

JUNIOR & SENIOR HORTICULTURE PLANT PARTS STUDY GUIDE

By Jerry Mills, Horticulture Educator Reviewed by Rhoda Burrows, SDSU Horticulture Specialist
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The basic parts of most all plants are seeds, roots, stems, leaves, flowers and fruits.

SEEDS:

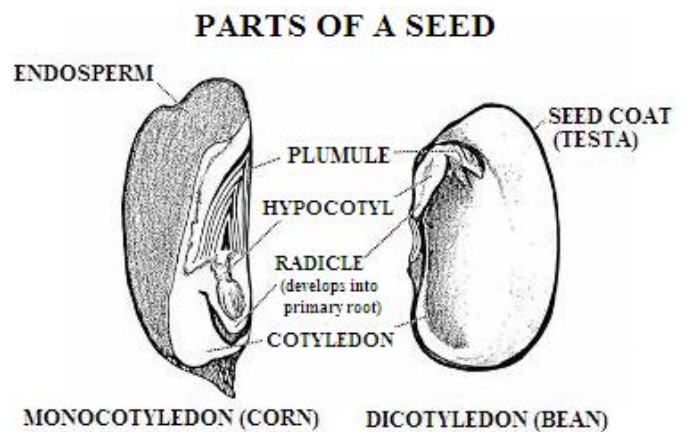
From the Beginner Horticulture Plant Parts Study Guide you learned:

“The main purpose of seeds is to make new plants. Each seed contains a tiny plant called an embryo that can grow into an entirely new adult plant. When a seed sprouts, it will grow a tiny root and one or two tiny leaves. The leaves and root will get a little energy from the seed, and then will start working just like an adult plant to make its own food.”

Some of the seeds we eat are dried, such as beans, rice, and barley. Some are ground into flour (wheat), or meal (corn). Others are immature (green peas and sweet corn).”

A typical seed has a seed coat, called a testa, an embryo and food for the embryo to feed on when the seed germinates.

A cotyledon is the part of a seed that contains food for the baby plant until it can grow up to make food with its own leaves. Plants with one cotyledon (like corn) are called monocotyledon or monocot. The monocot embryo gets its first food from the endosperm. Plants with two cotyledons (like beans) are called dicotyledon or dicot and the embryo gets its first food from the two cotyledons. When the seed germinates, the plumule becomes the shoot that produces the first true leaves and the radicle becomes the first root. The hypocotyl is where the embryo connects to the seed and draws the food from the endosperm or cotyledons. By the time the stored food in the endosperm or cotyledons is used up, the plumule has made true leaves. The true leaves produce food for the plant by photosynthesis.



ROOTS:

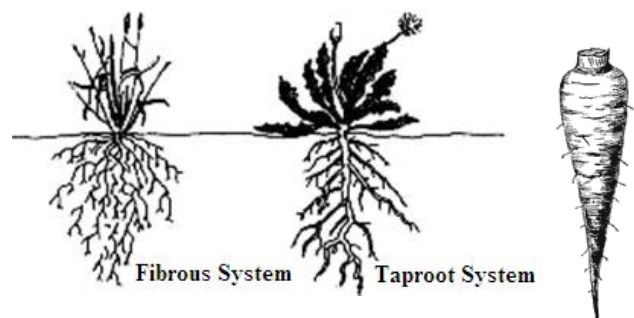
From the Beginner Horticulture Plant Parts Study Guide you learned:

“Roots are important because they allow the plant to absorb water and nutrients from the soil that the plant uses to make food. Roots also hold the plant in the soil and prevent the soil from washing away (eroding) during heavy rain. Roots may also store the energy that leaves make for the plant to use later.”

Examples of roots that people eat are carrots, beets, radishes, turnips, rutabaga, daikon, and parsnips.”

The energy stored in the roots is in the form of sugars and carbohydrates that the plant uses to grow and carry out other functions.

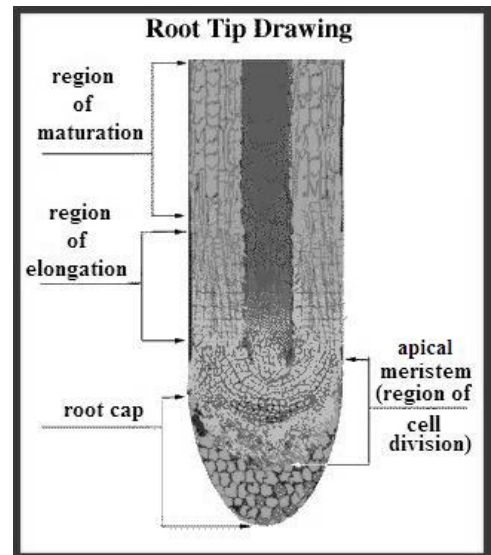
Plants are only as healthy as their root systems. The roots can make up more than half of the plant body. Monocot plants, such as grasses, generally have a fibrous root system. Dicot plants, such as many vegetables, shrubs, and most woody plants generally have taproot systems. Taproots such as found in carrots and turnips are capable of storing large



amounts of food.

The active root systems of most plants have four main regions:

- Root cap – The root cap region is the cluster of cells at the tip of the root. It protects the root as it pushes through the soil. It is continuously being worn off and replaced.
- Apical meristem region – This region, covered by the root cap, is where new cells are made that “push” the root through the soil.
- Elongation region – This is the region where the new cells grow larger.
- Maturation region – This is where the cells change into specialized cells. Root hairs also form in this area. Root hairs greatly increase the root’s surface area for absorption of water and nutrients.



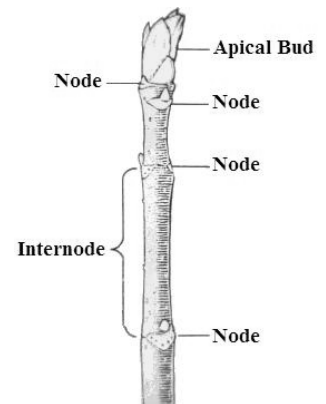
STEMS:

From the Beginner Horticulture Plant Parts Study Guide you learned:

“Stems connect the roots with the leaves. Nutrients go up and down the stem from the roots to the leaves. The stem is called a shoot.”

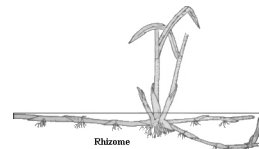
Examples of stems that people eat are kohlrabi and asparagus. Potatoes and onions are modified stems that grow underground.”

Herbaceous stems are often soft and moist. Woody stems are hardened and often larger in diameter. Woody dicot stems grow longer because of cell growth at the apical or terminal bud. Nodes of branches or twigs are where leaves attach. Internodes are the spaces between the nodes. In addition to food, people use stems for paper, building materials, furniture and fuel.



Here are some examples of modified stems:

* A rhizome is an underground stem. Rhizomes are common on quack grass and bromegrass.



on grasses such as

* A tuber is an underground food storage stem. We eat the tubers produced by potatoes.



* A bulb is a small cone-shaped modified stem with many modified leaves attached to it. Plants such as onion, allium



thickened, and lily produce bulbs.

* The tendrils, found on grapes, are modified stems used to coil around a supporting structure and hold the plant upright.



• A corm is a thickened fleshy stem with thin, papery leaves surrounding it. Plants such as gladiolus, crocus and cyclamen produce corms.



LEAVES:

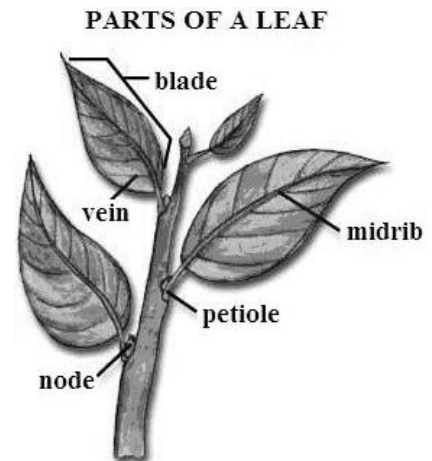
From the Beginner Horticulture Plant Parts Study Guide you learned:

“Leaves help the plant make food. This process of making food is called photosynthesis. To make food, leaves use the energy from the sun and combine it with carbon dioxide and water that the roots pull from the ground. The leaves take in the carbon dioxide through tiny openings on the underside of the leaf called stomata. The leaves also release oxygen through these same openings. This oxygen is what you and all animals breathe to stay alive.

Examples of leaves that people eat are lettuce, endive, kale, basil, and many other herbs.”

The leaf blade is usually attached to the stem node by a petiole. The leaf midrib is a main vein that connects the many secondary veins in the leaf with the plant. A deciduous leaf is one that is shed during the autumn season when the petiole detaches from the stem. Common examples of deciduous trees are ash, elm, and oak.

Leaves provide cover and food for many animals including humans. Leaves shade the ground. Leaves make oxygen for the atmosphere.



FLOWERS:

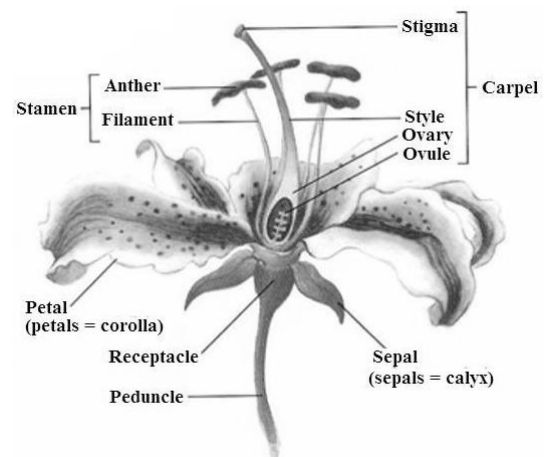
From the Beginner Horticulture Plant Parts Study Guide you learned:

“Flowers are the beginning of a plant’s seeds. Flowers provide food for bees and other insects. The bees and insects spread pollen from plant to plant. Pollen is the yellow dust inside flowers. Pollination is when pollen is spread from one flower to another to fertilize the seeds. If a flower is fertilized, it will make seeds that will grow into new plants.

Uses: Squash flowers can be stuffed and baked. Other flowers, such as pansies and nasturtiums, can be eaten in salads. If you eat the flower, it cannot make a fruit or seed, so if you want fruit or seed, leave the flowers on the plant. Broccoli is another type of flower that we eat.”

The flower has many parts that all work together to produce a seed. The flower stem is called a peduncle. The base of the flower is a receptacle. The sepals are the outermost circle of leaf-like structures. Sepals protect the developing flower bud. They are normally green and together are called the calyx. The flower petals generally form a whorl inside the calyx and together are called the corolla. Petals are often brightly colored and give off sweet smells that attract pollinating insects. The stamens and the pistil are the reproductive parts of the flower.

The stamen is the male part of the flower and the pistil is the female part of the flower. The stamen has a stalk-like filament and the anther, where pollen, containing male reproductive cells, is made. The pistil, located in the center of the flower, has a stigma at the top for collecting pollen, and a tube-like structure called the style that leads to the ovary. The ovary contains the female egg cell(s), the ovule(s). Together, the stigma, style, ovary and ovule are the carpel. During the process of fertilization, pollen lands on the stigma, a tube grows down the style and enters the ovary. The male reproductive cells travel down the tube and join with the ovule, fertilizing it. The fertilized ovule becomes seed and the ovary becomes the fruit.



FRUIT:

From the Beginner Horticulture Plant Parts Study Guide you learned:

“After a flower is fertilized, a fruit may form. Fruit is the covering that protects the seed. Fruit also attracts animals. This is important because animals carry the fruit away to eat it, helping spread the seeds.

There are many different types of fruits from around the world.

Any part of the plant that contains seed is a fruit. Examples of fruit that we eat include cucumbers, squash, apples, pears, cherries, lemons and many more!”

The fruit is the ripened ovary of a plant containing the seeds. After fertilization the ovary swells and becomes either fleshy or hard and dry to protect the developing seeds. Vegetables and fruits such as tomatoes, cucumbers, cherries and apples develop from a swollen ovary.

GLOSSARY

Anther	The terminal pollen sacs of a stamen where pollen grains with male reproductive cells develop.
Apical bud	Tip of the stem where cell division causes growth in length.
Apical meristem	Portion of the root, bud or shoot where cell division causes growth in length.
Blade (leaf blade)	The broad expanded portion of the leaf.
Bulb	A small, cone-shaped stem with many thickened leaves attached. Example: onion.
Calyx	See <i>sepals</i> .
Carbohydrate	Complex compounds manufactured by the plant and stored for plant growth and maintenance.
Carbon Dioxide	A gas given off into the air by animals when they breathe. It is taken up by plants and used in photosynthesis.
Corm	A thickened, fleshy stem with thin, papery leaves surrounding it; Example: gladiolus.
Corolla	See <i>petals</i> .
Cotyledon	The leaves of a plant embryo, which enlarge and store nutrients to feed the young plant after seed germination.
Deciduous	A plant that seasonally sheds its leaves.
Dicotyledon	A kind of plant with two cotyledons in the seed; also called dicot.
Elongation region	Region where new cells grow larger.
Embryo	A tiny plant complete with leaf, stem and root parts; a plant at an early stage of development.
Endosperm	Stored nutrients for the germinating seed to feed on.
Eroding	To be gradually worn away by wind or water.
Fertilization	When female cells are united with male cells, enabling the development of a seed.
Fibrous root system	A mass of roots, all of about equal size.
Filament	See <i>stamen</i> .
Fruit	A mature ovary.
Germination	The beginning of growth; the process by which a seed ends dormancy and resumes growth.

Herbaceous stems	Stem of a non-woody plant; stem lacking wood.
Hypocotyl	Portion of the plant embryo that connects the embryo with the cotyledon or endosperm.
Internode	Region between stem nodes.
Maturation region	Region where cells mature and specialize.
Midrib	Largest vein down the length of the leaf blade; also called midvein.
Monocotyledon	A type of plant in which the seed has only a single cotyledon; also called monocot.
Node	Location on a stem where a leaf is (or has been) attached.
Ovary	Enlarged base of the pistil.
Ovule	The female reproductive part of a flower. Mature ovules are seeds.
Oxygen	A gas given off by plants during photosynthesis and used by animals when they breathe.
Peduncle	Flower stem.
Petals	A modified leaf occurring in a flower. Petals are often colored and attract pollinators; collectively called the corolla.
Petiole	Part of a leaf that connects the blade to the stem.
Photosynthesis	A process by which green plants produce sugar from carbon dioxide and water, using energy from the sun.
Pistil	A reproductive structure of a flower made up of the stigma, style, ovary, and one or more ovules.
Plumule	Also called epicotyl; the portion of the plant embryo that develops to become stem and leaves.
Pollen	A powdery substance produced by flowering plants that contains the male reproductive cells. Pollen is carried by wind and insects to other plants, which it fertilizes.
Pollination	To transfer pollen grains from the male part of the plant to the female part of the plant. This leads to fertilization.
Radicle	Portion of the plant embryo that develops into the first root.
Receptacle	Base of the flower.
Rhizome	An underground stem. Example: sod-forming grasses.
Root cap	A mass of cells that protect the root tip.
Root hairs	Tiny roots in the maturation region that greatly increase the surface area and aid in water and nutrient absorption.
Sepals	Outermost whorl of flower structures beneath the petals; usually green; collectively called the calyx.
Stamen	A reproductive structure of the flower; made of a filament and an anther, where pollen grains are produced.
Stigma	The upper portion of the pistil of a flower. Pollen grains become attached to the stigma.
Stoma (plural: stomata)	A tiny hole in the outer layer of a plant leaf that controls the passing of water, carbon dioxide, and oxygen.
Style	The long slender portion of the pistil of a flower.
Sugar	Complex compounds manufactured by the plant and stored for plant growth and maintenance.
Taproot	A plant root system in which a single root is longer and thicker than the others.
Tendrils	Modified stem used to coil and hold plant to support. Example: grape vine.

Terminal bud	Tip of the stem where cell division causes growth in length (also see apical bud).
Testa	Seed coat that protects the embryo.
Tuber	An underground food storage stem. Example: white potatoes.
Veins	Long thin structures that transport food and water through the leaf.
Woody stems	Stems with tough, woody fiber.

Reference Sources:

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