

HUMANS AND PLANTS

Background Information

From the time when humans first appeared on Earth they have used plants in their daily lives. They began by using plants as a source of food and gradually added other uses such as clothing, housing, medicines, and dyes.

This first part of this section discusses plants used for food, textiles and dyes, and for lumber. Medicinal plant uses will be covered in 9–12s Botany. The second part of this section discusses the care of indoor and outdoor plants, in particular those that are completely dependent on people for their survival.



Plants — Food

The use of plants for sustenance goes back to early hunter-gatherer tribes. Later, people began growing their own food. In many parts of the world, growing food has become a fine art and a major industry. Not only do farmers grow staple crops, but

specialty crops have been developed to meet the needs of consumers always looking for better or tastier products. In some of the developing countries of the world, however, family groups still grow just enough food to feed themselves.

Staple foods

Of the quarter of a million plant varieties that could be grown for food, only 150 are farmed on a large scale. Of these, twelve species make up three-quarters of the world's food supply from plants. The most widely grown plants are grasses, particularly, cereals. **Cereals** are grasses that produce seed-like fruits called **grains** that are used as food. These plants supply most of the food needs for most of the people on earth. The most widely cultivated cereals are wheat, rice, and corn.

Wheat is a grass that grows about 4 ft (just over 1 m) tall. The leaves are long and thin, and the ears or spikes of grain grow at the ends of the stems. Wheat is the most widely grown grain in terms of the land area it covers. It occupies 17 percent of the world's cultivated land and is the staple food for one third of the world's inhabitants. Half of the world's wheat is grown in Asia. Most wheat is ground or milled to make flour for bread, pasta, and pastry. The rest is used for animal feed, and for making beer and whiskey.

Rice is a grass with long, narrow leaves that grows from 2–6 ft (60–180 cm) tall. Some varieties grow in dry climates, but the varieties grown in Asia and Africa grow best when their roots are under water. These varieties grow in **paddies** or flooded fields. Rice is the staple food for half the people



on earth, and is eaten mainly in Asia, Latin America, and the Caribbean. In the Caribbean, it provides not only food, but employment and income for about one million farmers.



Corn, also called maize, is generally a larger, sturdier plant than rice and wheat. It has long narrow leaves, a strong stem and the average height is 8 ft (2.4 m). The male part of the plant is called a **tassel** and

grows at the end of the stem. The female parts or ears are found along the stem below the tassel. Individual ovaries along the cob grow into corn kernels after fertilization. Corn is the staple food source for people living in sub-Saharan Africa, many of whom eat it at every meal. They cook a soft porridge to start the day and eat it with milk and sugar, if these are available. For their main meal they make it stiff porridge and eat it with vegetables.

Corn is also an important food source in the Americas where it was the main grain grown before Europeans arrived. As a staple food, corn is usually ground into meal. Where it is not the staple food, corn is often eaten on the cob or as the snack, popcorn. The US is the largest grower of corn, and about half the corn it grows becomes animal feed. Other important staple foods eaten around the world are potatoes, cassava, groundnuts, lentils, yams, and bananas.

Fruits and Vegetables

Apart from the staple foods, many other common foods and beverages come from plants. These include fruit, sugar, vegetables, nuts, oils, spices, herbs, coffee, cocoa, tea, and alcohol.

Fruits and vegetables are a very important part of a balanced diet because they provide vitamins and minerals that are not present in grains and meat. **Vitamins** are organic chemicals that animals require in minute amounts to stay healthy. Vitamin C, for example, comes largely from citrus fruits such as lemons and oranges, and early sailors discovered that eating citrus fruit was essential for preventing a disease



called scurvy. Unfortunately, many people in the western world do not eat nearly as many serving of fruits and vegetables as they need.

Even though fruits and vegetables only grow in certain seasons, people in much of the western world have a year round supply of these. The reason is that modern transportation systems and methods of preservation, such as refrigerated containers, allow fruits and vegetables grown in one area to be sold thousands of miles away. However, in rural areas, where refrigerated transportation is not common, people eat whatever fruits and vegetables grow in their area, and only eat them when products are in season. Some of the most common fruits are apples, berries, bananas, oranges, and lemons.

Vegetables are edible parts of herbaceous plants. Some vegetables are roots, some are leaves, and others are stems, tubers, bulbs, or flowers. Even the fruits of some plants — peas, for example — are considered vegetables rather than fruits.

What is the difference between fruits and vegetables? Fruit is a botanical term, but vegetable is not. The confusion arises because fruit is used in both scientific language and in everyday language, whereas vegetable is only used in everyday language. In botany, fruits are the ripened parts of plant ovaries, but in the grocery store, fruit generally refers to those botanical fruits that are sweet. Vegetable is a grocery term that refers to any edible part of herbaceous plants. Sometimes those parts happen to be fruits of herbaceous plants. Provided they are not sweet, they are generally referred to as vegetables, even though — botanically — they are fruits.



Examples of fruits, vegetables, and grains

Fruit	Vegetable	Grain
apple	bulb: onion	barley
avocado pear	flower: broccoli	corn
banana	flower: cauliflower	oats
berries	fruit: eggplant	rice
lemon	fruit: pumpkin	wheat
melon	leaf: lettuce	
orange	leaf: spinach	
peach	root: carrot	
pear	tuber: potato	

Herbs and spices

While staple foods provide a large amount of energy, herbs and spices do not. They do, however, have special properties that make them very useful.

Herbs are plants commonly used for flavoring food and for their medicinal benefits. Many have strong flavors and aromas. The term, herb, is also used by gardeners as an abbreviation for the word, herbaceous, but in this section it describes culinary and naturopathic herbs.

Herbs have been used since ancient times to treat common ailments and herb growing has become a major industry with the increase in knowledge of naturopathic medicine. The history of herb gardens goes back to monasteries where monks grew herbs as part of their role of tending to the

sick. These gardens were carefully laid out with specific plants, sometimes next to very basic hospitals. The monks kept accurate records of their horticultural work, and when the printing press was developed their records were made into books. As knowledge increased and travel abroad became more common, herb gardens became popular. They were laid out in intricate designs and were used for educational and medicinal purposes.

Herbs are relatively easy to grow. They can grow in small containers — even on windowsills — making them a popular addition to many kitchens. They can also be grown outdoors in pots or garden beds, and with some care, will last many years. Herbs are a great way to introduce students to the world of plants and to help widen the scope of their taste buds. Common herbs

include borage, chives, dill, marjoram, mint, oregano, parsley, rosemary, sage, and thyme.

Spices are plant extracts that add distinct flavors and odors to food. People often say a food is spicy if it feels hot on the tongue, but not all spices are hot. Other spices can give food a slightly sweet, bitter, or tangy flavor. Spice combinations are used to create a variety of different flavors. While spices are commonplace today, they used to be highly valued, and because of this played a significant role in human history. They were considered a luxury item, and at one stage the monetary value of some spices was equal to that of gold. China and India were important sources of spices, and it was the trade in these spices that drove much of the exploration of the world, including the expeditions of Portuguese explorers Bartholomew Diaz and Vasco da Gama. The spice trade also influenced the location of human settlements, which were established along overland trading routes.

Spices are extracted from roots, leaves, flowers, and fruits. Cinnamon, for example, comes from bark of the *Cinnamoum zeylanicum* tree. Cassia, a similar spice that is commonly referred to as cinnamon, and which was used in Egypt for embalming, also comes from bark. In the early twentieth century, true cinnamon was prized for its medicinal qualities and commanded a price of up to \$100 per lb (\$220 per kg). Another common spice, vanilla, is produced from the bean pod of a species of orchid, *Vanilla planifolia*. It was initially used as an ingredient in chocolate and perfume, but by the seventeenth century it was a popular flavoring in food. Many spices are sold in grocery stores in a powdered form in small

bottles. A few, cloves and peppercorns, for example, are also sold as whole spices.

The chart shows the plant parts from which common spices are extracted.

Spices and the parts from which they are extracted

Plant part	Spice
fruits	allspice, pepper, cardamom, chili,
seeds	anise, coriander, cumin, mustard, nutmeg
buds and flowers	cloves, saffron
bark	cinnamon, cassia
roots or bulbs	ginger, turmeric, garlic, horseradish

Did you Know?

Eating fruits, vegetables, and herbs that have not been washed can make people very ill. There are two reasons for this:

- Harmful microscopic organisms might be present on the food.
- Chemicals may be present on the food, because growers often spray fruit and vegetables with chemicals to prevent them from being damaged by insects or disease.

Washing fresh foods before eating them is therefore very important to remove chemicals or microscopic organisms that might be present.

Did you know?

People use a variety of methods to prevent food from going bad, because fresh food can go bad quickly if left in a warm place. This is because microscopic organisms, which are everywhere, can grow very fast. Food preservation methods either kill the microscopic organisms or slow down their growth. Cooking food thoroughly kills microscopic organisms, and refrigeration slows down their growth, so food stays safe longer. Some commonly used preservation methods include:

- cooking
- refrigeration or freezing
- drying
- pickling
- canning
- using chemical preservatives



Resources

Some interesting student resources about plant foods:

- Hughes, Meredith, S. *Flavor Foods: Spices and Herbs*. Minneapolis, MN: Lerner Publications, 2000.
- Hughes, Meredith, S. *Cool as a Cucumber, Hot as a Pepper: Fruit Vegetables*. Minneapolis, MN: Lerner Publications, 1999.
- Hughes, Meredith, S. *Glorious Grasses. The Grains*. Minneapolis, MN: Lerner Publications, 1999.
- Hughes, Meredith, S. *Green Power: Leaf and Flower Vegetables*. Minneapolis, MN: Lerner Publications, 1999.
- Kalman, Bobbie, and Susan Hughes. *The Food we eat*. Toronto, ON: Crabtree Publications, 1986.
- Patent, Dorothy, H. *Where Food Comes From*. New York, NY: Holiday House, 1991.

ACTIVITY 1

Exploring Staple Foods Around the World

Purpose

To learn what staple foods people around the world eat, and from which plants these foods come.

Material

Rice, uncooked.

Rice Cakes, or cooked rice.

Bread.

Pictures of wheat, rice and corn plants.

Flour.

Popcorn, cooked and uncooked.

Disposable cups or bowls.

Spoons.

Food accompaniments such as butter and sugar, if necessary.

Small amounts of each uncooked food in containers.

Prepared samples of the cooked cereals, enough for each student.

Pictures and books about rice, wheat, and corn.

Botany journals and pencils.

SAFETY NOTE: Ensure that all the students can tolerate rice, wheat, and corn products before offering samples for tasting.



Presentation

- Most Montessori teachers present this concept in Year 1.
- Announce that today the students will have the opportunity to explore some of the basic foods that are important around the world.

PART 1: LEARNING ABOUT GRAINS

- Introduce the concept by explaining that even though many people think of grass in terms of lawn, certain types of grass are extremely important as foods. Three of these, wheat, rice, and corn are the main staple foods eaten by people around the world.
- Show the students the sample of uncooked rice. Invite them to feel it. Instruct them not to eat uncooked cereals.



- Show them pictures of rice plants. Discuss rice as a staple food.
- Place the rice sample and pictures on a display table.
- Show the students pictures of wheat kernels and the sample of flour.
- Repeat the process followed with the uncooked rice. Place the samples and picture next to the rice samples on the display table.
- Repeat the same process with the popcorn.
- Ask the students to draw labeled pictures of the rice, wheat, and corn in their journals. Suggest they leave space to draw pictures of the cooked cereals.



PART 2: SAMPLING CEREALS

- Offer the students samples of the prepared cereals to taste.
- Ask the students to draw and label pictures of each cooked product in their journals.

Extensions

- Make a list of other grains that are important food sources (oats, rye).
- Potatoes, while not a grain, are another staple food. Research potatoes as a food source.

ACTIVITY 2

Exploring Fruits and Vegetables

Purpose

To learn about fruits and vegetables and their importance in a balanced diet.

Material

Selection of fresh fruits and raw vegetables (include vegetables that come from different plant parts).

Chart showing which parts of the plant from which the vegetables come.

Prepared samples of each specimen for tasting, enough for each student.

Name cards for each fruit and vegetable.

Pictures showing each fruit or vegetable on the plant.

Books and pictures of fruits and vegetables.

Botany journals and pencils.

SAFETY NOTE: Ensure that all the students can tolerate the fruits and vegetables provided before offering samples for them to taste.

Presentation

- Most Montessori teachers present this concept in Year 1.
- Announce that the students will be exploring other important foods around the world; fruits and vegetables.



- Discuss fruits and vegetables with the students. What fruits and vegetables do they enjoy eating? Are there any they do not like? Why?
- Place the chart where the students can consult it.
- Introduce the examples of fruits and vegetables to the students, one at a time.
- Show the students one fruit or vegetable specimen. Ask if anyone can name it. Can they describe what it tastes like, or how to prepare it for eating?
- Place the name card for the specimen facing the students. For vegetables, describe what part of the plant it comes from, i.e., whether it is a fruit, stem, leaf, or root.



- Place a picture of the plant that produces the fruit or vegetable next to the name card. Ask the students to describe the plant.
- Introduce another specimen, placing it next to the first specimen.
- Repeat the process followed for the first specimen.
- When all the specimens have been presented, offer each student a sample of the first specimen. Ask the students to describe the flavor and to name the fruit or vegetable.
- Offer samples of each specimen in turn.
- Ask the students to draw and label a picture of two fruits and two vegetables in their journals.

Extensions

- Arrange a field trip to a fruit or vegetable farm in springtime.
- Arrange a field trip to the local supermarket or green grocer where the students can be exposed to many more fruits and vegetables.