Organization of Plant Tissue

Plant Systems

The Shoot System

* Has two main functions: to conduct photosynthesis and to produce flowers for sexual reproduction

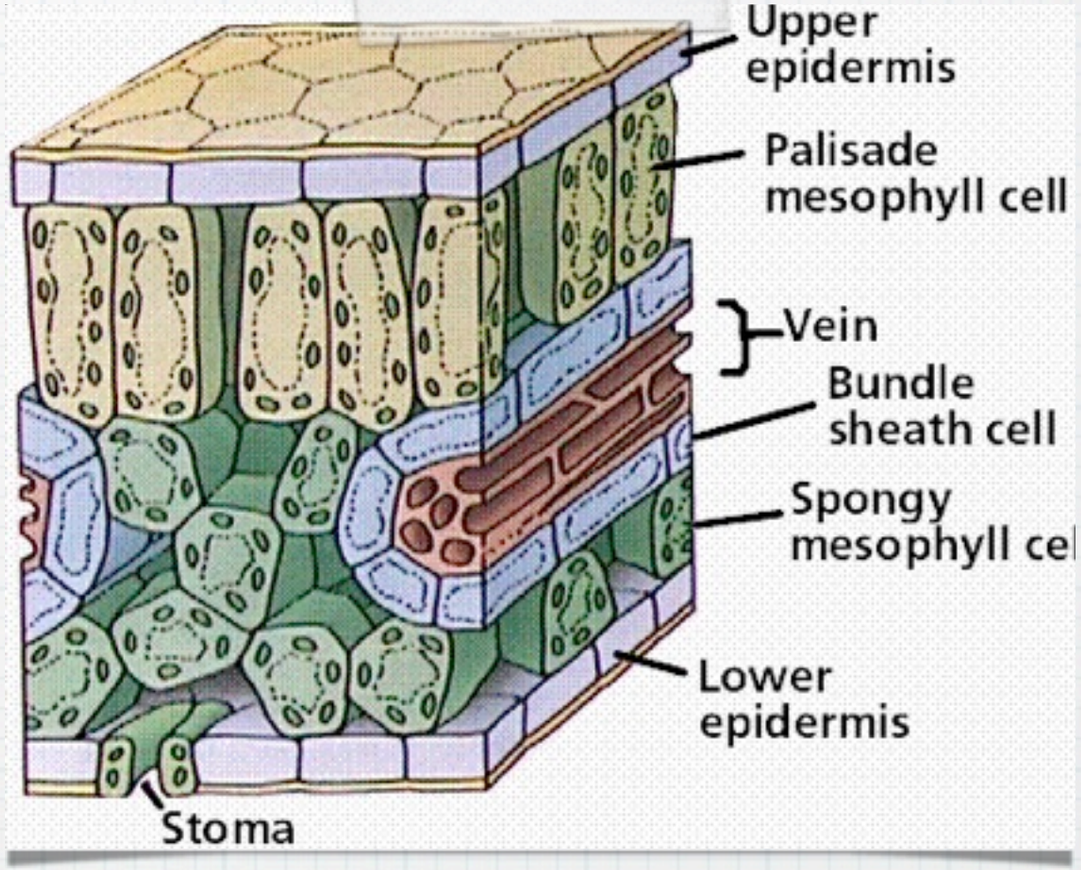
The Leaf

* Main photosynthetic structure of the plant.
* carbon dioxide+ water ⟶ glucose + oxygen

The Leaf

* Chloroplasts in the leaf cells have chlorophyll, a green pigment that absorbs light energy

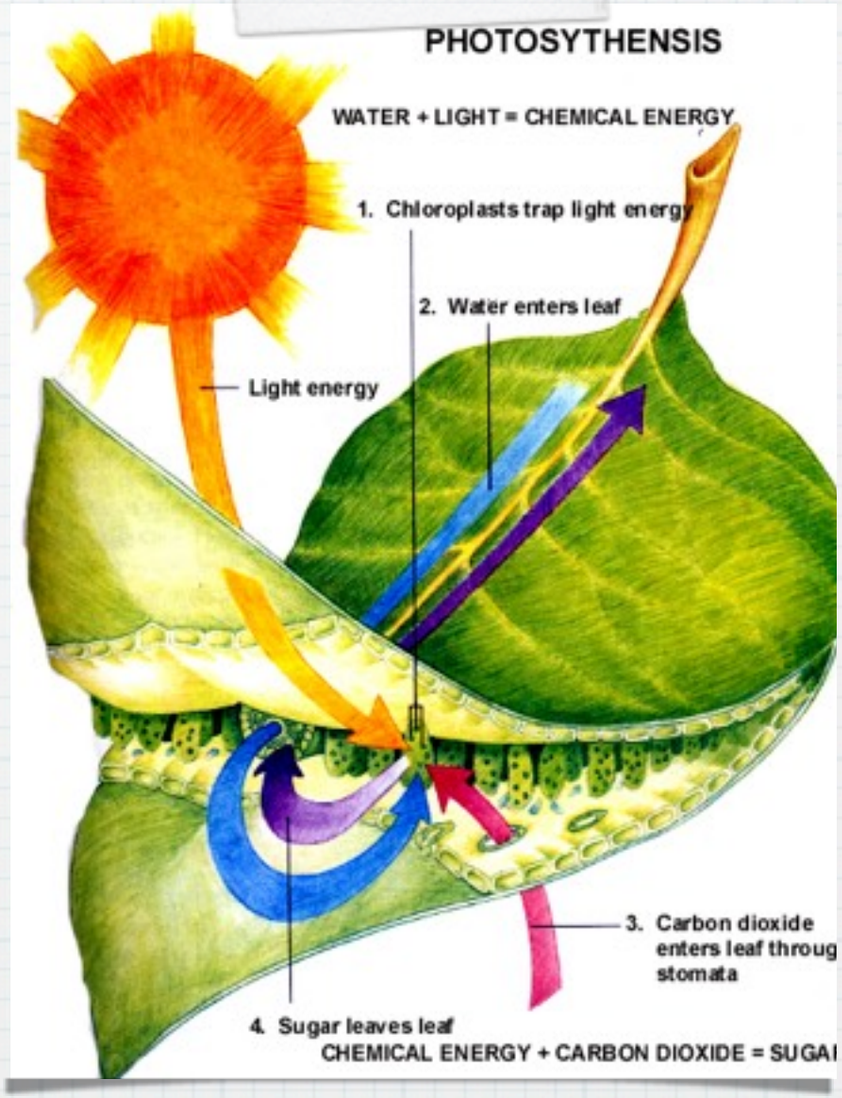
* Glucose that is made is used for plant growth and energy storage



The Leaf

* Leaves are always thin to get as much sun as possible

* Underneath the leaf is a stomate - opening to let carbon dioxide in and oxygen out



The Flower

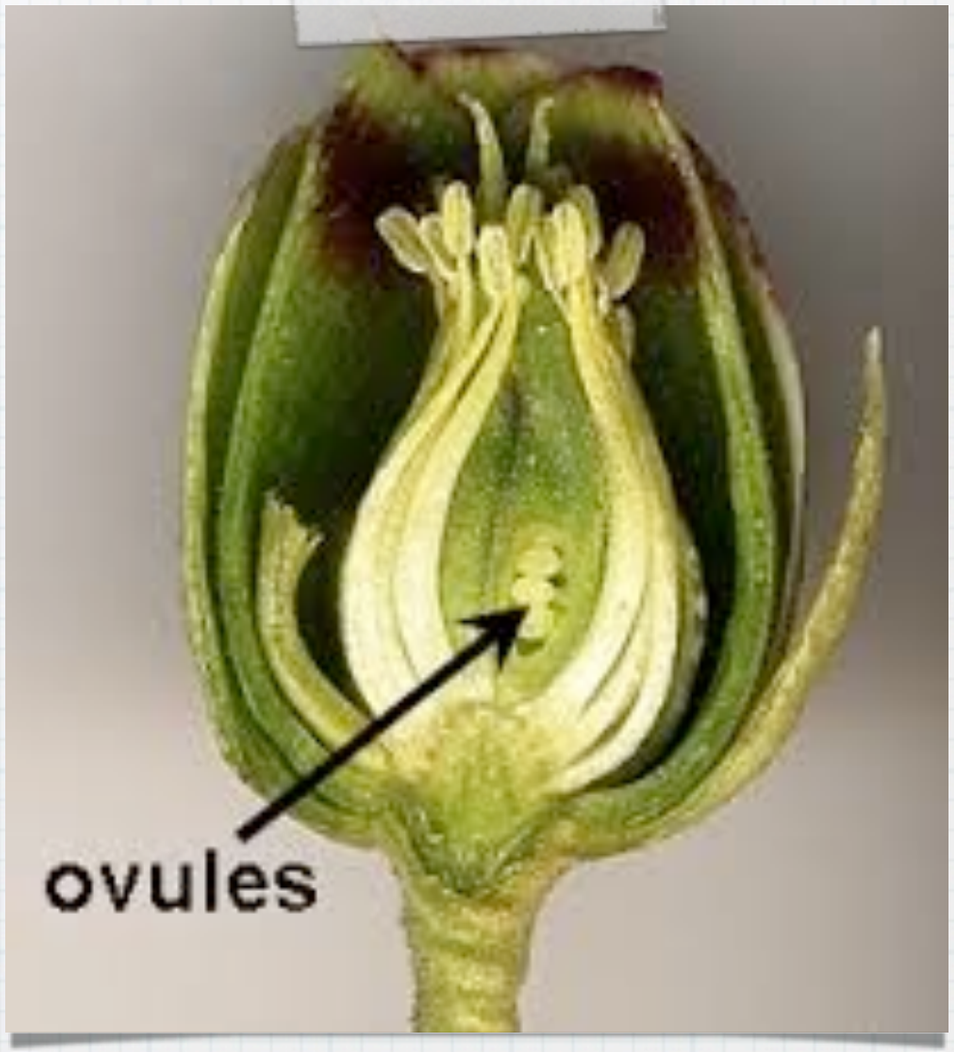
* Flowers are specialized structures that are used for sexual reproduction
* Contain male and female reproductive structures (sometimes both)

The Flower

* Male reproductive structures produce pollen grains

The Flower

* Female reproductive structures produce eggs



The Flower

* The eggs get fertilized by the pollen (preferably of a different plant)

* After pollination, the female flower parts form seeds

* In most flowering plants, the seeds are contained within fruit

The Flower

* Grasses and many trees are wind pollinated

The Flower

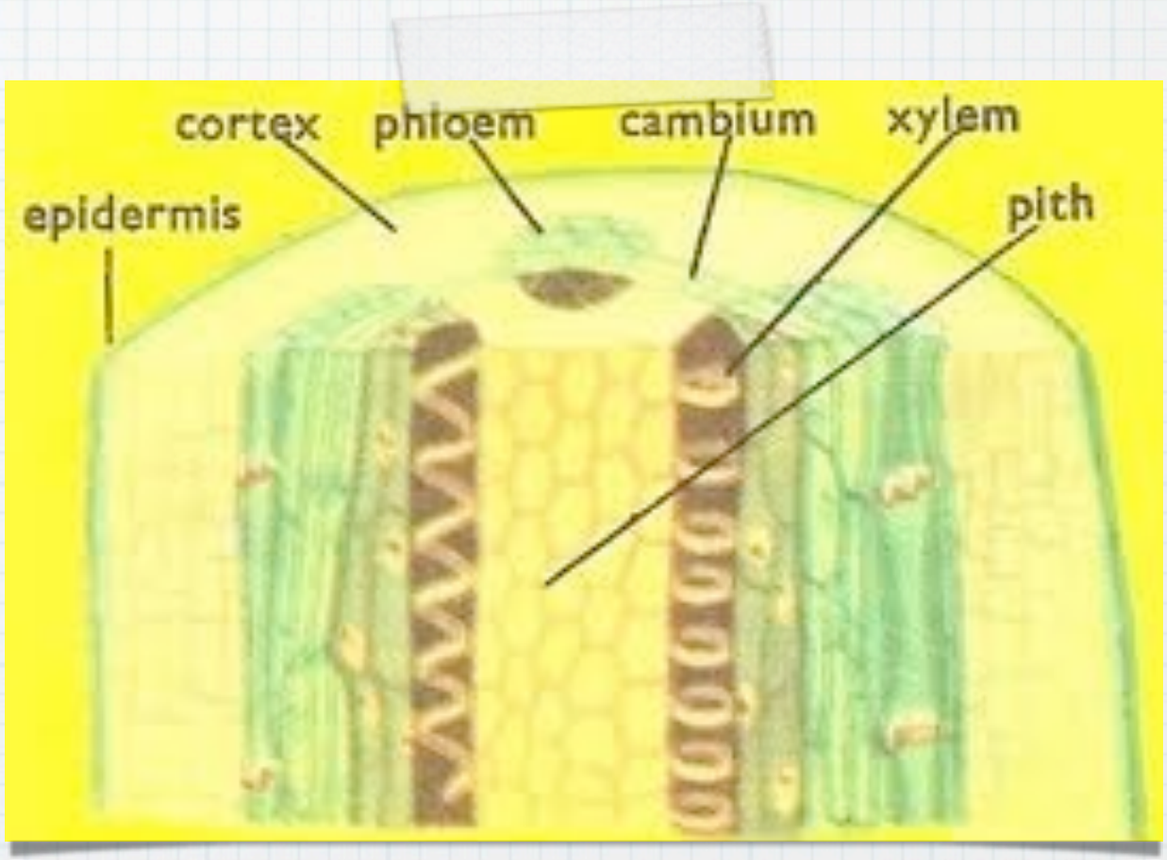
* Other plants rely on insects, birds and bats to pollinate them.

* These plants have large, colourful and fragrant flowers to attract their pollinators

The Stem

* The stem (or trunk) supports branches, leaves and flowers

* Provides a way to transport materials and always grows against gravity



The Stem

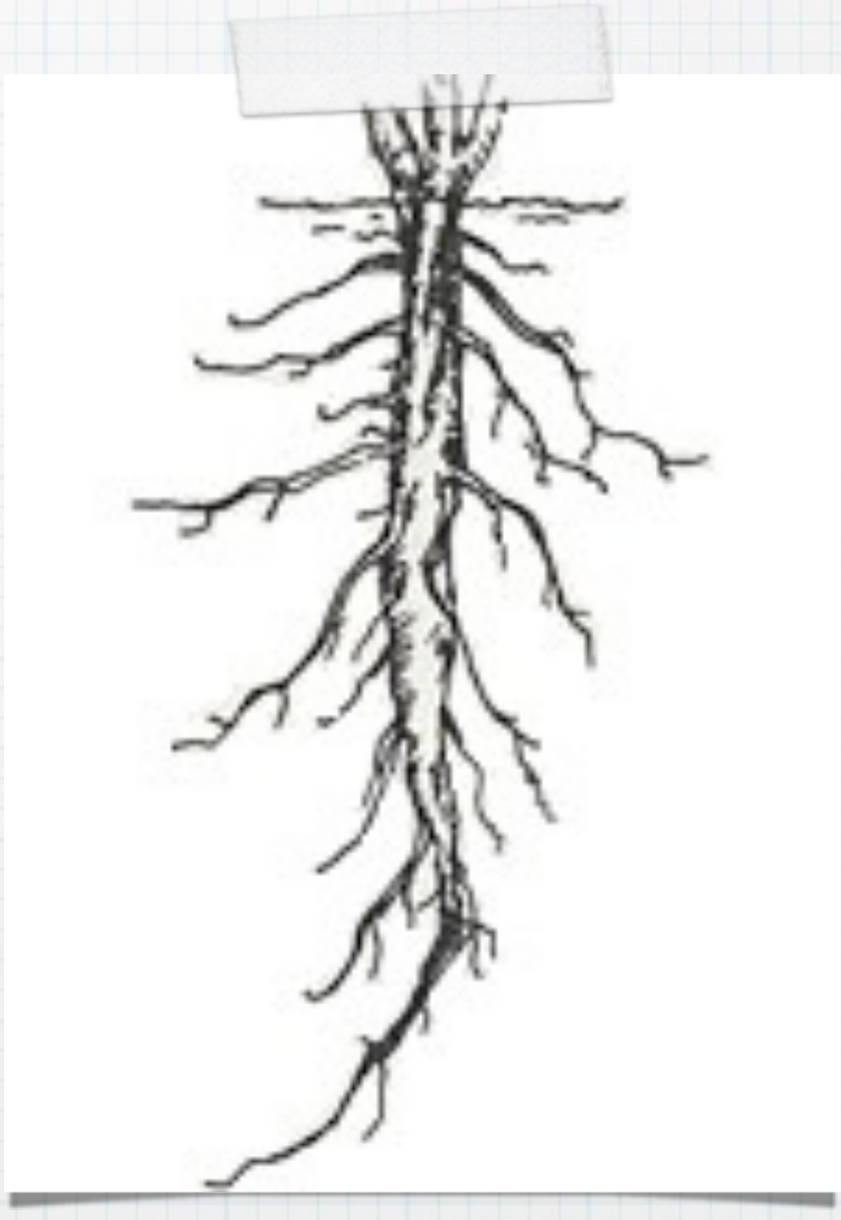
* Contain a large amount of vascular tissue to transport materials around the plant
* **Xylem** transports water and minerals from roots up the plant
* **Phloem** transports food (sugars) from leaves to other structures

The Root System

* typically grows below the ground
* Two functions:
  * 1) anchors the plant into the ground
  * 2)absorbs water and minerals from the soil
* Roots always grow with gravity

The Root System

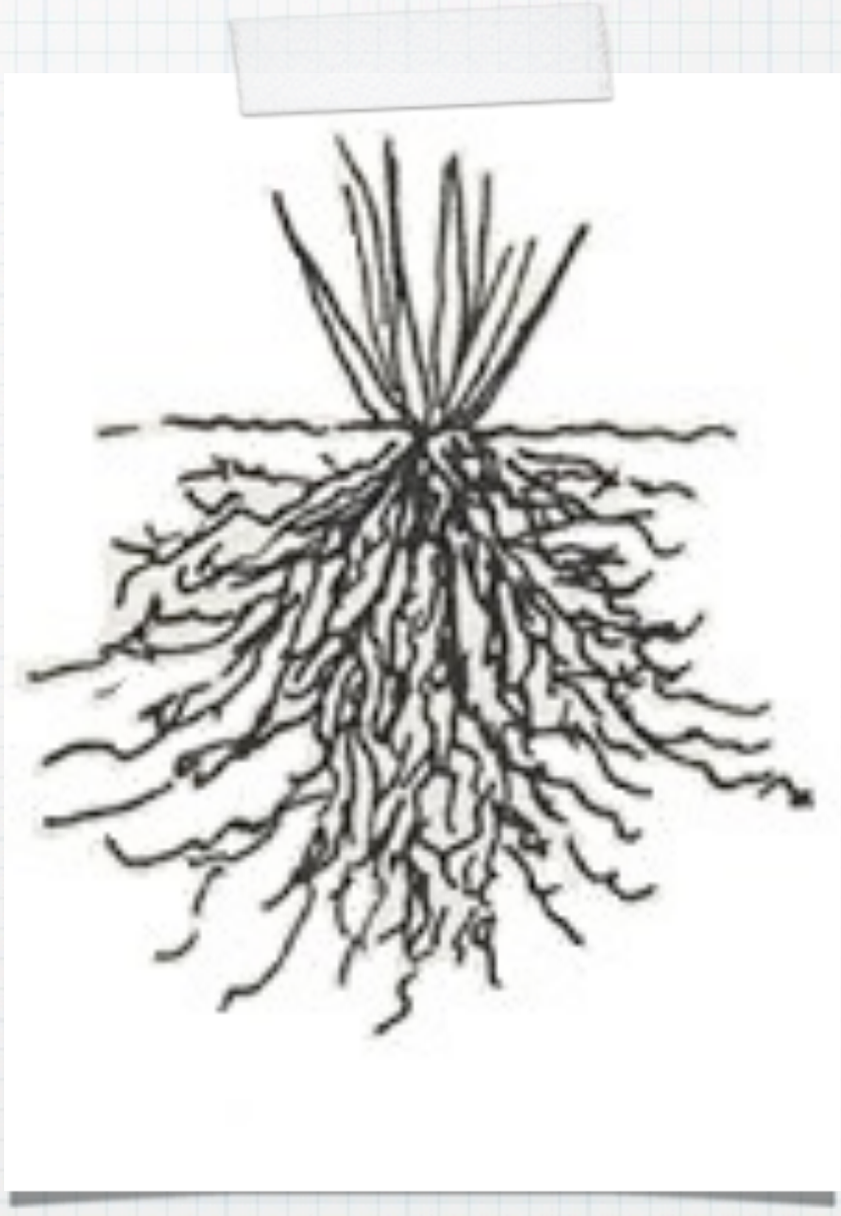
- There are two types of roots:
  - i)Tap roots: one main root with several smaller ones coming off the side
- allows for the roots to get deeper into the



The Root System

* ii)Fibrous roots: all roots are basically the same size

* allows for roots to spread out laterally



The Root System

* Most roots are white in colour - they have no chlorophyll. No point in having chlorophyll if the roots have no access to the sunlight!

The Root System

* Some roots, such as carrots and radishes, store food for the plant

Plant Tissues

Four Tissue Systems in Plants

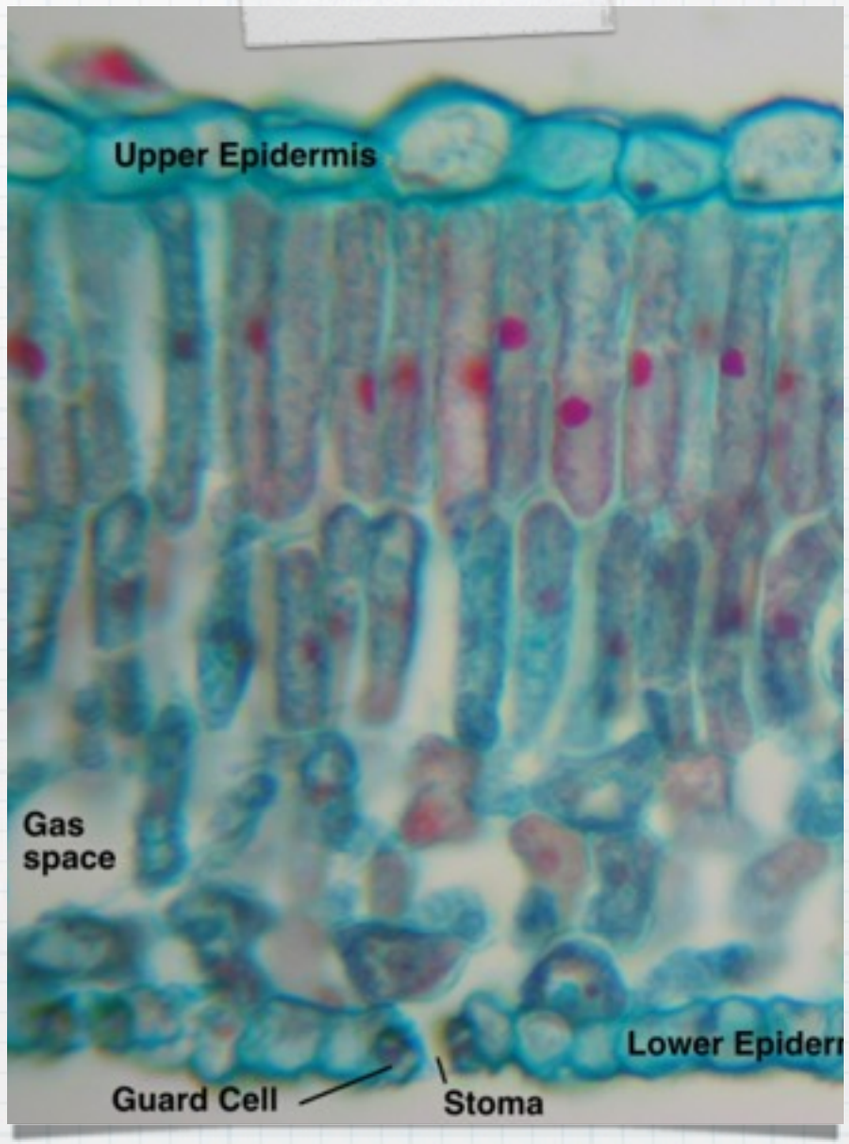
* 1) Meristematic
* 2) Dermal
* 3) Vascular
* 4) Ground Tissue

Meristematic Cells

* Unspecialized.
* Divide and differentiate into specialized tissues.

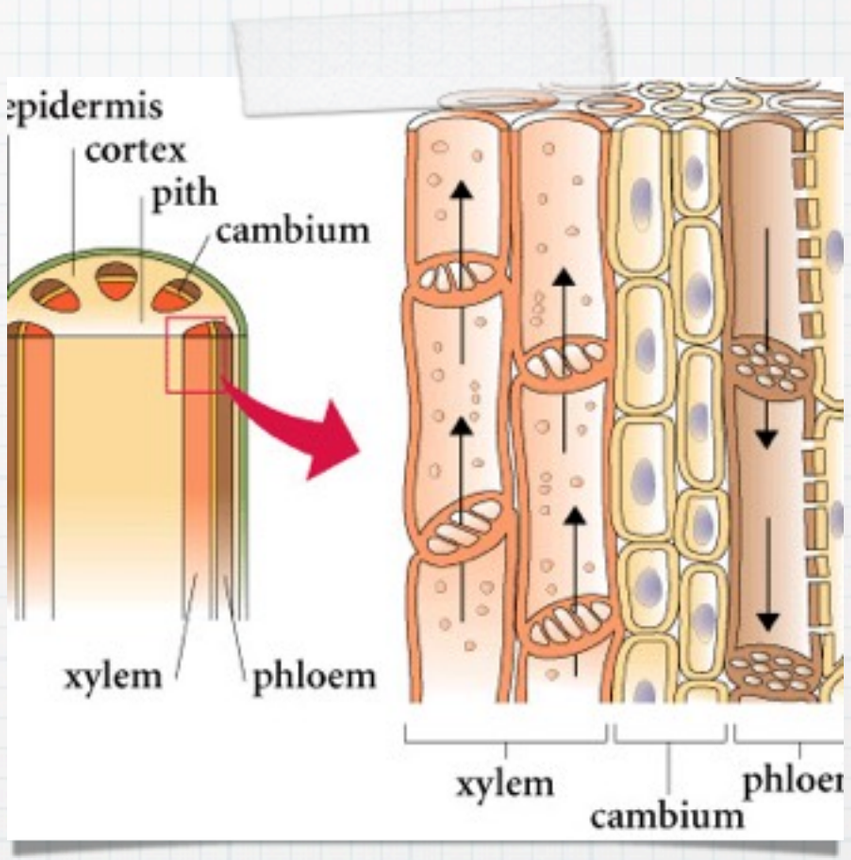
Dermal Tissue

* Forms outermost layer of a plant.
* Epidermis can be specialized:
  * Epidermal root cells can form root hairs to absorb water and minerals.
  * Epidermal leaf cells produce a waxy waterproof cuticle.



Vascular Tissue

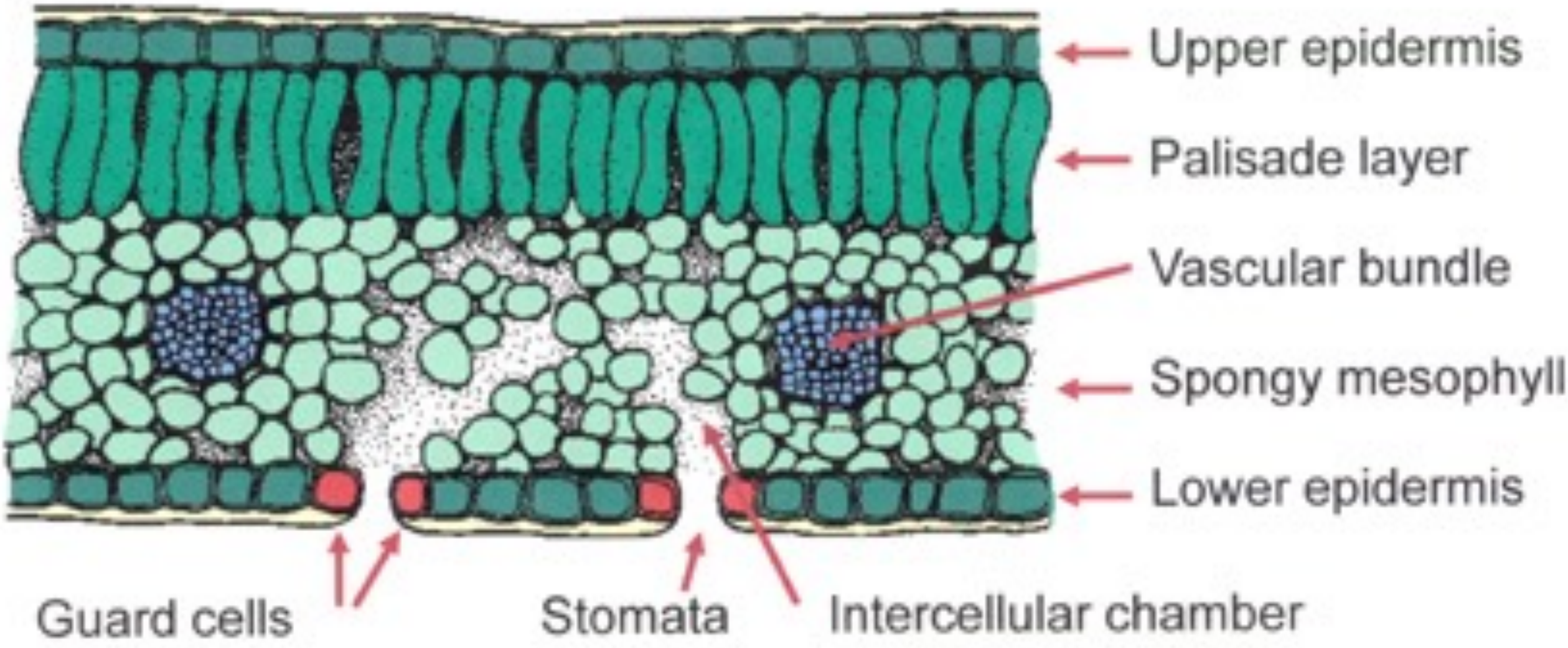
* Xylem
  * Transports water
* Phloem
  * Transports a sugar



Ground Tissue

* Located between the dermal and vascular tissue.
* Perform a variety of functions:
  * Photosynthesis.
  * Food and water storage.
  * Structural support.

Tissue	Tissue System	Function
Upper Epidermis	Dermal	Produces cuticle (minimizes loss de to evaporation)
Palisade Layer	Ground	Chloroplasts tightly packed, increase surface are to absorb sunlight
Vascular Bundle	Vascular	Transports food and water
Spongy Mesophyll	Ground	Contains loosely packed chloroplasts, increase contact with CO_2
Lower Epidermis	Dermal	Contains stomata
Guard Cells	Dermal	Open Stomata, let CO_2 in


Upper epidermis
Palisade layer
Vascular bundle
Spongy mesophyll
Lower epidermis
Guard cells
Stomata
Intercellular chamber