TEACHER MATERIALS - Root Structures

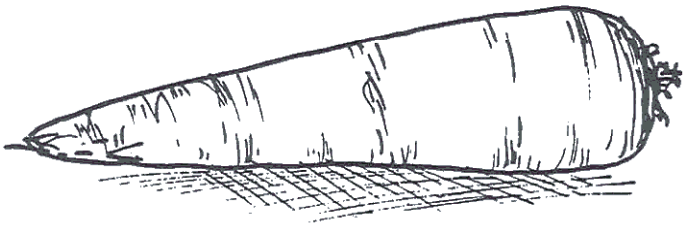
CONCEPTS: Math, Science, and Technology
-Standard 1.1- Scientific Inquiry
-Standard 4.5- Physical Setting
-Standard 4.1, 4.6- Living Environment
Career Development
-Standard 3a.1- Basic Skills

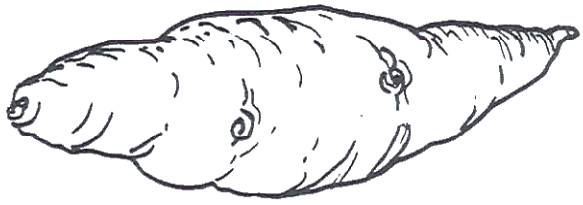
OBJECTIVES:
1. The students will understand that some plants store food in their roots.
2. The students will understand that plants need water.
3. The students will understand that gravity and sunlight have an effect on plants.

BACKGROUND: Plants store food in many ways in all parts of the plant--seeds, tubers, bulbs, roots, stems, and modified stems. Along with several other lessons in this section, the growth of plants reflects this fact. These two examples demonstrate how the roots of plants store food. In order to grow, plants need energy and nutrients. In these particular examples, the plants store food in root structures and tubers.

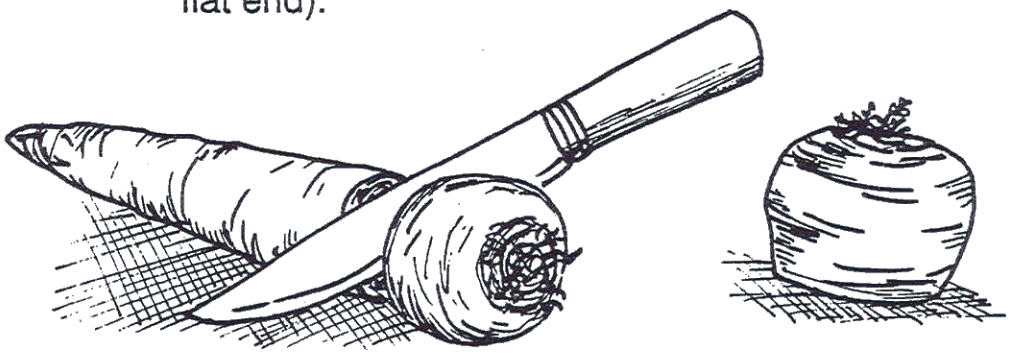
In addition, the upside down carrot demonstrates how a plant will grow upward, against the pull of gravity, to find light.

ACTIVITIES:
1. Obtain large carrots and a sweet potato or two.

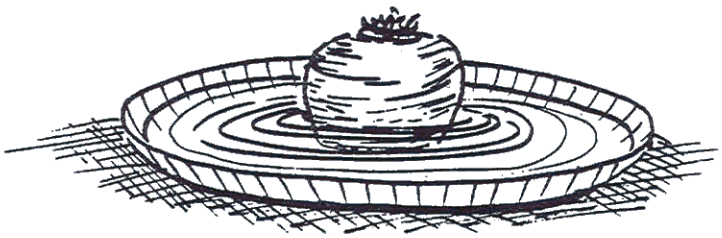




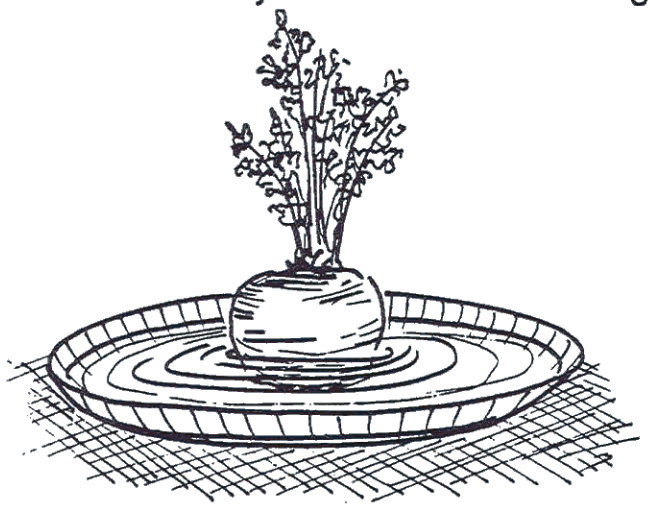
2a. Cut a large carrot about 1 1/2 inches from the top (the flat end).



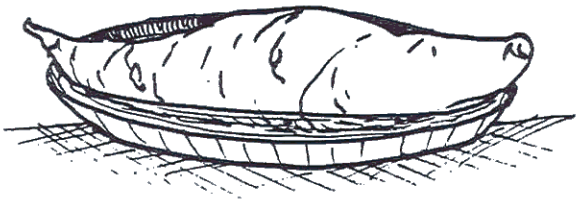
b. Place the top in a shallow dish filled with water.



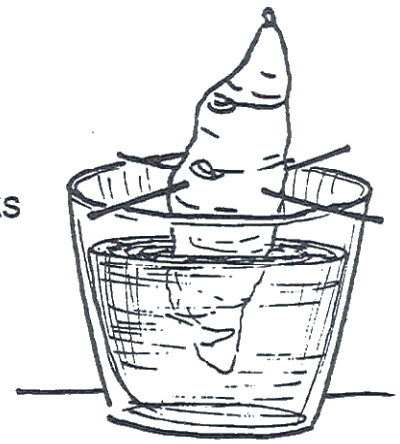
c. Place it in a sunny window and watch it grow!



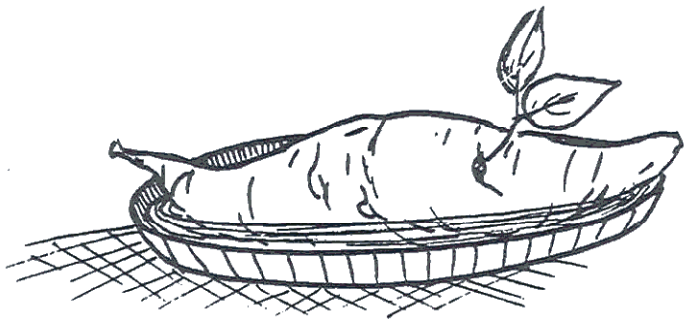
3a. Place a sweet potato lengthwise in a shallow dish of water



b. or suspend it on toothpicks in a jar of water.



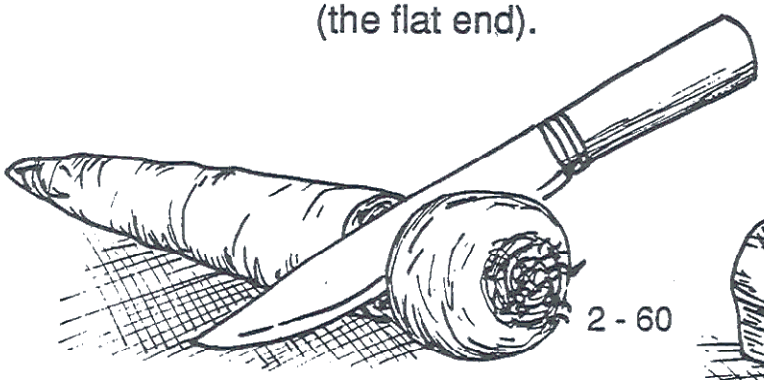
c. Place it in a sunny window and watch for growth.

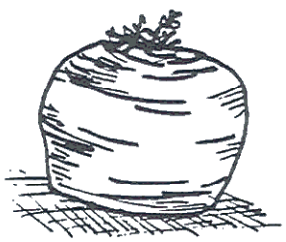


d. When the sprouts are 4 to 6 inches tall, the potato can be cut up and planted in a school garden. Make sure each section has both sprout and root.

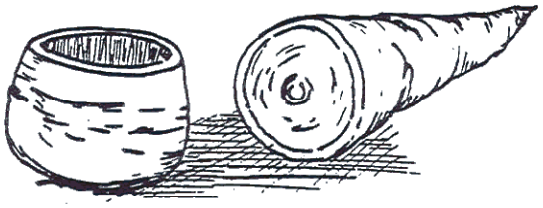
4. As a class demonstration, make a hanging planter out of a carrot. (This does not always lead to success. For best results try this lesson soon after harvest in fall or with carrots which still have the top leaves.)

4a. Take a large carrot and cut it two inches from the top (the flat end).

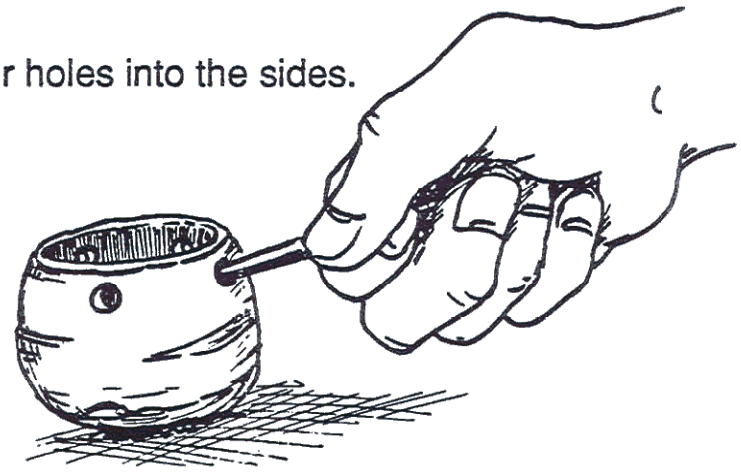


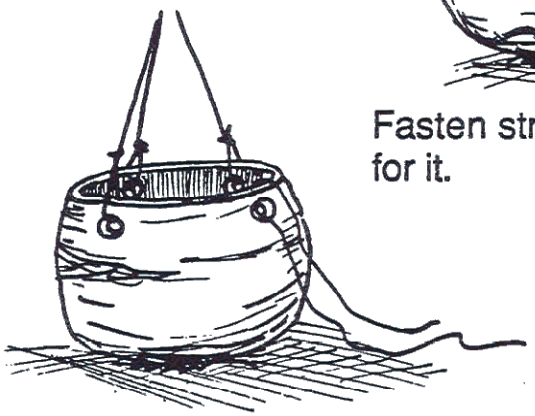


b. Carve out the center of it about 1 1/2 inches deep.



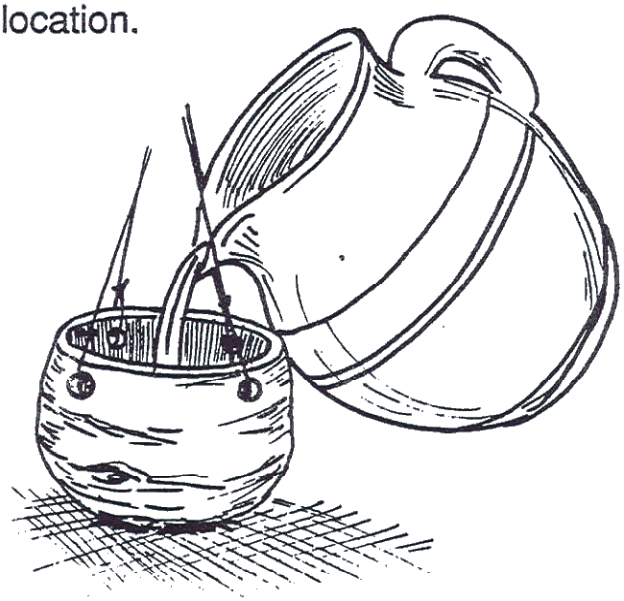
c. Drill three or four holes into the sides.



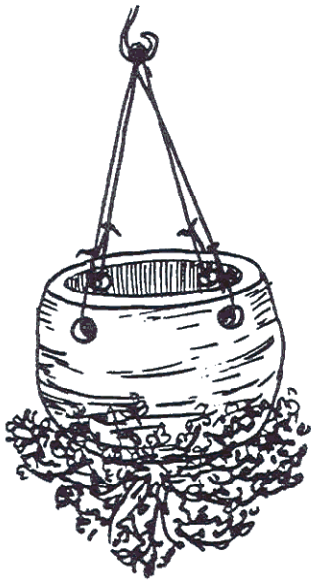


Fasten string to these to make a hanger for it.

d. Fill the center with water and hang the carrot upside down in a sunny location.



Very soon it will begin to grow.



e. Keep the center filled with water. Have the students check it daily. Observe how often the carrot needs to be watered.

f. Plan to let it dry to the point of wilting (without dying). Orchestrate this to happen perhaps over a weekend. Make sure the students are prepared and it is not anyone's "fault." When the carrot dries out, discuss with the students the fact that plants need water. Observe the wilting. Incorporate a discussion of drought--food production if plants wilt and die--Africa--starvation. Water the plant and see how long it takes to recover.

5. Ask the students why the plant grows upward instead of downward. What effect does this have on the natural growth of the plant? Plants will grow toward the sunlight in order to survive adverse conditions. The herbaceous parts of a plant do not respond to gravity, they respond to sunlight.

6. After completing the lessons on roots, the peanut, and the stem, have the students complete the worksheet "Using Plants" on pages 2-107 through 2-111 using "The Source." Discuss with the students the way that we used this stored food.