5.2.2 Respiration

(a)	the need for cellular respiration	To include examples of why plants, animals and microorganisms need to respire (suitable examples could include active transport and an outline of named metabolic reactions).
(b)	the structure of the mitochondrion	The components of a mitochondrion including inner and outer michondrial membranes, cristae, matrix and mitochondrial DNA.
(c)	the process and site of glycolysis	To include the phosphorylation of glucose to hexose bisphosphate, the splitting of hexose bisphosphate into two triose phosphate molecules and further oxidation to pyruvate **AND** the production of a small yield of ATP and reduced NAD. HSW8
(d)	the link reaction and its site in the cell	To include the decarboxylation of pyruvate to acetate, the reduction of NAD, and the combination of acetate with coenzyme A.
(e)	the process and site of the Krebs cycle	To include the formation of citrate from acetate and oxaloacetate and the reconversion of citrate to oxaloacetate (names of intermediate compounds are not required) AND the importance of decarboxylation, dehydrogenation, the reduction of NAD and FAD, and substrate level phosphorylation. HSW8
(f)	the importance of coenzymes in cellular respiration	With reference to NAD, FAD and coenzyme A.
(g)	the process and site of oxidative phosphorylation	To include the roles of electron carriers, oxygen and the mitochondrial cristae.
(h)	the chemiosmotic theory	To include the electron transport chain, proton gradients and ATP synthase in oxidative phosphorylation and photophosphorylation.
(i)	(i) the process of anaerobic respiration in eukaryotes (ii) practical investigations into respiration rates in yeast, under aerobic and anaerobic conditions	To include anaerobic respiration in mammals and yeast and the benefits of being able to respire anaerobically AND why anaerobic respiration produces a much lower yield of ATP than aerobic respiration. An opportunity to use sensors, data loggers and software to process data. M0.1, M0.2, M1.1, M1.3, M2.4, M3.1, M3.2 PAG4, PAG10, PAG11 HSW3, HSW4
(j)	the difference in relative energy values of carbohydrates, lipids and proteins as respiratory substrates	

(k)	the use and interpretation of the respiratory quotient (RQ)	To include calculating the respiratory quotient (RQ) using the formula: *RQ = CO_2 produced / O_2 consumed* *M0.1, M0.2, M1.1, M1.3, M2.3*
(l)	practical investigations into the effect of factors such as temperature, substrate concentration and different respiratory substrates on the rate of respiration.	For example the use of respirometers. An opportunity to use sensors, data loggers and software to process data. An opportunity to use standard deviation to measure the spread of a set of data and/or Student's t-test to compare means of data values of two sets of data. M0.1, M0.2, M1.1, M1.2, M1.3, M1.6, M1.10, M2.4, M3.2, M3.3, M3.5, M3.6 PAG4, PAG10, PAG11 HSW3, HSW4