

Plant structure Lab

Plant Structure

Plant cells differ in many respects from animal cells. They have chloroplasts, for one thing, and thick cell walls to support their thin cell membranes. There are many types of cells commonly found in plants, with a variety of functions.

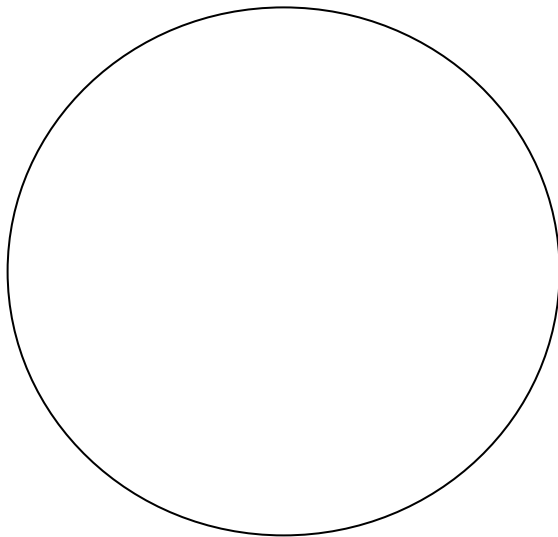
1. Growth - meristem cells
2. Support - parenchyma cells, collenchyma cells, sclerenchyma cells
3. Transport - xylem cells, phloem cells

Structure of Stems

At the very top of the stem, and at the very tip of all the growing branches, is an **apical meristem**. The tender meristem tissue is protected by a **terminal bud**. Buds are really just greatly shortened stems.

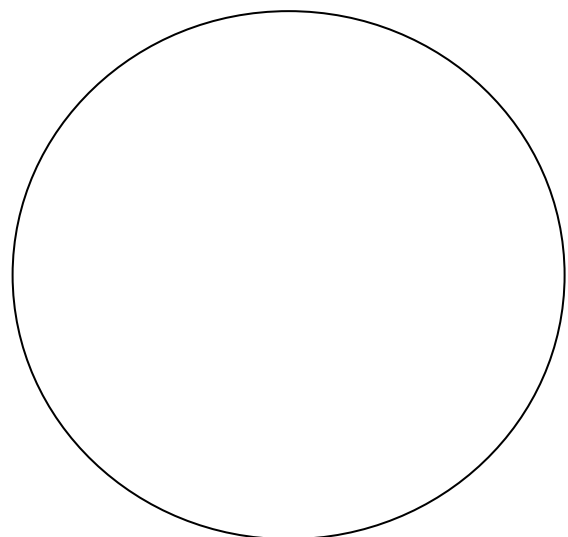
1. Examine slides of the monocot and dicot stem (**xs** or **cs** means cross section). Look for the **vascular bundles**, and identify the **xylem** and **phloem**. Can you tell the difference between monocot and dicot stems? The vascular bundles of monocot stems look like little "monkey faces". Draw and label detailed pictures in the spaces below of monocot and dicot stems.

Monocot stem



_____X

Dicot stem



_____X

Hint: In many of the slides in this lab, xylem cells are stained dark red, while phloem cells are stained light green.

Ecological, Evolutionary, and Economic Importance

Important "stem crops" include onions, potatoes, asparagus, and sugar cane.

Structure of Roots

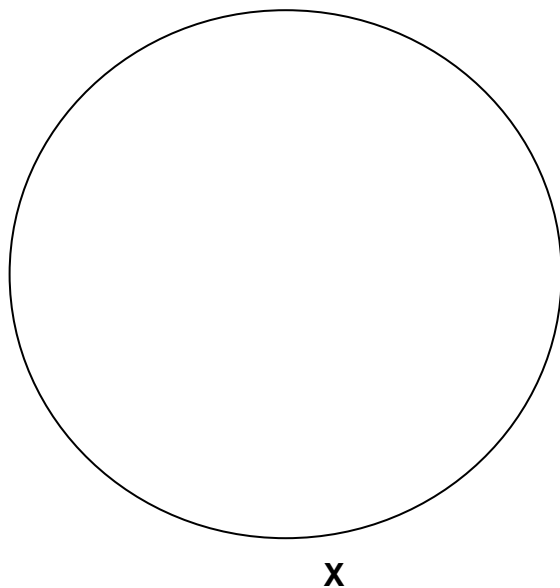
Roots serve not only to hold the plant in the soil, and take up water and dissolved nutrients, but also as a site to store food for the plant. The main body of the root is called the **primary root**. The **lateral or secondary roots** develop as lateral extensions from the primary root. Along the outer surface of the root are thousands of **root hairs**, finger-like extensions of the epidermal cells which handle the actual uptake of water. Unlike the epidermis of the stem, the epidermis of the root has no waxy cuticle to keep water in or out. The outer layer of the root is a thick cortex, used for food storage.

If we examine the tip of the root, we find the other **apical meristem**. This meristem is covered by a tough layer of cells called the **root cap**. (Why?) Just behind the apical meristem is a zone in which cells are growing longer and larger, the **zone of elongation**. Above this zone is the area of the root where the new cells are starting to differentiate into specialized cells like xylem and phloem. This is the **zone of differentiation**.

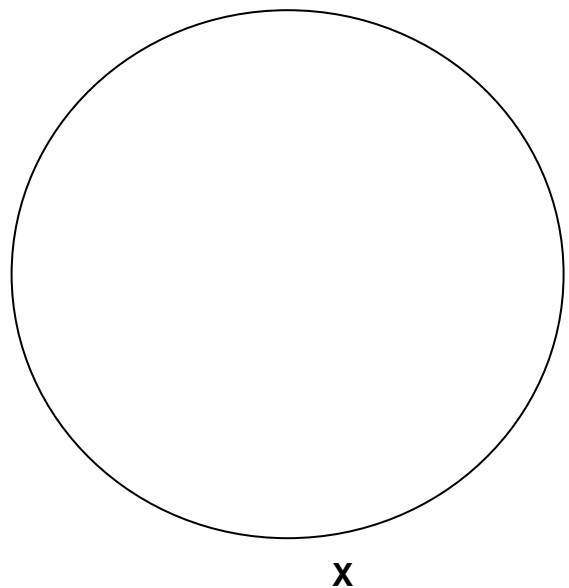
There are several different kinds of roots. Most roots are either tap roots or fibrous roots. **Tap roots**, like those of carrots or dandelions, are huge primary roots with lots of stored food. Plants like grasses and other monocots, on the other hand, have **fibrous roots**, in which no one root dominates the rest. Many plants, like English Ivy and cat's claw vines, have roots that emerge directly from the stem. Such roots are called **adventitious roots**. A few plants, like corn and mangroves, have large roots that emerge above ground, near the base of the shoot, and help prop up the plant. These roots are called **prop roots**.

2. *Examine cs slides of a monocot and dicot root.* Identify the **vascular bundles**. The large "arms" are made of **xylem** cells, and the smaller cells nestled between them are **phloem** cells. Draw and label detailed pictures in the spaces below of monocot and dicot stems.

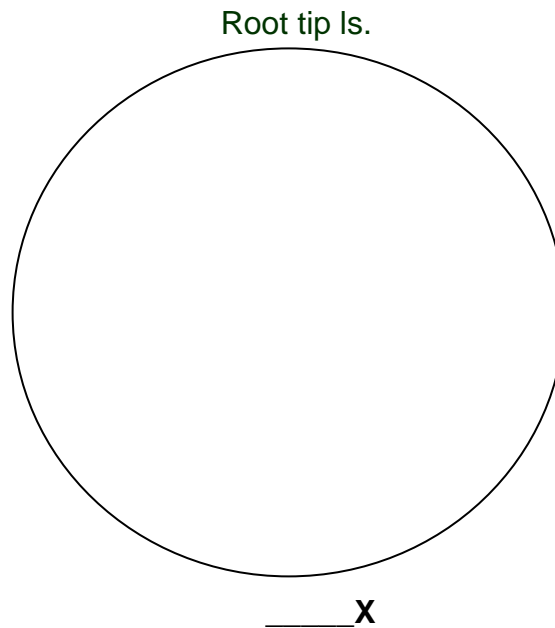
Monocot root



Dicot root



3. *Examine 1s slides of a root tip.* Identify the **root cap**, **apical meristem**, **zone of elongation**, and **zone of maturation**. Know the functions of these tissues. Draw and label a detailed picture in the spaces below of a root cross section.



Economic, Ecological, and Evolutionary Importance

Important root crops include carrots, sweet potatoes, turnips, radishes, and beets.

Structure of Leaves

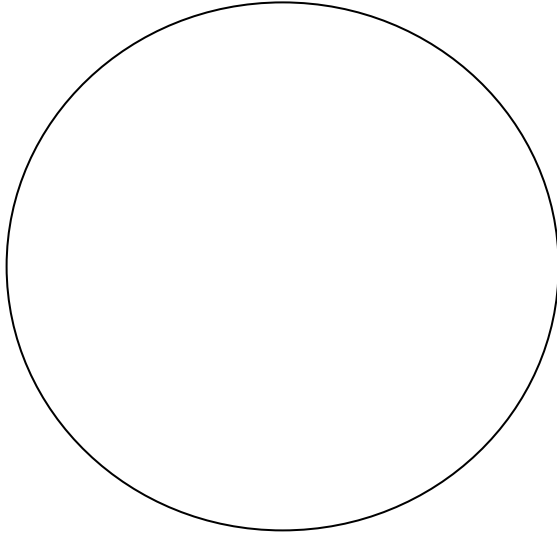
Leaves are structured to make the process of photosynthesis as efficient as possible. Leaves have an **upper and lower epidermis**, covered by a **waxy cuticle**. Both surfaces are dotted with numerous **stomata**, with bean-shaped **guard cells** that regulate the passage of gases and water vapor to and from the leaf. Most of the stomata are found on the bottom of the leaf. Between the upper and lower epidermis is a layer of parenchyma cells with many chloroplasts. It is in this “mesophyll” or middle leaf layer that most photosynthesis occurs. Below the upper epidermis is a fairly solid layer of rectangular cells called **palisade parenchyma**. Below this is a much more open layer of palisade cells, a **spongy parenchyma** layer, with many air spaces for diffusion of oxygen and carbon dioxide.

4. *Examine the slides of leaf xs.* Draw and label a detailed picture in the space below of a leaf xs.

Economic, Ecological, and Evolutionary Importance

Important leaf crops include lettuce, cabbage, celery, chicory, and spinach.

Leaf xs.



 x