Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Leaf Anatomy

**Purpose**

The purpose of this exercise is to study the structure of a typical plant leaf and to learn the function of each part. [[1]](#endnote-1)

**Procedure:**

**Materials**

1. Microscope
2. Prepared slides of leaf cross section
3. Colored pencils
4. Models/charts of leaf structure

**Sequence of Steps**

*Microscope examination of a leaf*

1. Obtain a prepared slide of a cross section of a leaf.
2. Place the slide on the microscope stage centered over the light opening.
3. Focus with the low power objective lens.
4. Using class examples and your textbook, examine the slide carefully. Check the *italicized* items off below as you identify them with the microscope.
5. You should see a top and bottom layer of protective cells. The top layer is *Upper Epidermis*, a continuous layer. The bottom layer is the *Lower Epidermis*. The lower epidermis has small openings called *Stomata*, with specialized cells around the openings called *Guard Cells*.
6. Usually, a very thin layer of waxy material called the *Cuticle* can be seen above the upper epidermis and below the lower epidermis. The cuticle may be seen better under high power.
7. Just below the upper epidermis is the layer of tightly packed columnar shaped cells. This is the *Palisade Layer*. It is usually only one or two cell layers thick.
8. Below the palisade layer are several layers of irregularly shaped cells called *Spongy Layer*. Between the cells of the spongy layer are many *Air Spaces*.
9. Search the slide to find an area of the leaf where there is a compact bundle of cells. This is a *Vein*.
10. Examine the vein under high power. Several different types of cells can be seen. The ring of cells around the vein is he *Bundle Sheath*. Inside the bundle sheath look for thick walled cells of *Xylem*. Cells with relatively thin walls are *Phloem*.

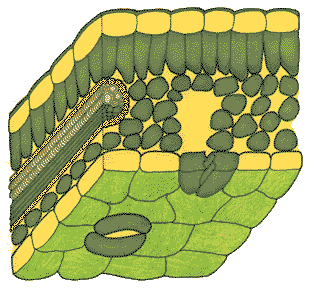
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*Label and color the drawing of the leaf cross section as follows*

1. Upper and lower epidermis – light green
2. Cuticle – Yellow
3. Palisade and spongy layers – dark green
4. Air spaces and stomata – blue
5. Guard cells – orange
6. Bundle sheath – brown
7. Xylem – red
8. C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmfPhloem – purple

**Observations**

1. Diagram of a leaf cross section – Identify parts as directed above.



[[2]](#endnote-2)

**Conclusions**

1. Briefly describe the function of each of the following structures:
   1. Cuticle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Upper epidermis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Lower epidermis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Stomata: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Guard Cells: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. Palisade layer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. Spongy layer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. Vein: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. Bundle sheath: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   10. Xylem: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   11. Phloem: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the function of the leaf?
3. How does the shape and internal organization of a plant cell help the leaf carry out important functions?
4. List and explain how 2 specific cells/groups of cells in the leaf help regulate interactions with their surroundings.

1. Examining the leaf structure, determine the role leaves play in helping a plant absorb water. How does this impact irrigation practices?

1. Agricultural Biology Curriculum Lesson Plans. Sacramento: California State Department of Education, Agriculture Education Unit, 1990. [↑](#endnote-ref-1)
2. "The World of Plants." Making Food. Bitesize Biology. 3 Oct 2008 <www.bbc.co.uk/.../making\_food\_rev5.shtml>. [↑](#endnote-ref-2)