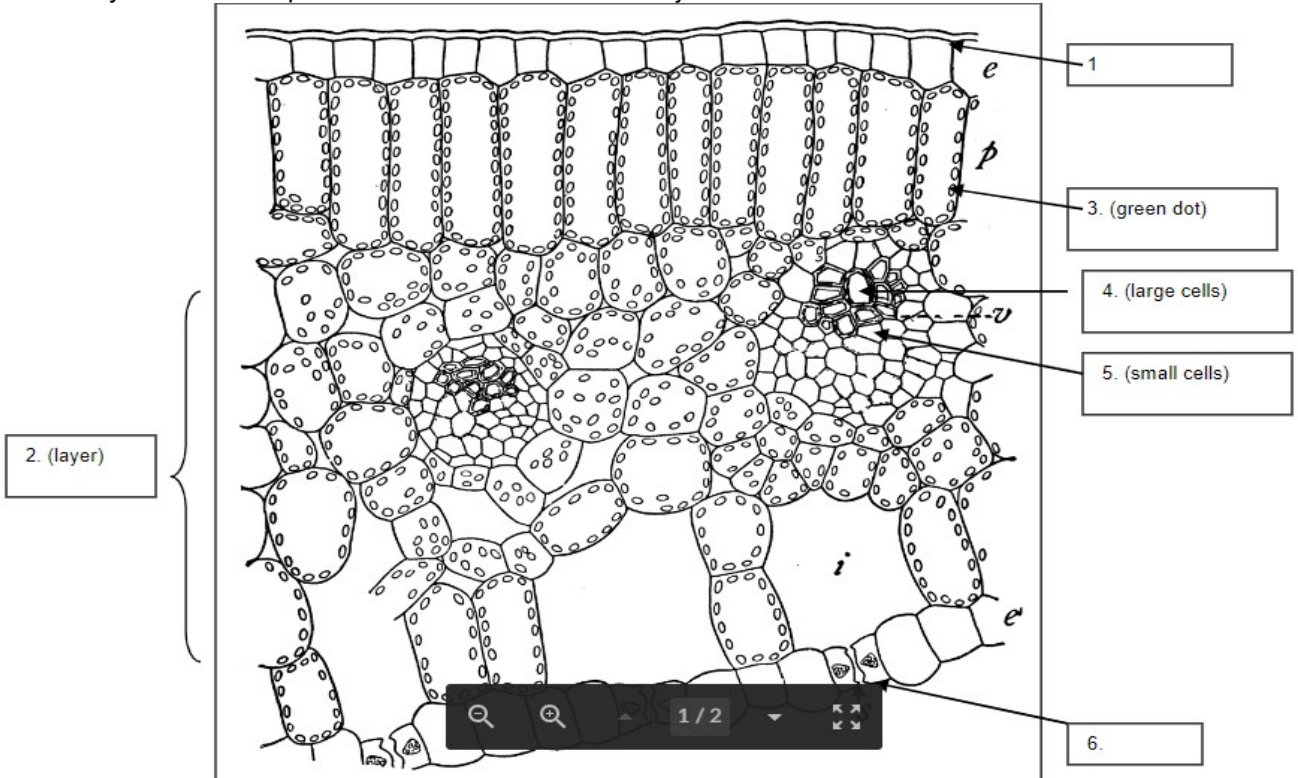


Procedure and Observations:

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.		

2. Observe that the leaf is composed of three tissues: (1) epidermis (2) mesophyll (3) conducting/vascular tissue.
3. 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

1. 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.

1. Describe these cells and their orientation to the upper epidermis (parallel or right angles?) _____.
2. Besides containing many chloroplasts describe two other features of the palisade cells.
3. 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.

4. Of the two, which layer is more compact? _____
5. Are chloroplasts as numerous in the spongy cells as they are in the palisade cells? _____
6. 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.

1. 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

1. Examine the lower epidermis. How many cell layers compose it? _____
2. 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.

3. 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>)		

4. 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