

1. Definition : **The loss of water in the form of water vapour from a plant to the atmosphere.**

2. About 90% of transpiration takes place through the **stomata**, 5% through the **cuticle** and 5% evaporated from the lenticels of the stem

3. The importance of transpiration:

(i) Creates a **transpirational pull** that sucks water and dissolved mineral salts from the soil.

(ii) Maintains **osmotic pressure** in the cells due to elimination of excessive water in the plant body.

(iii) Gives a **cooling effect** due to absorption of heat by water during evaporation.

4. Factors affecting the rate of transpiration are **air movement, temperature, light intensity** and **relative humidity**

(i) The rate of transpiration **increases** when the air movement increases

(ii) The rate of transpiration **increases** when the temperature increases

(iii) The rate of transpiration **increases** when the light intensity increases

(iv) The rate of transpiration **decreases** when the relative humidity increases

Transport of water and mineral ions

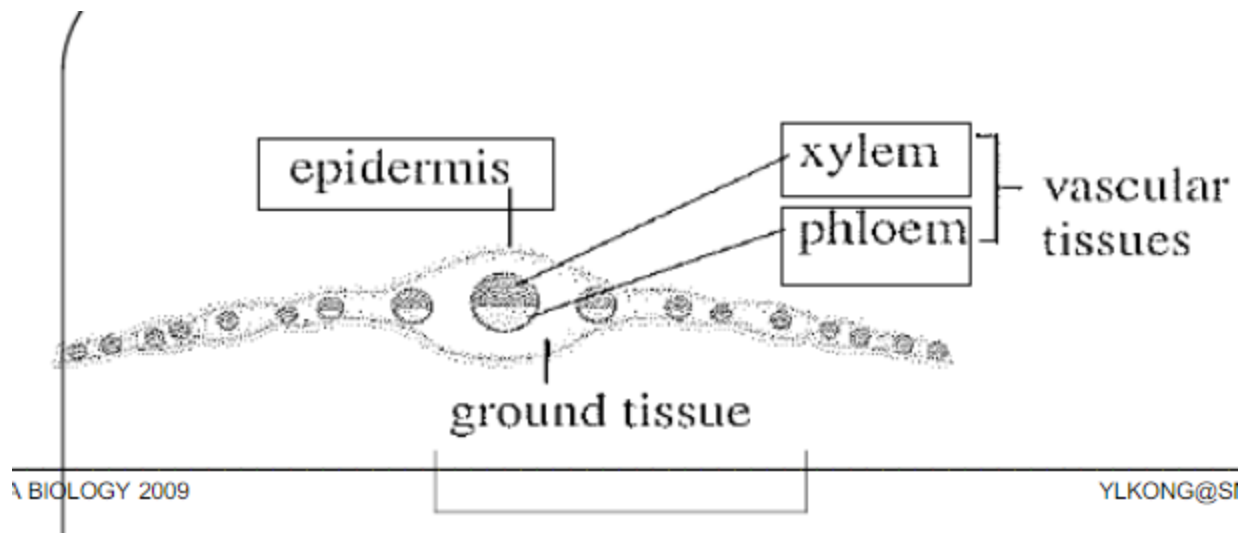
1. Water enters the root by **osmosis** while mineral ions by **active transport**.

The regulation of transpiration by stomata

1. Each stoma consists of a pair of kidney shaped **guard cells** surrounding the **stomata** .

2. Guard cells are specialized **epidermal cells** with the inner cell wall **thicker** than the outer cell wall.

3. In general, stomata **open** during the day and **close** at night.



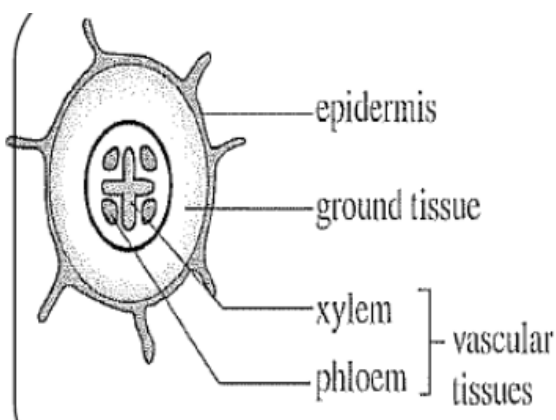
1. The **vascular tissue** consists of veins.
2. **Xylem** forms the upper part of the vascular bundle, while the **phloem** forms the lower part of the bundle.

### WORKSHEET 10.7 The Transport of Substances in Plants

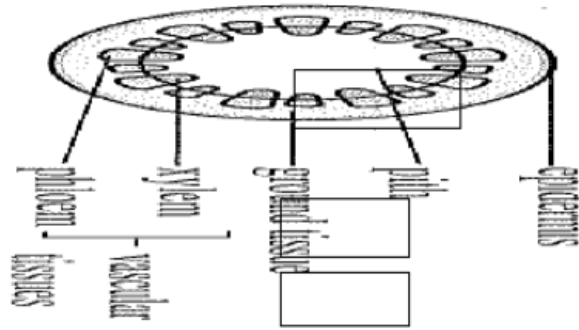
The vascular tissue in stem, root and leaf

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1. The two main vascular tissues are **xylem** and **phloem**.
2. **Xylem** transports water and minerals salts upward from the **roots** to the **stems** and **leaves**.
3. **Phloem** transports organic substances such as sucrose from the leaves or storage



1. In the centre of the root is a core of vascular tissue called **vascular cylinder**.
2. The **xylem** is shaped like a star.
3. The **xylem** bundles alternate with the **phloem** bundles.



1. Xylem and phloem together form **vascular bundles** which are arranged in a **ring** pattern surrounding the **pith**.
2. Each vascular bundle consists of an outer **phloem** , an inner **xylem** and intervening zone of meristematic cells (**cambium**).