Uptake of water by plants

Student worksheet

Uptake of water and dissolved solutes

The uptake of water by a plant is driven by a process called transpiration. Water diffuses out of stomata and evaporates from leaf and stem surfaces. Hydrostatic pressure in the upper parts of a plant decreases. Water is absorbed through the plant's roots. Together with any dissolved solutes it is drawn up the plant and moves through the xylem to the upper parts of the plant.

Equipment and materials

- Celery stalks with leafy tops
- Food colouring
- 250 cm^3 measuring cylinder
- Scalpel
- Hand lens
- Cutting board

Method

Care: Wear eye protection. Take care when using the scalpel and always cut materials on a cutting board.

1. Pour 25 cm^3 of water into a 250 cm^3 measuring cylinder and add several drops of food colouring.
2. Cut across the base of the celery stalk to expose a fresh section. Place the stalk in a measuring cylinder, with its cut end in the coloured solution. Leave it in bright light.
3. Monitor the uptake of the coloured solution for 30 minutes or longer if possible by measuring the height the solution has travelled up the stalk. Do this at 5 or 10 minute intervals.
4. Rinse the lower part of the celery stalk with water under a running tap. Dab the stalk dry with kitchen towel.
5. Cut across the celery stalk about 0.5 cm from the bottom. Use a hand lens to examine the cross section. Note how the food colouring is distributed in the stalk (a photograph might be taken).
6. Now cut the stalk into 5 cm lengths and examine both ends of each piece using a hand lens.
7. Finally select one or two leaves that have become coloured. Cut across them and use a hand lens to examine the cross section. Make a note how the food colouring is distributed in the leaf.