

Knowledge



1. Palisade layer
2. Water and mineral ions
3. Dissolved sugars (NOT 'food')
4. The movement of dissolved sugars around the plant in the phloem
5. Evaporation of water through the stomata
6. Stomata
7. Temperature, humidity, light intensity, wind speed (air flow)
8. How much water is in the guard cells
9. The underneath, as it's cooler and less water will be lost by evaporation
10. Meristem

Apply

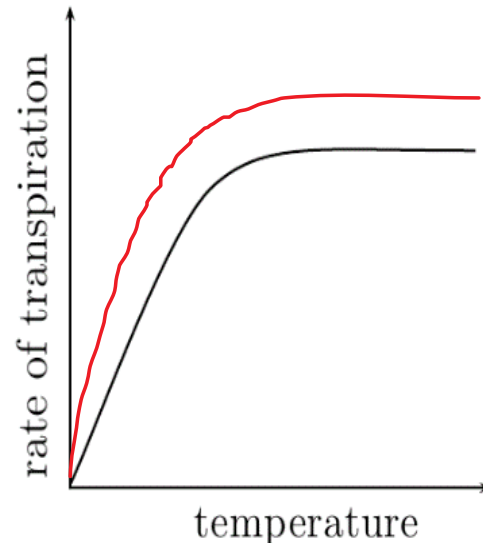
1. Carbon dioxide diffuses from the air outside the leaf (high concentration) through the stomata and the spongy mesophyll to the palisade cells down a concentration gradient.
2. Water evaporates through the stomata, which draws more water up the xylem vessels in the leaves and the stem and into the roots by osmosis
3. Osmosis
4. Xylem cells are hollow tubes so there is lots of space for water to flow. They are strengthened with spirals of lignin for support. Phloem are similar and have small pores in the end walls to allow dissolved substances to flow through

5. When it is dark, the stomata close because there is no need for CO_2 to get in as photosynthesis cannot happen. As the stomata are closed, very little water can escape

6a) As the temperature increases, the rate of transpiration increases up to a maximum, then the rate stays the same even if the temperature is increased

6b) When it's hotter, more water is lost by evaporation through the stomata, but there comes a point when the rate cannot get any faster

6c)



Independent

Dependent

Controls

Method

- Put a plant in the photometer and make sure the bubble is at zero
- Start the stopwatch and time for 5 minutes
- Read off the scale **how far the bubble has moved** and convert this to a rate by dividing by 5
- Reset the bubble to zero and repeat, but this time use a hairdryer on **low speed, then medium and then high speed.**
- Keep the **plant the same**, the **temperature setting** and the time **period of 5 minutes**