Assessment schedule: practice paper 2026

AS 91603 Demonstrate understanding of the responses of plants and animals to their external environment · Vertex Academy practice paper, not an NZQA paper

QUESTION ONE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	circadian rhythm actogram zeitgeber	Describes a circadian rhythm. Describes an actogram. Describes a zeitgeber, with the light-dark change as the example.		
(b)	rhythm continues in constant dark free-running period = 24 − 0.5 = 23.5 h light-dark cycle entrains the clock to 24 h	States that the rhythm continued in constant darkness. Gives the free-running period as 23.5 hours.	Explains that the rhythm is endogenous (internal clock) because it persists without the cue, AND that the 23.5 h free-running period is entrained to 24 h by the light-dark zeitgeber.	
(c)	nocturnal endogenous clock 23.5 h period drifts 30 min a day light entrains it	Describes an advantage of being nocturnal (avoiding predators or water loss). Describes the clock allowing the wētā to anticipate dusk.	Explains why an internal clock is better than only responding to darkness (anticipation; works without light cues), OR explains why entrainment is needed (the free-running period drifts).	Discusses the advantages of nocturnal activity, of anticipating dusk with an internal clock, AND of daily entrainment correcting the 23.5 h drift, linked to survival and reproduction.

QUESTION TWO

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)

(a)	Pr + red (660 nm) → Pfr Pfr + far-red (730 nm) → Pr daylight: mostly Pfr Pfr at dawn	Describes the two forms Pr and Pfr. Describes red converting Pr to Pfr and far-red converting it back. Describes Pfr converting to Pr in the dark.		
(b)	red flash red then far-red long unbroken night	Describes the red flash as converting Pr to Pfr. Describes the far-red flash as reversing the red flash.	Explains both results: the red flash raises Pfr and interrupts the long night so flowering is inhibited, and the far-red converts it back so the night acts as unbroken and the plants flower.	
(c)	auxin made in tip auxin → cell elongation on shaded side no tip mica on shaded side advantage	Describes auxin made in the tip. Describes auxin causing cell elongation. Describes the shoot bending towards light (positive phototropism).	Explains bending: auxin moves to the shaded side, causing more elongation there, OR explains one experimental result.	Discusses the mechanism (auxin made in the tip, moved to the shaded side, elongation) AND uses both experimental results as evidence, AND the advantage for photosynthesis.

QUESTION THREE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	kererū and tawa kererū and possums stoats and kererū	Names and describes all three relationships correctly.		

(b)	territory around a rich nectar source benefit: more nectar, more energy for breeding costs: energy, time, injury risk defended when benefit > cost	Describes the behaviour as defending a territory or food source. Describes a benefit. Describes a cost.	Explains the territorial (agonistic) behaviour as competition for a limited resource, weighing the energy gained against the costs.	
(c)	helping = altruism helpers related to chicks kin selection direct benefits: protection, experience, future territory favoured when breeding alone is hard and helpers are kin	Describes cooperative breeding. Describes altruism as helping others at a cost to oneself. Describes kin selection as helping relatives.	Explains how kin selection works: helping related chicks passes on shared alleles indirectly, OR explains a direct benefit to helpers.	Discusses altruism and kin selection (shared alleles, inclusive fitness) AND direct benefits to helpers and breeders, justifying why cooperative breeding could evolve in pūkeko.

Judgement for each question

N0	N1	N2	A3	A4	M5	M6	E7	E8
No response, or nothing relevant.	One Achievement point, partly described.	Two Achievement points.	Three Achievement points.	Four Achievement points.	One Merit point.	Two Merit points.	One Excellence point, with a minor error or omission.	One Excellence point, complete.

Grade score out of 24 (each question's grade: N0 = 0 to E8 = 8): Not Achieved 0 to 7, Achieved 8 to 13, Merit 14 to 18, Excellence 19 to 24 (the 2025 exam's cut scores).