SACP 103

EDIBLE PLANT PARTS

GRADES 2-3

written by
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Pamela Emery

for the
California Foundation for Agriculture in the Classroom

in cooperation with
California Cling Peach Advisory Board
California Department of Education
California Farm Bureau Federation

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The California Foundation for Agriculture in the Classroom is dedicated to fostering a greater public knowledge of the agricultural industry. The Foundation seeks to enlighten students, educators and leaders in the public and private sector about agriculture's vital, yet sometimes forgotten, role in American society through teacher training, resource materials and student and public awareness programs.

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INTRODUCTION

Eating flowers at dinner? Serving stem and root hors d'oeuvres? These sound like unusual food dishes to say the least. But if you think about it, they are not so peculiar. Students will be fascinated to learn that when broccoli is served at dinner, they are eating flowers and when celery and carrots are served with a dip, they are eating stems and roots.

This unit, *Edible Plant Parts,* encourages students and teachers to examine the six basic plant parts in a unique way. Hands-on activities are included for each basic plant part--roots, stems, leaves, flowers, fruits and seeds. At the same time, the students learn about California agriculture and food production.

Students work independently and collaboratively with classmates to learn about basic botany in a variety of subject areas. Each lesson stands alone, may be used at different times throughout the school year and can easily be incorporated into existing curricula. From charting observations and dissecting plant parts, to preparing simple foods, this unit is entertaining and educational. The *Edible Plant Game* and creative writing assignment The *Fabulous Food Phantom* culminate this unit in an interesting and unforgettable way.

Edible P/ant Parts is one of numerous educational units provided by the California Foundation for Agriculture in the Classroom. The Foundation educates teachers and students about California agriculture in an unbiased and realistic way. The Foundation appreciates the support from the California Cling Peach Advisory Board for assisting in the funding and development of this unit. Contact the Foundation for further assistance in integrating agriculture into your existing curriculum. Your comments on this unit or on other Agriculture in the Classroom resources are always welcome and appreciated.

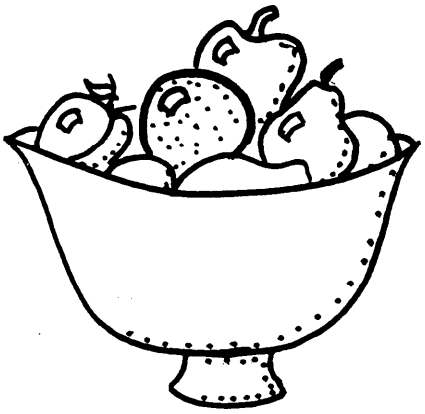
UNIT OVERVIEW

BRIEF DESCRIPTION

Students will learn about the six basic plants--roots, stems, leaves, flowers, fruits and seeds-by performing activities with a variety of foods, some familiar and some new. The students will analyze the plants they eat and determine which of the basic plant parts they consume. These lessons culminate with a story entitled The *Fabulous Food Phantom,* where students construct a food phantom in which all parts of the plant are edible.

SCIENCE THEMES

- Scale and Structure
- Systems and Interactions
- Energy



SCIENCE CONCEPTS

According to the 1990 Science Framework for California Public Schools, the students will understand that:

- Humans use plants and animals for food and clothing (p. 125).
- All resources used by humans, including food, fuels, metals and building materials, ultimately come from the earth (p. 97).
- People get the energy they need from food (p. 118).
- Scientists categorize objects or ideas in order to compare and communicate information about them (p. 148).

ENGLISH - LANGUAGE ARTS CONCEPTS

According to the 1988 California Enalish-Languaae Arts Model Curriculum Guide, the students will:

- Participate in a variety of activities designed to help them become effective listeners, speakers, readers and writers (p. 11).

- Respond both orally and in writing to questions that encourage higher-order thinking (p. 25).
- Write in many different modes of discourse such as story, observation, poetry and report (p. 22).

SOCIAL SCIENCE CONCEPTS

According to the 1988 California History - Social Studies Framework, the students will:

- Develop group interaction skills such as a willingness to listen to the differing views of others, decision-making, compromising, resolving conflicts and leadership skills (p. 24).
- Develop an appreciation of the many people who work to supply their daily needs (pp. 37-38).

MATHEMATICS CONCEPTS

According to the 1992 Mathematics Framework for California Public Schools, the students will:

- Classify and sort objects, using one or more attributes, by observing relationships and making generalizations (p. 24).
- Use measurement to prepare foods (p. 107).

KEY VOCABULARY

- by-product
- edible
- flower
- function
- leaf
- phantom
- photosynthesis
- plant
- root
- seed
- stem
- structure
- tuber
- vegetable

SEQUENCE OF ACTIVITIES

1) Review and complete the Before You *Begin* section of the unit on page 8.

2) Complete the following activities with your students:

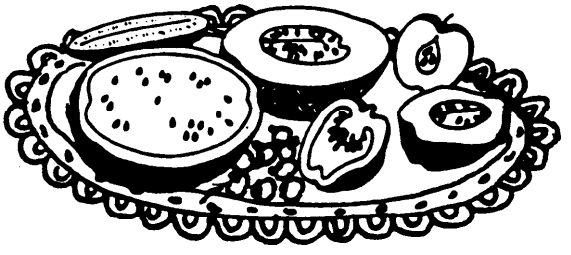
- *Dig 'Em Up*
- *Snappy Stems*
- *Luscious Leaves*
- *The Fabulous Flowers*
- *Freshest Fruits*
- *Supreme Seeds*
- *Edible Plant Game*
- *The Fabulous Food Phantom*

BULLETIN BOARD IDEAS

- Enlarge a plant with the six different parts. Label each part and provide a brief description of each plant part's function. Labels are provided on page 65.
- Title a bulletin board "Do You Know What You Are Eating?" Divide the board into the six plant parts. Have the students bring in pictures of edible plants. Discuss with the students where the pictures belong and create a collage. Labels are provided on page 65.
- Display *The Fabulous Food Phantom* pictures and models the students create in the last activity.

EVALUATION

Assessment tools are incorporated throughout the unit. Individual responses to *The Fabulous Food Phantom* lesson will inform the teacher as to each student's understanding of edible plant parts and plant anatomy. Participation in whole-class discussions and activities as well as written responses to specific questions also can be used as assessment tools.



BEFORE YOU BEGIN

1. Skim over the entire unit. Make appropriate changes to the lessons and student worksheets to meet the needs of your students and teaching style.

2. Write to appropriate organizations requesting posters and information on specific commodities. Allow 4 weeks for the delivery of the commodity materials. The Teacher Resource Guide from the California Foundation for Agriculture in the Classroom (1601 Exposition Boulevard, FB-16, Sacramento, CA 95815; 916/924-4380) provides a listing of many commodity commissions and groups.

3. Consider ordering a photograph set of each of the commodities used in the *Edible Plant Game.* The cost is $12 per set (3" x 5" photographs) and can be ordered from the California Foundation for Agriculture in the Classroom (1601 Exposition Boulevard, FB-16, Sacramento, CA 95815; 916/924-4380).

4. Arrange for classroom visits from people involved in the food industry. Guest speakers may include farmers, packers, chefs and grocers.

5. Consider an optional field trip to a local grocery store, packing plant or food distributor. Make appropriate arrangements.

6. Some of the activities suggest that students taste or eat various plant parts. Find out about any food allergies your students have. Also be aware that various cultures have dietary restrictions.

7. Gather the materials needed for the activities. Grocery stores and parents may be able to provide donations.

WHY PEOPLE NEED PLANTS

PURPOSE

The purpose of this lesson is for students to understand that plants provide people with food, clothing, shelter and many other things.

CONCEPT

- Humans use plants and animals for food and clothing.

MATERIALS

For each group of 3 *or* 4 *students:*

- Butcher paper
- Cotton shirt or fabric
- Crayons
- Flower
- Wooden block
- Fruit
- Granulated sugar
- Maple syrup
- Perfume
- Tape
- Vegetable
- White paper

TIME

Teacher Preparation . . . . . 45 minutes
Student Activity . . . . . One **45-minute** session

BACKGROUND INFORMATION

Everything we eat and most things we use come directly or indirectly from plants. A partial list of plant products is given below. Encourage your students to think of specific products made from plants.

- Food
- Oxygen
- Clothing
- Medicine
- Paper
- Building Supplies
- Cosmetics
- Energy Sources
- Shelter

It is important to discuss that all animals, including humans, depend on plants for survival. Plants not only provide oxygen, but are also at the bottom of the food chain.

Although this activity will encourage students to think of many plant uses, the rest of this unit will focus on plants as a human food source.

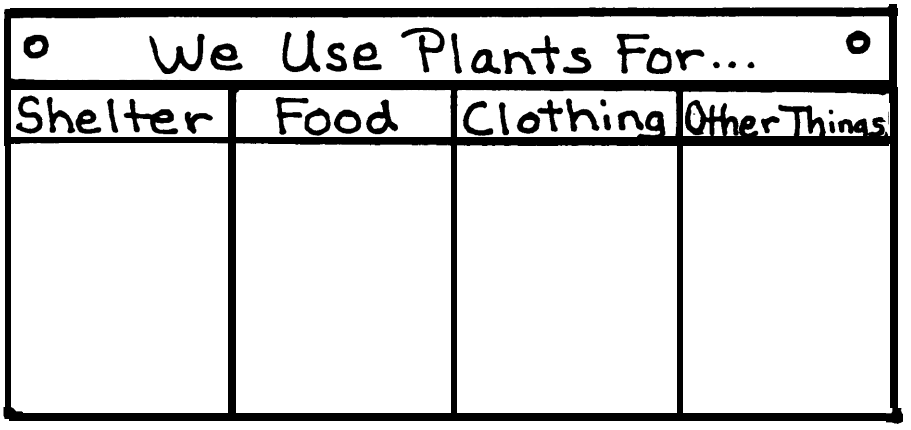
PROCEDURE

1. Organize students into groups of three or four.

2. Without telling the students the purpose of the lesson, distribute the following plant products to each group. To make the lesson more interesting, vary the items in each group.

- cotton shirt or fabric
- flower
- fruit
- maple syrup
- granulated sugar
- perfume
- vegetable
- paper
- wooden block

3. Have the groups discuss the origin of each product. For example, a piece of wood came from a tree. Also have the students discuss where each item would fit on a pre-made butcher paper chart like the one illustrated:



4. Have each student draw and color a picture of one item and post it in the appropriate place on the chart.

5. Discuss the chart and the fact that people depend on plants for food, oxygen and many other things.

CONCLUSION

Humans depend on plants for survival.

VARIATIONS

- Instead of working in groups, have each student work with one item from the list.
- Have students bring in their favorite fruit or vegetable. Discuss what part of the plant might this be.
- Individually or in groups, have the students complete the People Need *P/ants* worksheet (p. 13).

EXTENSIONS

- Make a collage of things that come from plants.
- Have students write letters to specific plants thanking them for providing the resources they do.
- Have students think of a plant from which we get at least five products. Have students share their information with their classmates.

PEOPLE NEED PLANTS

Name(s) _____

_____

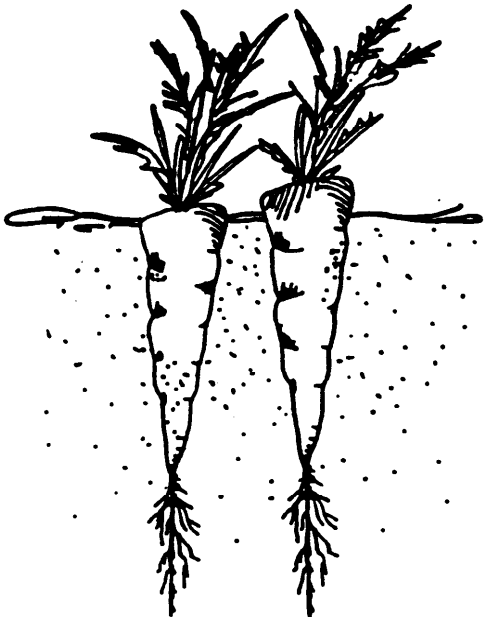
Instructions: Look around the room. Think of all the ways we use plants. Make a list.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____

DIG 'EM UP
(THE FUNCTION OF ROOTS)

PURPOSE

The purpose of this lesson is to review the functions of roots and to develop an understanding that the roots of some plants are edible.



CONCEPTS

- Plant roots take in water and nutrients from the soil
- Roots anchor plants in the soil.
- People eat some roots for nutrients and energy.

MATERIALS

*For **the** **class:***

- Chart or butcher paper
- Edible roots samples such as carrots, radishes, turnips, rutabagas, ginger or parsnips (preferably with the tops)
- Markers
- Shallow containers (see Procedure **#6**)
- Encyclopedias and other books about plants (optional)

TIME

Teacher Preparation . . . . . 20 minutes
Student Activity ..... One 45-minute session

BACKGROUND INFORMATION

Scientifically speaking, roots help anchor plants in place and take in water and nutrients from the soil for use by the plants. Some roots also store sugars and starches. Examples of roots that store nutrients include beets, carrots, radishes, rutabagas and turnips. People eat roots to obtain many of the essential nutrients they require for survival.

PROCEDURE

1. Post a large piece of chart paper in front of the room.

2. Check the students' understanding of the functions of roots. Review that roots help hold the plant in place and take in water and nutrients. Write down this information on the chart paper.

3. On the chart paper, brainstorm a list of edible roots. If you would like, have student groups research edible roots in the books you provide. Encyclopedias are a great resource for this activity.

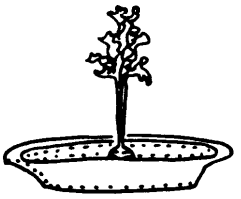
4. Display the selection of real edible roots. Assist the students in identifying them. Add any new edible root names to the list.

5. Discuss the similarities and differences of the root samples.

6. Cut off the top portion of each root, leaving about ½ inch of the vegetable. Place the top portion in a shallow container with water until it begins to sprout. Plant the sprouted root (with greens).

7. Cut the roots into bite-sized pieces. Have the students taste these vegetables.

8. On a sheet of blank paper, have the students draw their favorite edible root and write a sentence describing how people eat it.



CONCLUSION

Roots of some plants are edible and are a basic component of diets around the world.

VARIATIONS

- Have "Root Day"--observe various root types (taproots, fibrous roots, etc.) then have roots for a snack.

- Ask a farmer who grows an edible root to visit your classroom and discuss his/her operation.

EXTENSIONS

- Graph student predictions on how long it will take a particular root cutting to sprout.
- Make a picture graph of favorite roots.
- Pull weeds from school or home. Compare the various root types. Which are tap roots? Which are fibrous roots?
- Loosely fill clear straws with cotton. Place a radish seed on top. Place the straws upright in a container that has a small amount of water in it. Observe the seeds daily. Soon roots will grow and root hairs may even be visible.

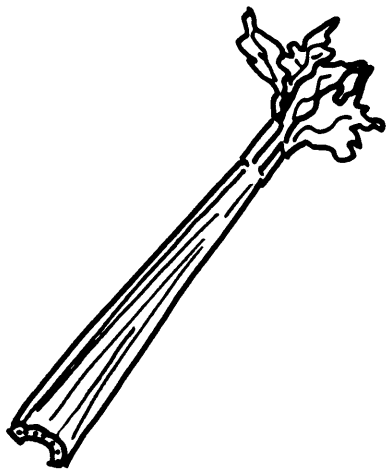
SNAPPY STEMS

PURPOSE

The purpose of this lesson is to review the functions of plant stems and to develop an understanding that the stems of some plants are edible.

CONCEPTS

- Stems support leaves and transport water, nutrients and food throughout the plant.
- Stems of some plants are edible.



MATERIALS

For the teacher:

- Butcher paper or chart paper
- Markers

For each group of 3 or 4 students:

- Edible stems--celery, asparagus, potato, rhubarb, can of bamboo shoots, sugar cane
- Daffodil
- Stalk of celery
- Magnifying lens
- Pictures of edible stems (optional)

TIME

Teacher Preparation . . . . . 20 minutes
Student Activity . . . . . One 45-minute session

BACKGROUND INFORMATION

Stems **support** leaves, flowers and fruit. Liverworts, hornworts and mosses are the only green plants that do not have stems. Stems can be very short, as in lettuce plants, or very tall, as in the trunks of redwood trees. Stems can be hollow, as in daffodils, or somewhat solid, as in tree trunks. Food produced in the leaves travels down the stems to the roots, while water and nutrients absorbed from the roots travel through the stems to other parts of the plant. Edible stems include celery, asparagus, bamboo shoots, rhubarb and sugar cane. Some stems of other plants are edible even if they are not necessarily grown for their stems. Such is the case with broccoli and cauliflower.

Many interesting products come from stems. Granulated sugar is processed from the above-ground stems of sugar cane and from sugar beets. Maple syrup is obtained form the trunks of maple trees. Cinnamon comes from tree bark. Potatoes are special stems, called tubers, that grow underground.

PROCEDURE

1. Post chart paper in front of the room.

2. Discuss the functions of stems. Stems support plants and transport water, nutrients and food throughout the plant. Guide the discussion so students discover that stems come in all shapes and sizes. Stems can be very small or very large. Write key points about stems on the chart paper.

3. Have students go outside and observe a variety of stems on campus. When back in the classroom, have students discuss what they observed.

4. Have students brainstorm a list of edible stems. Assist the students by showing pictures, or by researching stems in encyclopedias or CD-ROMs.

5. Distribute a stalk of celery to each group. Have the students cut or break the celery in half, and observe the stringy tubes that carry water and liquids to the rest of the plant. Use magnifying lenses for close observation. Have students draw what they see.

6. Cut the stem samples into pieces and distribute to small groups for observation.

CONCLUSION

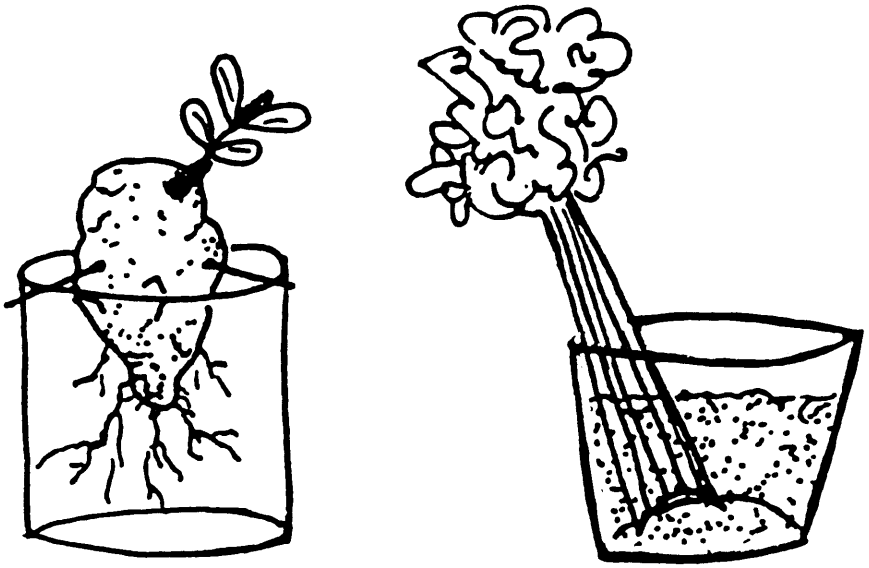
Stems of certain plants are edible. Stems come in all shapes and sizes.

VARIATION

- Before having the students go outside, create a scavenger hunt card that has students look for certain items. Scavenger hunt clues may include a stem taller than the teacher, a green stem, a stem that is brown, a stem that has spines, a stem that has branches and a stem that has fruit.

EXTENSIONS

- Invite a celery farmer to visit your class and discuss how celery is grown.
- Have a stem tasting party. (**Note**: Rhubarb leaves are toxic. Make sure all green parts are removed before eating.)
- Have a celery potluck. Ask students to bring in their favorite topping for celery to share with their classmates. Make a bar graph called "Favorite Celery Stuffings".
- Perform the AIMS activities *Stem Study* and *Flower in Water* to reinforce the functions of plant stems.



LUSCIOUS LEAVES

PURPOSE

The purpose of this lesson is to review the functions of plant leaves and to develop an understanding that leaves of some plants are edible.

CONCEPTS

- Leaves capture light energy and convert it to food for the plant.
- Some plants are grown for their edible leaves, but not all leaves are edible.

MATERIALS

For the teacher:

- Butcher paper or chart paper
- Markers
- Knife

For each student:

- Five edible leaf samples (lettuce, cabbage, spinach, parsley, mustard greens, Swiss chard, etc.)
- Leaf Tasting Record Chart (p. 25)

TIME

Teacher Preparation . . . . . 20 minutes
Student Activity . . . . . One 45-minute session

BACKGROUND INFORMATION

The main function of leaves is to make food for the plant through the process of photosynthesis. During photosynthesis, leaves use light energy to convert carbon dioxide and water into sugar.

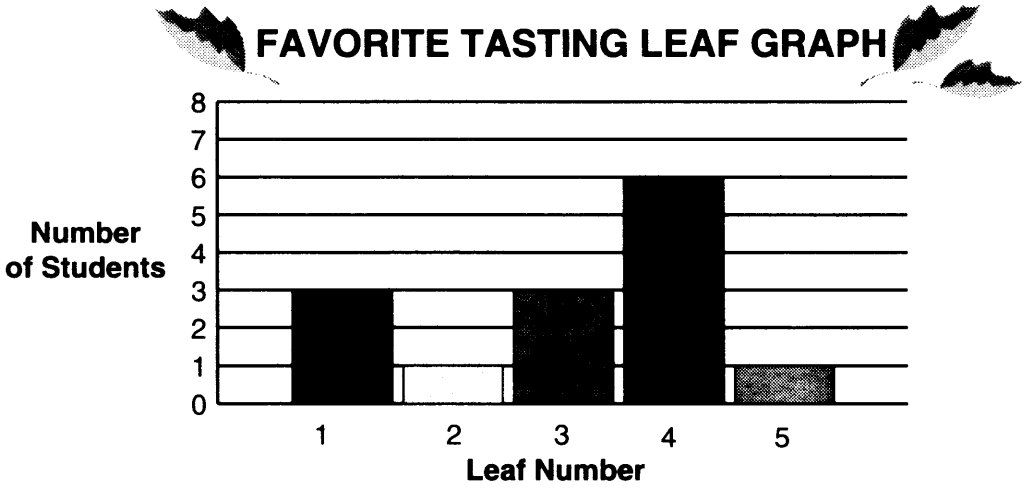
Many leaves of plants are edible and are grown for food. Edible leaves include cabbage, lettuce, grape leaves, parsley, spinach, mustard greens and Swiss chard. When you eat plant leaves, you may also eat the stems of the plants. This is the case with mustard greens, spinach and Swiss chard. It is very important to let the students know that not all leaves are edible, and that they should never eat anything they are not sure of, unless it is approved of by a responsible adult.

PROCEDURE

1. Discuss with your students the functions and uses of leaves. List their answers on chart paper. Possible answers include creating shade, providing food and shelter for animals and making food for the plants. Decomposed fallen leaves return nutrients to the soil.

2. Show your class one edible leaf. Do not identify the leaf by its name. Rather, have the students describe the leaf on the basis of size, color, texture, smell and, finally, taste. Have the students record all information in their Leaf Tasting Record Chart. Continue in this manner with the rest of the edible leaves.

3. Create a *Favorite Tasting Leaf Graph* as illustrated.



4. Discuss the results of the graph.

5. After the graph is complete, reveal the names of the leaves that were tasted. On the graph, place the name of each leaf under the appropriate leaf number.

CONCLUSION

Some plants are grown for their edible leaves.

VARIATIONS

- Have students bring in their favorite edible leaves. Make a class graph of the results.
- Make an edible leaf salad.

EXTENSIONS

- Give each student an edible leaf. Have each student make a leaf rubbing by placing the leaf under a piece of white paper and then rubbing a crayon over the top of the paper. The image of the leaf will be visible. Mount the rubbings on colorful paper.
- Complete the AIMS activities *Don't Leaf Out the Vegetables* and *More Leafy Facts* to reinforce the many uses of leaves.
- Have students plant a vegetable garden.
- Bring in fresh and dried herbs. Discuss how they look and taste.
- Gather a variety of leaves. Sort them in a variety of ways, including by color, size and shape.

LEAVE TASTING RECORD CHART

Name_____

Follow your teacher's directions. Some leaves can be harmful.

Leaf	Size	Color	Texture	Smell	Taste
1					
2					
3					
4					
5					

My favorite leaf is number ____ because _____

_____

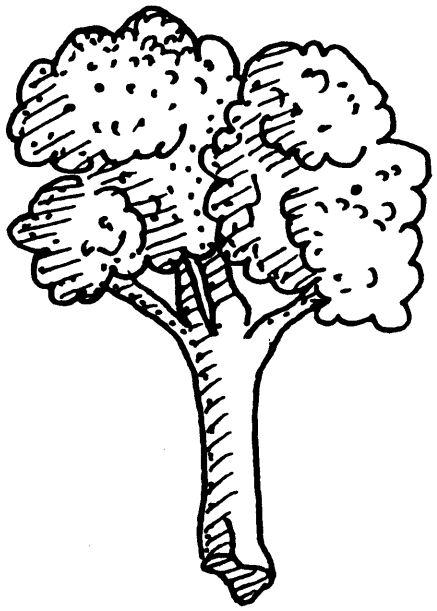
FABULOUS FLOWERS

PURPOSE

The purpose of this lesson is to review the functions of flowers and to develop an understanding that some flowers are edible.

CONCEPTS

- Flowers are the reproductive parts of plants.
- Flowers of some plants are edible.



MATERIALS

For the class:

- Broccoli
- Cauliflower
- Vase
- Vegetable Dip

TIME

Teacher Preparation . . . . . 30 minutes
Student Activity . . . . . 20 minutes

BACKGROUND INFORMATION

Flowers are the reproductive parts of plants. Most flowers produce seeds. Some flowers have colorful petals and fragrances which attract pollinators such as bees and flies. Seeds develop in the ovary of the fertilized flower and, when planted in the proper environment, grow into new plants. The ripened ovary becomes the fruit.

Flowers of some plants are edible. Examples include broccoli, cauliflower and artichokes. Broccoli and cauliflower flowers are called "heads" and are usually eaten along with their stems. Artichokes are actually the buds of flowers. Zucchini and orchid flowers are considered a delicacy in some parts of the world.

Students should be warned that some flowers are poisonous. They should never eat anything they are not sure of, unless it is approved by a responsible adult.

PROCEDURE

1. Review the functions of flowers. Ask your students to describe characteristics of flowers.

2. Arrange broccoli and cauliflower in a vase of water. Tell your students that you received a beautiful bouquet of flowers. Show them your bouquet. Discuss that broccoli and cauliflower are flowers that humans can eat.

3. Cut the broccoli and cauliflower into bite-sized pieces. Distribute the vegetables and vegetable dip. Have students taste the flowers.

CONCLUSION

Flowers are the reproductive parts of plants. Flowers of some plants are edible.

VARIATION

- Prepare the broccoli or cauliflower in a variety of ways. Have the students make a graph displaying their favorite ways to eat the broccoli or cauliflower.

EXTENSIONS

- Have the students make prints with an artichoke. Cut the artichoke in half lengthwise, dip the artichoke in paint and then press it on construction paper. Complete other artichoke activities available from the California Advisory Board. See page 70.

- Invite a flower farmer into your classroom. Have him/her discuss the flower operation. Contact your county Farm Bureau for possible guest speakers.

- Place broccoli in water so students can see it "bloom".

- Go to your local supermarket or nursery and obtain flowers that are no longer sellable. Have the students dissect the flowers and identify the parts.

FRESHEST FRUITS

PURPOSE

The purpose of this lesson is to review the functions of fruit.

CONCEPTS

- Fruits generally surround and protect plant seeds until they are ready for dispersal.
- Many plants, trees, and shrubs are grown for the fruit they produce.

MATERIALS

For the class:

- Fruit knife
- Paper towels
- Fruit (1 each of 8 different kinds)
- Several varieties of canned peaches or pears (halved, sliced, diced, fruit cocktail)

For each student:

- *As I See It* worksheet (p. 33)

TIME

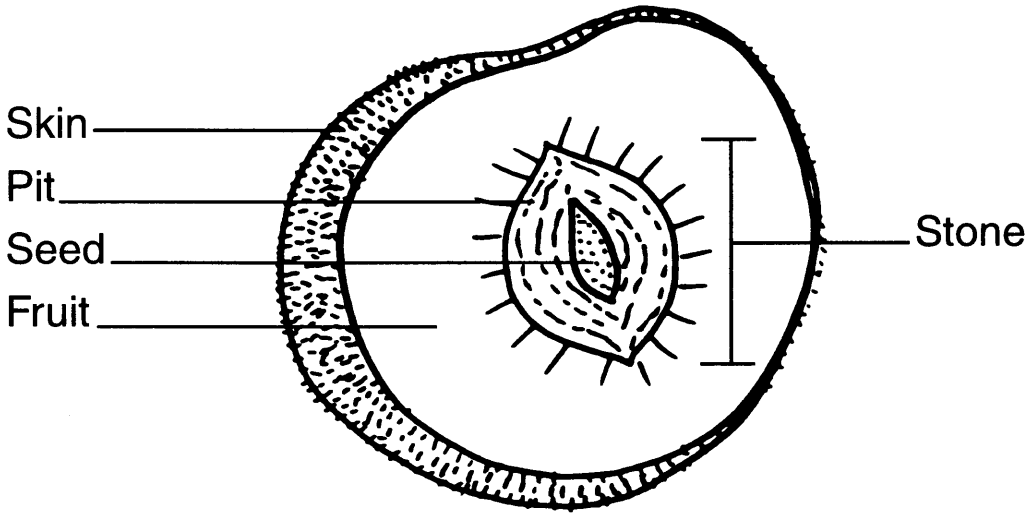
Teacher Preparation . . . . . 20 minutes
Student Activity . . . . . One 45-minute session

BACKGROUND INFORMATION

Crops that are usually listed as fruits are grown on trees, shrubs or vines and produce fruit for a number of years. These include apples, apricots, avocados, cherries, dates, figs, grapes, lemons,

nectarines, olives, oranges and pears. The fruit of a plant generally surrounds the seeds of a plant. The fruit protects the seeds and attracts animals and insects.

PARTS OF A STONE FRUIT



It is important to note that farming has played a very important role in California's history. In the 1800s, many farmers left their fields and headed westward for potential fortunes in gold in California. Many farmers, however, did not strike it rich. Fortunately, they discovered that the fertile soil in many parts of California was ideal for farming. Many crops and orchards were planted. Missionaries delivered the fruit to the people they visited. Canned peaches from mission orchards were shipped all over the country. Today, California is the leading agricultural state in the nation.

Besides eating, there are many uses for fruits and their seeds. For example, the peach seed within the pit is used in cosmetics as an abrasive in facial scrubs and in perfumes. Peach stones are used as an alternative fuel source in co-generation plants. Peach pits are converted to activated charcoal by burning them under pressure. Activated charcoal is used for air filters in hospitals, filters in fish tanks and filters to purify water. Walnut shells are used as an abrasive in sandblasting, and almond shells are used for animal bedding. Using renewable resources such as fruit seeds helps reduce the consumption of fossil fuels.

PROCEDURE

1. Display a selection of various fresh fruits for the students to observe. Discuss the similarities and differences. Discuss how these fruits are grown.

2. Form groups of three or four. Distribute one fresh fruit to each group. Make sure each group has a different fruit.

3. Cut the fruit in half crosswise so that the inside can be examined. Have the students examine the inside of the fruits and complete the *As I See It* worksheet. Have each group show other students the seeds from their fruit.

4. As a class, discuss the similarities and differences of the insides of the fruit.

5. Ask the students if they can think of any other uses for seeds besides growing new plants. Let them know that there are many products made from fruit by-products. Show samples of items made partially from fruit, including perfume, facial cleansers and fish filters.

6. Show students the different varieties of canned fruit. Discuss how agriculture provides a wide variety of fruits year-round. For example, farmers grow two types of peaches--clingstone and freestone. Freestone peaches are generally eaten fresh. Clingstone peaches are used for canning and freezing.

7. Discuss how agriculture has played a key role in the development of California.

CONCLUSION

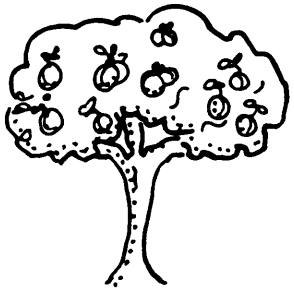
Fruit is grown for food and for many other uses. Using by-products from plant material helps reduce our dependency on fossil fuels. Agriculture has played a key role in the development of California.

VARIATIONS

- Prior to the lesson, brainstorm ideas of what the class should do with the fruit used in this activity.
- Examine pictures of fruit from magazines and identify the parts.

EXTENSIONS

- Visit a fruit packing plant. Learn how fruit is graded and packed.
- Do some class cooking with fruits. Recipes are provided on pages 60-61.
- Discuss the nutritional value of fruit.
- Have students research a particular fruit and create a book in the shape of their fruit.
- Make a collage using the seeds from the fruit.



AS I SEE IT

Name _____

My fruit is a _____.

A) Draw what you see after your fruit is cut in-half.

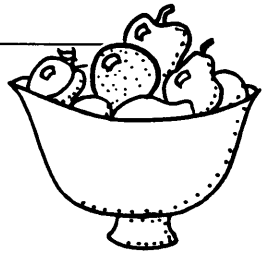
B) How many seeds does your fruit have? _____

C) Are the seeds small or large? _____

_____

D) Why do plants have fruit? _____

_____



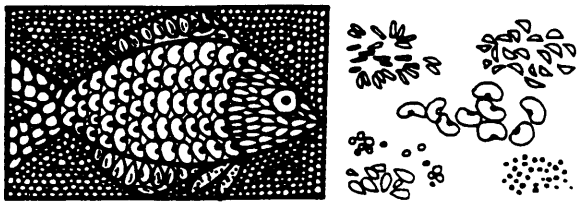
SUPREME SEEDS

PURPOSE

The purpose of this lesson is to review the functions of seeds and to learn about plants that are grown for their edible seeds.

CONCEPTS

- The function of the seed is to allow the plant to reproduce itself in nature.
- Seeds have unique characteristics such as shape, size and color.
- Seeds are an important food source for animals.



MATERIALS

For each student:

- Posterboard or cardboard (9" x 12")
- A wide variety of dried seeds--beans, sunflower seeds, peas, rice, caraway, millet, etc. (available in bulk at many stores)
- Felt pens
- Glue
- Egg carton

TIME

Teacher Preparation . . . . . 15 minutes
Student Activity . . . . . One 40-minute session

BACKGROUND INFORMATION

Plants produce seeds so their species will continue to exist in nature. Each seed contains a tiny plant embryo. The seed also contains food, in one or two cotyledons, which supplies energy and materials for growth until the young plant grows its first true leaves and can make food for itself.

Seeds provide nourishment to people all over the world. Corn, oats, rice and wheat are seeds known as cereal grains. Edible seeds known as legumes include peanuts, peas and beans. Other edible seeds include walnuts, almonds, pistachios and pecans.

PROCEDURE

1. Place a wide variety of seeds in egg cartons. Distribute one filled egg carton to each team of students.

2. Provide time for the students to examine the seeds. As a class, discuss the similarities and differences between the seeds.

3. Discuss the functions of seeds.

4. Discuss that people grow seeds to eat. Brainstorm a list of edible seeds.

5. Read selected stories about different seeds such as Corn is Maize and Everybody Cooks Rice (see p. 69).

6. Have the students make a seed mosaic as follows:

   - Have each student sketch a simple picture or design on posterboard or cardboard.
   - Have the students glue various seeds on the board to create a colorful display.

7. Display the mosaics in the classroom, school hallways and offices.

CONCLUSION

Seeds come in various shapes and sizes. The have many functions and are a common food source around the world.

VARIATIONS

- Give students a handful of seeds. Have them sort the seeds by different attributes.

- Use birdseed and/or other feed grains in a classification activity.

EXTENSIONS

- Have the students look at a mature sunflower. Have the students estimate the number of seeds in the sunflower. Have the students count the seeds as they remove them. Roast the seeds and enjoy eating them.

- Have the students save seeds from fruits and vegetables they eat. Have the students draw a picture of the item and then glue the seed(s) in the appropriate place(s). Bind the samples together to make a class seed book.

- Create a seed matching game. For example, a card with apple seeds glued on it would be matched to a card with a picture of an apple.

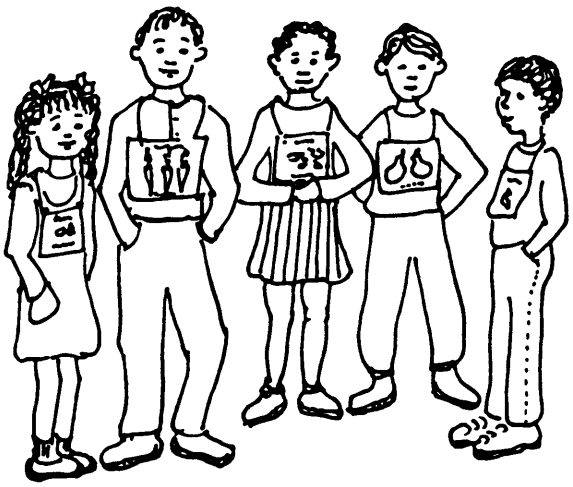
- Organize a "Seeds for Lunch!" day. Each dish must contain edible seeds. Examples include corn bread, peanut butter and jam sandwiches, rice pudding, granola, burritos, popcorn balls, banana-nut bread, chocolate-covered raisins and corn on the cob.

- Have the students examine the various ways seeds promote their own dispersal. For example, some seeds get caught in fur while others are carried by the wind.

EDIBLE PLANT GAME

PURPOSE

The purpose of this activity is to reinforce the concept that people eat different parts of different plants.



CONCEPTS

- Plants consist of six basic parts--roots, stems, leaves, flowers, fruits and seeds.
- People eat various plant parts to obtain nutrients and energy.

MATERIALS

For the class:

- Edible plant part cards made on cardstock so that they may be worn around a student's neck (pp. 41-54).
- Pictures or photographs of the following foods (optional):

- Kiwifruit
- Brussels sprout
- Grapes
- Almonds
- Vegetables
- Avocado
- Pumpkin
- Tomato
- Silage
- Cotton
- Rice
- Iceberg lettuce
- Carrot
- Cauliflower
- Celery
- Strawberry
- Olive
- Pear
- Onion
- Artichoke
- Wheat
- Lemon
- Spinach
- Peach
- Parsnip
- Watermelon
- Potato

TIME

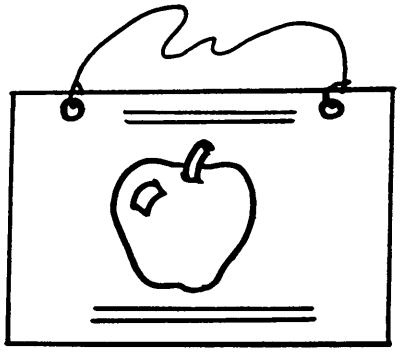
Teacher Preparation . . . . . 20 minutes
Student Activity . . . . . One 45-minute session

BACKGROUND INFORMATION

This activity will be most beneficial if it is performed by the students after they have done the individual plant part lessons. It incorporates the knowledge they have gained about plant parts with the fact that plants provide people with the nutrients and energy needed for survival.

Note: Photographs (3" x 5") of the plants used in this activity are available from the California Foundation for Agriculture in the Classroom. Contact the Foundation for more information (916/924-4380).

PROCEDURE



1. Reproduce the edible plant cards on cardstock. Color the pictures. Cut the cards on the dotted lines. Place string on each card as shown. Be sure the string is long enough to allow students to hang the cards around their necks.

2. You will need exactly 28 participants for this activity. If you have more than 28, you can assign a few students special jobs such as being a "checker" or a "materials" person or have two students represent one card. If you have less than 28 participants, include yourself in the activity and/or include students from another classroom.

3. Shuffle the cards. Pass out one card to each student and have him/her read the card and then place it around his or her neck so it is visible to the other students.

4. The object of the activity is for the class to make a human ring that has all of the foods in the proper order. Begin by having one student read his/her card aloud. (If your students are nonreaders, you can read the cards. This student is the beginning of the ring. The student who has the correct answer will read his or her card aloud and then stand as part of the ring. Continue until the human ring is formed. When done correctly, everyone should be part of the ring.

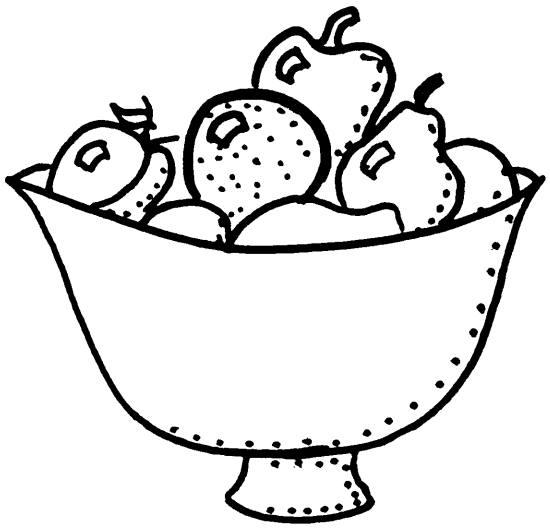
5. After the class has done the activity properly, redistribute the cards so everyone has a new food. Do the activity again! This time a little quicker.

CONCLUSION

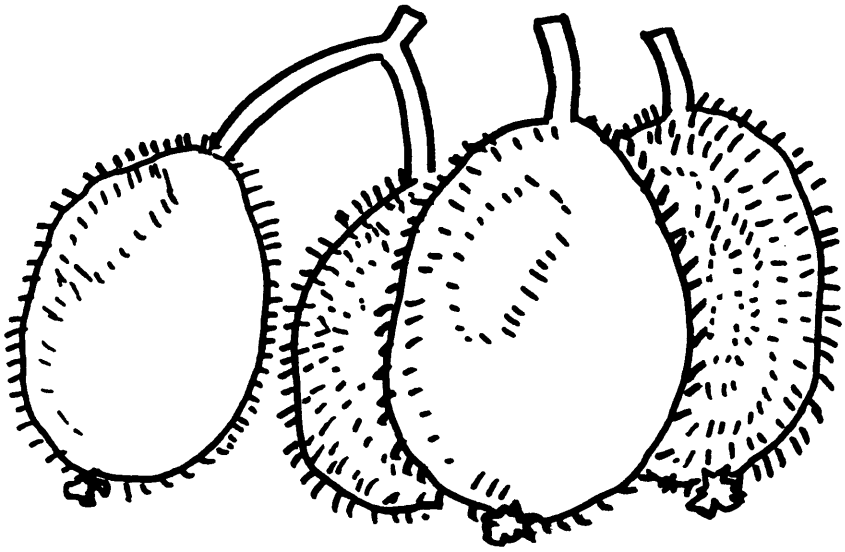
Roots, stems, leaves, flowers, fruits and seeds are the six basic plant parts. People eat plants for nutrients and energy.

EXTENSIONS

- Take a trip to the produce section of a grocery store. Identify the produce as roots, stems, leaves, flowers, fruit and seeds.
- Perform the AIMS activity *Plant Parts* to reinforce the understanding of the six basic parts of a plant.
- Invite a parent to prepare and cook an ethnic dish in class. Have the children discuss the origin of each ingredient.
- Have students keep a food journal for a week recording the leaves, stems, seeds, flowers, roots and fruit they eat.

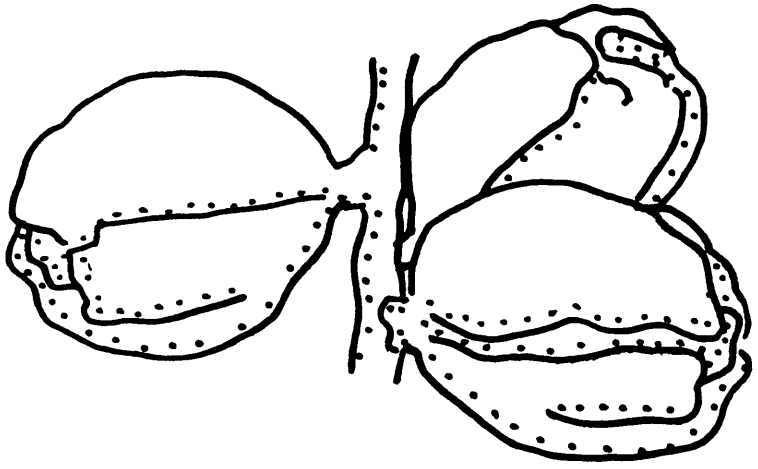


I AM A KIWIFRUIT.



WHO IS A GREEN VEGETABLE WHOSE FLOWERING BUD LEAVES WE EAT AND YOU LOOK LIKE A BABY CABBAGE?

I AM A BRUSSELS SPROUT.



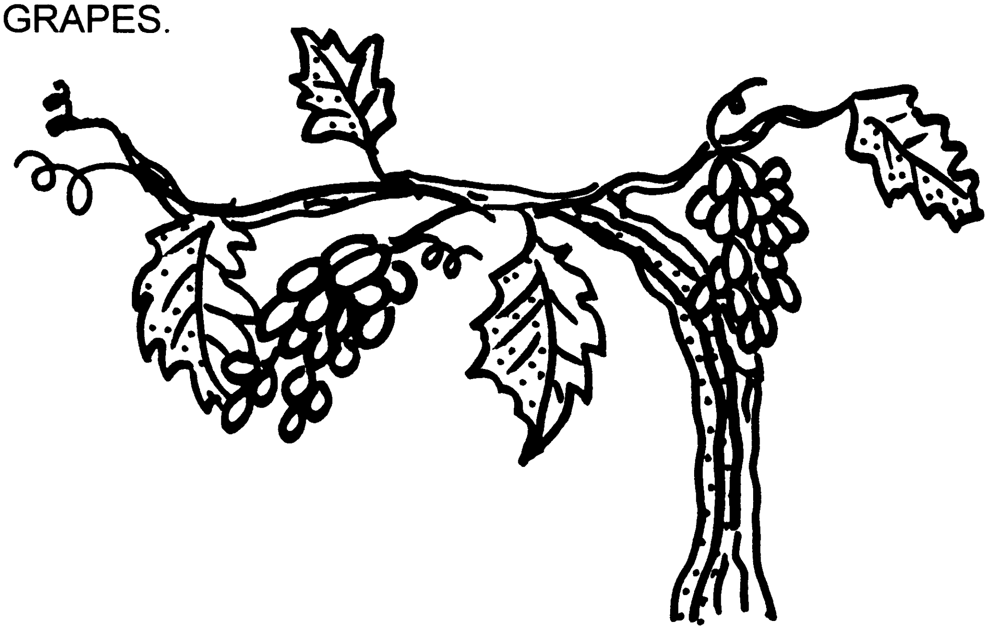
WHO IS THE STATE THAT GROWS MORE FOOD THAN ANY OTHER STATE IN THE UNITED STATES?

I AM CALIFORNIA.

WHO IS A FRUIT THAT CAN BE DRIED TO MAKE RAISINS?

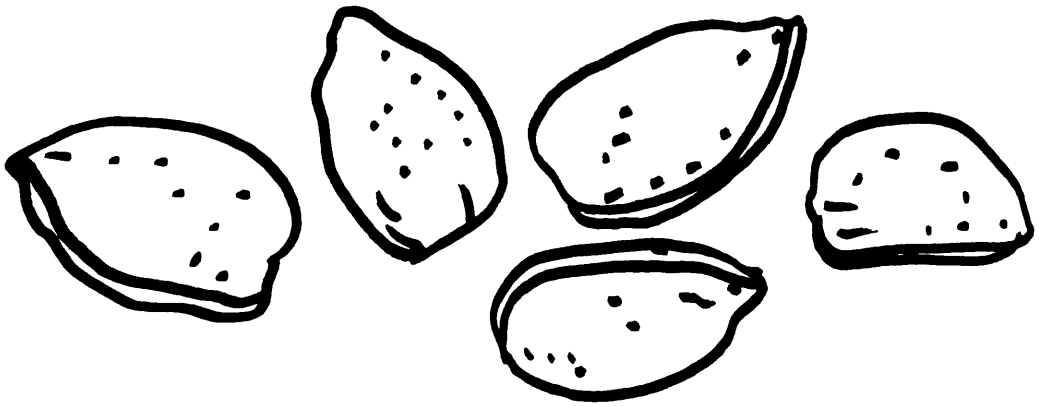
✂- -

I AM GRAPES.



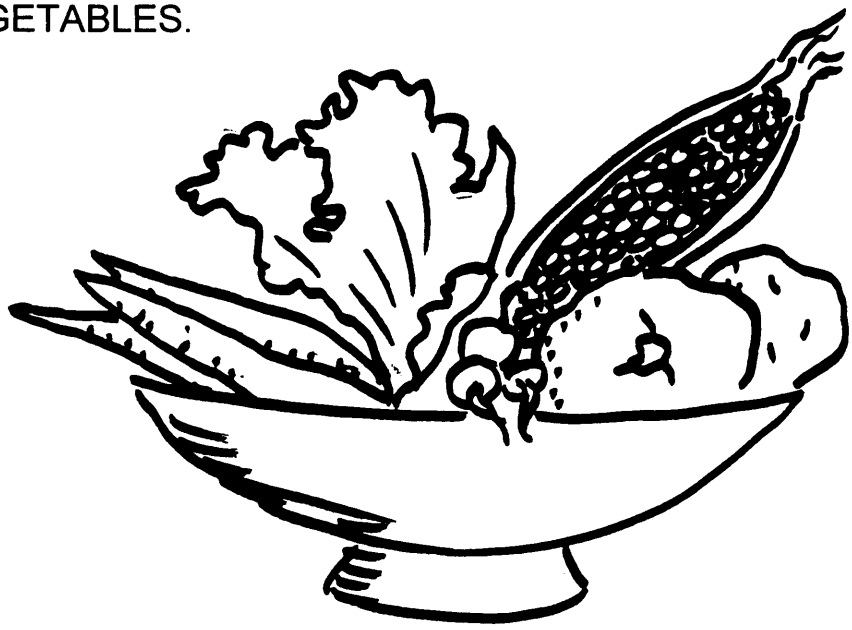
WHO IS A SEED PEOPLE EAT RAW OR ROASTED THAT GROWS ON TREES?

I AM AN ALMOND.



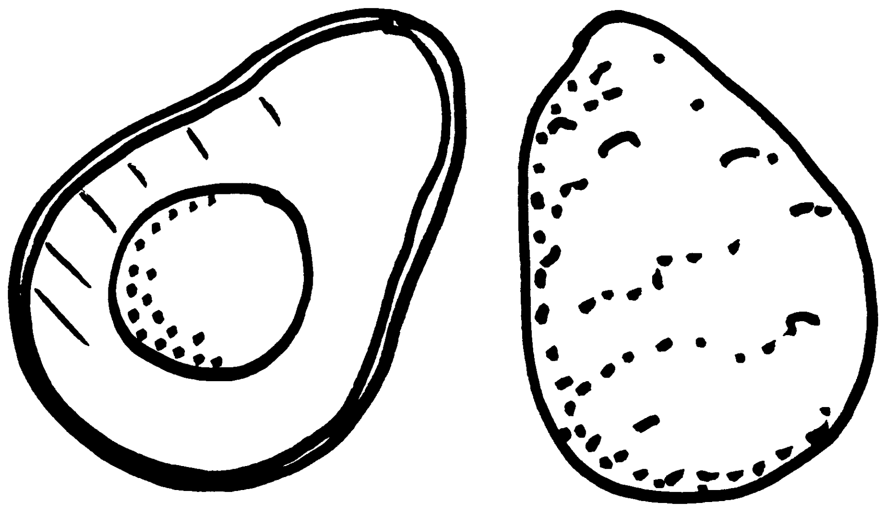
WHO IS THE WORD THAT MEANS "VEGETATION YOU PUT ON THE TABLE"?

I AM VEGETABLES.



WHO IS A GREEN FRUIT THAT, WHEN MASHED, MAKES A TOPPING FOR MEXICAN FOOD AND A DIP FOR CHIPS?

I AM AN AVOCADO.



WHO IS A FRUIT IN THE SQUASH FAMILY THAT IS GROWN FOR THANKSGIVING AND HALLOWEEN?

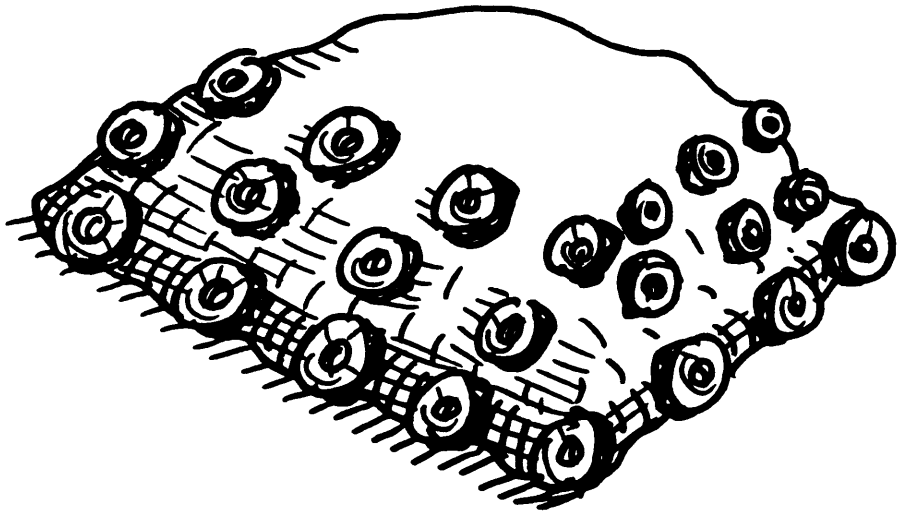
I AM A PUMPKIN.

WHO IS A RED FRUIT USED TO MAKE LOTS OF SAUCES?

I AM A TOMATO.

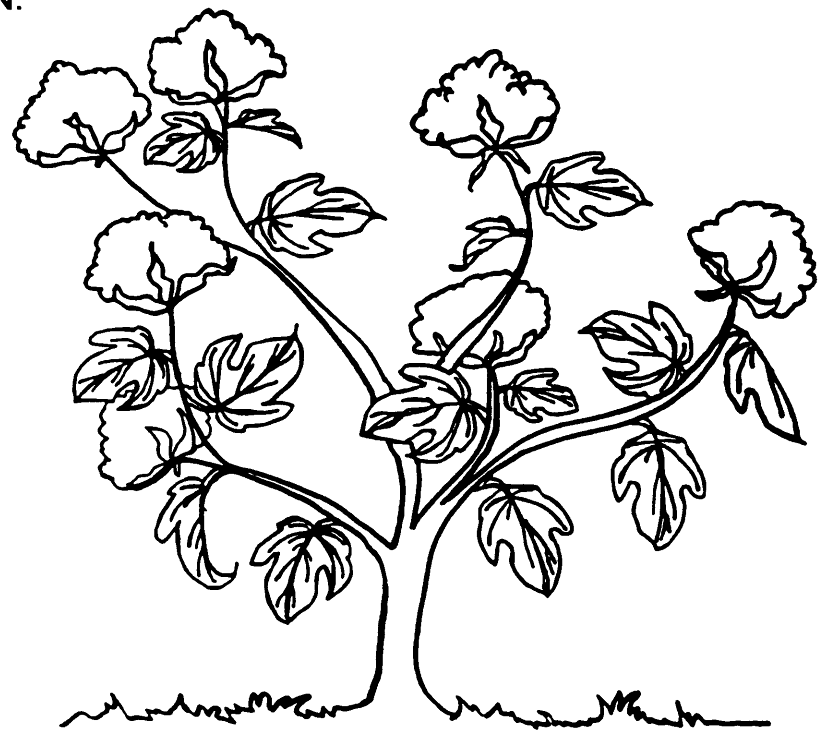
WHO IS A MIXTURE OF GRAINS THAT COWS EAT?

I AM SILAGE, A FOOD FOR ANIMALS.



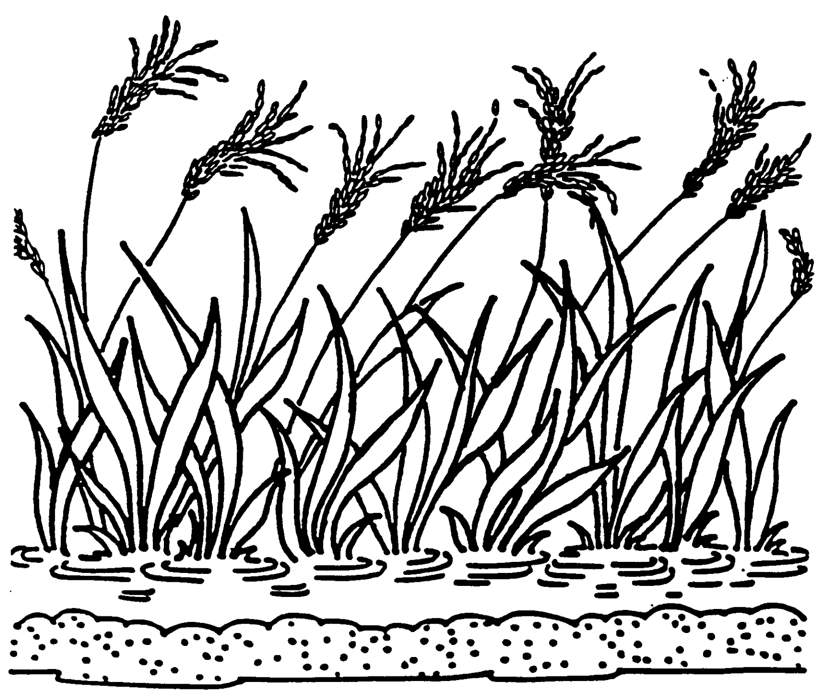
WHO IS A PLANT THAT MAKES FIBER FOR CLOTHES?

I AM COTTON.



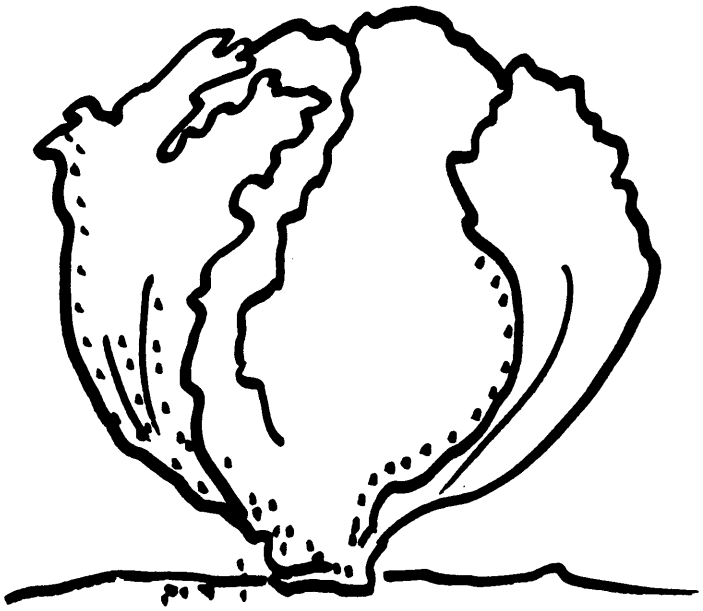
WHO IS A GRAIN (A SEED) THAT GROWS IN A VERY WET FIELD?

I AM RICE.



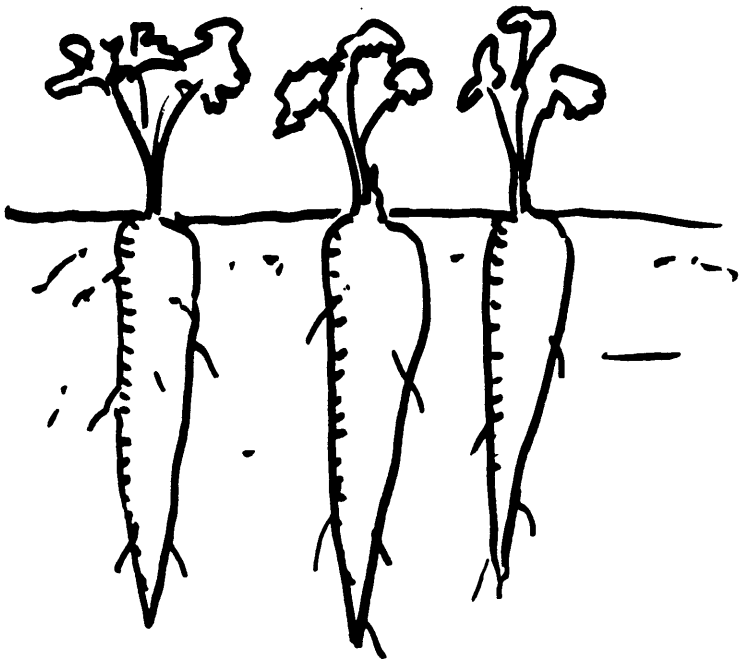
WHO IS A GREEN LEAF USED IN SALADS THAT HAS A VERY "COLD" NAME?

I AM ICEBERG LETTUCE.



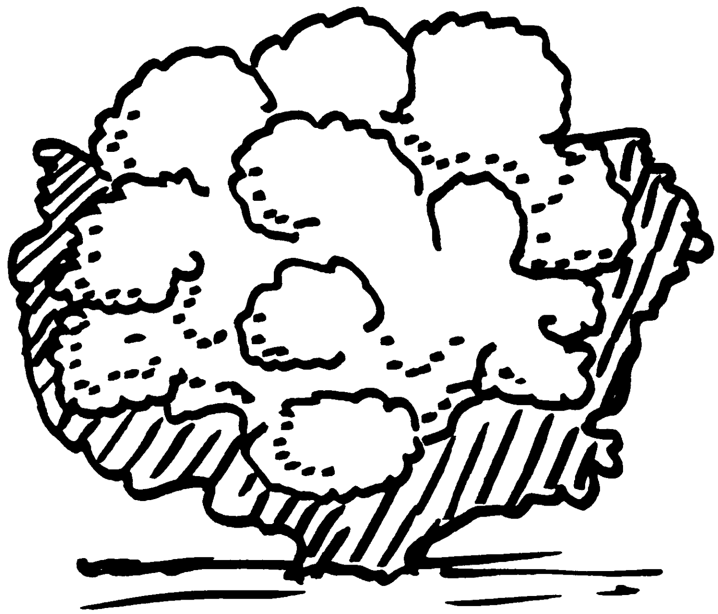
WHO IS AN ORANGE ROOT, FULL OF VITAMIN A?

I AM A CARROT.



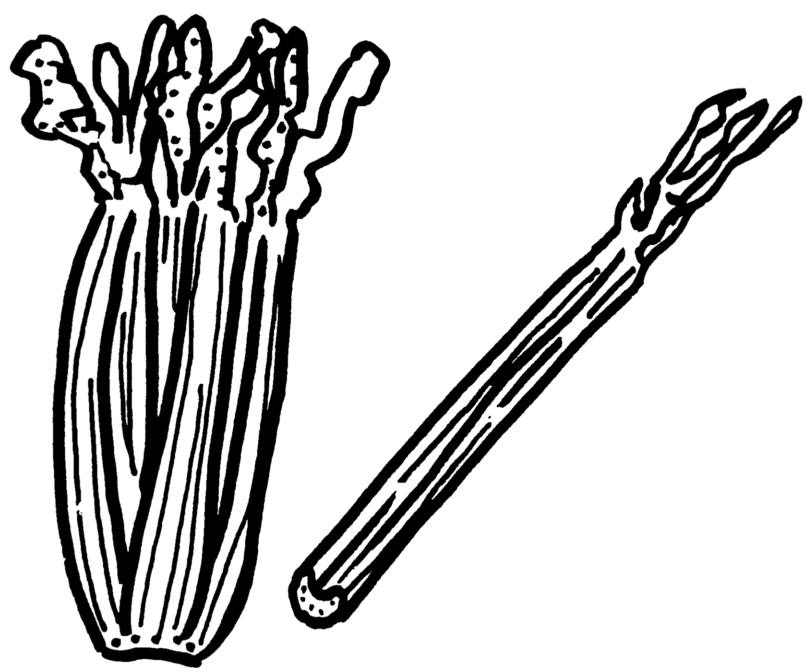
WHO IS A WHITE FLOWER PEOPLE EAT?

I AM CAULIFLOWER.



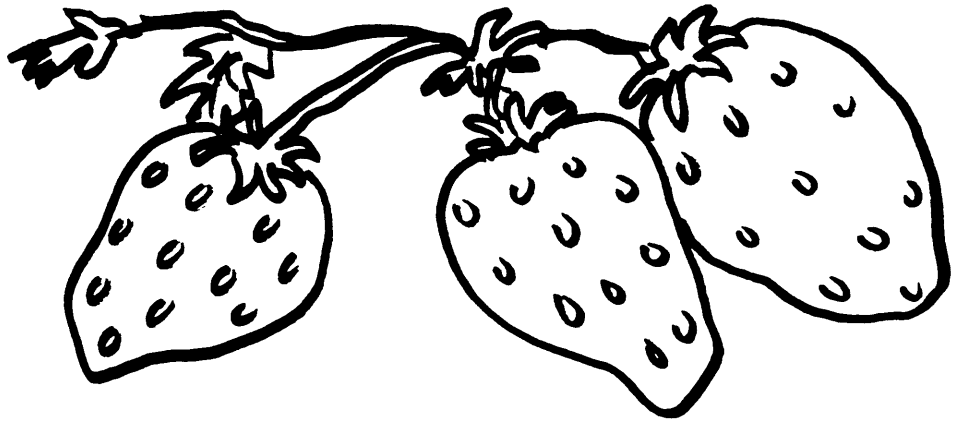
WHO IS A GREEN STEM THAT IS SOMETIMES EATEN WITH PEANUT BUTTER OR CREAM CHEESE?

I AM CELERY.



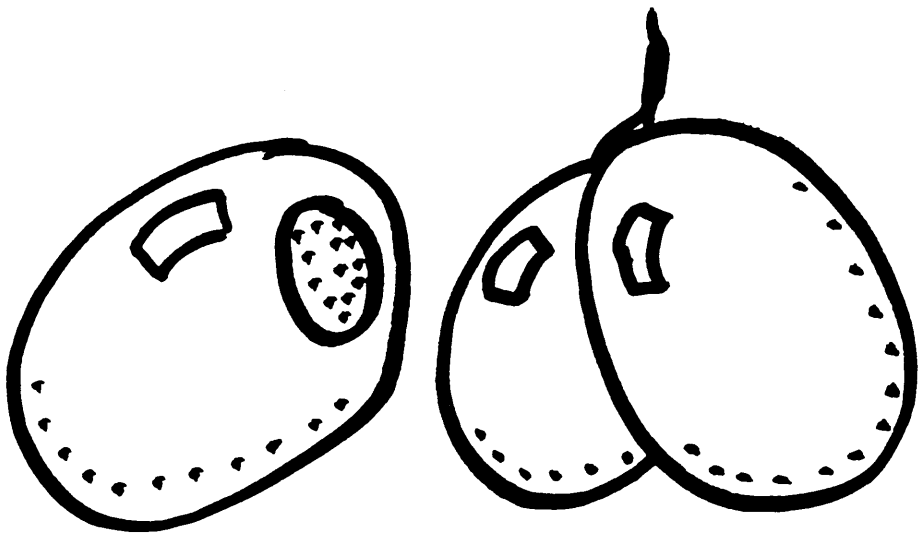
WHO IS A RED FRUIT THAT HAS LOTS OF TINY SEEDS ON ITS OUTSIDE?

I AM A STRAWBERRY.



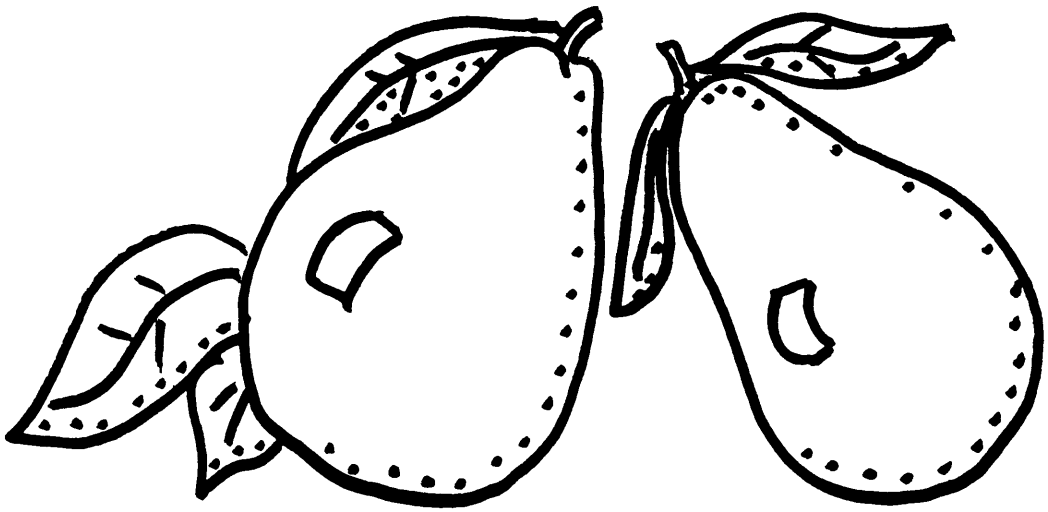
WHO IS A BLACK OR GREEN FRUIT THAT IS SOMETIMES PUT ON PIZZAS?

I AM AN OLIVE.



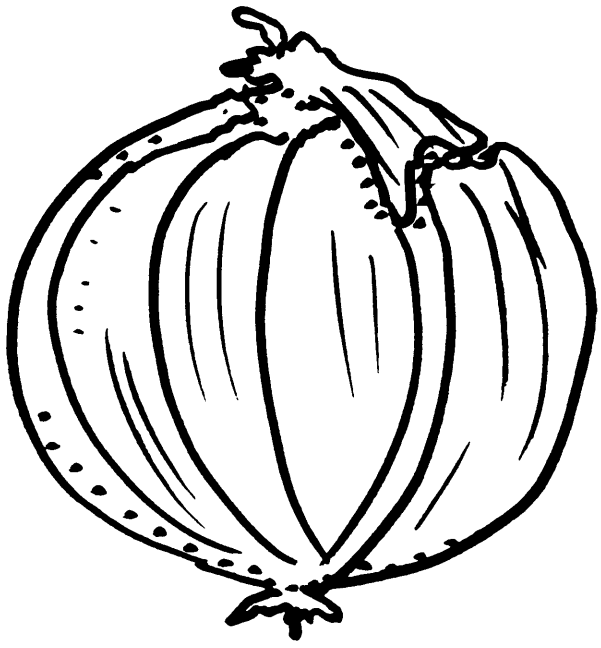
WHO IS A YELLOW, GREEN, OR BROWN TREE FRUIT THAT FEELS GRITTY WHEN YOU EAT IT?

I AM A PEAR.



WHO IS A VEGETABLE WITH UNDERGROUND LEAVES THAT MAKES EYES WATER?

I AM AN ONION.

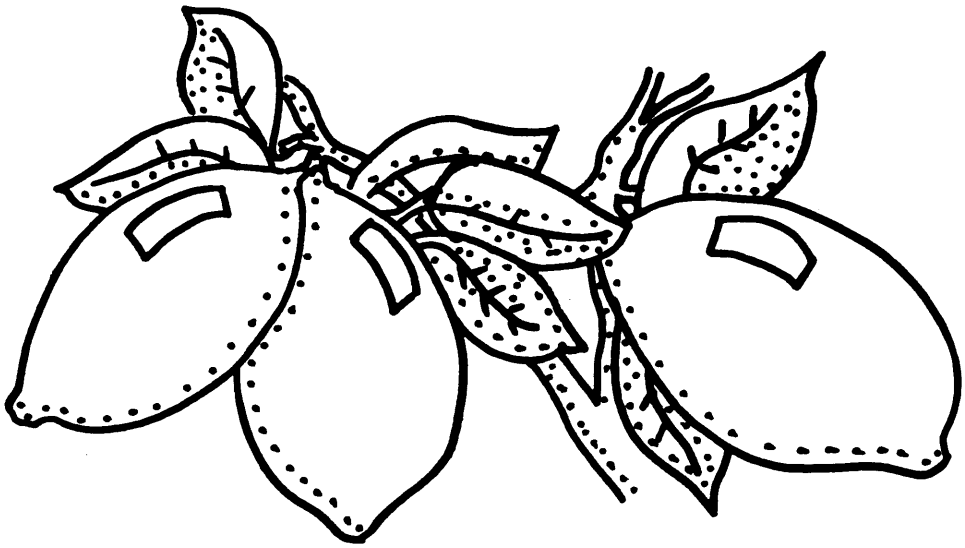


WHO IS AN GREEN EDIBLE FLOWER THAT HAS POINTY ENDS?

I AM AN ARTICHOKE.

WHO IS A SOUR YELLOW CITRUS FRUIT?

I AM A LEMON.

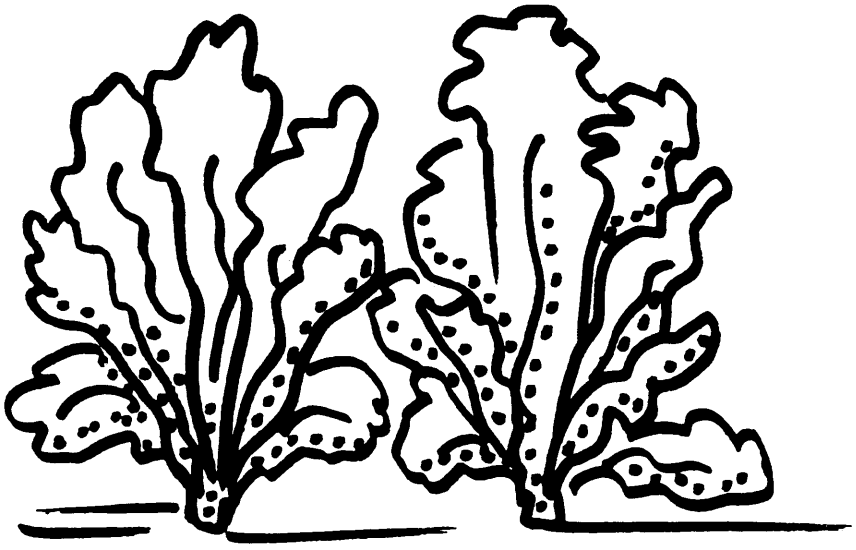


WHO IS A GRAIN USED TO MAKE MOST BREADS IN THE UNITED STATES?

I AM WHEAT.

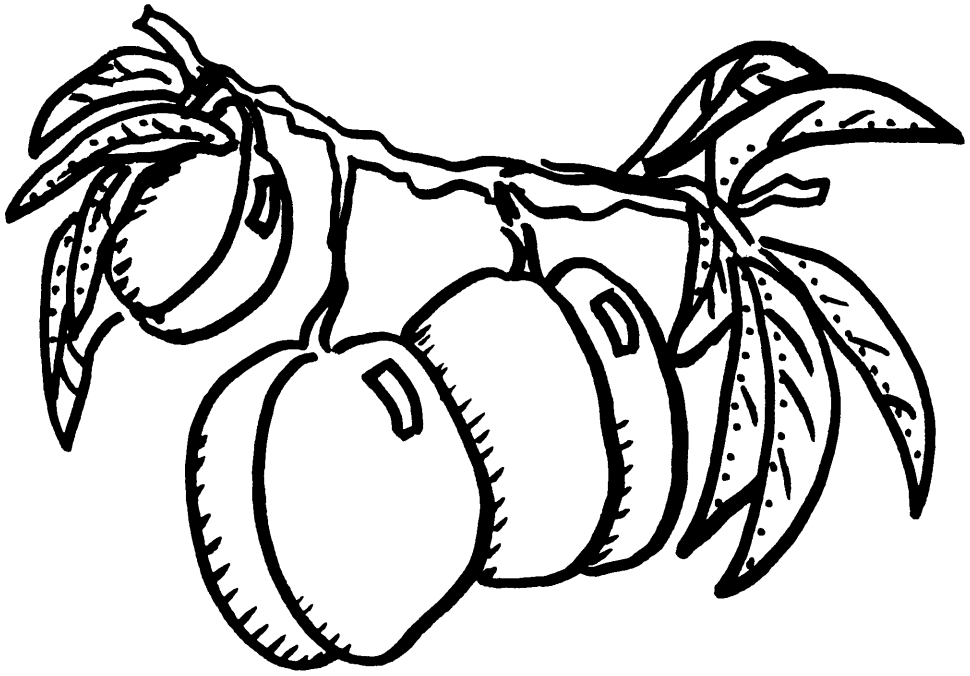
WHO IS A LEAF THAT POPEYE EATS?

I AM SPINACH.



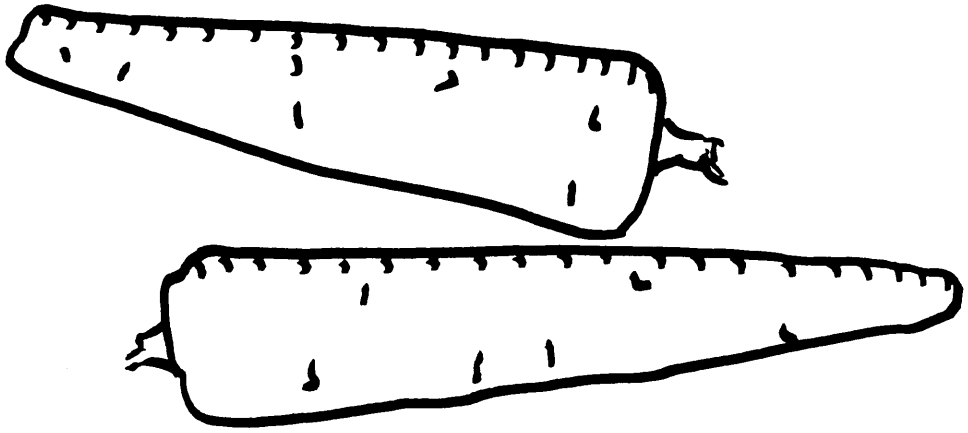
WHO IS A FUZZY FRUIT THAT CAN BE EATEN FRESH OR CANNED?

I AM A PEACH.



WHO IS A WHITE ROOT THAT LOOKS SOMEWHAT LIKE A CARROT?

I AM A PARSNIP.



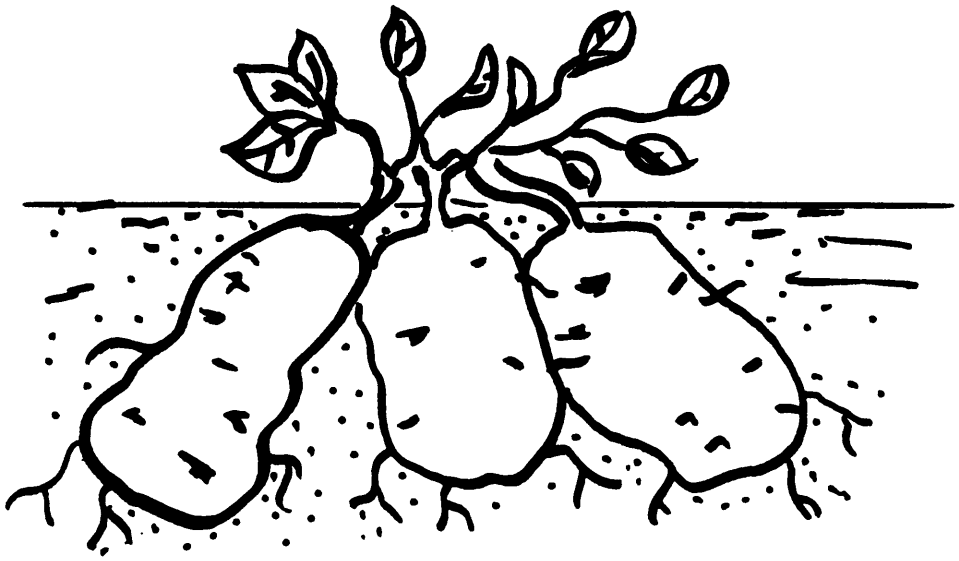
WHO IS A PINKISH MELON FRUIT THAT CONTAINS BLACK SEEDS BUT SOMETIMES CAN BE SEEDLESS?

I AM A WATERMELON.

WHO IS AN UNDERGROUND STEM CALLED A TUBER THAT COMES IN THE VARIETIES RUSSET, RED AND WHITE?

✂----------

I AM A POTATO.



WHO IS A BROWN FURRY-SKINNED FRUIT THAT HAS BLACK SEEDS?

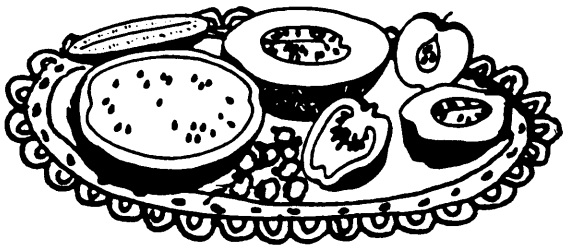
THE FABULOUS FOOD PHANTOM

PURPOSE

The purpose of this lesson is for the students to use their newfound knowledge about edible plant parts to construct a plant in which all parts are edible.

CONCEPTS

- Plants are made of six basic plant parts--roots, stems, leaves, fruits, flowers and seeds.
- Humans consume different parts of different plants.
- California produces a variety of fresh produce.



MATERIALS

For the class:

- Charts from previous lessons listing edible plant parts and plant part functions
- *Fabulous Food Phantom* story (pp. 59-60)

For each student:

- Fresh fruits and vegetables
- *My Fabulous Food Phantom* practice sheet (p. 62)
- Parent letter (p.61)
- *Peachy Keen* certificate (p. 64)
- Toothpicks and/or other objects that will hold fruits and vegetables together

TIME

Teacher Preparation . . . . . 20 minutes
Student Activity . . . . . Two 45-minute class periods

BACKGROUND INFORMATION

The following is a list of edible plant parts that you may wish to use in this activity.

Roots	Stems	Flowers	Leaves	Fruits	Seeds
carrot	celery*	broccoli*	celery*	tomato	corn
onion	rhubarb	cauliflower	parsley	apple	rice
radish	kohlrabi	artichoke	mint	banana	beans
ginger	asparagus	zucchini*	cabbage	eggplant	coconut
beets	broccoli*	capers	lettuce	grapes	pumpkin*
sweet potato	bok choy*		spinach	pumpkin*	sunflower
turnip	potato		bok choy*	zucchini*	

* These foods fit into more than one category.

PROCEDURE

1. Using charts developed during previous lessons or a newly created chart, brainstorm edible roots, stems, leaves, flowers, fruit and seeds. This information will need to be available to the students during the remainder of this lesson.

2. Read the story *The Fabulous Food Phantom* (p. 59) aloud to your students. Have the students assist you in filling in the blanks of the story.

3. Distribute a *My Fabulous Food Phantom* activity sheet to each student. Have your students draw their "Food Phantom" using colored pencils, markers or crayons. Remind your students that their creature must have all six basic plant parts and that each part must be edible.

4. Have the students take home the parent letter and their completed *My Fabulous Food Phantom* activity sheet.

5. On a selected day, have the students bring in the necessary items to build their Food Phantoms.

6. Discuss the possibilities of actually growing a plant like their Food Phantom.

7. Distribute *Peachy Keen* certificates to all students who successfully completed the edible plant parts unit.

CONCLUSION

People eat different parts of different plants.

VARIATIONS

- Have each student bring in two vegetables or fruits from home. In groups, have the students create a Food Phantom with the foods provided.

- Ask a produce manager from a grocery store to bring produce items to your classroom. Have him/her discuss the responsibilities of a produce manager. Have students use the produce donations to create Food Phantoms.

EXTENSIONS

- Have students complete the dot-to-dot activity on page 63.
- Create an edible plant part soup that uses at least one item of each of the basic plant parts.
- Read the story *Growing Vegetable Soup* by Lois Ehlert.

THE FABULOUS FOOD PHANTOM

Farmers Ben and Kathy Wishwell lived in Fresno, California and grew all kinds of fruits, vegetables and nuts. They grew watermelon, grapes, walnuts, almonds, pumpkins and peaches. Like many farmers in California, the Wishwells grew more than one type of food. Altogether, over 250 different kinds of crops and livestock are grown somewhere in California.

In this particular year, the Wishwells were having a difficult time making ends meet. The weather was not cooperating and did not provide enough rain. The Wishwells were not the only ones having trouble. Many of the farm families all over California were unable to grow food on all of the land they owned because there was not enough water to go around. The rain that did fall came at the wrong time and made fruit blossoms drop and fruit rot. Food prices were rising, and because of this, many families were beginning to have less food on their tables.

One day, as Kathy was out in the peach orchard deciding whether or not the peaches were ready to be picked, she thought she heard a little voice say, "I wish I could help you."

She said to herself, "I've been worrying about these peaches too much lately. I'm beginning to imagine that someone is going to help grow enough food for everyone . . . I couldn't have heard anything."

Just then, one of the peaches rubbed against Kathy's leg and said, "I WISH that I could help you." Kathy shook her head and looked down. She thought she felt something fuzzy rub against her leg. The only thing that she saw was a peach on the ground that had been knocked off during a wind storm. She picked up the peach and walked back to her house to get a cold drink.

As she walked back, she felt as if something was following her. Kathy looked around, but saw nothing. It sounded as if something was shuffling behind her. "It must be the rustling of the leaves," Kathy said to herself.

Once again, Kathy started back to the house and, again, she heard the shuffling sound. Kathy walked faster back to the house. She finally reached the kitchen and poured herself a large cold glass of Country Peach Juice. She put her feet up and closed her eyes . . .

Kathy heard a soft voice say again, "I wish that I could help you." She opened her eyes and what Kathy saw really startled her. The creature was made entirely out of edible plant parts! The face of this creature looked just like a peach. It's arms were made of _____, its fingers and toes were made of _____. Its eyes looked like seeds of _____. This was the most delicious-looking creature that Kathy had ever seen.

Kathy asked in a very soft voice, "What is your name?"

It said, "I am the Fabulous Food Phantom. I help farmers while they work in their fields and orchards. You have been worrying about how things are going."

Kathy replied, "You're right. I have been worrying too much. But you look so delicious that for a moment, I forgot about how hard it is to farm."

The Fabulous Food Phantom said, "I'd like to help all farmers. I dream about helping the farmers feed all the people of the world, even in years of drought. In my dreams, there will be enough food for everyone, and enough water for farmers to water their crops. Please take my seeds and plant them in your fields. When new plants grow, they will look similar to me. Every part of the new plants will be edible."

Just then, Kathy opened her eyes. "Wow! That was some dream I had. Wait until I tell Ben when he comes in from town!" She rubbed her eyes and began to take another sip of juice. Right beside her glass was a large juicy peach and a small bowl of glistening seeds . . .

Kathy felt as if things would turn out all right. In farming, there are good years and bad years. Kathy knew good years were close at hand.

Date _____

Dear Parents,

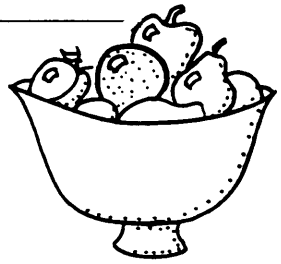
We are studying about edible plant parts. As a culminating activity, your child has created an imaginary Fabulous Food Phantom--a plant with entirely edible parts. Please help your student create a shopping list of the items needed to build this creature and then obtain these items from a grocery store or home garden.

We will construct the Food Phantom in class on _____. Please have your child bring the necessary items to school on this day.

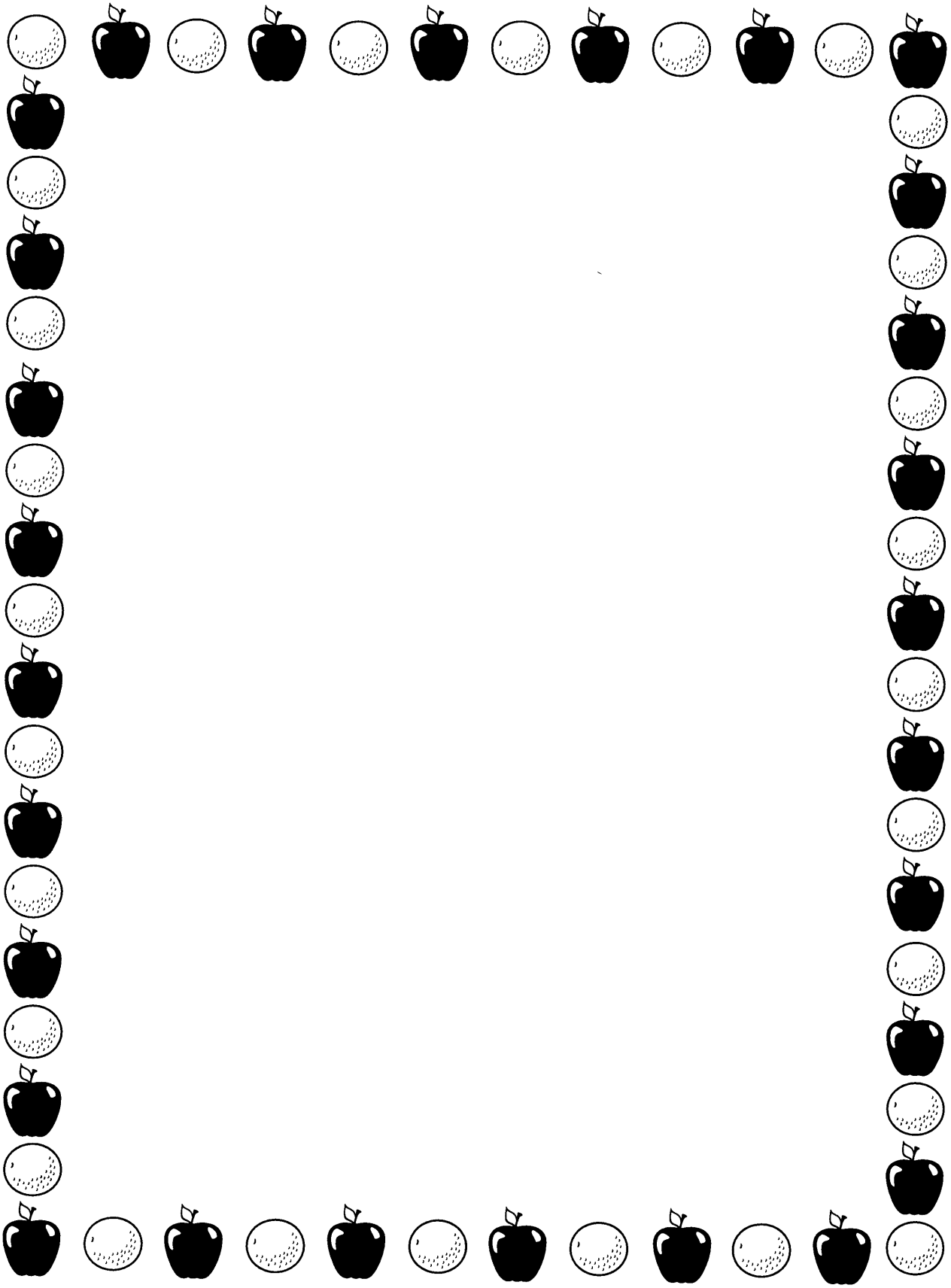
If you have any questions or concerns, please let me know. I appreciate your help in your child's learning.

Sincerely,

_____



MY FABULOUS FOOD PHANTOM

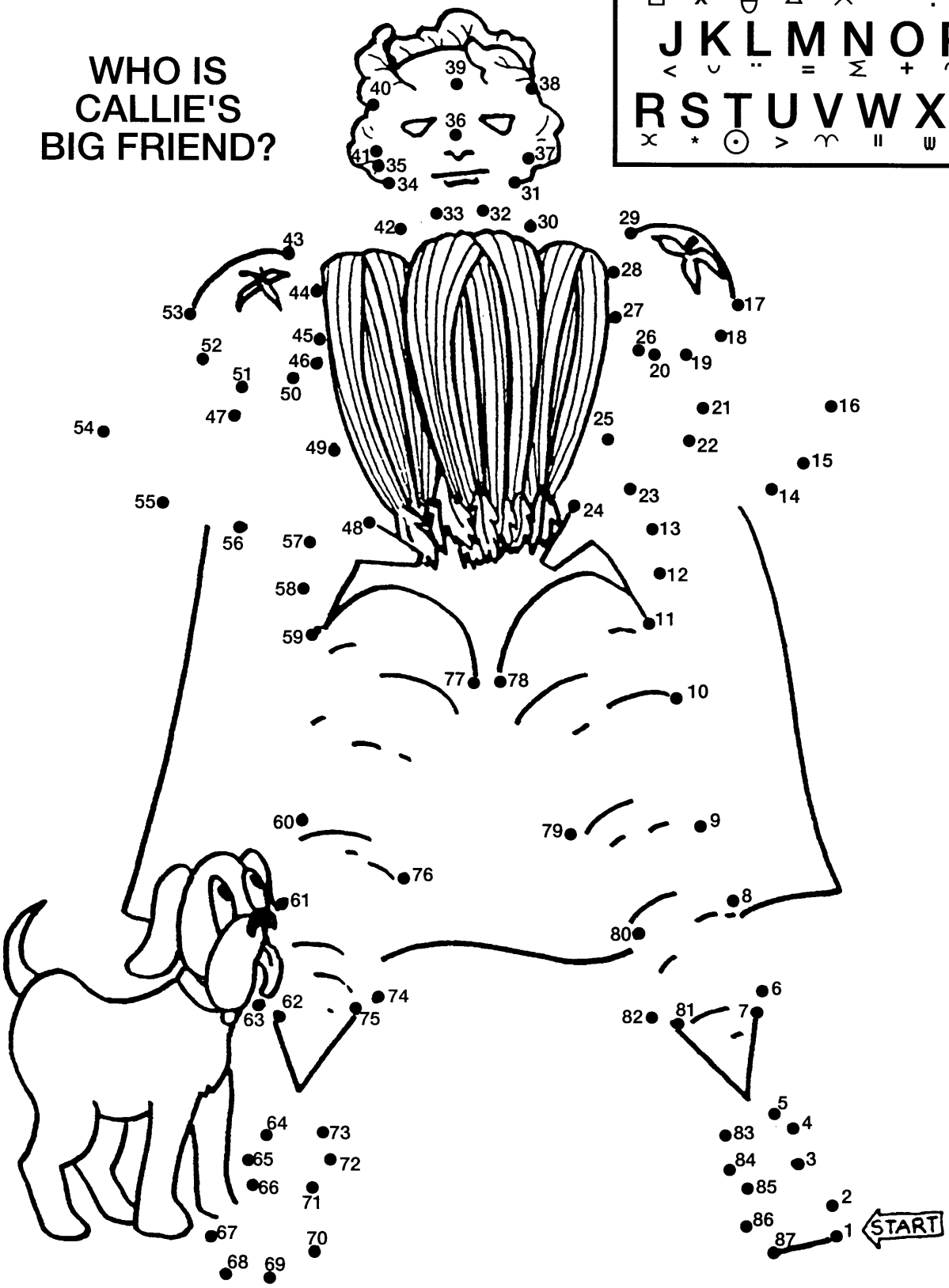


Name _____

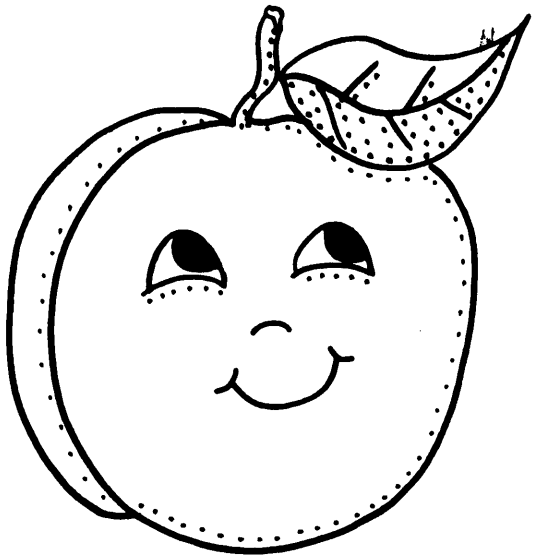
Can you break the code?

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	
R	S	T	U	V	W	X	Y	Z

WHO IS CALLIE'S BIG FRIEND?



YOUR WORK ON PLANT PARTS WAS PEACHY KEEN!



Name

Teacher

Date

LABELS

roots

stems

flowers

leaves

fruit

seeds

SWEET AS A PEACH!

EASY PEACH BAKE

- 6 fresh California peaches
- 1/3 cup brown sugar (packed)
- 1 tablespoon lemon juice
- 1/3 cup grated coconut OR chopped nuts
- 2 tablespoons margarine
- 2 tablespoons water

Cut peaches in half and remove pit. Put peaches in 1 1/2 quart microwave-proof dish. Sprinkle with brown sugar, lemon juice and coconut. Place margarine and water on top. Microwave on HIGH for 4 minutes until peaches are tender. Makes 6 servings.

A PERFECT SUMMER PARTY CAKE!

NECTARINE CELEBRATION CAKE

NECTARINE CELEBRATION CAKE

- 3/4 cup flour
- 1/4 cup whole wheat flour
- 3/4 cup sugar
- 3/4 teaspoon baking soda
- 1/2 teaspoon baking powder
- 1/2 teaspoon salt
- 1 teaspoon cinnamon
- 2 eggs, lightly beaten
- 1/2 cup vegetable oil
- 1 teaspoon vanilla extract
- 2 carrots, grated
- 2 fresh California nectarines, chopped (1 cup)

Mix together flours, sugar, baking soda, baking powder, salt and cinnamon. Add eggs, oil and vanilla extract; mix together to form a thick batter. Stir in carrots and nectarines. Pour into a greased 10" round pan or a 9" by 13" baking pan or a 7 1/2 cup bundt pan. Bake in 350 degree oven 40 to 50 minutes. Cool 10-15 minutes in pan, then invert and cool on rack. Sprinkle top with powdered sugar. Makes 8 to 10 servings.

FRUIT LEATHER

Fresh California peaches, nectarines, plums **OR**
Bartlett pears, chopped.

For each 1 cup of chopped fruit, add 1 1/2 tablespoons of sugar. Boil to 180 degrees. Cool slightly. Mix until smooth in blender. Return to heat and cook until the consistency of a thick paste and reduced by half. Spread fruit 1/4 inch thick on plastic wrapped trays or cookie sheets. Cover pans with a cheesecloth screen. Place pans in direct sunlight for 12 to 24 hours until dry. Fruit leather is done when edges pull back from plastic and center is not sticky when cool. Ten cups of fruit cover a 12" by 17" tray.

STUDENT LITERATURE

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Lasky, Kathryn. **Sugaring Time**. Macmillan, 1983.

Meltzer, Milton. **The Amazing Potato**. Harper Collins, 1992.

Merrill, Claire. **A Seed Is a Promise**. Scholastic Books, 1973.

Pallotta, Jerry & Bob Thomson. **The Victory Garden Alphabet Book**. Charlesbridge Publishing, 1992.

Patent, Dorothy Hinshaw. **Where Food Comes From**. Holiday House, 1991.

Rylant, Cynthia. **This Year's Garden**. Bradbury Press, 1987.

Stevens, Janet. **Tops and Bottoms**. Harcourt Brace & Jovanovich, 1995.

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Wexler, Jerome. **Flowers, Fruits, and Seeds**. Simon & Schuster Books, 1991.

Wilkes, Angela. **My First Garden Book**. Alfred A. Knopf, 1992.

TEACHER RESOURCES AND REFERENCES

AIMS Activities, AIMS Educational Foundation; P.O. Box 7706, Fresno, CA 93747.

AIMS offers integrated math and science activities. Two recommended books are Fun With Foods and Primarily Plants.

The Amazing Apple Book, Paulette Bourgeois; Addison-Wesley Publishing Company, Inc., 1990.

Numerous interdisciplinary apple activities as well as interesting facts about apples. Other books available by this author include The Amazing Potato Book and The Amazing Dirt Book.

American Farm Bureau Federation; 225 Touhy Ave., Park Ridge, IL 60068. (312) 399-5764.

Write and request a list of educational activities and posters.

"Bread, from Wheat to Table" Video, Encyclopedia Britannica, 1988.

A 13-minute film for grades 1 through 5 discussing the harvesting, storing and milling of grain and the preparing and baking of bread.

California Artichoke Advisory Board; P.O. Box 747, Castroville, CA 95012. (408) 633-4411.

Request a complimentary copy of the *"We're Smartichokes"* thematic unit.

California Foundation for Agriculture in the Classroom; 1601 Exposition Blvd., Sacramento, CA 95815. (916) 924-4380.

The Foundation has a variety of educational materials that promote a better understanding of California agriculture. *The Mysterious Plant Caper* unit for grades K to 1 and the *What Are You Eating* unit for grades 4 to 6 complement the *Edible Plant Parts* unit. Request a *Teacher Resource Guide* and ask to be put on the mailing list.

California Tree Fruit Agreement; P.O. Box 968, Reedley, CA 93654-0968. (209) 638-8260.

Information and educational materials on peaches, plums and nectarines. Request an order form and a list of available items.

Five A Day Adventures, Dole Food Company, Inc.; 155 Bovet, Suite 476, San Mateo, CA 94402. (415) 570-4378.

A food pyramid computer program available on CD-ROM for both Macintosh and Windows.

Food - A Thematic Unit, Teacher Created Materials; P.O. Box 1214, Huntington Beach, CA 92647.

This unit, designed for primary students, has many motivating hands-on activities.

Foodworks, Addison-Wesley Publishing Company, Inc., 1992.

Over 100 science activities and fascinating facts that explore the magic of food.

Fun with Fruits and Vegetables, Patricia Lief; Fearon Teacher Aids, 1991.

An activity booklet with ideas that complement this unit.

Gurney's Seed Catalog, 110 Capital Street, Yankton, SD 57079.

This catalog is an excellent source for pictures of produce as well as seeds to order.

Having Fun with Peanuts - A Teaching Kit for Grades K to 3, Betsy Owens, Director, Virginia-Carolina Peanut Promotions; P.O. Box 1709, Rocky Mount, NC 27802-1709. (919) 446-3097.

This teaching kit contains seven activities, a teacher's guide and a poster. The activities tie into many subject areas including nutrition, history and science.

Healthy Kids Resource Center, Alameda County Office of Education; 313 West Winton Ave., Room 180, Hayward, CA 94544. (510) 670-4581 FAX (510) 670-4582.

A variety of nutrition materials available on a free loan basis: videos, books, lessons and activity books.

Kids . . . Get Cookin'! Cookbook, California 5-A-Day Campaign, Nutrition and Cancer Prevention Program; 601 North 7th Street, M5-65, P.O. Box 942732, Sacramento, CA 94234-7320. (916) 327-2788.

Simple-to-use recipes and colorful pictures encourage students to eat healthful meals.

Nut-Bush Planting Kit, New Tomorrow Scientific Co.; 7251 Garden Grove Blvd., E2, Garden Grove, CA 92641. (714) 892-3373.

An inexpensive, self-contained peanut planting kit.

Science Framework for California Public Schools, K to 12, 1990. Bureau of Publications, Sales Unit. California Department of Education; P.O. Box 271, Sacramento, CA 95812-0271. (916) 445-1260.

This document provides the state guidelines for teaching science. Other subject matter frameworks are also available.

GLOSSARY

Bulb--an underground bud which enables a plant to live through winter; formed of stem and surrounded by fleshy leaves.

Edible--something that can be eaten.

Embryo--tiny plant within a seed.

Fungus--a simple plant that lacks chlorophyll (the pigment that makes plants appear green); fungi get their food from decaying material.

Flower--the reproductive part of a plant. The color, shape and fragrance of the flowers aid in pollination which leads to seed production.

Fruit--the part of a plant surrounding the seed.

Function--the purpose or use for something.

Leaf--flat, thin expanded plant parts growing from a stem; the main site of food-making (photosynthesis).

Phantom--a creature of one's imagination.

Photosynthesis--process by which plants make their food using sunlight, water and carbon dioxide.

Root--underground part of plant with three main functions: anchoring the plant, absorbing water and minerals and storing food.

Row Crop--cultivated plants grown in lines or rows.

Seed--part of a flowering plant that contains an embryo within its protective coat and a stored food supply.

Stem--the main supportive part of a plant; part of the transport system carrying water from the roots and food produced during photosynthesis to other parts of the plant.

Structure--a part of an object; in this unit, a part of a plant such as root or leaf.

Tuber--the short, thickened, fleshy part of an underground stem, which can grow new shoots. *A potato is a tuber.*

Vegetable--a plant cultivated for eating; vegetation prepared for the table.