Scheme of work for Option C, *Cells and energy*

Syllabus section	Content	Time required	Outline of lessons	Coursebook resources	Worksheets	Teacher's resources / Teaching ideas
C1	Proteins	1 lesson	• Explain the four levels of protein structure; outline the structure of fibrous and globular proteins giving four examples and their functions; explain the significance of polar and non-polar amino acids in proteins	p333–336 Short-answer Qs p336 End-of-chapter Qs p356–359: Q1, Q5, Q6	Extension: Q1	In a mixed class this can be taught with HL Chapter 7 Practical activity: 3D modelling of protein structure Link to ICT: simulations
C2	Enzymes	2 lessons	• Describe the induced-fit model for enzyme action; explain that enzymes lower activation energy of reactions and that metabolic pathways consist of chains of enzyme-catalysed reactions • Explain competitive and non-competitive inhibition and explain how metabolic pathways are controlled by end-product inhibition and allosteric sites	p337–340 Short-answer Qs p340 End-of-chapter Qs p356–359: Q4, Q9, Q10	Extension: Q2 Support: Q1	In a mixed class this can be taught with HL Chapter 7 Link to Chapter 3: opportunity for assessed practical investigating enzyme activity Link to ICT: data logging Link to TOK: development of induced-fit hypothesis

C3	Cell respiration	5–6 lessons	• Draw and label a mitochondrion as seen using the electron microscope and identify the areas in which glycolysis, the Krebs cycle and the electron transfer chain occur; explain the relationship between the structure and the function of the mitochondrion • Outline the process of glycolysis and identify oxygen, hydrogen and electron loss and gain during oxidation and reduction • Explain aerobic respiration – the link reaction, Krebs cycle and electron transfer chain • Explain oxidative phosphorylation in terms of chemiosmosis	p341–347 Short-answer Qs p343, p347	Support: Q2, Q3, Q6 Extension: Q4, Q5	In a mixed class this can be taught with HL Chapter 8 and/or 3.7 Practical activities: opportunity for assessed practical using yeast; modelling and comparing chloroplasts and mitochondria

C4	Photosynthesis	5–6 lessons	• State that photosynthesis consists of light-dependent and light-independent reactions; explain the relationship between the structures of the chloroplast seen using the electron microscope and their functions; identify the sites of the reactions of photosynthesis • Explain the light-dependent reactions including the roles of the two photosystems, photolysis of water, electron transport, cyclic and non-cyclic photophosphorylation and reduction of $NADP^+$ • Explain the light-independent reactions including the roles of RuBP, reduction of GP to TP, and $NADPH + H^+$ • Explain the relationship between action and absorption spectra of photosynthetic pigments • Explain the concept of limiting factors using light intensity, temperature and CO_2 concentration as examples	p348–356 Short-answer Qs p352, p356 TOK p353 End-of-chapter Qs p356–359: Q2, Q3, Q7, Q8, Q10, Q11	Support: Q2, Q3, Q4, Q5, Q6 Extension: Q3, Q6, Q7	In a mixed class this can be taught with HL Chapter 8 and/or 3.8 Practical activities: chromatography of plant pigments; opportunity for assessed practical investigating rate of photosynthesis – link to ICT if data loggers are used; opportunity for assessed practical investigating accessory pigments Link to TOK: crops in glasshouses

Note: 1 lesson = approximately 40 minutes