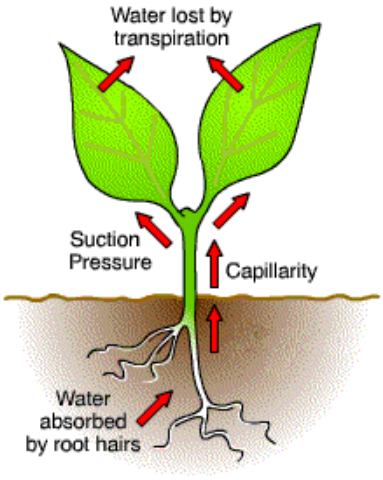
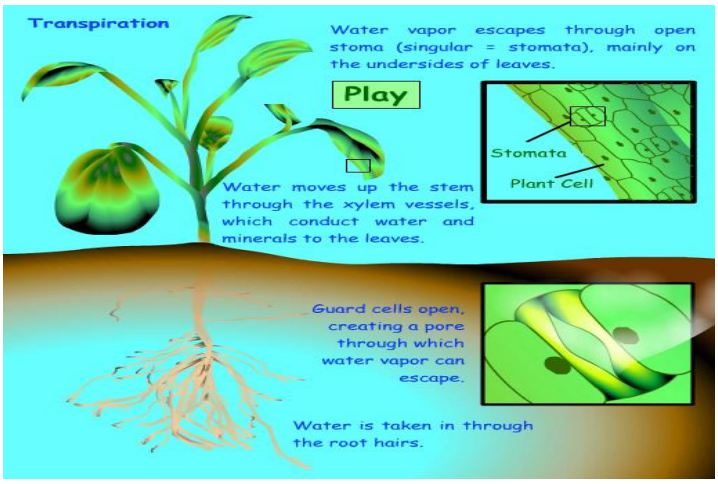
The transpiration:

Loss of water in the form of vapor from living plants, particularly from the aerial parts (parts which is exposed to the air), this process is in principle one of evaporation & diffusion.

Leaf surfaces are dotted with openings called stomata, which pores that are bordered by guard cells .The rate of transpiration is directly related to the degree of stomatal opening. The amount of water lost by a plant depends on its size , along with the surrounding light intensity ,temperature , humidity,& wind speed ,soil water supply &soil temperature can influence stomatal opening, & thus transpiration rate.

The transpiration occurs as a result of water potential differences among the parts of system (soil, root, stem, leaf, and atmosphere).





Soil Wp.> Root > stem> leaves>atmosphere Wp.

Most the transpiration rate occur through the mesophyll tissue of the leaf, particularly through their parenchymal cells, because they have thin walls, no pectin materials is found , more inter space between the cells for their non re gularly shapes.

Types of transpiration:

1.stomatal t. ⟶ 90-95%

2.cuticular t. ⟶ 1- 10%

3.lenticular t. ⟶ 2-8%

Lenticles are the minute openings on the surface of stems &twigs, replaced the stomata in the secondary plant tissue.

Q/what is the importance of transpiration in plants?

1. cooling the plant tissue in the leaf (each gram of water to evaporated through the stomata needs (580 calorie)which absorbed this heat from the plant tissue).

2. promotes absorption & translocation of solutes.

3. exude the increasing water from the plant &kept the optimum turgor for the plants cells.

Methods of transpiration rate measurements:

1. technique of potometers

Amount of the absorbed water= amount of loosed water

2.weighting method (Lysimeter)

Weight of a plant before transpiration- wt. Of it after trans.

3.cobalt chloride paper (transpiration indicator)

4.collection &weight the water lost by transpiration.

Factors affect the rate of transpiration:

*Environmental factors

1. Light 2.Temperature 3.Air humidity 4.Wind speed
5. Soil water content

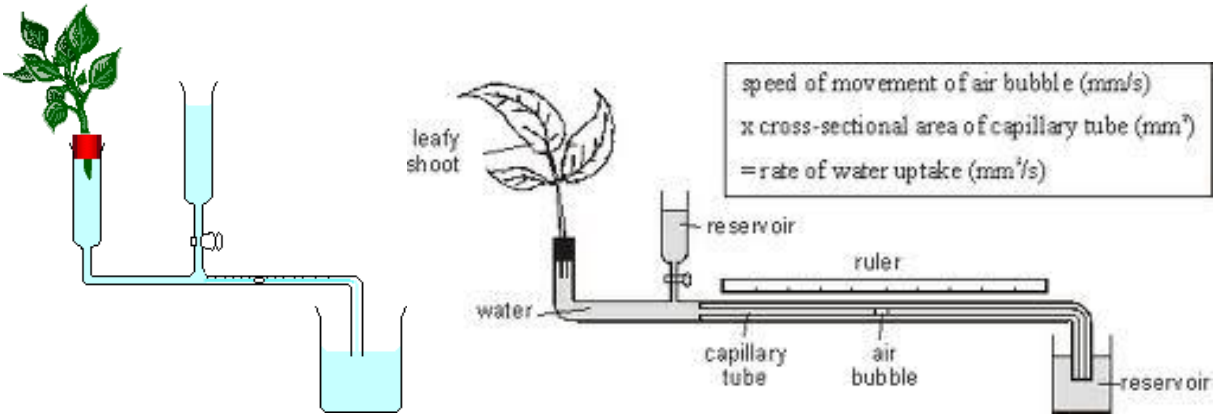
*plant factors

1. Leaf area
2. Root-shoot ratio
3. Leaf structure &stomata.

Practice part:

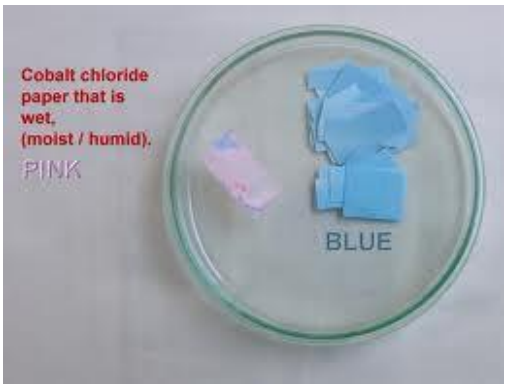
1.**determination of transpiration rate by potometer:**

Indirect measure of transpiration, it is based on the assumption that the rate of water absorption is very nearly equal to the of transpiration .



2**. Cobalt chloride paper method (qualitative)** :

Transpiration is estimated by a change in color rather than by a change in weight. Pieces of filter paper are soaked in cobalt chloride solution (3%) then dried in oven at (60 c) . papers colored with blue when dry and turn pink when moist .



Q1\ each one of leaf sides, require more time for color turning ? why?
Q2\ try using another plant, then compare between the results, with calculate the time of color turning?

3.proving of stomata founding on the leaves surface with using a hot water

- Count the appearance tiny bubbles on the leaves surfaces , then compare between the two plants .
- Also take the lower surfaces of leaves then see the difference between the two plants.