

END TERM 3 2026

GRADE 10

BIOLOGY

MARKING SCHEME & TEACHER'S GUIDE

TOTAL MARKS: 80

CURRICULUM COVERAGE

The assessment samples Strand 3.0: Anatomy and Physiology of Animals, specifically 3.1 Nutrition, 3.2 Transport and 3.3 Gaseous Exchange and Respiration. The Curriculum Design covers insect mouthparts and bird beaks; transport systems in animals; mammalian heart and blood grouping; respiratory structures and adaptations; aerobic and anaerobic respiration; respiratory quotient; and factors affecting respiration.

CURRICULUM TRACEABILITY

Q	Sub-strand	Learning outcome focus	Cognitive level	Marks
1	3.1 Nutrition	Relate insect mouthparts to feeding functions	Understand/Apply	4
2	3.1 Nutrition	Relate bird beaks to feeding habits	Understand/Analyse	5
3	3.2 Transport	Distinguish circulatory systems	Understand	4
4	3.2 Transport	Explain significance of transport systems	Understand	4
5	3.2 Transport	Interpret pulse data and explain exercise response	Apply/Analyse	8
6	3.1 Nutrition	Interpret insect mouthpart structure and function	Apply/Analyse	8
7	3.2 Transport	Interpret mammalian heart structure and function	Apply/Analyse	7
8	3.2 Transport	Interpret ABO grouping and transfusion compatibility	Apply/Analyse	5
9	3.3 Gaseous Exchange	Identify respiratory structures and adaptations	Apply	5
10	3.3 Gaseous Exchange	Compare fish and mammalian gaseous exchange	Analyse	10
11	3.3 Respiration	Explain aerobic and anaerobic respiration	Understand/Analyse	10
12	3.3 Respiration	Design/describe an investigation of breathing rate	Apply/Create	10

MARKING SCHEME

1. Marking guide

Any two functions, 2 marks each: grasping/holding food; cutting; tearing; crushing/chewing; manipulating food into the mouth.

(a) Mandibulate/biting-and-chewing mouthparts — 1 mark.

(b) Any three: strong mandibles; hardened structures; tooth-like edges; strong muscles/force; coordinated structures for handling solid food — 1 mark each.

2. Marking guide

(a) Any two valid foods consistent with the curriculum: grains/seeds, nectar, fish, flesh, fruit, insects, etc. — 1 mark each.

(b) Award 3 marks for explaining that beak shape/size is adapted to feeding mode, with a correct example linking structure to food acquisition.

3. Marking guide

Open circulatory system: circulatory fluid is not confined entirely to vessels and bathes tissues; closed circulatory system: blood remains within vessels — 2 marks.

(a) Insects/another valid example — 1 mark.

(b) One explained advantage of closed circulation, e.g. efficient high-pressure transport/precise distribution — 2 marks.

(c) Single circulatory system — 1 mark.

4. Marking guide

(a) Any two: oxygen, digested nutrients/glucose, hormones, water, mineral salts — 1 mark each.

(b) Any two: carbon dioxide, urea/metabolic wastes, excess heat or another valid waste material — 1 mark each.

5. Marking guide

- (a) $126 - 72 = 54$ beats per minute: M1, A1.
- (b) Pulse falls from 126 to 94 to 76 beats per minute and approaches resting value — 2 marks.
- (c) Increased exercise demand causes increased oxygen/nutrient delivery and faster removal of carbon dioxide; heart rate therefore rises — any two linked points, 1 mark each.
- (d) Any two: fitness, intensity/duration, age, health status, recovery/rest, temperature or emotional state — 1 mark each.

6. Marking guide

- (a) A — mandible; B — maxillary/palp region or equivalent intended structure shown — 1 mark each.
- (b) C — labrum/upper-lip region; accept a correct function such as holding/manipulating food — 2 marks.
- (c) Up to 4 marks: grasp/hold; cut/tear; crush/chew; manipulate food into mouth; coordinated movement of mouthparts — 1 mark per correct explained point.

7. Marking guide

- (a) Award 1 mark each for the correctly interpreted names of chambers A and D from the supplied schematic.
- (b) Prevent backflow and maintain one-way movement of blood — 2 marks.
- (c) Left ventricle pumps blood to the whole body and therefore generates higher pressure; thicker muscle provides the force required — 3 marks.

8. Marking guide

- (a) P = group A; R = group AB — 2 marks.
- (b) Incompatible blood can cause agglutination/immune reactions, block vessels and damage red blood cells; compatibility prevents harmful transfusion reactions — up to 3 marks.

9. Marking guide

- (a) A — trachea; B — lung — 2 marks.
- (b) Any three: large surface area; thin walls/short diffusion distance; rich blood supply; moist surface; ventilation maintains concentration gradients — 1 mark each.

10. Marking guide

- (a) Fish: gills; mammal: lungs — 2 marks.
- (b) Any four explained points: many filaments/lamellae provide large surface area; thin exchange surfaces; rich capillary supply; continuous water flow maintains a gradient; counter-current flow where correctly described; efficient ventilation — 1 mark each.
- (c) Oxygen diffuses from alveoli into capillary blood, binds to haemoglobin, is carried to tissues, then diffuses into cells down a concentration gradient — 4 marks.

11. Marking guide

- (a) Aerobic respiration uses oxygen and releases more energy; anaerobic respiration occurs without oxygen and releases less energy — up to 4 marks.
- (b) Lactic acid/lactate — 2 marks.
- (c) Any two: vigorous exercise; oxygen supply cannot meet demand; short intense muscular activity; oxygen-debt conditions — 1 mark each.
- (d) Any two: less energy/ATP released; incomplete energy release; lactic acid accumulation; less efficient for prolonged activity — 1 mark each.

12. Marking guide

- (a) Breathing rate increases with exercise intensity — 2 marks.
- (b) Increased muscular activity raises energy demand and respiration; more carbon dioxide is produced; breathing becomes faster/deeper to increase oxygen intake and remove carbon dioxide — up to 4 marks.
- (c) Independent variable: exercise intensity/duration (1); dependent variable: breathing rate (1); two control variables such as participant, duration, environment/recovery interval (1); one safety precaution such as warm-up/supervision/stop if unwell (1).

MARKING CODES

M = Method/working mark. A = Accuracy/correct answer mark. C = Concept/curriculum point mark. Credit scientifically correct alternatives that satisfy the stated learning outcome. Do not award the same idea twice.

TOTAL-MARK VERIFICATION

Question Paper total = 80 marks. Marking Scheme total = 80 marks. Diagram-based assessment is integrated into Questions 6, 7 and 9 and contributes 20 marks, satisfying the visual-assessment requirement for Biology.

TEACHER / EXAMINER GUIDANCE

The Grade 10 Biology Curriculum Design identifies Strand 3.0 as Anatomy and Physiology of Animals and includes structured assessment through written tests, oral assessment, observation and practical activities. The marking guide therefore credits equivalent correct biological responses rather than requiring identical wording. Diagram marks should be awarded for correct identification and biological interpretation, not artistic quality unless drawing quality is explicitly assessed.

