

5.2.1 Photosynthesis

- (a) the interrelationship between the process of photosynthesis and respiration
To include the relationship between the raw materials and products of the two processes.
M0.1, M0.3, M0.4, M3.4
- (b) the structure of a chloroplast and the sites of the two main stages of photosynthesis
The components of a chloroplast including outer membrane, lamellae, grana, thylakoid, stroma and DNA.
- (c) (i) the importance of photosynthetic pigments in photosynthesis
To include reference to light harvesting systems and photosystems.
M0.1, M0.2, M1.1, M1.3, M2.2, M2.3, M2.4 **PAG6** HSW4
(ii) practical investigations using thin layer chromatography (TLC) to separate photosynthetic pigments
- (d) the light-dependent stage of photosynthesis
To include how energy from light is harvested and used to drive the production of chemicals which can be used as a source of energy for other metabolic processes (ATP and reduced NADP) with reference to electron carriers and cyclic and non-cyclic photophosphorylation **AND** the role of water.
HSW8
- (e) the fixation of carbon dioxide and the light-independent stage of photosynthesis
To include how the products of the light-dependent stage are used in the light-independent stage (Calvin cycle) to produce triose phosphate (TP) with reference to ribulose biphosphate (RuBP), ribulose biphosphate carboxylase (RuBisCO) and glycerate 3-phosphate (GP) – **no** other biochemical detail is required.
HSW8
- (f) the uses of triose phosphate (TP)
To include the use of TP as a starting material for the synthesis of carbohydrates, lipids and amino acids **AND** the recycling of TP to regenerate the supply of RuBP.
- (g) (i) factors affecting photosynthesis
(ii) practical investigations into factors affecting the rate of photosynthesis.
To include limiting factors in photosynthesis with reference to carbon dioxide concentration, light intensity and temperature, and the implications of water stress (stomatal closure) **AND** the effect on the rate of photosynthesis, and on levels of GP, RuBP and TP, of changing carbon dioxide concentration, light intensity and temperature.
An opportunity to use sensors, data loggers and software to process data.
M0.1, M0.2, M0.3, M1.1, M1.3, M1.11, M3.1, M3.2, M3.4, M3.5, M3.6, M4.1 **PAG4, PAG10, PAG11** HSW3, HSW4, HSW5, HSW12