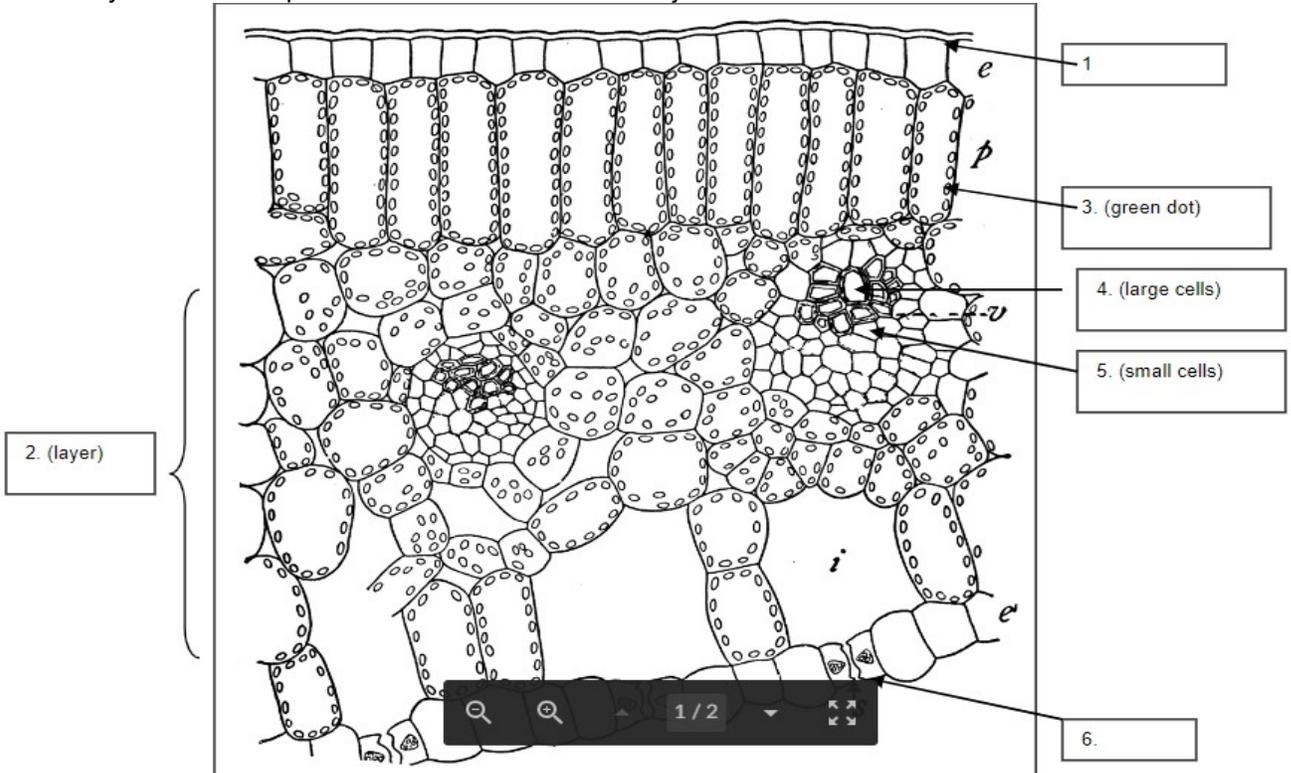


Procedure and Observations:

1. Identify the indicated parts of the leaf and state the major functions of each below.



#	Structure	Function
1		
e		
p		
2.		
3.		
v.		
4.		
5.		
i.		
e	lower epidermis	
s.		
6.		

- Observe that the leaf is composed of three tissues: (1) epidermis (2) mesophyll (3) conducting/vascular tissue.
- Examine your labelled diagram of a leaf cross-section, as was viewed under *medium power* of your microscope and answer the following questions.

### A. UPPER EPIDERMIS

- How many cells thick is it? \_\_\_\_\_ Are there any chloroplasts present? \_\_\_\_\_

### B. MESOPHYLL

The mesophyll is the largest area of the leaf and is composed of two regions. The first of these is made up of **palisade cells**, which lie just below the upper epidermis. Study this area.

- Describe these cells and their orientation to the upper epidermis (parallel or right angles?) \_\_\_\_\_.
- Besides containing many chloroplasts describe two other features of the palisade cells.
- How does this structure and arrangement of palisade cells provide an advantage to its function?  
\_\_\_\_\_

Locate the layer of **spongy mesophyll** cells below the palisade mesophyll layer.

- Of the two, which layer is more compact? \_\_\_\_\_
- Are chloroplasts as numerous in the spongy cells as they are in the palisade cells? \_\_\_\_\_
- Note the numerous spaces among the spongy cells. These are air spaces. What is the advantage of having air spaces instead of being tightly packed? \_\_\_\_\_

### C. VASCULAR TISSUE

The spongy mesophyll layer contains many **veins**. Examine a vein closely.

- Locate empty cells with thick walls in the upper parts of the vein. These are the **xylem cells**. The main function of xylem cells is to transport \_\_\_\_\_ from the roots into the leaf. The thin walled cells that form a cluster below the xylem cells are the **phloem cells** which transport \_\_\_\_\_ out of the leaf mainly toward the roots.

### D. LOWER EPIDERMIS

- Examine the lower epidermis. How many cell layers compose it? \_\_\_\_\_
- Find the tiny pores of the epidermis with small rounded cells on either side. The pores are the **stomata** and the rounded cells are called **guard cells**. Suggest a relationship between the amount of water available and the number of stomata in the leaf.  
\_\_\_\_\_

- Conserving water is a need for plants living in dry environments. Predict if more stomata would be found on the top or bottom of the following types of leaves:

Leaf Class	Example	Stomata on Top or Bottom	Notes/Reasons
Xerophyte (desert plant)	cactus		
Mesophyte—dicot (moderate rainfall)	Maple leaf ( <i>leaf faces perpendicular to sun</i> )		
Mesophyte--monocot	Corn leaf (leaf sticks up in air toward the sun)		
Hydrophyte ( <i>lives on or in water</i> )	Lily pad ( <i>leaves float on water</i> )		

- Identify 4 adaptations of the leaves of gymnosperms in preventing water loss:

### 5. DISCUSSION:

The layer of cells which lacks chloroplasts is the \_\_\_\_\_ . The \_\_\_\_\_ layer is composed of cells which are oriented at right angles to the epidermis. The presence of \_\_\_\_\_ is typical of the spongy mesophyll layer. The \_\_\_\_\_ is a waxy layer which prevents the loss of water from leaf tissues. \_\_\_\_\_ are composed of tissues which carry materials to and from leaf tissues. Pores found on the underside of leaves are known as \_\_\_\_\_. The only cells that contain chloroplasts in the epidermis are \_\_\_\_\_ . Major differences between monocot and dicot leaves:

Monocot Leaf

Dicot Leaf