various parts of a plant (stem, roots, flowers, bark, and leaves) and their characteristics. Have the children guess which parts of the plant form the different foods. This can be done with a worksheet (sample attached) or by breaking the children up into groups and giving each group one of each of the foods. They can then come up with a group opinion concerning the answers. The food can then be placed on a table or area that has been labeled with the plant parts (for example, a table for all stem foods, one for all fruits). Another possibility is to draw a large plant on butcher paper and let them put the food on top on the corresponding plant part.

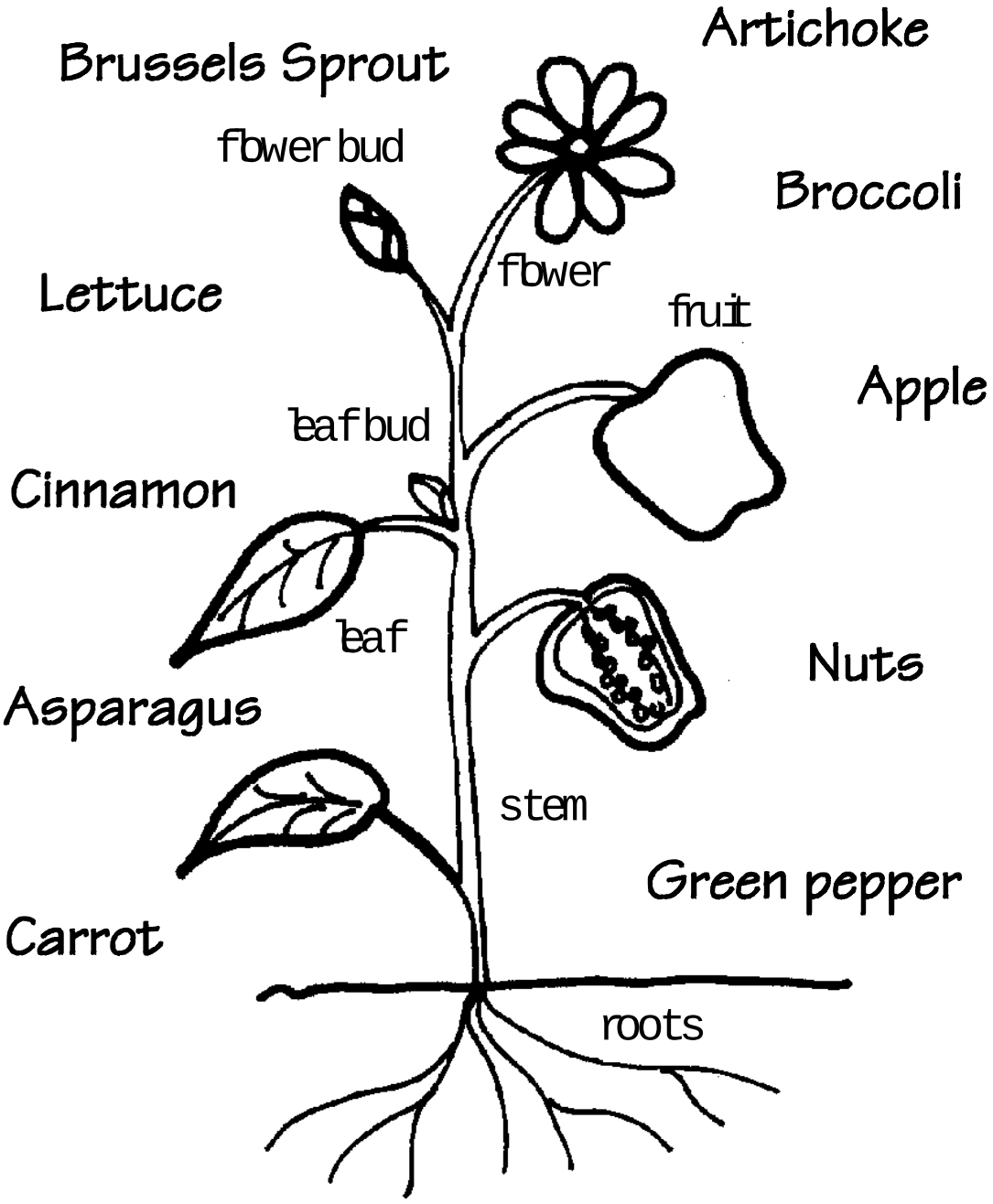
2. Review the following foods and plant parts

flowers - broccoli, cauliflower
flower buds - artichokes, cloves
stem buds - brussel sprouts
stems - asparagus, kohlrabi, bamboo, potatoes, sugar cane
whole leaves - spinach, cabbage, lettuce
leaf stalk - celery, rhubarb
roots - carrots, radishes, beets, tapioca, sugar beets
bark - cinnamon, root beer (bark of the sassafras tree)
seeds - peanuts, nuts, peas, lima beans, nutmeg cola flavoring (including Coke)
fruits - cucumbers, green beans, squash, tomatoes, muskmelon, apples, oranges, green pepper
seed pods - snow peas, vanilla
sap - maple syrup

ANSWERS:

Artichoke - flower bud; brussels sprouts - stem buds; lettuce - whole leaves; carrot - root; asparagus - stems; cinnamon - bark; nuts - seeds; green pepper - fruit; apple - fruit; broccoli - flowers

DRAW A LINE FROM THE FOOD TO THE PART OF THE PLANT THAT MAKES IT



LIFE CYCLE - PLANTS (1B)

PRE LAB

Students watch seeds germinate.

OBJECTIVES:

1. Growing two kinds of plants from seeds.
2. Comparing the differences and similarities as both plants grow.

VOCABULARY:

growth
seed

MATERIALS:

clear plastic cups,
a support medium for the seeds (preferably moistened blotter paper wrapped around the inside of a glass, cotton, or sand)
bean seeds soaked overnight
corn seeds (The intent of soaking is to speed germination. It makes a definite difference with the beans, but does not affect corn as fast.)
eye dropper
hand lens

BACKGROUND:

Seeds are wonderful little incubators for new plants. It seems like seeds know which way should face the sun and which way the roots should grow. Children are amazed when they actually follow a seed germinating to watch the leaves and roots grow. However, this observational task requires patience and time. As the plants grow, it is very instructive for students to look at the sides of the glass to see the roots and leaves start to grow.

PROCEDURE:

1. Plant the seeds between the blotter paper or cotton so that the seed pushes against the surface of the glass. Have the children plant some of the seeds upside down and others right side up. Place a little water on the bottom of the glass to keep the paper moist. Cover the top lightly with saran wrap to keep the cups moist. You may want to have the students place about 20-40 drops of water. Instruct them that they have to keep the cotton moist, but not soaking wet.

2. It will help the children to focus on what is actually happening if they are asked

to answer a few questions as they observe the growth. The following are suggestions:

a. What kind of seed begins growing first?
b. Does the root or the stem begin growing first? (The root is first, normally, although sometimes they seem to grow at the same time.)
c If the seed is planted upside down, will the plant grow upside down? (No, the plant can sense gravity. The roots will grow down, eventually, and the stem will start up. You may be able to see some initial growth in the opposite direction.)
d. When do the root hairs appear? (Variable)
e. What happens to the food supply? (The part that stores the food will shrink as the food is used up and the root takes over feeding the plant.)
f. Does the part that stores the food stay below ground? (On corn and peas, yes. On beans, supposedly not.)
g. Can you see the leaves when the stem first appears? (Not really. The corn leaf is encased in a sheath to protect it on its trip through the soil. This sheath is actually the seed leaf. The bean leaf should be hidden between the two seed leaves until it gets above ground. Pea leaves you can see.)
h. Are the seed leaves shaped like the other plant leaves? (Not usually. They are not as well developed and specialized as regular leaves.)
i. Do the shoots come straight up or are they hooked to protect the growing tip? (Straight up on corn, hooked on beans and peas.)
j. Are the leaves green when they first appear? (Usually yellow until they are exposed to light.)
k. What happens to the seed coat? (It's discarded.)

3. Remember this observational lesson should be done over a period of weeks. At the beginning the children should observe their beans every other day. Once the seed coat has been broken, the miracle of growth should be watched everyday.

LIFE CYCLE - PLANTS (1B)

LAB

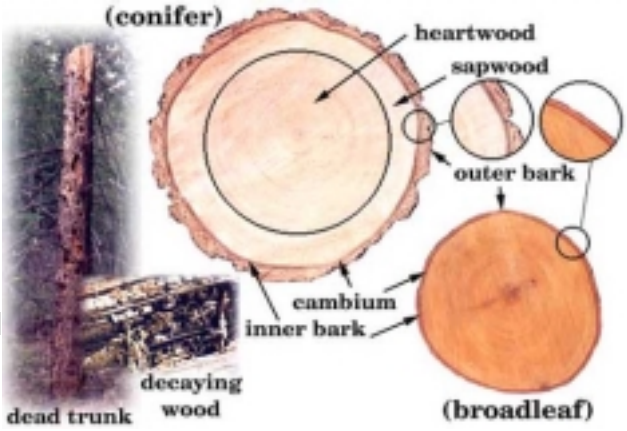
Students experiment with stems.

OBJECTIVES:

1. Exploring stems and flowers.
2. Discovering why plants have stems and flowers.

VOCABULARY:

flower
leaf
root
stem



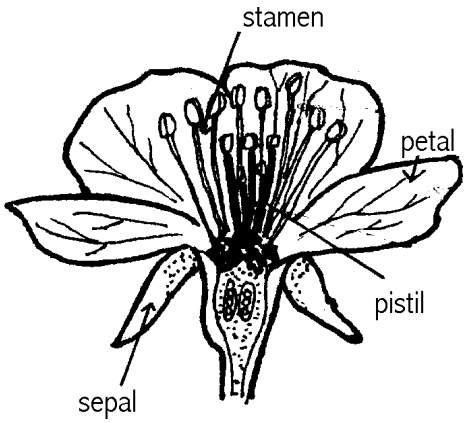
MATERIALS:

LIFE CYCLE - PLANTS 1B (or small tree sections showing rings)
hand lens
worksheets
examples of foods from stems and flowers
large diagram of flower

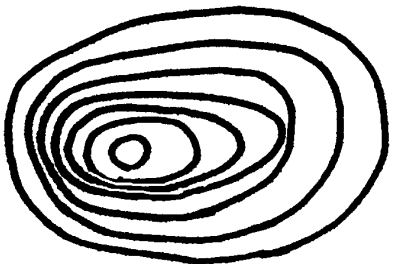
BACKGROUND:

The basic parts of flowering plants include the roots, stems, leaves, and flowers. Stems are important in water and food transportation, and provide support for the leaves, flowers and fruit. Some plants store food (potatoes) or water (cactus) in stems. Flowers are necessary for seed production, without which many species would die out.

The main parts of a flower are drawn on the right. A plant with colored petals and/or a pleasant scent is usually pollinated by insects or birds. Wind or self-pollinated plants usually have rudimentary, inconspicuous flowers. Seeds develop in the ovary, and the ovary may develop into a fruit. Flowers that we eat include broccoli, cauliflower and artichokes, although the last one is actually the flower bud.



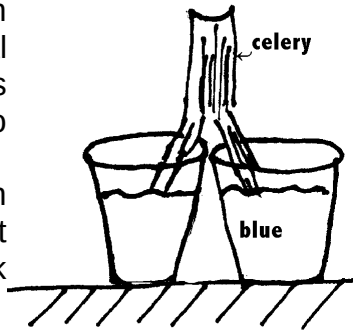
Tree trunks are a special kind of stem, and the age of a tree can be determined by counting the rings of a tree trunk. A ring is actually the new water-conducting tissue that is made each year. Thick rings mean that the tree grew a lot in the spring and



summer. Thin rings reflect bad growing conditions, like drought, or just the fact that the tree grows slowly. Concentric rings mean that the tree grew straight up, and rings that are off-center, with one side wider than the other, mean that the tree grew on a slope (look at diagram to the left). The downhill side has wider rings. Seasonal variations in conditions may cause color variations inside a ring.

There are many different kinds of stems. They may be underground or above-ground, woody or soft, stiff or flexible. Stems that we eat include asparagus and potatoes. (Potatoes are very specialized stems that help to reproduce the plant. Small semi-circular leaf scars near the eyes show that they are stems.) Brussels sprouts are stem buds.

PROCEDURE:



1. BEFORE CLASS: Stand a celery stalk in water for an hour or so. Then put it in water with food coloring for several hours. Cut cross sections off the end to show the veins (strings), which should be colored. In class you may also partially strip a string from the stalk, and it should show color. Use this as a demonstration that water moves upward through plant tissue. Discuss that the stem of a plant is very important to move water and nutrients up to the leaves where it will work with Sun to create food for the plant.

Discuss the purpose of stems. Show a vein that you have stripped out of the celery stalk, and mention that this is how celery plants move water. Let them examine the cross sections.

2. Discuss tree rings. Tell the children that they should examine the branch cross sections with their hand lens and answer the following questions:

a. How old is the branch?

b. Did it grow on a slope?

c. Have them count the number of rings on the worksheet branch and have them color in the ring that was growing in the year they were born.

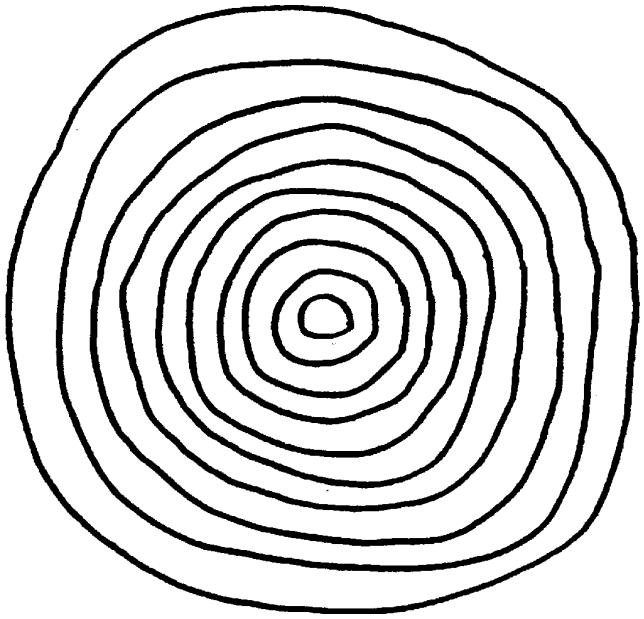
3. Ask the students why flowers are important to plants (i.e., they are essential to seed production.) Mention that pollen has to land in a special place so that seeds will develop. Point out the pollen and seed area on the large flower picture. Instruct students to draw the flower before they dissect it. Let them examine the flowers with a hand lens and pull them apart. Count the petals, notice the color and shape. Have them draw a picture of their flower on the worksheet. If possible, they should indicate where the pollen comes from and where the seed grows. Ask them how they think the pollen is carried on the flower they are examining.

LIFE CYCLE - PLANTS (1B)

LAB

STEMS AND FLOWERS

HOW OLD IS THIS TREE?_____ YEARS.



COLOR THE RING THAT WAS MADE WHEN YOU WERE BORN.

DRAW YOUR FLOWER. SHOW THE POLLEN. WHERE DOES THE SEED GROW?

LIFE CYCLE - PLANTS (1B)

POST LAB

Students use a worksheet to look at items made from plants.

OBJECTIVES:

1. Exploring uses of plants.
2. Analyzing if an item is made from a plant.

VOCABULARY:

plants
plant product

Chickpea fields in California. Peas are used for food.

MATERIALS:

worksheet
Corn is Maize by Aliki (Harper)
items listed on worksheet
in addition you might want to bring in other items made from plants like foods, vanilla flavoring, cinnamon, nutmeg, coffee, cola, tea, cotton shirt, linen napkin, rope, string, erasers, rubber balls, wood, paper, bayberry candle, basket, mint chewing gum, rayon ball, aspirin, bamboo chopsticks

BACKGROUND:

Plants may be used for decoration, erosion prevention and climate control (wind and sun breaks) foods, beverages, flavorings, medicines, fabrics, rope and other fibers, wood, rubber, dyes, paper, and many other products. The original form of aspirin came from willow bark. American Indians would make a tea from the bark for fevers and pain. Even marijuana was originally introduced into this country as a source of hemp for making ropes, cloth and sail.

PROCEDURE:

1. Let the children help you list some uses of plants. Set out the items listed on the worksheet. Let the children guess whether the items come from plants or not. Go over their guesses.

2. Show some of your extra items. Ask the students to guess whether these things also come from plants, then discuss their answers. Paper clip, tea and bag, rope, knife, cotton ball, tread, toothpicks, chopstick, paper, marble

3. You may want to read *Corn is Maize* or a similar book which shows all the products that the Indians created and used in the Americas.

4. If you have internet and want to find more about how plants are useful in society you may want to consult the following web site.

http://www.botany.org/

Web site of the Botanical Society of America. Interesting links to plants in the news.

Paprika, a spice, comes from the pod of a bell pepper plant.

LIFE CYCLE - PLANTS (1B)

POST

ARE THESE THINGS MADE FROM PLANTS?

	YES OR NO (IF YES NAME PLANT)
1. PAPER CLIP	
2. TEA AND BAG	
3. ROPE	
4. KNIFE	
5. COTTON BALL	
6. THREAD	
7. TOOTHPICKS	
8. CHOPSTICKS	
9. PAPER	
10. MARBLE	