



The DIRT Society

Introduction to Plant Anatomy

Though the study of plant anatomy usually focuses on the internal operations of the organism, it is important to first understand the larger structure and its general components. We will use popular food crops in this lesson, but the basic rules are true of all angiosperms.

Note: Angiosperms are a group of plants that produce flowers, fruit and seeds. These plants make up most of the agricultural industry; providing raw foods, grains, and livestock feed for the entire human race.

Angiosperms have in common three basic anatomical structures: The root, the stem, and the leaf.



Roots have many functions during the life of a plant. They serve to anchor the plant physically; attaching the organism to its soil or environs. Roots also absorb water and minerals that the plant will require to live and grow. Occasionally, roots will also serve as storage for nutrients.



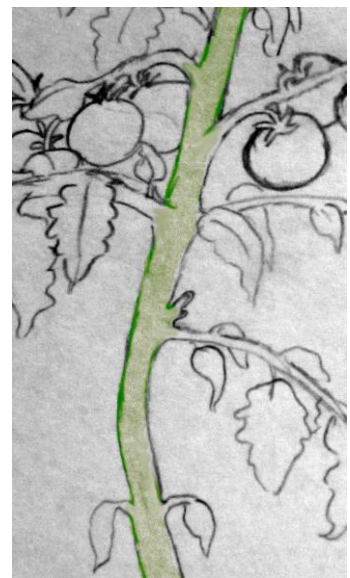
There are two major types of root systems present in angiosperms; the **Tap Root System** and the **Adventitious Root System**. Tap Root Systems utilize one primary root, which grows downward into the soil, and various secondary roots that grow laterally from it. In Adventitious Root Systems, the primary root dies quickly, and many smaller roots (similar in size to each other) take its place. Knowing which type of root system a plant will develop is one key to providing adequate soil and water.

Dandelions, Carrots and some younger trees are examples of plants with tap roots.

Corn, cassava and grasses are examples of plants with adventitious roots.

Stems serve to move the leaves of the plant upwards or outwards, toward sunlight. Stems also create sturdy center bodies, which allow fruits, leaves, and branches to grow. Within the stem is a network of channels that move nutrients up and down. Most often, the stem of a plant will be visible above ground. However, there are plants that grow laterally, and whose stems may be partially beneath the soil.

Some commonly eaten stems are celery and asparagus.



Leaves have many varied uses in plant growth. They are the food-producers of the organism; using sunlight, via photosynthesis, to create energy for primary consumers (the plant itself) and secondary consumers (such as animals.) Leaves, therefore, are arranged and adapted so that they can absorb the maximum amount of sunlight possible; despite being attached to a stationary body. Leaves may spread, fold, rotate, or change color to best serve the plant. Other uses of leaves include storage and respiration. When leaves release water, they create suction, pulling nutrients up the plant's body. Furthermore, leaves send hormonal signals to the plant which trigger blossoming and fruit production.



Lettuce, spinach and cabbage produce popular leaf foods.



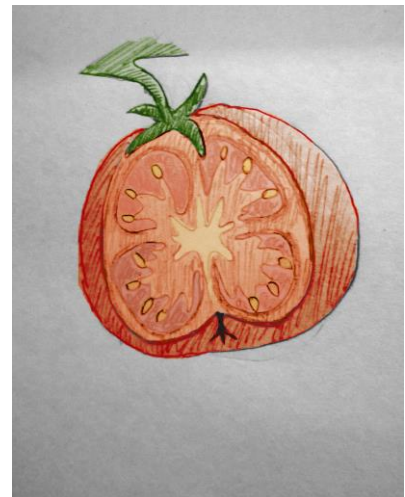
Other common physical features are fruit, seeds and flowers. **Each of these plays a part in natural plant reproduction.**

Flowers produce gametes; the sex cells used to reproduce. They may also serve as a platform upon which sex cells merge and the plant is fertilized. Some flower blossoms, such as okra, roses, squash and chamomile, are edible. In other plants, such as broccoli, cauliflower, and artichokes, the flower is the harvested food crop.

If a plant is successfully fertilized, it will create seeds and fruit.

Seeds are the components of the plant which carry both its genetic material and the resources needed to grow independently. Some seeds are harvested for food, like corn and wheat. Others may be eaten along with the plant's fruit, like strawberry and banana seeds.

Fruits exist to house and, in some cases, transport the seed. Fruit often creates a thick, soft barrier with which the seed is protected from external damage. It may also attract consumers, which eat the fruit and spread the seed in their feces.



The human diet can include roots, stems, leaves, fruit, seeds, and blossoms. When broken into distinct anatomical units, it is both interesting and important to note that unique flavor and nutrient profiles exist for each part of the plant. While we may not eat apple tree roots or potato leaves, it is by mixing various harvested plant components that we arrive at our varied and colorful diet.