

3.1.3 Transport in plants

- (a) the need for transport systems in multicellular plants To include an appreciation of size, metabolic rate and surface area to volume ratio (SA:V).
M0.1, M0.3, M0.4, M1.1, M2.1, M4.1
HSW1, HSW3, HSW5, HSW8
- (b) (i) the structure and function of the vascular system in the roots, stems and leaves of herbaceous dicotyledonous plants To include xylem vessels, sieve tube elements and companion cells.
PAG1 HSW4
(ii) the examination and drawing of stained sections of plant tissue to show the distribution of xylem and phloem **PAG2** HSW4
(iii) the dissection of stems, both longitudinally and transversely, and their examination to demonstrate the position and structure of xylem vessels
- (c) (i) the process of transpiration and the environmental factors that affect transpiration rate To include an appreciation that transpiration is a consequence of gaseous exchange.
(ii) practical investigations to estimate transpiration rates To include the use of a potometer.
M0.1, M0.2, M1.1, M1.2, M1.3, M1.6, M1.11, M3.1, M3.2, M3.3, M3.5, M3.6, M4.1 **PAG5, PAG11** HSW2, HSW3, HSW4, HSW5, HSW6, HSW8
- (d) the transport of water into the plant, through the plant and to the air surrounding the leaves To include details of the pathways taken by water **AND** the mechanisms of movement, in terms of water potential, adhesion, cohesion and the transpiration stream.
HSW2, HSW8
- (e) adaptations of plants to the availability of water in their environment To include xerophytes (cacti and marram grass) and hydrophytes (water lilies).
HSW2
- (f) the mechanism of translocation. To include translocation as an energy-requiring process transporting assimilates, especially sucrose, in the phloem between sources (e.g. leaves) and sinks (e.g. roots, meristem) **AND** details of active loading at the source and removal at the sink.
HSW2, HSW8