

## Internal Leaf Anatomy

Examine (using the compound microscope) a cross-section of a leaf from a representative Dicot, such as lilac or privet. Use low power and orient the slide so that a ribbon-like section appears horizontally across the field. You can easily see the **upper** and **lower epidermis**, the **mesophyll** and the occasional **vein**. Switch to high power and examine these tissues and cell types in greater detail. Observe the **upper epidermis**, noting that the cells are closely packed and have a waxy covering, the **cuticle**, on the outside. Next, examine the **mesophyll**, the bulk of the cells between the upper and lower epidermis. The mesophyll consists of two major tissues, the **palisade mesophyll** and the **spongy mesophyll**. Note how tightly the cells are packed in the upper tissue, the palisade. The abundance of chloroplasts in these cells (parenchyma) indicates that a major function of these cells is photosynthesis. The spongy layer consists of irregular cells with an abundance of air spaces. This permits a more rapid exchange of oxygen, carbon dioxide, and water vapor by these cells. These exchange processes are important during photosynthesis and transpiration.

Locate a **vein** and note the two major tissues, the **xylem** and the **phloem**. The xylem is above the phloem.

Observe the thin-walled ring of large cells around the vein. These are **bundle sheath cells**. These cells facilitate the transfer of water and dissolved sugars between the vein and mesophyll. Label the vein, xylem, phloem, and the bundle sheath. Locate the midrib (main vein) in the center of the leaf. Note that there are layers of supporting **collenchyma** cells above the xylem and below the phloem. Lastly, locate the **lower epidermis**. Note that its cells, and those of the upper epidermis, do not normally contain chloroplasts. Locate the two sausage-shaped **guard cells** and the small pore or **stomata** between them. Changes in the water content and thus shape of the guard cells result in opening and closing of the stoma.