

## Highsted Knowledge Organiser, Biology, Term 5, Year 9: Plant systems

### What I need to know

Tissues and organs in plant  
 Transport systems in plants  
 Evaporation and transpiration  
 Factors affecting transpiration

### Key Vocabulary:

Photosynthesis  
 Stomata  
 Guard cells  
 Transpiration  
 Translocation  
 Light intensity  
 Temperature  
 Humidity  
 Wind speed  
 Phloem  
 Xylem

### Challenge question:

How are transpiration and translocation processes connected to photosynthesis?

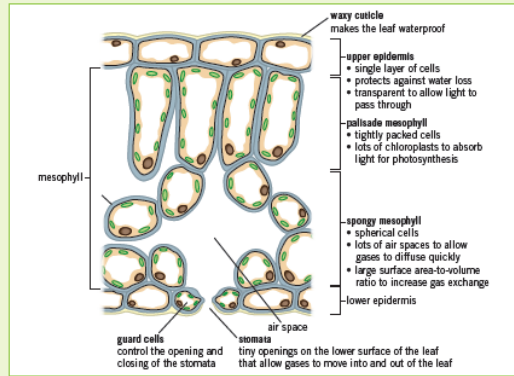
### Suggested reading:

[www.kerboodle.com](http://www.kerboodle.com)

<https://www.bbc.co.uk/bitesize/guides/zyk8msg/revision/1>

### Tissues in leaves

Leaves are organs because they contain many tissues that work together to perform photosynthesis.



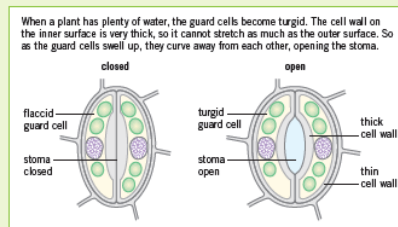
### Stomata

**Stomata** are tiny openings in the undersides of leaves – this placement reduces water loss through evaporation.

They control gas exchange and water loss from leaves by:

- allowing diffusion of carbon dioxide into the plant for photosynthesis
- allowing diffusion of oxygen out of the plant.

Guard cells are used to open and close the stomata.



### Transpiration

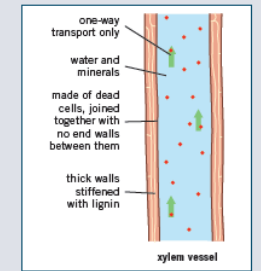
**Description**

Water is lost through the stomata by evaporation. This pulls water up from the roots through the xylem and is called transpiration. The constant movement of water up the plant is called the **transpiration stream**.

**Importance**

- provides water to cells to keep them **turgid**
- provides water to cells for photosynthesis
- transports mineral ions to leaves

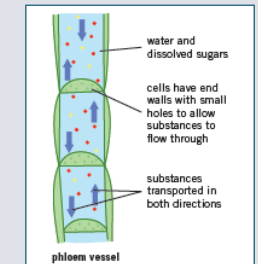
**Specialised tissues**



### Translocation

The movement of dissolved sugars from the leaves to the rest of the plant through the **phloem**.

- moves dissolved sugars made in the leaves during photosynthesis to other parts of the plant
- this allows for respiration, growth, and glucose storage



### Factors affecting the rate of transpiration

Factor	Effect on transpiration	Because...
<b>temperature</b>	higher temperatures <i>increase</i> the rate of transpiration	water evaporates faster in higher temperatures
<b>humidity</b>	lower humidity <i>increases</i> the rate of transpiration	the drier the air, the steeper the concentration gradient of water molecules between the air and leaf
<b>wind speed</b>	more wind <i>increases</i> the rate of transpiration	wind removes the water vapour quickly, maintaining a steeper concentration gradient
<b>light intensity</b>	higher light intensity <i>increases</i> the rate of transpiration	stomata open wider to let more carbon dioxide into the leaf for photosynthesis

### Key terms

Make sure you can write a definition for these key terms.

photosynthesis stomata guard cells transpiration translocation  
 light intensity temperature humidity wind speed phloem xylem