Plant Form and Functions

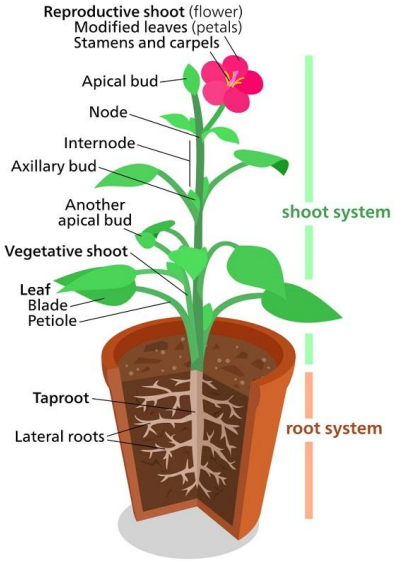
Plant Organs

Let's dissect a typical plant and explore the different structures and organs that help it carry out its daily functions.

Typical Plant Organs.

The basic structure of a plant reflects its land-dwelling capacity. They must absorb water and minerals from beneath the ground while obtaining CO_2 and light above-ground. As such, a typical plant has a subterranean root and an aerial shoot.

A **root** anchors a plant in the soil, absorbs and transports water and minerals, and stores carbohydrates. Together, all the roots of a plant make up the **root system**. Near the tips of the root are tiny finger-like projections called root hairs that increase the surface area, allowing more efficient absorption of water and minerals.



A diagram of a highly idealized eudicot. No plant actually looks exactly like this. Image by Kelvinsong. Licensed under CC BY-SA 3.0.

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The **shoot system** of a plant is made up of stems, leaves, and structures for reproduction, which in angiosperms are flowers.

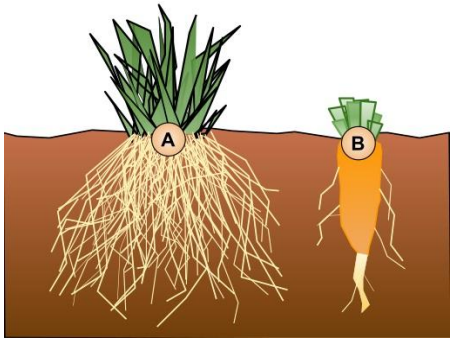
The **stems** bear the leaves and buds. A stem has **nodes**, points at which leaves are attached, and **internodes**, portions of the stem between nodes. The **leaves** are the main photosynthetic organs in most plants, as green stems can also perform photosynthesis. Most leaves consist of a flattened blade and a stalk, or **petiole**, which joins the leaf to a node of the stem.

The buds of a plant are undeveloped shoots. When a plant stem is growing in length, the **terminal bud** (or apical bud) at the tip of the stem has developing leaves and a compact series of nodes and internodes. The **axillary buds**, one in each of the crooks formed by a leaf and the stem, are usually dormant. In many plants, the terminal bud produces hormones that inhibit the growth of the axillary buds, a phenomenon called **apical dominance**.

Apical dominance allows plants to grow taller, increasing the exposure to light. This would be very helpful in areas of dense vegetation. This is also the reason why pruning fruit trees and “pinching back” houseplants make them bushier.

Modified Plant Organs.

Over time, the three basic plant organs evolved to have a variety of functions. In addition, because of agriculture, humans have further influenced plant structure through selective breeding. Many familiar foods come from enlarged or otherwise modified plant organs.



For example, root crops are harvested before flowering, when their nutritional value is maximized. These include carrots, turnips, sweet potatoes, and others that have enlarged taproots.

Modified stems include that of a strawberry, which has a horizontal stem called a *stolon* or *runner* that grows along the ground. Ginger is another type of modified stem, which looks like a root-like structure called a **rhizome**, horizontal stems that grow below the soil surface.

A potato has rhizomes that end in enlarged structures specialized for storage called **tubers** (which are the ones we eat). Potato “eyes” are axillary buds on the tubers that can grow, so you may try planting them.

Plant **bulbs**, meanwhile, are underground shoots containing swollen leaves that store food (for example, an onion). Other modified plant leaves include **tendrils**, which help vines cling to solid structures, while some grasses and monocots have long leaves without petioles. Other eudicots have enormous petioles--the stalk we eat, as in celery. The spines of cactuses are actually modified leaves that protect them from being eaten; in turn, the large green stem acts for photosynthesis and water storage.

Organs are made of tissues. In the next article, we will see how different plant organs are formed as we examine the different plant tissues.