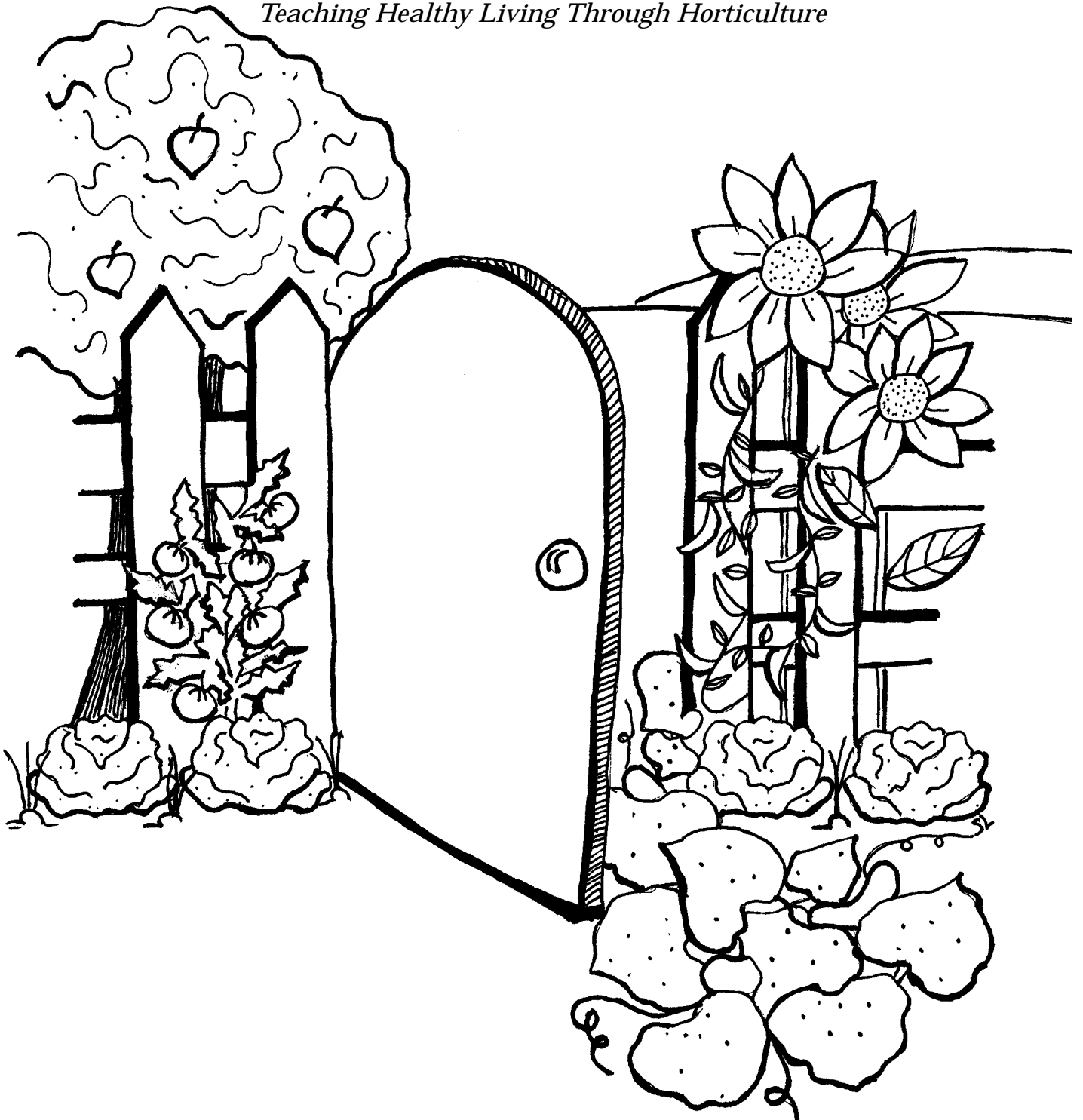


Nutrition in the Garden



Teaching Healthy Living Through Horticulture



Nutrition in the Garden

Teaching Healthy Living Through Horticulture

**Sarah Lineberger
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Because of its impact on growth, development and the ability to learn, nutrition plays a key role in a child's life. Learning about different foods and practicing healthy eating habits can greatly affect a child's achievement, success and overall contentment. Because eating habits are adopted early in life, childhood is a good time to learn about nutrition. Since children spend much of their time in the classroom, schools can play a significant role in the adoption of healthy lifestyles.

Teachers have many ways to present nutrition education, including using school gardens and horticultural activities. The U.S. Department of Agriculture campaign, "Five-a-Day for Better Health," encourages people to eat more vegetables and fruits. A school garden is an excellent teaching tool to support this message.

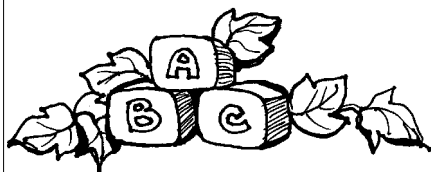
Gardening can help children learn how to grow their own food. Gardens can also serve as a site to teach food safety and preparation. Although children are often timid about eating new foods, the excitement of eating something they produced in a class garden may overcome questions and fears. Exposure to fruits and vegetables may encourage them to eat more of these beneficial foods.

This activity and curriculum guide is designed to help teachers integrate nutrition education into a horticulture program. Ten lessons provide information and activities about plants and human nutrition. Each lesson has an objective and background information to increase the teacher's knowledge about the subject. The teacher can then decide the amount and level of information to deliver to students. The lessons conclude with at least three activities combining horticultural and nutritional concepts. The activities can be conducted with or without a garden.

From these lessons, students can learn how to beautify and respect their environment as well as their bodies. They can use the lessons on healthy lifestyles and gardening skills for the rest of their lives.



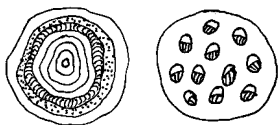
1



Plant ABCs

Objectives: To identify the main parts of a plant and explain their functions. To learn that our foods come from different plant parts.

Stem Cross Sections



Teacher background information

There are millions of types of plants, including trees, shrubs, perennials and annuals. While differing in appearance and function, they all have similar structural components, including roots, stems (trunks), leaves, flowers, fruits and seeds.

One major difference among plants is whether or not they produce true flowers. To account for this difference, plants are divided into two categories:

- Gymnosperms, which lack true flowers and fruits and usually bear their seeds in cones (example: pine trees); and
- Angiosperms, which include true flowering plants that bear their seeds in fruits. All important food crops are angiosperms.

In studying fruits and vegetables, we will focus our attention on angiosperms.

Our diet consists of foods taken from a variety of these parts, so it is important to be able to identify them and understand what they do for the plant.

Roots

Roots are vital to plants. A plant cannot grow above ground without healthy roots below the ground. There are two types of plant roots: tap and fibrous. Tap roots have one large primary or tap root with a few smaller secondary roots. Carrots, beans and radishes have tap roots. Fibrous roots have many similar-sized roots. Lettuce, broccoli and tomatoes have fibrous roots.

Both fibrous and tap roots are covered with tiny root hairs. These hairs absorb water from the soil, which contains the necessary dissolved mineral nutrients for the plant. The water then moves up into the roots and is transported through the stems to the leaves.

Stems

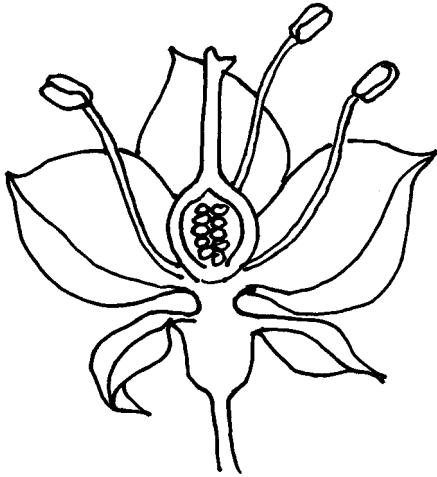
Plant stems contain a transport system that allows water and nutrients to move from the roots to the leaves, where the plant produces needed food and vitamins. Food produced in the leaves is moved to other parts of the plant through the stems. *Xylem* cells in the stem transport water and *phloem* cells transport food. In addition to its important transportation system, the stem also supports the plant and is the backbone of its growth.

Leaves

Leaves contain a plant's food factories. Plants have the special ability to produce their own food through a process called *photosynthesis*. Inside the plant cells are *chloroplasts*, which use carbon dioxide, water, chlorophyll and sunlight to make sugars/carbohydrates (plant food). A plant without leaves does not have the energy to continue living unless it is dormant or has enough food stored in other parts. Leaves also *transpire* or lose water (similar to human sweat), which helps the plant maintain its temperature and encourages the roots to continue absorbing water.

Leaves are highly specialized for their environment. Most have mechanisms to help conserve water, such as a waxy surface, small size or the ability to store water. Some plants have very large leaves to help capture more sunlight. Many adaptations can be found in various plants. Look at some leaves on your school yard to see if any are specially adapted to your environment.

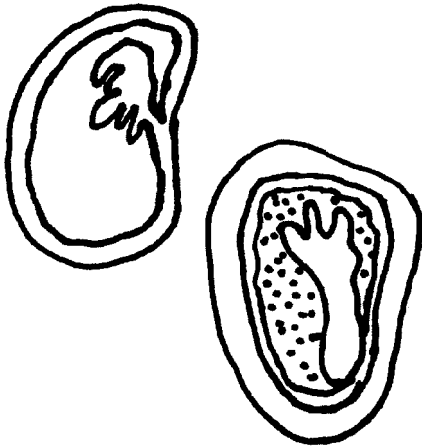
Flowers



Flowers are the sexual organs of plants. Their sole purpose is to make the seeds and fruits needed to produce more plants and to ensure the species' survival. Most flowers contain a female organ, the *pistil* (usually one), and male organs, the *stamens* (usually more than one). If separate flowers on the same plant contain the male and female parts, the plant is considered to be *monoecious*. If a species has male flowers and female flowers on separate plants, it is called *dioecious*.

Like leaves, flowers are also highly specialized. They are specialized in order to attract pollinators. *Pollination* and *fertilization* are the two processes by which female pistils are fertilized by pollen from male stamens; they lead to the creation of seeds. To help move the pollen from the stamens to the pistils, often organisms such as insects or birds are needed. These organisms are called pollinators. To attract pollinators, flowers have adapted special fragrances, nectar, colors, patterns and shapes. Study flowers in your school yard and list reasons pollinators should visit specific flowers.

Seeds



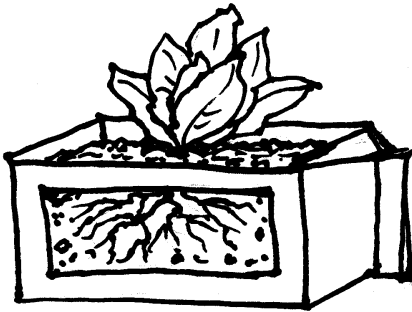
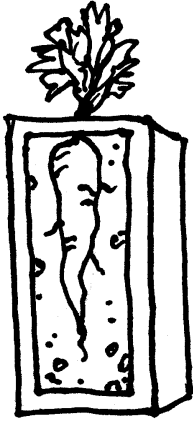
Seeds grow into a new plant. Like leaves and flowers, they also have adaptations for their environment. Seeds have different mechanisms to help them be transported — to ensure survival, they need to move away from the parent plant and spread to new areas. For example, maple seeds have wings to help them glide through the air; coconuts can float in water. Each seed has a *seed coat* and an *embryo* containing young leaves, a stem and roots. Find and study seeds from your school yard.

Fruits

Seeds are usually found in fruits, which are nature's special packages for seeds. They begin to develop after the flower is pollinated. The fruit can protect the seed as well as aid in transportation. Animals transport seeds by eating the fruits and then leaving the seeds in their droppings.

The true definition of a fruit, then, is the structure that is formed by the pollinated flower and that contains the seeds. This definition may be confusing, because many items we call vegetables are actually plant fruits (tomatoes, cucumbers, squash). By strict definition, vegetables are foods that come from plants' vegetative parts: stems, roots and leaves. However, these strict definitions are not used in our everyday life; some items are called vegetables (even though they are truly fruits) if they are commonly eaten with the main course of a meal.

Activities



1. Create your own plant. Have students create a plant, requiring that it include each of the discussed parts — roots, stems, leaves, etc. These creations can be drawn or made of such art materials as pipe cleaners, construction paper, etc.
2. Root view box. Plant seeds in a box with one clear side so that children can see what roots look like and how they develop. Use plants with tap (carrots) and fibrous (lettuce) roots. It would also be interesting to grow legumes (discussed in the chapter on plant nutrition) such as peas, alfalfa or peanuts.

There are many ways to build a view box. You can make a window box with one clear side, use an empty aquarium, or make a small root view box out of an old $\frac{1}{2}$ -gallon paper milk or orange juice container. To make a box from $\frac{1}{2}$ -gallon containers, follow these steps:

- Lay the milk container on its side or stand it straight up and cut off the top.
 - Cut a window out of one of the sides, leaving $\frac{1}{2}$ inch of carton around the edges. Place a piece of glass or plastic (you can use an overhead transparency sheet) in the box against the window. Secure the plastic with a waterproof seal (waterproof glue or strong tape).
 - Add soil and plant your seeds close to the window. Because the box has no drainage holes, be careful not to overwater. Tilting the box forward helps the roots grow against the clear side, making them more visible.
3. Bring or have students bring different fruits and vegetables to class. Have students make a chart classifying them as roots, stems, leaves, flowers, fruits or seeds. Suggestions include:

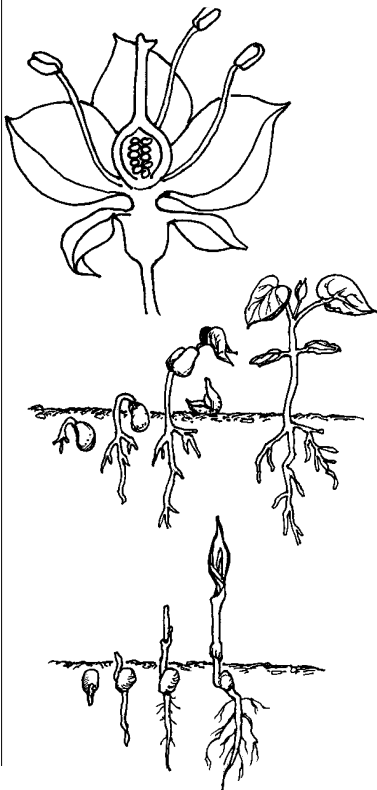
| | |
|---------|--|
| Roots | Carrots, sweet potatoes, turnips, beets, parsnips, radishes |
| Stems | Asparagus |
| Leaves | Lettuce, spinach, cabbage, kale, parsley |
| Flowers | Broccoli, cauliflower |
| Fruits | Tomatoes, cucumbers, peppers, squash, apples, oranges, pears, plums, cherries, mangoes |
| Seeds | Corn, peas, dry beans, rice, barley, oats, nuts, coconuts, sunflower seeds |

2



Plants at Work

Objective: To learn about some of the key processes of plants and to recognize their importance in our world.



Teacher background information

Along with knowing the basic plant structures, it is also important to understand some of the plant processes. We will look at *pollination*, *fertilization*, *germination*, *photosynthesis* and *transpiration*, as well as the *plant life cycle*.

Pollination and fertilization

Flowers contain female (the *pistil*) and male (the *stamen*) parts. The *pistil* resembles a vase, with a sticky opening called a *stigma*, a long tube called a *style* and a rounded base known as the *ovary*. The *stamen* is made up of a long *filament* that supports the pollen-producing *anther*. The female *ovary* contains an ovule that, when fertilized with pollen, becomes a new embryo or seed. After the pollen matures, it is released from the anther. Pollen then travels to the pistil and is collected by the sticky stigma. This process is called *pollination*. Then the pollen forms a pollen tube that grows down the style to the ovary. Once the pollen comes in contact with the egg, the flower begins to produce its seed and fruit. This process is called *fertilization*.

An important aspect of pollination is the pollen's traveling to the stigma. Pollen can be transported by wind, but often it needs more help from organisms known as pollinators. Insects and birds can be pollinators. For example, a bee collects nectar (sugary substance produced by a flower) and pollen from a flower to make honey. While it is collecting, small bits of pollen may stick onto its legs or body. When the bee moves to the next flower, it may brush against the stigma and leave some of this pollen, and therefore pollinate the flower. Flowers have special adaptations to attract pollinators, including fragrance, color, patterns and shapes.

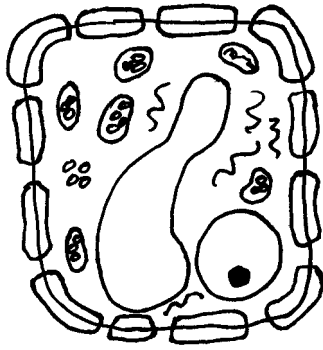
Germination

Germination is the process by which a seed begins to grow into a plant. To grow, each seed needs certain environmental conditions. Seeds wait until the environment is favorable for growth so that bad conditions do not hinder their growth. Most seeds require moist soil, oxygen (which helps them to turn their stored food into usable energy) and warm temperatures (68° to 85° F). Contrary to what some people believe, seeds do not need sunlight for germination. Available light may or may not be an important factor.

The first step in growth is the removal of the protective seed coat. Some seed coats are removed merely by being exposed to water. Others need a cold period (*stratification*) or a mechanical or chemical treatment (*scarification*) to break the seed coat. Once the seed coat is broken, the seed soaks up water, then sends out its roots and a shoot.

Each shoot has a *cotyledon* or seed leaf (not a true leaf) that helps provide initial energy. Seeds with one cotyledon are called *monocots* (corn); those with two cotyledons are called *dicots* (beans). Sometimes cotyledons stay below ground, but other times they break the surface in early stages of growth. Beans are good plants to use to show students cotyledons.

The seed grows using stored energy, which is eventually depleted. By the time the seed has used all of its energy, the plant should be able to produce its own food through photosynthesis.



Photosynthesis

Photosynthesis is important not only to the plant, but also to every creature on this planet. All life depends on plants for food and for the oxygen they produce during photosynthesis. Without plants and photosynthesis, humans would be unable to survive.

Cells in plant leaves have structures called *chloroplasts*, which contain the chemical *chlorophyll*. Chlorophyll captures light from the sun and converts it to energy. During photosynthesis, water taken in by the roots is put in the presence of chlorophyll with the stored light energy. The result of this encounter is then exposed to carbon dioxide taken from the atmosphere through leaf openings. The final products are carbohydrates or sugars (plant food) and oxygen. The extra oxygen produced is then released into the atmosphere for us to breathe.

Plants are unique in their ability to produce their own food through this process. Plants are producers of food; all other organisms are consumers.

Respiration

Carbohydrates (plant food) can be broken down into the energy that plants need for growth. This process also results in carbon dioxide and water.

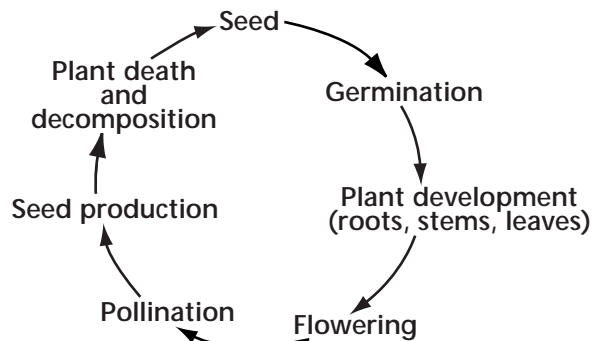
Transpiration

Plant leaf surfaces have small openings called *stomata*. Through these openings, oxygen and carbon dioxide are exchanged. Water can also move through these openings.

You may wonder how the roots absorb water and move it against gravity up to the leaves. They perform this feat by the pressure formed by a constant flow of water being pulled out of the plant. As a molecule of water exits the stomata via evaporation, it forces the roots to absorb more water to replace that molecule, just as liquid moves up a straw. If no water is available in the soil to replace this water, the plant wilts. This is why it is important to have water in the soil and not necessarily on the leaves.

Plant life cycle

Just as people grow from babies to adults, plants also have specific development stages. Below is a list of the stages and activities a plant undergoes during its life cycle. The life span of a plant and the time spent in each stage varies.



Activities



1. Make a seed viewer to observe the germination process. Roll a piece of construction paper and place in a clear plastic cup so that the paper touches all sides of the cup. Stuff crumpled paper towels into the center so that the paper is firm against the sides of the plastic cup. Place 3 to 4 seeds (dried bean or corn seeds from the grocery store work well) between the plastic cup and the construction paper. Moisten the paper towels. The seeds should sprout in 4 to 5 days.

An alternative to this activity is to place seeds on top of wet paper towels inside a closed plastic sandwich bag. This also allows you to watch germination.

2. Conduct experiments to test the effects of light and dark on seed germination and plant growth. Plant seeds in small pots and place half of them in a sunny location and the other half in a dark location (in a cabinet or closet). Keep both moist and at the same temperature. After a few days, record germination results on charts and compare.

Continue growing the plants in the light and dark locations. Compare the growth rate and plant color. Record results and then discuss the results in relationship to photosynthesis.

3. Look for water movement in plants. To see transpiration, put a small plastic sandwich bag over a leaf or a few leaves on a schoolyard plant. Return later in the day to check on the leaf. You should see moisture forming because of transpiration.

Another way to watch movement of water in plants is to put celery or white carnations in containers with water dyed with food coloring. As the plants take up this water, students can see how quickly water moves up the stems and where it goes.

4. Watch each stage of plant growth. Start by planting seeds, letting them grow until they produce flowers and new seeds. You could use fast-growing plants (such as Wisconsin Fast Plants) or those needing to grow all year (such as carrots).

3



Origins of New Plants

Objective: To start your own plants and gain more workable knowledge about growing plants.

Teacher background information

New plants can be produced in two ways: through *sexual* or *asexual* propagation. Sexual propagation involves planting seeds in soil. It is called sexual propagation because seeds result from pollination and fertilization. To start plants from seeds, remember to supply the right environmental conditions to meet the needs for germination (moisture, oxygen and warm temperatures).

You can sow seeds directly into a garden or start them in other containers (trays or peat pots) inside, then transplant them outside. An advantage to starting plants inside is that you can plant them earlier in the season and have them ready to move outside when weather permits. This is especially important in the spring. Transplanting can also protect seedlings from adverse weather conditions and animal consumers.

When planting seeds, take note of their spacing requirements. Plants need room to grow both above and below ground. If seeds are very small and hard to space when planted, you may plant many, but then thin them (pick out some of seedlings) once they sprout. Make sure to thin in early growth stages so that plants are not affected by overcrowding.

The second type of propagation is asexual, in which new plants arise from the vegetative parts (roots, stems and leaves) of old plants. Examples include *cuttings*, *layering*, *division* and *tissue culture*.

- **Cuttings:** A small piece of a plant can be cut off an existing plant and then forced to grow adventitious (growth in a nontypical place) roots or shoots. Some plants are better at adventitious growth than others. Plants easy to grow from cuttings include pothos, English ivy, philodendron, kalanchoe, begonias or coleus. Cuttings need high humidity for new growth.
- **Layering:** Layering involves forcing roots to grow in new places without removing pieces from the existing plant.
- **Division:** Many plants form clumps of young shoots. These can be dug up and divided to become new plants.
- **Tissue culture:** Small pieces of tissue can be taken from plants and grown in a culture medium. This can produce many new plants from a relatively small piece of an existing plant.

Activities

1. Study the importance of correct spacing. Plant five 4-inch pots of radish seeds (or some other type of fast-growing seeds). In the first pot, plant only one seed; in the second, plant five; in the third, 10; in the fourth, 15; and in the fifth, 20. Grow the seeds without thinning until the radishes are mature; then compare the sizes of the radishes in each pot. Measure the width of each radish and chart the results.
2. Buy a stock plant (a large plant with plenty of stems and leaves to cut from) and have the students take cuttings. You can root the cuttings in water or in soil. To root cuttings in water, fill clear plastic cups with water and cover them with clear plastic wrap. Secure the wrap with a rubber band. Stick the cutting into the cup through the wrap. Make sure no leaves are in the water.

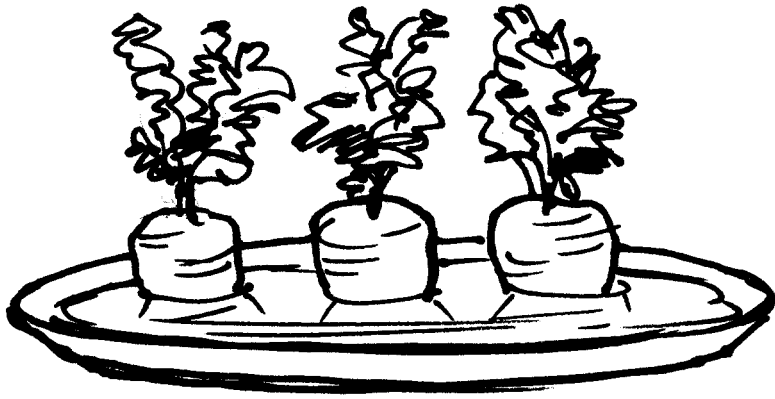


To root cuttings in soil, plant the new plant pieces in small pots filled with soil. Then create humidity by covering each pot with a plastic bag secured with a rubber band. The bag will keep moisture in and help with new root growth. Examples of easy-to-root plants include pothos, English ivy, philodendron, kalanchoe, begonias or coleus.

3. Start seeds in small pots to be transplanted later in your garden. Teach students proper plant care and allow them to thin extra seedlings. Not all seeds germinate, which is why you often plant more than one seed in each space container. Thinning is the process by which you remove excess seedlings to provide proper space for seedlings to grow. When seedlings are mature (have two sets of true leaves), plant them in a garden. If you do not plan to have a garden, the students can take the plants home.



4. Cut the tops off carrots and remove the leaves. Place the tops in a dish of water and watch the leaves resprout. Make snacks from the carrots.



4



Plants Eat, Too!

Objective: To learn what plants need for growth.

Teacher background information

To grow, plants need air, water, sunlight and nutrients from the soil.

Air

Plants need carbon dioxide and oxygen from the air in order to perform important processes (see Plants at Work).

Water

Plants take up nutrients from the soil through water. Water is also important to plants, as can be seen when plants wilt on hot, dry days. Plants are about 80 percent water.

Sunlight

Sunlight is needed for photosynthesis. A plant cannot produce its food without sunlight.

Nutrients

It is easy to understand that plants need water, air and sunlight. But the need for nutrients is sometimes more difficult to comprehend. There are two types of nutrients: *macronutrients*, which plants need in larger quantities, and *micronutrients*, which are needed in smaller quantities. Macronutrients include nitrogen, phosphorus, potassium, magnesium, calcium and sulfur. Micronutrients include iron, manganese, copper, zinc, boron, molybdenum and chlorine.

The most important nutrients are *nitrogen*, *phosphorus* and *potassium*. Nitrogen helps keep the plant green and encourages growth. Phosphorus promotes root growth and improves flowering and fruiting. Potassium is important for root development, overall growth and disease resistance. Plants take in these nutrients from the soil through their roots.

Usually the soil contains the necessary nutrients, but sometimes people need to add nutrients to poor soil. Nutrients can be added through man-made *fertilizers* (solid or liquid), *compost* (decaying plant material) or *mineral additives* (lime).

A special group of plants called *legumes* can help return nitrogen to the soil. They are sometimes called green fertilizers. Legumes include beans, peas and clover. Legumes have a type of bacteria called *Rhizobium* growing on their roots. These Rhizobia can take in nitrogen from the air, bring it into the soil and fix it into the form of nitrogen that plants can use. In return for the nitrogen, the Rhizobia get carbohydrates from the plant.

In farming practices, legumes are often planted as cover crops when other crops are not being grown. Legumes are planted on unoccupied land and allowed to grow until they begin to flower. Then the stems and leaves are cut off but the roots are left in the soil to decompose. The legumes leave behind a good supply of nitrogen for new plants to use.

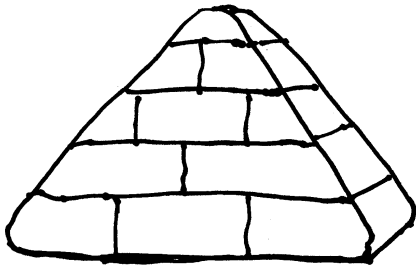
These additives can improve the nutrient content in soil or compost:

| Additive | Nutrient supplied |
|--------------------------|---|
| Slow-release fertilizers | Check labels; usually nitrogen, phosphorus, potassium |
| Lime | Calcium |
| Compost | Nitrogen (perhaps more, depending on the compost) |
| Bonemeal | Phosphorus |
| Fallen leaves | Nitrogen, phosphorus, potassium |
| Grass hay | Nitrogen, phosphorus, potassium |
| Legume hay | Nitrogen, phosphorus, potassium |
| Egg shells | Calcium |
| Sawdust | Nitrogen, phosphorus, potassium |
| Straw | Nitrogen, potassium |
| Corn stalks | Nitrogen, phosphorus, potassium |
| Nut shells | Nitrogen |
| Pine needles | Nitrogen, phosphorus, potassium, iron |

Activities

1. Analyze your school's soil. You can buy soil-testing kits (one source is the Let's Get Growing Co., 1-800-408-1868) or contact your county Extension service for information on soil testing. There is a \$10 to \$50 fee for soil testing at the state Extension lab.
2. Improve your soil. Once you have analyzed your soil, determine as a class what the soil needs. Next, let the students research different additives and come up with their own recipe to improve the soil.
3. Conduct experiments by growing plants in different soils and using different types of additives (fertilizers and compost). For example, grow plants in different media, including sand, soil from your school yard and store-bought potting mix or compost. Let students keep charts of growth observations.

5



Food Guide Pyramid

Objectives: *To learn about the food guide pyramid and general daily intake requirements. To show how plants are integral to all levels of the pyramid.*

Teacher background information

Nutrition has been taught in numerous ways and in multiple models. The food guide pyramid is the most recent development in nutrition education. It was developed by the U.S. Department of Agriculture to demonstrate the daily ingredients needed for a healthy diet. The pyramid divides foods into six classifications and shows the recommended daily servings for each food group.

The base of the pyramid is made up of the breads, cereals, rice and pasta group, which also represents the base of a healthy diet. People should eat six to 11 servings from this group.

The next level includes fruits and vegetables. It is recommended that individuals consume three to five servings of vegetables and two to four servings of fruits. A new campaign, “Five-a-Day for Better Health,” has been devised to encourage people to eat more fruits and vegetables. The average American child eats two and a half fruits and vegetables a day. The “Five-a-Day” campaign’s goal is to increase this number to five.

The next level, divided into two sections, includes the milk, yogurt, and cheese group and the meat, poultry, fish, dry beans, eggs and nuts group, with two to three servings of each recommended. The top of the pyramid represents foods that should be eaten sparingly or occasionally. This group includes fats, oils and sweets. Sodium is not specifically mentioned in this group’s title, but should also be limited because consuming too much sodium may contribute to high blood pressure.

The pyramid is designed so that foods needed in the largest quantities are at the bottom and those needed in the smallest quantities at the top. Because plants are directly responsible for foods in the bottom three food groups, it is easy to see that they play a key role in the human diet. It is important to have a balanced and healthy diet. Each person needs to eat items from all groups. Foods should not be classified as “bad” or “good” but instead should be labeled to be frequently, sometimes or occasionally eaten. Foods recommended only for occasional consumption are not bad, but just need to be limited.

An example is sugar. Sugar has a bad reputation because eating too much can cause tooth decay and obesity. It is often found in foods with little nutritional value. However, it is not harmful in moderation. Sugar is found naturally in many of our important foods, such as fruits, vegetables and milk. Although it should be limited in foods in which it is a main ingredient, such as soft drinks, desserts and candy, it does not need to be avoided altogether. Similarly, we need to control the amount of fat in our diets, but not eliminate it, because it is necessary for many bodily processes.

The USDA has devised these guidelines to help in planning a healthy diet:

- Eat a variety of foods.
- Maintain a desirable weight.
- Choose a diet low in fat, saturated fat and cholesterol.
- Choose a diet with plenty of vegetables, fruits and grain products.
- Use sugars only in moderation.
- Use salt and sodium only in moderation.

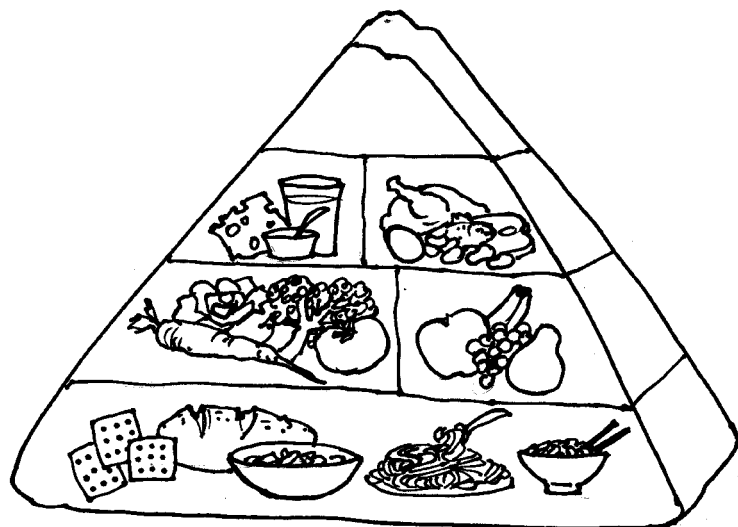
Healthy guidelines often work in conjunction with societal, cultural and religious practices to determine what people consume. What we eat affects our physical, mental and psychological states. We can improve the quality of our lives by improving the quality of our diets. To improve our diets, we need to be well-informed about what makes up a healthy diet. We can begin by learning and understanding the components of the food guide pyramid.

A key to using the food guide pyramid is to understand what makes up a serving of a particular food. This chart provides some examples to help in visualizing a serving size.

Examples of Serving Size

| Food Group | One Serving |
|---|--|
| Bread, cereal, rice and pasta | 1 slice of bread, 1 package of instant oatmeal, 1/2 bagel, 3/4 cup of cereal, 1/2 cup cooked cereal, rice or pasta |
| Vegetable | 1 cup of raw leafy vegetables, 1/2 cup of other cooked or raw vegetables, 3/4 cup of vegetable juice |
| Fruit | 1 medium apple, banana or orange, 1/2 cup chopped, cooked or canned fruit, 3/4 cup fruit juice |
| Milk, yogurt and cheese | 1 cup milk, 1 cup of yogurt, 1 1/2 ounces of natural cheese, 2 ounces of processed cheese |
| Meat, poultry, fish, dried beans, eggs and nuts | 2-3 ounces of lean meat, poultry or fish, 1/2 cup cooked dry beans, 1 egg, 2 tablespoons of peanut butter* |

*1/2 cup cooked dry beans, 1 egg and 2 tablespoons of peanut butter are equal to 1 ounce of meat.



Activities:

1. Discuss the origin of a typical meal, such as a cheeseburger and french fries. Then let each child analyze the parts of his/her favorite meal.

For example:

burger → beef → cow → feeds on hay or grains.

You should find that plants are the basis for most of your foods.

Origins of some common foods:

Ketchup – tomatoes, sugar cane, spices

Hamburger, cheese – cows (which eat plants)

French fries – potatoes

Peanut butter – peanuts

Grape jelly – grapes, sugar cane

Spaghetti – wheat

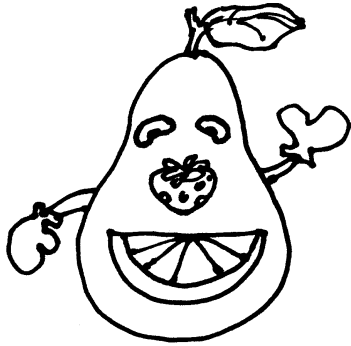
Cornflakes – corn

Crackers – wheat

Pickles – cucumbers

2. Plan a menu for the day that uses the correct number of recommended servings from the food guide pyramid.
3. Tell students about the “Five-a-Day” Campaign (each state has its own campaign representative) and then have them make up their own plan to encourage other students to eat better. They can make posters with healthy foods or the food pyramid, display unusual vegetables or fruits, or create brochures. Let them display their work for the other students.

6



You Are What You Eat

Objective: To learn about the necessary vitamins and nutrients for proper nutrition and relate vitamins and nutrients to fruit and vegetable intake.

Teacher background information:

Just as plants have certain needs to live and grow, people also have specific requirements. Humans need *proteins, fats, carbohydrates, water, minerals* and *vitamins*. No single food contains all the necessary nutrients, so we need a variety of foods to have a balanced diet. We will look at each one of the nutrients needed in depth and explain what they are, what they do in the body and how we can get them. **Examples of plants that are key to each group are in bold type.**

Protein

Description: Proteins are made up of chemical compounds called amino acids. Our bodies need 22 different types of amino acids. Our bodies can manufacture 13 of these amino acids, but we must consume food containing the other nine “essential amino acids.” A food containing all nine of the essential amino acids is classified as a complete protein. Protein from animal sources such as meat, fish and poultry are usually complete. A food that does not contain all nine is classified as an incomplete protein. Most plant foods, such as beans, rice and corn are incomplete proteins, but when eaten in the right combinations can supply all essential amino acids.

Functions: Protein helps the body build and repair tissue; provides energy; regulates body functions; helps transport nutrients and oxygen.

Sources: Meat, fish, poultry, eggs, dairy products, **nuts, dried beans, peanut butter.**

Fats

Description: Although many people view fats negatively, and the new trend is to eat fat-free or low-fat foods, fats are actually vital for our body to function properly. As long as no more than 30 percent of our daily intake comes from fat, we will get our daily requirements and perhaps decrease the risk for heart disease and obesity. Once again, moderation is the key.

There are three types of fats in foods: *saturated, monounsaturated* and *polyunsaturated*. Fats are classified by how solid they are at room temperature. The least solid fats are best for your body.

Polyunsaturated fats are the least solid, and are found in some cooking oils, peanut butter and soft margarine.

Monounsaturated fats are a little more solid at room temperature and are found in some cooking oil, olive oil and some peanut butter.

Saturated fats should be restricted in a diet. They are found in butter, chocolate, egg yolks, lard and shortening.

Functions: Fats are a source of stored energy; help absorb and transport specific vitamins (fat-soluble vitamins A, D, E and K); cushion vital body organs; supply essential fatty acids; insulate the body; protect nerves and blood vessels.

Sources: Butter, cheese, mayonnaise, **olives, avocado, coconut, nuts, margarine, vegetable oils, bacon.**

Carbohydrates

Description: Carbohydrates should be consumed most frequently because the body relies on them for energy. There are three types of carbohydrates: **sugars, starches** and **fiber**.

Sugars are the simplest form found in the body and the easiest to use. They can be consumed to provide quick bursts of energy. Sugars are divided into two groups, *monosaccharides* (glucose, fructose, and galactose) and *disaccharides* (sucrose, maltose and lactose). Monosaccharide means “one sugar.” It has the simplest molecular structure. Dissaccharide means two sugars; it is made up of two monosaccharides combined. Simple sugars are found in fruits, milk, and table sugar.

The other two types of carbohydrates, starch and fiber, are considered *polysaccharides*. Polysaccharides are made up of more than two sugars and have the most complex molecular structure. **Starch**, found in roots, legumes, grains and vegetables, is changed into a simple sugar to be used by the body. **Fiber**, also called cellulose, is found only in plant foods and cannot be digested by humans. Sources include whole grain cereals, fruits and vegetables. Fiber is an important aid in moving food through the digestive system and out of the body.

Functions: Carbohydrates are our main source of energy. They also aid with digestion.

Sources: **Breads, cereals, rice, pasta, corn, fruits, potatoes, vegetables.**

Water

Description: Water is an important component for both plants and people. The human body is 70 percent water. Plants are 80 to 95 percent water.

Functions: Helps with digestion; helps lubricate bones and joints; regulates body temperatures.

Sources: Found in almost all foods and beverages.

Minerals

Description: Minerals are non-organic substances the body needs to function properly. Those needed in large quantities are called macrominerals (calcium, phosphorus, magnesium, sodium, potassium, chloride); those needed in smaller quantities (iron, iodine, zinc, fluorine) are called *microminerals* or *trace elements*.

Functions: See chart.

Sources: See chart.

Macrominerals

| Mineral | Function | Source |
|--------------------------------|--|---|
| Calcium | Needed for strong bones; helps with blood clotting; muscle use and nerve functions | Milk, milk products, added to orange juice, leafy dark green vegetables, broccoli |
| Phosphorus | Helps build strong bones and teeth | Meat, poultry, liver, fish, eggs, milk, dairy products, whole grains, nuts, legumes, potatoes, wheat flour |
| Magnesium | Helps regulate temperature, the nervous system and muscles helps the body use carbohydrates, fats and proteins | Dark green leafy vegetables, and nuts, legumes, whole-grain cereals, cheddar cheese |
| Sodium, chloride and potassium | Work together to regulate body fluids, the nervous system, muscle functions and nutrient absorption | Sodium and chloride: table salt; potassium: meats, milk, bananas, leafy green vegetables, citrus fruits |

Microminerals

| Mineral | Function | Source |
|----------------|--|--|
| Iron | Important for hemoglobin, the protein that carries oxygen in the blood | Liver, egg yolks, dried legumes, leafy green vegetables, dried fruit, enriched breads |
| Iodine | Necessary for the thyroid | Glandiodized salt, ocean fish, milk |
| Zinc | Helps lungs release oxygen; helps the immune system | Oysters, egg yolks, organ meats, milk, wheat bran |
| Fluoride | Prevents tooth decay; contributes to healthy bones | Drinking water, sea-food, tea, toothpaste |

Vitamins

Description: Vitamins are organic compounds that help the body in many ways. Fat-soluble vitamins are consumed in various foods and then stored in body fat until needed by the body. Water-soluble vitamins dissolve in water and therefore cannot be stored in the body; they need to be consumed every day.

Functions: See chart

Sources: See chart

Water-soluble vitamins

| Vitamin | Function | Source |
|------------------------------|---|--|
| Vitamin C (ascorbic acid) | Helps fight infection and heal wounds; helps body to absorb iron and calcium, | Oranges, citrus fruits, cantaloupe, strawberries, dark leafy green vegetables, broccoli, cabbage, green peppers |
| B Vitamins: | | |
| Thiamin (B1) | Helps body use carbohydrates and release energy from foods | Whole-grains, peas, potatoes, pork, liver |
| Riboflavin (B2) | Helps body use carbohydrates | Cheese, eggs, enriched breads, leafy green vegetables , lean meats, legumes |
| Niacin (B3) | Important to the nervous system and digestive tract | Liver, lean meats, whole grains, nuts, legumes |
| Folate | Helps with production of red blood cell | Broccoli, wheat germ, wheat bran, yeast, leafy green vegetables , liver, legumes |
| Biotin | Helps use carbohydrates, fats and proteins | Bananas, grapefruit, watermelon, strawberries, mushrooms, tomatoes |
| Pantothenic Acid | Helps body use fat and helps in production of hormones and cholesterol | Meats, poultry, egg yolk, wheat germ, rice germ, tomato paste, sweet potatoes, oatmeal , milk |
| Pyridoxine (B6) | Helps nervous system function; maintains healthy skin and red blood cells | Liver, meats, cereals, bran, oatmeal, vegetables , milk |
| Cyanocobalamin (B12) | Necessary for normal growth | Liver, muscle meats, eggs, chicken, milk |

Fat-soluble vitamins

| Vitamin | Function | Source |
|--|--|---|
| Vitamin A (retinol) | Helps with night and color vision; contributes to growth of bones and teeth; helps to produce healthy skin | Carrots, sweet potatoes, spinach, broccoli, apricots, cantaloupe, peaches, whole milk, liver, butter |
| Vitamin D (calciferol) | Development of bones and teeth; helps body absorb and use calcium and phosphorus | Sunlight, added to milk products, egg yolks, liver |
| Vitamin E (alpha tocopherol) | Helps to protect cells and tissues and keep them strong | Vegetable oils, wheat germ, whole-grain bread, cereal products, green leafy vegetables |
| Vitamin K (phylloquinone and menaquinone) | Needed for blood clotting | Green leafy vegetables, broccoli, peas vegetable oil, soy-bean oil, liver, cheese and eggs |

Activities

1. Test common foods for carbohydrates, fats, sugar, protein, etc. In all experiments, have students hypothesize which nutrients they think they will find in the foods, collect data and then analyze the results.

Test for vitamin C

Make a vitamin C indicator: Stir a teaspoon of cornstarch into a cup of boiling water. Cool the liquid. Next add drops of iodine until the mixture turns blue.

Pour a small amount of the vitamin C indicator into a few test tubes or small clear glasses. To use the indicator, add drops of substances containing vitamin C (fresh or frozen orange juice, or other drinks claiming to contain vitamin C). Adding drops of vitamin C will slowly make the blue color disappear. Record the number of drops it takes to cause the blue color to completely disappear, so that you can compare the vitamin C content of the different substances. The more drops it takes for the color to disappear, the less vitamin C is present. Chart the results and discuss your findings. Look for answers on product nutrition labels.

DANGER: Iodine is poisonous and should not be ingested.

Test for carbohydrates

Simple carbohydrates (sugars):

Test foods for sugars with an indicator called Tes-tape™ Tes-tape is a chemically treated paper used frequently by diabetics who have to limit their sugar intake. It is available at pharmacies.

Gather a collection of foods (milk, sugar dissolved in water, flour dissolved in water, fruits, vegetables, soft drinks, etc.). Have students

hypothesize which products they think will contain sugar then perform the experiment. Let students dip 1-inch strips of Tes-tape in different liquids or juices of different foods. Interpretation of the indicator will be given when purchased. Chart the results and discuss your findings.

Complex carbohydrates (starch)

Test food samples to see if they contain starch (a type of carbohydrate) by putting a drop of iodine on the food. If the drop results in a purple or a blue-black color, then it contains starch. The darker the color, the more starch it contains. Check the results with product nutrition labels.

DANGER: Iodine is poisonous and should not be ingested

Test for fat

Test for fat by rubbing a piece of food on a square piece of brown paper until it leaves a wet spot (or just add a drop if it is a liquid). Let the square dry. To test if the food contained fat, hold the dry square up to the light. If it left a greasy, translucent spot, then the food had fat in it. Before beginning, have students write down predictions and then compare with the results.

Test for proteins

DANGER: This experiment uses poisonous solutions and should be conducted carefully.

Prepare a sodium hydroxide solution by putting one layer of sodium hydroxide pellets on the bottom of a 1-quart jar. Add one pint of water and stir with a stirring rod until pellets are dissolved.

Prepare a copper sulfate solution. Dilute 20 grams of copper sulfate in 62 milliliters of water.

To test for protein, fill a jar with $\frac{3}{4}$ inch of sodium hydroxide solution. Add a small crumbled food sample (carefully, without splashing). Add a few drops of copper sulfate solution. A pinkish-blue color indicates that protein is present. Repeat with other foods. Chart and discuss the results.

2. Learn to identify the vitamins and minerals found in foods. Create a chart or brochure to take home and share.
3. Design a garden to grow plants that can provide needed vitamins and minerals.
4. Study a vegetable in depth with a special Vegetable Spotlight bulletin board. An example spotlight for carrots follows.

Carrots

Origin

Carrots originated about 3,000 years ago in Middle Asia. Traders and travelers spread them quickly to the Mediterranean region. The first carrots looked very different from today's carrot. Their edible roots were white, purple and yellow, not orange. The orange carrot was not developed until the 1600s by the Dutch.

Nutritional benefit

Carrots have many nutritional benefits. They are high in beta carotene, which gives them the orange/yellow color. Beta carotene is used in our bodies to make vitamin A, which we need for healthy skin, bones and teeth. It also helps our night and color vision. Studies have shown that beta carotene may also help lower the risk of cancer and other diseases. Eating one carrot can satisfy our daily requirement of vitamin A. Carrots are also a good source of fiber, potassium and vitamin C.

Varieties

Carrots can be found in many shapes and sizes: long, short (a popular variety used for mini-peeled carrots is called "Caropak"), and even maroon carrots. Texas A&M University has just developed a carrot called "Betasweet" that is orange on the inside and maroon on the outside. These new carrots have more beta carotene and a sweeter flavor than regular carrots.

Packaging

Carrots come in a variety of packages. You can buy them whole with their leaves attached, prepackaged into strips, prepackaged into baby strips, prepackaged into horizontal chips, canned and frozen.

7



Going to the Market

Objective: To learn how to be an informed consumer of fruits and vegetables.

Teacher background information:

Now that you know what you should eat, it is important to learn how to select the right foods. The Food and Drug Administration requires packaged foods to have informational labels explaining:

- What the food is;
- Name and address of the manufacturer;
- Packer and distributor;
- Weight of the product;
- Ingredients, listed in order of weight; and
- Dietary information.

Learning how to read and understand these labels help consumers be more informed and make smarter eating choices. Labeling guidelines have been evaluated and revised continually since they were first established in 1938. Remind students that because advertisements do not always give complete information, they need to be careful about their choices and not be swayed by fancy packages and wrappers.

Shopping for fruits and vegetables is a little different from shopping for other foods. You need to select produce based not only on content but also on quality. Although produce has standards, it is not standardized; for example, all apples in a stack are not exactly alike, unlike other products. The Greengrocer, Curtis Aikens, offers four criteria for buying produce:

Look: Color can indicate the ripeness of fruits and vegetables. To determine this, you must know what color it should be. Also check for bruises and scars. Most fruits and vegetables have some type of protective cover or peel. Any cut in a peel is a site for insects, microorganisms or pesticides to enter. Do not buy produce with scars or bruises.

Smell: As fruit ripens, the sugar content rises and the smell increases; the stronger the smell, the more ripe the fruit. This can be helpful with fruits like cantaloupes, which have a thick outer shell. If a fruit smells too sweet or a vegetable smells sour, it may be too ripe.

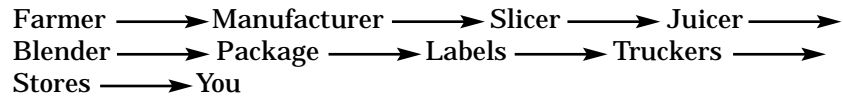
Touch: Ripe fruits and vegetables should be firm to the touch but give a little to slight pressure. If it is too hard, it probably is not very ripe ; if it is mushy soft, it is too ripe.

Season: Have you ever noticed that grocery stores have fruits and vegetables during the winter when nothing is growing outside? Much of our produce is imported from other countries or southern states (California, Texas and Florida) in order to offer the same products year-round. The freshest vegetables and fruits are those in season. Find out where the produce in your local grocery store was grown. Do you have a farmers' market nearby? Where does the produce originate for the market?

The road to your store

Fruits and vegetables usually move through many hands before they appear on your table. They first are grown on farms. Farmers sell them to manufacturers or wholesalers, who then process the produce or send it to grocery stores, where consumers buy them. To get the full effect of this process, follow an orange from tree to juice to see how many hands

it goes through before it reaches the consumer.



Fruits and vegetables are moved through this process as quickly as possible to keep them fresh.

Foods differ in how much they are processed. Foods requiring little or no processing are called “natural” foods. Many fruits and vegetables fall into this category, such as fresh lettuce, carrots or apples. Others are minimally processed, such as whole-wheat flour or precut fruits and vegetables. We also have foods that are highly processed, having been combined with other ingredients including chemical additives and preservatives, such as fruit jellies and juices.

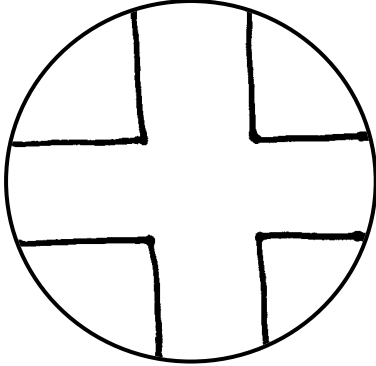
Activities

1. Practice reading labels. Give each student a copy of a nutritional label, point out each section and explain what it tells about the product. Remember that the daily requirements listed are for average adults and may need to be changed for children and youths. Let them bring in a label from their favorite food and analyze it on their own. Also, look at ingredient labels. Many products might be interesting to compare, such as fruit juices and fruit drinks. Many fruit drinks actually contain no real fruit juice.

Make a dish from a recipe (it could be something as easy as muffins, or more difficult, such as a meal) and then create your own label and list of ingredients. Ingredients are listed in a specific order. The ingredient making up the highest percentage of the product is listed first and then it continues in descending order.

2. Judge fruits and vegetables. Bring in different fruits and vegetables (from your garden or grocery store) and rank them by quality. You may set up a contest with vegetables from your school garden for categories such as biggest, tastiest, funniest look, etc.
3. Visit a local grocery store or farmers’ market or bring in a guest speaker from one of these locations. Have an expert teach students about marketing fruits and vegetables.
4. Conduct a taste test of carrots in their various forms to compare the different types, including fresh samples from your garden or a farmers’ market. Carrots are sold whole, prepackaged into strips, prepackaged into baby strips, prepackaged into horizontal chips, canned and frozen. Discuss flavor and texture differences.

8



Safety First

Objective: To teach students how to safely harvest fruits and vegetables and how to handle and store foods properly.

Teacher background information

Food manufacturers and grocery stores are careful to provide the appropriate environmental conditions for your foods and are required to do so by law. Therefore, it is important to know how to keep food safe once you bring it home.

Eating food that has been handled improperly can result in a food-borne illnesses caused by *microorganisms*. Microorganisms are small organisms that can be seen only with a microscope. The types of microorganisms affecting foods are molds, yeast and bacteria:

- *Molds* are a type of fungus that can be detected visually. They can be any color, but often are shades of green, blue or white. They can attack food under almost any condition.
- *Yeast* is also a type of fungus affecting foods with sugar, and causes food to ferment. Yeast can be detected by a discoloration of the food and by odor.
- *Bacteria* are single-celled organisms that usually cannot be detected visually like yeast or molds. Most illnesses are caused by bacteria.

Many microorganisms are in the air, soil and water; we usually have some in our bodies. Unless many are present, they do not affect our health. Microorganisms thrive in environments that have food, moisture and warm temperatures. They can be carried by insects, animals, people or unclean objects (like dirty utensils). To prevent food spoilage by microorganisms, consumers should store their food for the right amount of time (food does not last forever) and at the right temperature (temperature varies by the food). Also, wash hands and utensils with soap and hot water and dry them before they come into contact with food.

Temperature is a big factor in food safety. Cold slows the growth of microorganisms, which is why we need refrigerators. Keep refrigerators at 36 to 40 degrees F. This temperature does not kill microorganisms, but does slow their growth. Microorganisms can be killed at temperatures higher than 140 degrees F, which is why we often boil objects to sterilize them. Most are killed in the cooking process. However, once the food cools, microorganisms return.

Most fruits and vegetables can be stored at room temperature without spoiling, but they last longer if kept in a refrigerator. Fruits and vegetables continue to mature or die after being harvested. Grocery stores often wax fruits and vegetables to improve their appearance and slow down the loss of water. Before eating fruits and vegetables, wash them to remove any dirt, insecticide residue or display wax.

To harvest fruits and vegetables, use a clean harvest knife or clippers to cut ripe fruits and vegetables off the plants. Be very careful with sharp harvest equipment. Collect produce in a harvest basket or container. Discard (place in compost) vegetables or fruits with insect holes or rotting spots. Damaged areas are places where microorganisms may be able to enter. Thoroughly wash the produce to remove any dirt or chemicals that may have been used in the garden.

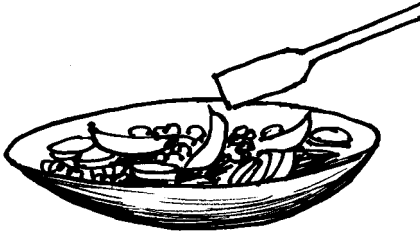
Some tips to keep food safe:

- Keep cold foods cold and hot foods hot.
- Wash all utensils before use with hot, soapy water.
- Keep stored food covered in tight containers, foil or plastic wrap to limit air exposure.
- Oxygen increases decay time.
- Wash hands before touching food (make sure to scrub the whole hand with soap and warm water – even under fingernails).

Activities:

1. Demonstrate harvesting in your garden or visit a local farm operation or grocery store to learn about their safety precautions.
2. Have students create a poster to take home to help remind them of safety tips.
3. Wash a potato in a clear glass bowl. First, just dip it in the water and ask the class if they think it is clean. Next, return it to the water and scrub with a brush. This should demonstrate the importance of cleaning food thoroughly.

9



Cook Up A Storm

Objectives: *To learn some basics about food preparation and participate in hands-on experiences. To have the opportunity to taste various fruits and vegetables.*

Teacher background information:

Preparing and cooking healthy foods is an important activity that teaches children good nutritional behavior. It gives students an enjoyable way to apply their knowledge about food selection and safety.

If you have a class garden, one of the students' greatest rewards is eating fruits and vegetables they have cared for lovingly. With or without a garden, the classroom can be a place for children to taste fruits and vegetables they may or may not have tried before. Children often dislike produce items because they have never had the opportunity to taste them. However, if you give them the chance to try new foods, they may find out that they actually like healthful foods.

It is also good to demonstrate how quick and easy healthful cooking can be. Many adults complain that they do not have time to cook healthful food and, therefore, have poor diets. If kids learn early the benefits of cooking, they may not consider food preparation a habit rather than a hassle.

Preparation can vary. Many fruits and vegetables are eaten in their raw or natural forms. However, they can also be tasty cooked. When cooking fruits and vegetables, be careful not to overcook and destroy important vitamins and minerals. The best forms of cooking for nutrient retention include microwaving, steaming and stir-frying. Boiling and frying often leach nutrients and lower the nutritional value of the fruits and vegetables.

Some tips for nutrient retention:

- Avoid overcooking. Increased exposure to heat increases the loss of vitamins.
- Cut fruits and vegetables in large pieces and chop immediately before eating to avoid overexposure to oxygen.
- Refrigeration usually reduces nutrient loss.
- Rinse in cold water, but do not soak (soaking can cause loss of water-soluble nutrients).
- Use raw fruits and vegetables.

The most important thing is to keep it fun. Make cooking an activity kids will enjoy for the rest of their lives.

Activities:

1. Make a classroom cookbook with the recipes that students bring from home.
2. Cook and taste unique fruits and vegetables. Have students come up with an advertisement to entice people to try an unusual fruit or vegetable. Examples include kiwifruit, mango, blackberries, papaya, rutabaga, kohlrabi and sprouts.

If you have a garden, you can plant unusual plant varieties such as maroon carrots, black lettuce, blue corn, yellow watermelon, lemon cucumbers, burgundy beans, yellow pear tomatoes, chocolate green peppers, gold potatoes or white eggplant.

3. Cook some easy recipes. Recipes can be found in special cookbooks for kids, in magazines and on the Internet. Here are a few ideas to get you started:

Banana Wheels

Bananas
Orange juice
Wheat germ

Slice bananas, dip in orange juice and roll in wheat germ.

Homemade Peanut Butter

1 cup salted shelled peanuts
1 tablespoon peanut oil
Crackers, bread or celery

Mix peanuts and peanut oil in blender until smooth (may take several minutes). Turn off the blender and scrape the sides with a rubber spatula occasionally to push mixture down into the blender. Blend for a few more minutes. Let each student taste the peanut butter on crackers, bread or celery.

Salsa

3 cups fresh tomatoes, peeled
1/2 cup finely chopped red onion
2 tablespoons finely chopped fresh coriander
1 or 2 jalapeño peppers, finely chopped
Salt and pepper to taste

Blend tomatoes in food processor or electric blender until they are coarsely chopped. Place into bowl with other ingredients and mix well. Serve with chips.

Saltless Seasoning (a substitute for salt)

1 teaspoon ground celery seed
2 1/4 teaspoons crushed marjoram
2 1/2 teaspoons crushed summer savory
3/8 teaspoon crushed thyme
1 1/2 teaspoons crushed basil

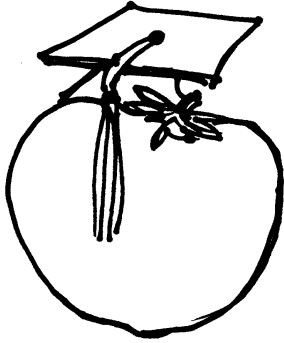
Mix all ingredients.

Carrot Salad

6 medium grated and peeled carrots
1 cup raisins
3/4 cup sunflower seeds
3/4 cup sesame seeds
1 to 2 cloves diced garlic
2 tablespoons lemon juice

Mix all ingredients together and let the salad sit for at least an hour for the flavors to blend.

10



Health Smart

Objective: *To discover resources in your community and throughout the world to help with nutrition education.*

Teacher background information

In today's world, where available information can double in the blink of an eye, it is important for educators to provide students with a strong base of knowledge. Equally important is to show students how to find necessary resources, to answer additional questions and to keep up to date with the latest information. Following is a list of local, state, national and international nutrition information sources. Take time to teach kids how to teach themselves.

Activities

1. Bring in a local dietitian as a guest speaker. Make sure students have time to ask questions. You may be able to find one at the school, at a hospital or a college.
2. Explore the Web. A lot of information is available through the Internet. Here are a few suggestions for resource sites:

Nutrition sites

<http://aggie-horticulture/nutrition/index/index.html>

This site was developed to accompany the Nutrition in the Garden Guide.

<http://www.dole5aday.com/>

A site sponsored by Dole for the Five-A-Day campaign. It has excellent nutritional information about a variety of fruits and vegetables in a child-friendly format (students can learn from Bobby Banana).

<http://www.kidsfood.org/index.html>

This site is called the Kids Food Cyber Club and is sponsored by the Connecticut Association for Human Services and Kaiser Permanente. It has information for students, teachers and parents and even includes interactive nutritional quizzes. Children will enjoy browsing through the "Kids Only" section.

<http://www.cspinet.org/>

This site is by the Center for Science in the Public Interest, which publishes the Nutrition Action Healthletter. It also has a section just for youths and is a place to find recent nutrition information.

Gardening sites

<http://www.nmnh.si.edu/garden/>

This attractive site was developed for a special gardening project called Seeds of Change that combines gardening and history. It was created by New Mexico State University's College of Agriculture and Home Economics and sponsored by the Smithsonian. It is an excellent place for ideas and information.

<http://aggie-horticulture/kindergarden/index.html>

This site developed at Texas A&M University provides general garden information and links to other useful sites.

Hundreds of other web sites may be used by your class. These are just a few to start your exploration. You may even decide to create your own site, based on your classroom experiences.

3. Write a letter requesting information from or asking a specific question to a local or national organization.

Local organizations

Food Services/ Cafeteria Staff
Dietitians (hospitals, health care centers, school districts)
County Health Department
Local Extension Service

National

**Center for Food Safety
and Applied Nutrition**
Food and Drug Administration
200 C St. S.W., Room 3321
Washington D.C. 20204
202-332-9110

**Food and Drug
Administration,
Consumer Inquiries**
5600 Fishers Lane
Rockville Maryland 20857
301-443-3170

**Food Safety and
Inspection Service,
Information Division**
Department of Agriculture
14th St. and Independence
Ave. S.W.
Washington, D.C. 20250
202-447-9113

American Cancer Society
Medical Library
4 West 34th St.
New York, NY 10001
212-736-3030

**American Diabetes
Association**
505 8th Ave.
New York, NY 10018
212-947-9707

**American Heart
Association**
7320 Greenville Ave.
Dallas, TX 75231
214-750-5300

Centers for Disease Control
Office of Public Affairs
1600 Clifton Road N.E.
Atlanta, Georgia 30333
404-329-3286

**Beltsville Human Nutrition
Research Center**
Ag Research Service
S. Department of Agriculture
Room 223, Bldg. 308
Beltsville, MD 20705
301-244-2157

National Cancer Institute
NIH Bldg. 31, Room 10A18
Bethesda, MD 20892
301-496-5583

**Community Nutrition
Institute**
2001 S. St. N.W.
Washington, D.C. 20009
202-462-4700

**Human Nutrition
Information Service**
Food and Consumer Services
U.S. Department of Agriculture
6505 Belcrest Road
Hyattsville, MD 20782
301-436-7725

**National Health Information
Clearinghouse**
P.O. Box 1133
Washington, D.C. 20013
800-336-4797

**President's Council on
Physical Fitness**
450 Fifth St. N.W., Room 7103
Washington, D.C. 20001
202-272-3421

**Tufts University Diet and
Nutrition Letter**
80 Boylston St., Suite 353
Boston, Massachusetts 02116
617-482-3530

**American Dietetic
Association**
126 W. Jackson Boulevard,
Suite 800
Chicago, IL 60606-6995
800-366-1655

**Nutrition Education and
Training Program**
Texas Department of Human
Resources
The Library 434-W
701 West 51st Street
P.O. Box 2960
Austin, TX 78769
512-450-3530

Food Marketing Institute
1750 K St. N.W.
Washington, D.C. 20006
202-452-8444

Food Processors Institute
1401 New York Ave, N.W.,
Suite 400
Washington, D.C. 20007
202-393-0890

**Grocery Manufacturers of
America**
1010 Wisconsin Ave. N.W.,
Suite 800
Washington, D.C. 20007
202-337-9400

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