Assessment schedule: practice paper 2026

AS 91159 Demonstrate understanding of gene expression · Vertex Academy practice paper, not an NZQA paper

QUESTION ONE

Part	Evidence	Achievement (u)	Merit (r)	Excellence (t)
(a)	template 3′ TAC GGA TTC ACC 5′ mRNA 5′ AUG CCU AAG UGG 3′ Met, Pro, Lys, Trp	Correct mRNA sequence. Correct amino acid sequence.		
(b)	mRNA ribosome tRNA stop codon	Describes mRNA carrying the code to the ribosome. Describes tRNA carrying amino acids. Describes the ribosome joining amino acids.	Explains how the codon-anticodon pairing of tRNA with mRNA in the ribosome determines the order of amino acids joined by peptide bonds.	
(c)	1: AAG → UAG (stop) 2: CCU → CCC, still Pro 3: deletion frameshift changes all later amino acids	Correct new mRNA codon for one mutation. Identifies a substitution and a deletion. States that Mutation 2 does not change the amino acid.	Explains the effect of one mutation on the protein using the codon table (for example, UAG is a stop codon, so the protein is cut short; or the frameshift changes every later codon).	Discusses all three mutations: nonsense (early stop), silent (degenerate code, same amino acid) and frameshift (every later codon changed), linking each to the effect on the protein.

QUESTION TWO

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

(a)	pathway: chain of reactions each step catalysed by a different enzyme each enzyme coded by one gene faulty gene	Describes a metabolic pathway as a series of enzyme-controlled steps. Describes each enzyme as coded for by a gene. Describes a faulty gene blocking a step.		
(b)	two faulty alleles step 1 blocked high phenylalanine low-phenylalanine diet	Describes PKU as a non-working enzyme 1. Describes phenylalanine building up. Describes the diet limiting phenylalanine.	Explains that the faulty enzyme blocks the conversion of phenylalanine to tyrosine so it accumulates, AND that the diet prevents the build-up by reducing the phenylalanine taken in.	
(c)	PKU: step 1 blocked tyrosinase works albinism: step 2 blocked no other route to melanin	Describes step 1 as blocked in PKU. Describes step 2 as blocked in albinism. Describes tyrosine as present in food.	Explains why people with PKU still make some melanin (dietary tyrosine is converted by working tyrosinase), OR explains why people with albinism make none (step 2 blocked).	Discusses both conditions, comparing the position of the blocked step and whether its substrate can be supplied another way, linked to how much melanin is made.

QUESTION THREE

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

(a)	genotype phenotype same genotype, different colour	Describes genotype as the alleles. Describes phenotype as the observable characteristics. Describes the environment (soil pH) changing the phenotype.		
(b)	same allele in every cell warm body cool extremities	Describes the extremities as cooler. Describes the enzyme as working only at lower temperatures.	Explains the pattern: the temperature-sensitive enzyme is inactive at body temperature (pale fur) and active in the cooler extremities (dark fur), with the same genotype throughout.	
(c)	cold patch kittens: warm uterus after birth extremities cool phenotype = genotype + environment	Describes the patch as dark because it is cool. Describes the kittens as pale because the uterus is warm. States that the genotype has not changed.	Explains one observation using the temperature-sensitive enzyme (active when cool, inactive when warm) with the genotype unchanged.	Discusses both observations, linking temperature to enzyme activity and pigment, AND justifies that phenotype results from the interaction of an unchanged genotype with the environment.

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).