

Water and Mineral Uptake by Roots

PASSIVE

- Diffusion
- Facilitated Diffusion
- Osmosis

ACTIVE

- Endocytosis
- Exocytosis

Transport → Exchange of materials

- Nutrients
- Waste material

Materials to be transported in Plants

→ **Water, Gases, Solutes**

↓
Movement across the membrane

• **LONG DISTANCE TRANSPORTATION**

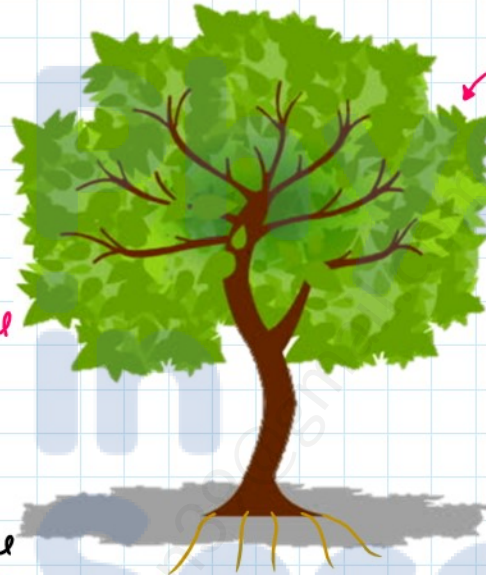
→ **Water + Minerals**
(Xylem vessels)

→ **Food / Organic material**
(Phloem vessels)

• **SHORT DISTANCE TRANSPORTATION**

→ **Loading / Unloading of Organic material**
Photosynthetic cells

Sieve tube Elements



• Diffusion ✓

→ **WATER** → Osmosis
→ **MINERALS** → Fertility Acidity
Active Passive

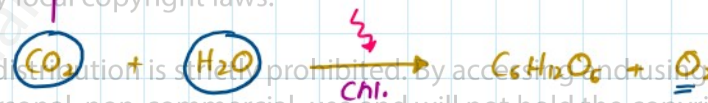
Roots → Anchorage
Absorption → H₂O Minerals

- Soluble form → mineral ✓
- Banded form → X

TRANSPORTATION REQUIREMENT :

The course videos and lecture notes provided by Physics In Seconds are for educational and informational purposes only and protected by local copyright laws.

✓ **PHOTOSYNTHESIS :**



Unauthorized reproduction or distribution is strictly prohibited. By accessing and using these materials, you agree to use them solely for personal, non-commercial use and will not hold the copyright holder liable for any damages.

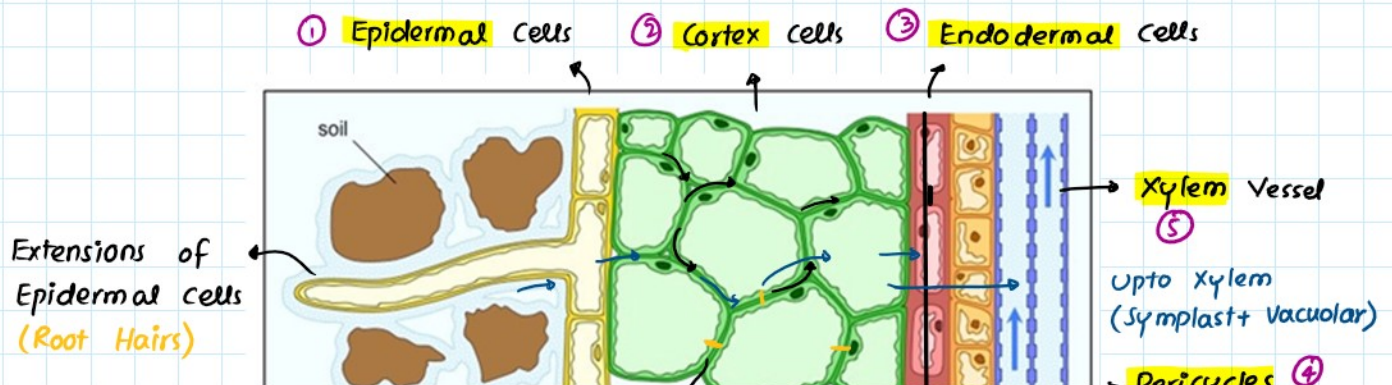
Roots → **Root Hairs** (Enhanced surface area of roots)

→ (14 million)

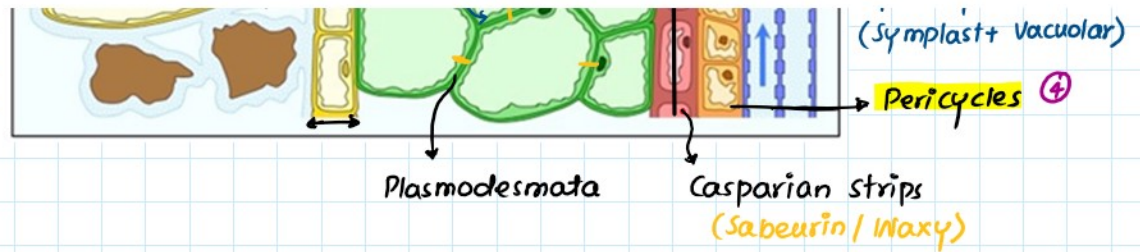
→ 67% of surface area, Rye Plant Root Branches

By accessing and using the materials, you also agree to abide by all local copyright laws.

• Prosopis (leguminous family) → Roots depth (50 meters)



Epidermal Cells
(Root Hairs)



Water Pathways

Apoplastic Pathways

Extra-cellular Pathway

- Movement of water via the help of cell wall.
- Dis-continue at the level of Casparian strip.

Symplastic Pathways

Via inter-connected Protoplasts.

- Movement of water via the help of plasmodesmata.

Vacuolar Pathways

via vacuole

- Movement of water via the help of vacuole / Tonoplast.

The course videos and lecture notes provided by Physics In Seconds are for educational and informational purposes only and protected by local copyright laws.

Unauthorised reproduction or distribution is strictly prohibited. By accessing and using these materials, you agree to use them solely for personal, non-commercial use and will not hold the copyright holder liable for any damages.

By accessing and using the materials, you also agree to abide by all local copyright laws.