Assessment schedule: practice paper 2026

AS 91414 Demonstrate understanding of processes in the atmosphere system · Vertex Academy practice paper, not an NZQA paper

QUESTION ONE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	high Sun at the equator, low Sun at the poles Hadley cell: rises at the equator, sinks at about 30°S Ferrel cell: surface air flows poleward from 30°S towards 60°S Coriolis effect: deflected to the left in the Southern Hemisphere poleward air turned east New Zealand 34°S to 47°S little land to slow them	Describes the equator receiving more solar radiation than the poles. Describes air rising at the equator and sinking at about 30°. Describes the Coriolis effect deflecting air to the left in the Southern Hemisphere. Describes New Zealand being in the westerlies.	Explains how uneven heating drives the Hadley cell and creates the subtropical high. Explains why poleward-moving surface air in the Ferrel cell is deflected into westerly winds.	Discusses why New Zealand lies in the westerlies, linking uneven heating, the Hadley and Ferrel cells, the subtropical high and the Coriolis effect to the direction of the wind at New Zealand's latitudes.

QUESTION TWO

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	rising air expands and cools; sinking air is compressed and warms dry rate about 10 °C per km: 18 − 0.8 × 10 = 10 °C at 800 m condensation releases latent heat 10 − 1.7 × 6 ≈ 0 °C at 2500 m rain falls on the West Coast descends at the dry rate: 0 + 2.5 × 10 = 25 °C at Christchurch about 7 °C warmer and much drier	Describes rising air cooling and sinking air warming. Describes condensation and rain on the West Coast. Describes the air being warmer and drier in Canterbury. Calculates at least one temperature correctly.	Explains that rising air expands and cools and sinking air is compressed and warms. Explains that latent heat released by condensation makes saturated air cool more slowly. Calculates the temperatures at each stage.	Discusses why the air arrives warmer and drier, linking the slower saturated rate going up (latent heat release) and the faster dry rate coming down to the loss of moisture as rain on the West Coast, supported by the temperatures.

QUESTION THREE

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

(a)	shortwave in, mostly unabsorbed warm surface emits longwave (infrared) greenhouse gases absorb longwave and re-emit it in all directions balance: energy in = energy out 326 ppm to 416 ppm: (416 − 326) ÷ 326 ≈ 28% more CO_2 more longwave trapped, less escapes new balance at a higher temperature water vapour feedback and ice-albedo feedback	Describes incoming shortwave and outgoing longwave radiation. Describes greenhouse gases absorbing longwave radiation. Describes rising carbon dioxide causing warming. Describes one feedback.	Explains how greenhouse gases absorb and re-emit longwave radiation, warming the surface. Explains how more carbon dioxide means less energy escapes, so the energy balance is upset. Explains how a feedback amplifies warming.	Discusses the effect of rising carbon dioxide on the energy balance, linking shortwave and longwave radiation, absorption and re-emission by greenhouse gases and the imbalance to warming, AND discusses how feedbacks amplify it.

Judgement for each question

N0	N1	N2	A3	A4	M5	M6	E7	E8
No response, or nothing relevant.	One idea described at Achievement level.	Two ideas described at Achievement level.	Three ideas described at Achievement level.	Four ideas described at Achievement level.	Two ideas explained at Merit level.	Three ideas explained at Merit level.	The question discussed at Excellence level, with a minor error or omission.	The question discussed at Excellence level, 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).