Question	Part	Step	Answer	Mark scheme
1	a	7	if/how water flea heart rate changes with temperature	**1 mark**
	bi	8	as temperature increases, heart rate increases	**1 mark**
	bii	8	Any two from: ● did not test above 25 °C ● did not repeat investigation ● could have been higher at an intermediate temperature (example given)	**2 marks** – 1 for each point
	ci	8	both show heart rate increased with increasing temperature all student B's results higher than student A's also accept use of student's names – Sofia (student A) and Matthias (student B)	**2 marks** – 1 for each point
	cii	8	Any two from: ● student B was using a different water flea species ● student B left the slides on the microscope for longer, which warmed up the water fleas ● student B made a mistake and timed for longer than one minute ● they might have measured temperature differently ● there might have been some other variable such as light that also affected the heart rate ● there might have been some chemicals in the water that affected the water flea Also accept use of student's names – Sofia (student A) and Matthias (student B)	**2 marks** – 1 for each point
	d	8	Any three from: ● leave water fleas in solution with and without alcohol ● control other variables/named variables ● put the water fleas under a microscope ● count the heartbeat ● repeat	**3 marks** – 1 for each point
2	a	8	Any three from: ● using photosynthesis ● water and carbon dioxide needed ● oxygen and glucose produced ● chlorophyll/chloroplasts trap energy (transferred by light)	**3 marks** – 1 for each point
	b	7	**A** chlorophyll	**1 mark**
	c	8	photosynthesis/glucose production stops less starch stored in the bulb (for the following year) if cut back too soon	**2 marks** – 1 for each point

Question	Part	Step	Answer	Mark scheme
3		8	Any three from: ● alcohol slows reactions/increases reaction time ● slower nerve impulses to brain ● takes longer to realise child is there ● takes longer to contract muscle/respond/brake ● car has not slowed down as much (with alcohol) before hitting child	**3 marks** – Accept reverse argument for without alcohol
4	a	8	×50	**1 mark**
	b	7	**B** mitochondria	**1 mark**
	c	8	[LHS] glucose + oxygen (either order) [RHS] carbon dioxide + water (either order) [Ignore references to ATP/energy.]	**2 marks** – 1 for correct format of equation, 1 for correct products and reactants
	d	8	large surface area speeds up/helps absorption (of nutrients)	**2 marks** – 1 for each point
5	ai	8	27 cm^3	**1 mark** – Number and unit
	aii	8	54 cm^2	**1 mark** – Number and unit
	b	8	SA : volume ratio of cube A is 54 : 27 = 2 : 1 cube B is 96 : 64 = 1.5 : 1 cube A has a larger SA : volume ratio than cube B	**3 marks** – 1 for each point
	c	8	Any three from: ● large surface area/many alveoli ● reference to more/faster diffusion ● good blood supply ● thin walls	**3 marks** – 1 for each point
6	a	8	Any three from: ● mean mass for variety A always higher than for variety B/always higher than or similar to variety B ● mean mass for both varieties was higher with other plants (than alone) ● variety A has greatest mean mass when grown with poppies ● variety A had greater mean mass than variety B with both types of other plant ● correct pair of data values to support any statement (award once)	**3 marks** – 1 for each point
	b	7	**B** selective breeding	**1 mark**

Question	Part	Step	Answer	Mark scheme
	ci	8	$\frac{(32+33+25)}{3}$ 30 g	**2 marks** – 1 for the working and 1 for the correct answer (number and unit) Award both marks for a correct answer with no working shown
	cii	8	mean mass of wheat plants is less when grown outside *and* Any two from: ● plants in the greenhouse at a constant temperature ● plants supplied with sufficient water ● soil in the greenhouse could have more nitrates/nutrients ● less competition from weeds	**3 marks** – 1 for the difference and 2 for the explanation Accept reverse arguments
7	**a**	**8**	provides energy to swim/move tail	**2 marks** – 1 for each point
	b	**8**	damaged = 16 million not damaged = 24 million	**2 marks** – 1 for each
8		**7**	characteristics genes survival reproduce	**4 marks** – 1 for each correct letter
9		**9**	(plant) photosynthesis releases oxygen animal *and* plant respiration releases carbon dioxide (plant) photosynthesis uses carbon dioxide released from respiration	**3 marks** – 1 for each point
10		**See below**	Answers will be credited according to student's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and students are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. Indicative content: ● carbohydrates as an energy resource ● fat as an energy resource, insulation and for hormones ● fibre allow peristalsis through the alimentary canal/aid digestion ● vitamins and minerals to allow cells to function properly ● protein for growth and repair.	**See marks below**

Marks	Step	Descriptor
1–2	4–5	Level 1 A description that includes the role of at least one dietary group. The description will contain basic information with some attempt made to link knowledge and understanding to the given context.
3–4	6–7	Level 2 A description that includes the role of at least two dietary groups. The description shows some linkages and lines of scientific reasoning with some structure.
5–6	8–9	Level 3 A description that includes the role of most dietary groups. The description shows a well-developed, sustained line of scientific reasoning which is clear and logically structured.