Ecosystems

4. Photosynthesis

CONCEPT 3

LESSON GUIDE

WATER AND MINERAL MOVEMENT IN PLANTS

PRECISE LEARNING POINTS

KNOW

I know where water and minerals are taken in and stored in a plant.

APPLY

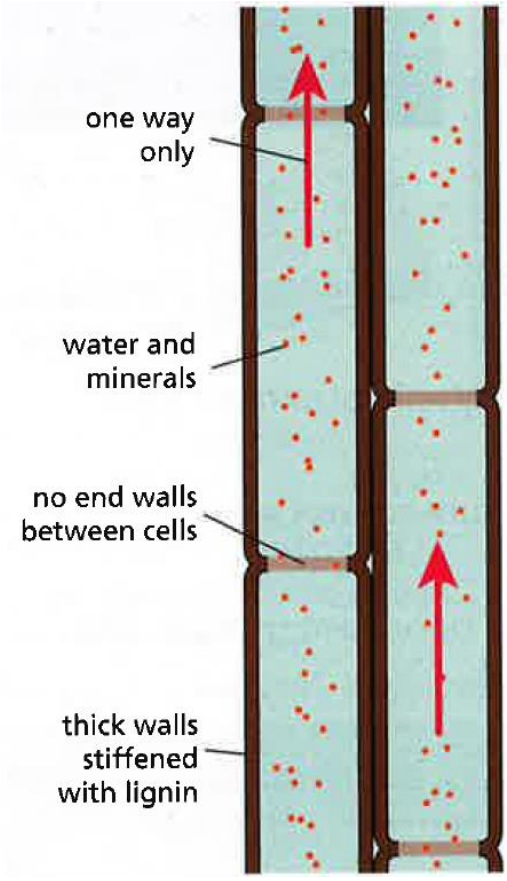
I can apply my knowledge to explain how water and minerals are taken in and stored in a plant.

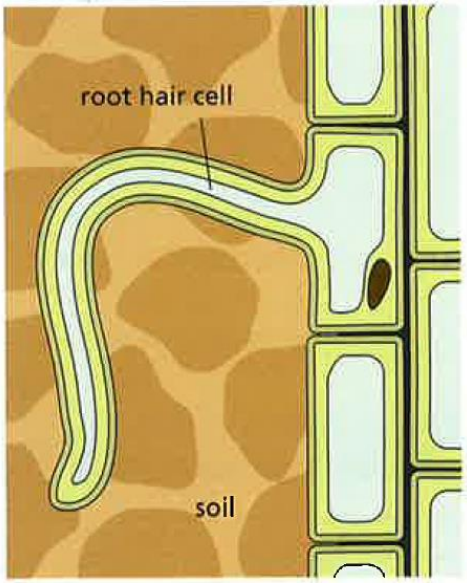
EXTEND

I can extend my knowledge to explain transpiration in a plant.

NOTES

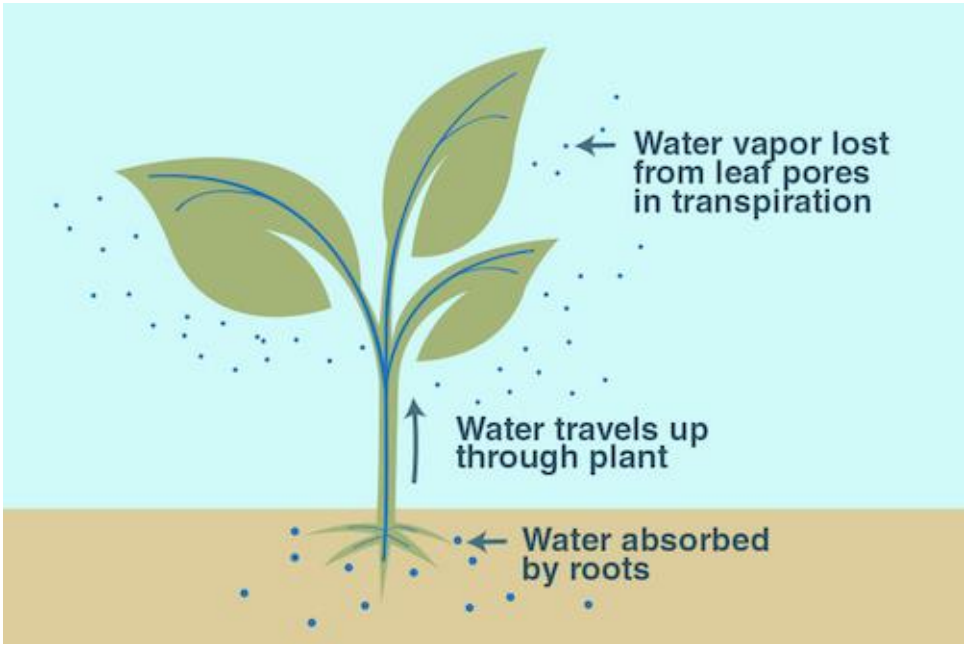
Water is essential for plants not only for photosynthesis but also to provide support. Minerals dissolved in water are also important to keep the plant healthy, a bit like vitamins do for you.
Water and minerals are taken up via the **root hair cells.** The water and minerals then travel through the **xylem** which is located in the stem. These specialised cells act like a pipeline through the plant and when the water evaporates through the stomata of the leaf, a sucking effect is created. This is what allows even the tallest trees to get water all the way up to their leaves.

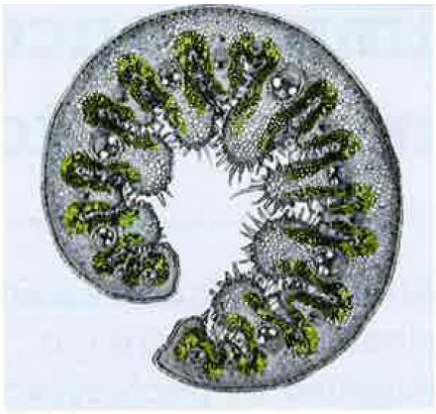




Here we can see that a **root hair cell** is adapted to have a large surface area which increases the uptake of water and minerals.
Here we can see some of the adaptations of **xylem** cells. They are strengthened with **Lignin** so that they can support the plant (this is what forms the wood that we make furniture from)
There are no end walls between the cells to allow the free movement of water and please note that the water only flows in one direction, from the roots to the leaves.

The loss of water from the surface of a leaf is called **TRANSPIRATION**. It is a consequence of the stomata being open to allow gas exchange and helps to draw water up from the roots. However, too much water loss can cause a problem for plants. When conditions are windy or hot, them too much transpiration might occur. Some plants have adapted their leaves to reduce this effect.





Here we can see the leaf of Marram grass. It has a curled leaf to reduce the surface area, the hairs help to trap moisture and the stomata can be found in sunken pits to increase the humidity around them.
Other plants have a **thick, waxy cuticle** to reduce water loss and some desert plants have **spines** instead of leaves.

Factors that **increase** the rate of transpiration are **sunlight, wind and high temperature.**
High humidity will **decrease** the rate of transpiration.