

Three Internal Tissue Networks

The structural and functional
organization of higher plants.

Tissue Systems by Structure and Location

01

Epidermal System

Outer Covering

The outermost layer interfacing directly with the external environment.

02

Ground System

Fundamental Bulk

Fills the critical space between the external protective layer and the internal core.

03

Vascular System

Conducting Core

The internal plumbing and transport network of the plant.



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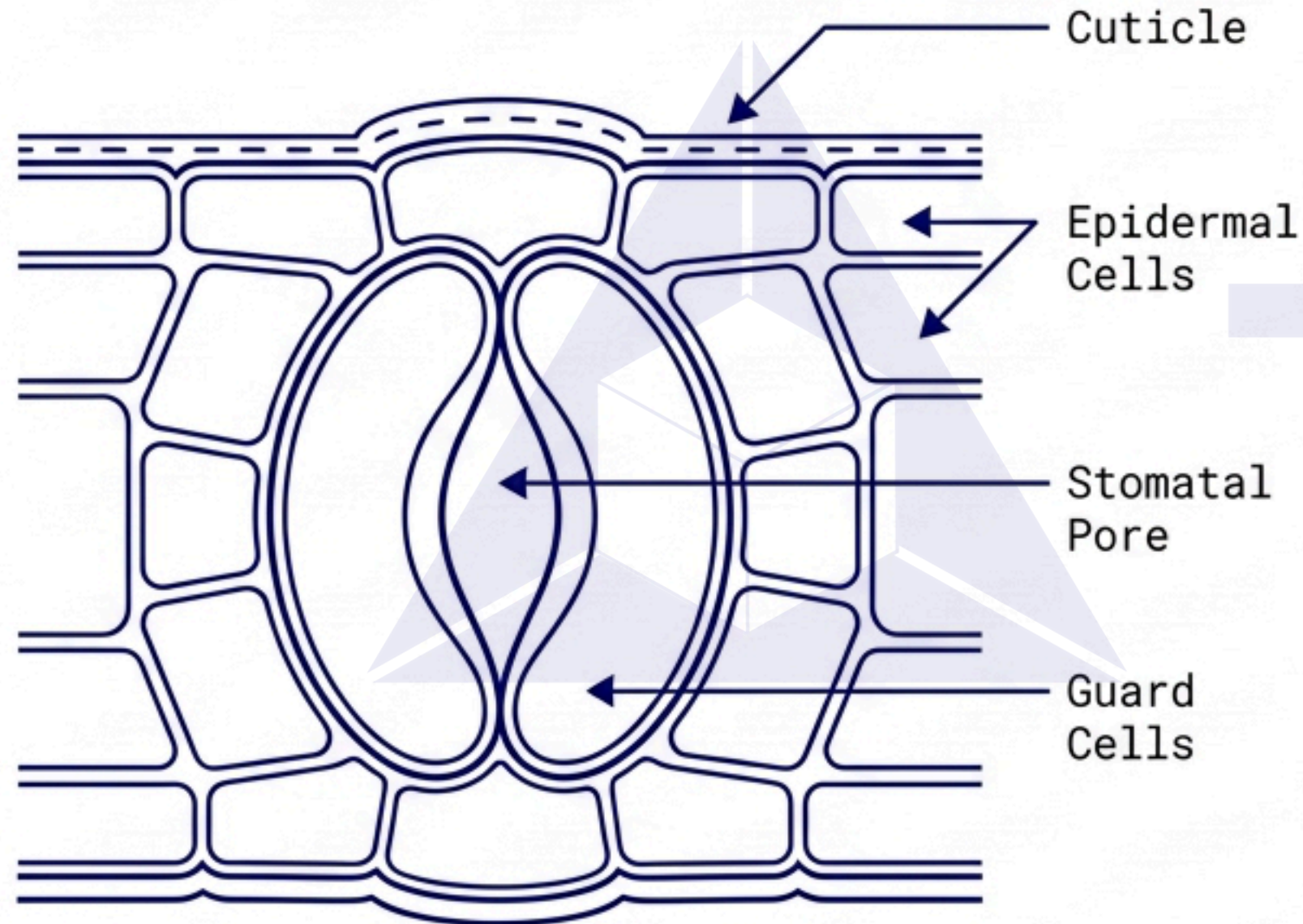
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Key Highlights

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- » Get Clear Explanations, Not Just Marks
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The Outer Defense: Epidermal System



01 Barrier

Made of a single, continuous parenchymatous layer. Coated with a waxy cuticle to prevent water loss.

02 Appendages

Features root hairs (unicellular, absorb water/minerals) and stem trichomes (multicellular, prevent water loss).

03 Stomatal Apparatus

Regulates transpiration and gas exchange. Guard cell shape varies: bean-shaped generally, but dumb-bell shaped in grasses.

Note: Cuticle is uniquely absent in root epidermis to allow for continuous water absorption.

The Foundation: Ground Tissue System

Scope

Comprises absolutely all plant tissues except the epidermis and the vascular bundles.

Cell Types

Composed of simple tissues.

Parenchyma

Collenchyma

Sclerenchyma

Location (Roots & Stems)

Forms the primary structural zones: cortex, pericycle, pith, and medullary rays.

Location (Leaves)

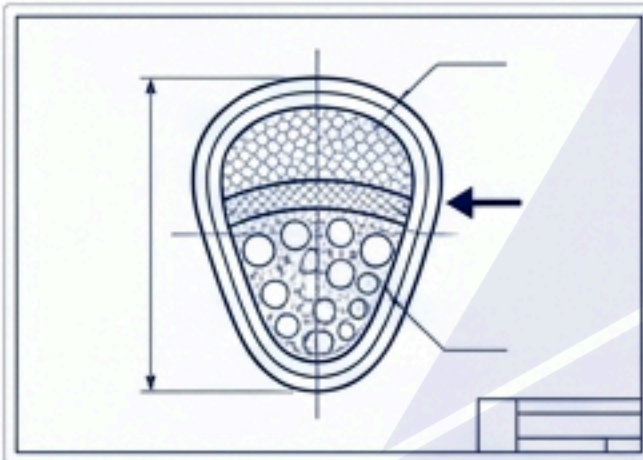
Forms the mesophyll. Composed of specialized thin-walled, chloroplast-containing cells.

Takeaway: The ground system is the primary site for photosynthesis, food storage, and structural support.

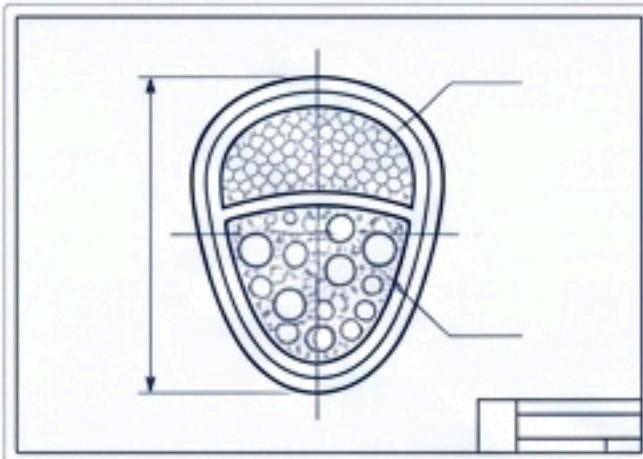
The Transport Hub: Vascular System

Composed of complex tissues: Xylem (Water transport) + Phloem (Food transport).

Growth Capability

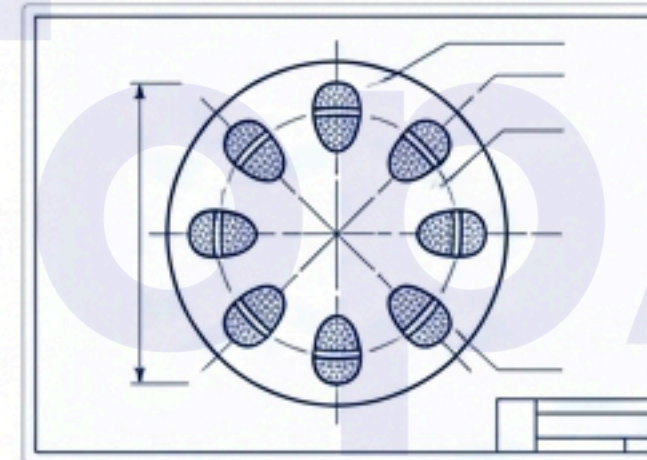


Open Bundles (Dicots)
- Cambium present.
Secondary growth possible.

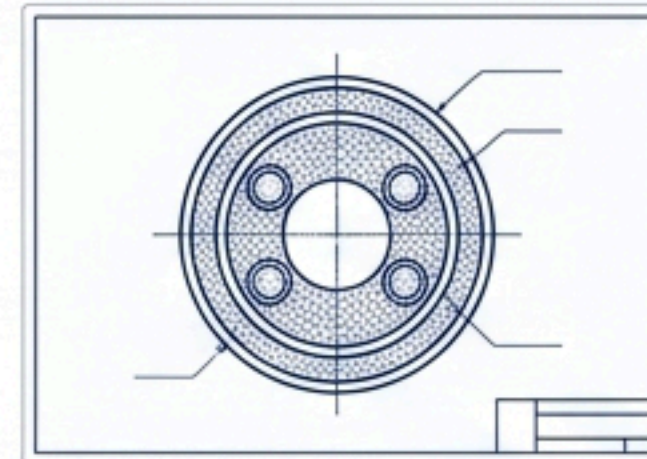


Closed Bundles (Monocots) - Cambium absent. No secondary growth.

Spatial Arrangement



Radial - Xylem & Phloem alternate on different radii. (Common in roots).



Conjoint - Xylem & Phloem situated along the same radius, with Phloem on the outer side. (Common in stems/leaves).

System Synergy: Protection, Support & Transport



01 / Interface

Protection (Epidermal)

Environmental interface management, water retention (via cuticle/trichomes), and precise gas exchange (stomata).

02 / Bulk

Storage & Support (Ground)

Structural integrity, starch/nutrient storage, and the primary engine of photosynthesis (mesophyll).

03 / Plumbing

Transport (Vascular)

System-wide, continuous distribution of water/minerals (Xylem) and complex photosynthates (Phloem).

Together, these three networks form a highly adaptable blueprint, allowing higher plants to survive and thrive across diverse global environments.



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