# Water and Plants

I. Water

A. Properties *37-43

2.1.5 Outline the properties of water that are significant to living organisms including transparency, cohesion, solvent properties and thermal properties. Refer to the polarity of water molecules and hydrogen bonding where relevant. 2

2.1.6 Explain the significance to organisms of water as a coolant, transport medium and habitat, in terms of its properties. 3

➔ Cohesion, adhesion, surface tension, specific heat,

➔ Review pH scale *43-46

➔ What are the unique chemical and physical properties of water that make life possibe?

B. Movement of Water *137-140

1.4.4 Define diffusion and osmosis. 1

➔ Hypertonic, hypotonic, isotonic, osmoregulation, turgid, flacid

II. Water Transport in Plants

A. Anatomy and Structure *Ch 35

13.1.2 Draw a diagram to show the external parts of a named dicotyledonous plant.1 Include the root, stem, leaf, axillary and terminal buds.

13.1.3 Draw plan diagrams to show the distribution of tissues in the stem, root and leaf of a generalized dicotyledonous plant.1

Note that plan diagrams show distribution of tissues (eg xylem, phloem) and do not show individual cells. They are sometimes called "low power" diagrams.

13.1.4 Explain the relationship between the distribution of tissues in the leaf and the functions of these tissues. 3

B. Movement of Water and Nutrients *700-711

13.2.1 Explain how the root system provides a large surface area for mineral ion and water uptake by means of branching, root hairs and cortex cell walls. 3

13.2.2 Describe the process of mineral ion uptake into roots by active transport. 2

13.2.3 Explain the process of water uptake by root epidermis cells and its movement by the symplastic and apoplastic pathways across the root to the xylem. 3

13.2.4 State that terrestrial plants support themselves by means of thickened cellulose, cell turgor and xylem. 1

13.2.5 Define transpiration. 1

13.2.6 Explain how water is carried by the transpiration stream, including the structure of xylem vessels, transpiration pull, cohesion and evaporation. 3

13.2.7 State that guard cells can open and close stomata to regulate transpiration. 1

13.2.8 Explain how the abiotic factors, light, temperature, wind and humidity, affect the rate of transpiration in a typical terrestrial mesophytic plant. 3

13.2.9 Outline the role of phloem in active translocation of biochemicals. 2

13.2.10 Describe an example of food storage in a plant. 2

III. Plant Reproduction *730-740

13.3.1 Draw the structure of a dicotyledonous animal-pollinated flower, as seen with the naked eye and hand lens. 1
Limit the diagram to sepal, petal, anther, filament, stigma, style and ovary.

13.3.2 Define pollination. 1

13.3.3 Distinguish between pollination, fertilization and seed dispersal. 2

13.3.4 Draw the external and internal structure of a named dicotyledonous seed. 1
The named seed should be non-endospermic. The structure in the diagram should be limited to testa, micropyle, embryo root, embryo shoot and cotyledons.

13.3.5 Describe the metabolic events of germination in a typical starchy seed. 2

13.3.6 Explain the conditions needed for the germination of a typical seed. 3

➔ Sporophyte, gametophyte, seed coat

IV. Plant adaptations

13.1.5 Outline four adaptations of xerophytes. 2

13.1.6 Outline two structural adaptations of hydrophytes. 2

➔ What is the adaptive significance of alternation of generations in the major groups of plants?

➔ What adaptive features have contributed to the success of various plants on land?

➔ 13.3 Reproduction in Flowering Plants (2h)

13.3.1 Draw the structure of a dicotyledonous animal-pollinated flower, as seen with the naked eye and hand lens. 1

Limit the diagram to sepal, petal, anther, filament, stigma, style and ovary.

13.3.2 Define pollination. 1

13.3.3 Distinguish between pollination, fertilization and seed dispersal. 2

13.3.4 Draw the external and internal structure of a named dicotyledonous seed. 1

The named seed should be non-endospermic. The structure in the diagram should be limited to testa, micropyle, embryo root, embryo shoot and cotyledons.

13.3.5 Describe the metabolic events of germination in a typical starchy seed. 2

Absorption of water precedes the formation of gibberellin in the cotyledon. This stimulates the production of amylase which catalyses the breakdown of starch to maltose. This subsequently diffuses to the embryo for energy production and growth. No further details are expected.

13.3.6 Explain the conditions needed for the germination of a typical seed. 3

Seeds vary in their light requirements and therefore this factor need not be included.