



AP[®] Biology 2005 Scoring Commentary Form B

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AP[®] BIOLOGY
2005 SCORING COMMENTARY (Form B)

Question 1

Sample: 1A

Score: 10

In part (a) the student received no credit for incorrect definitions of taxis and kinesis. However, response to light earned 1 point, and the explanation that kinesis moves organisms into a survival-maximizing environment (under rocks) earned 1 point. Migration is also chosen, and the student earned 1 point for linking bird migration to changes in day length and 1 point for describing the thermal benefits of bird migration. In part (b) the student identifies line C as the carnivores (1 point) and notes that increases in their food supply (prey increases) lead to increases in their population (1 point). The essay earned 1 point for identifying line B as small herbivores and 1 point for the justification of its predator–prey relationship with C. The student identifies line A as large herbivores (1 point) and cites the lack of predation as justification (1 point).

Sample: 1B

Score: 9

In part (a) the essay defines taxis and kinesis but is too vague about the “stimulus” to earn a point. A point was awarded for clearly adaptive characteristics of responding with taxis/kinesis. Migration is linked to changes in day length for the second point, and the thermal benefits of bird migration are stated clearly for a third point. Salmon migrating upstream to spawn is a valid migration event but is not linked to environmental factors. In part (b) the student identifies line A as small herbivores (1 point) and justifies predators’ disinterest (1 point). The identification of line B as large herbivore/prey and the justification of B’s increase driving the predator (C) increase each earned 1 point. The student earned 1 point for identifying line C as carnivores and 1 point for the explanation of their die-off due to the decreasing population of large herbivores.

Sample: 1C

Score: 6

In part (a) the student chooses migration. One point was earned for the identification of the seasonal changes in resources among stimuli for migration. A second point was earned for noting that catastrophic stimuli “affects migration.” A third point was earned for explaining that species gain increased access to resources by migration (resources are specified earlier in the essay). Courtship is chosen, and 1 point was earned for the identification of the seasonal changes and resources as stimuli. The essay was awarded 1 point for linkage to changes in hormone secretion. Identifying that environmental catastrophes can terminate courtship earned 1 point. In part (b) the incorrect graph assignments are not adequately justified to earn credit.

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Question 2

Sample: 2A

Score: 10

The two types of organisms chosen are flowering plants and reptiles. In the discussion of flowering plants, 4 points were earned for animal vector pollination (1 point), genotypic diversity produced by pollination (1 point), seed distribution by animals eating fruits (1 point), and broad leaves improving the harvest of light energy for photosynthesis (1 point). In the discussion of reptiles, 6 points were earned for food supply in the amniotic egg (1 point), the shell preventing desiccation of the embryo (1 point), “waterproof skin” minimizing water loss to the land environment (1 point), skin dividing the internal and external environments (1 point), well-developed lungs allowing gas exchange on land (1 point), and lungs being folded exchange surfaces inside the body (1 point). More points could have been awarded, but the maximum had been reached.

Sample: 2B

Score: 8

The two types of organisms chosen are flowering plants and reptiles. In the discussion of flowering plants, 4 points were earned for animal vector pollination (1 point), seed distribution by animals eating fruits (1 point), broad leaves increasing light harvest for photosynthesis (1 point), and identification of chloroplasts as organelles involved in photosynthesis (1 point). Wind pollination is mentioned but not adequately compared to animal vector pollination to have earned a point. In the discussion of reptiles, 4 points were earned for the shell of the amniotic egg reducing desiccation (1 point), waterproof skin reducing desiccation (1 point), lungs large surface area allowing gas exchange (1 point), and lung arrangement inside the body reducing water loss (1 point). Mechanical/chemical protection of the skin is mentioned but did not earn a point because the idea is not adequately developed.

Sample: 2C

Score: 6

The two types of organisms chosen are flowering plants and flatworms. In the discussion of flowering plants, 4 points were earned for animal vector pollination (1 point), seed distribution by animals eating fruits (1 point), seeds containing food reserves for the embryo plant (1 point), and broad leaves increasing the rate of photosynthesis (1 point). Seed dormancy is also discussed but did not earn a point because the internal maximum for fruits/seeds had been reached. In the discussion of flatworms, 2 points were earned for three germ layers facilitating specialization of tissues (1 point) and bilateral symmetry of flatworm permitting directed motion of the body (1 point). Cephalization is mentioned but did not earn a point because the concept is not accurately described.

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Question 3

Sample: 3A

Score: 10

In part (a) 6 points were awarded for describing the temporary unwinding of DNA (1 point), the role of DNA as a template (1 point), the concept of complementary base-pairing (1 point), the role of tRNA to carry the amino acid (1 point), the codon/anticodon relationship (1 point), and peptide bond formation (1 point). In part (b) no points were awarded. In part (c) 2 points were awarded for accurately describing differences between translation and transcription in product and template. In part (d) 2 points were earned for cleavage of the initial methionine and posttranslational chemical modification of the protein. If the response had not already earned a 10, the student would have been awarded a point for describing protein folding and an elaboration point for demonstrating an understanding the types of bonds involved in protein folding.

Sample: 3B

Score: 8

In part (a) 4 points were earned for describing the role of tRNA as carrying the amino acid (1 point), the role of the ribosome (1 point), peptide bond formation (1 point), and termination at the stop codon (1 point). In part (b) a point was awarded for the describing the similarity in base pairing between translation and transcription. In part (c) a point was earned for describing differences in location of translation and transcription (in the last paragraph). In part (d) the description of folding earned 1 point, and the good description of both secondary and tertiary structures earned an elaboration point.

Sample: 3C

Score: 6

In part (a) 3 points were awarded for describing temporary DNA unwinding (1 point), RNA produced by RNA polymerase (1 point), and tRNA carries the amino acid (1 point). In part (b) no points were awarded. In part (c) 2 points were earned for differences between translation and transcription in location and product. In part (d) a point was earned for identifying the role of hydrogen bonding in protein folding.

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Question 4

Sample: 4A

Score: 10

Three points were earned in part (a). The graph is drawn correctly (1 point); the data points are correct and the line drawn (1 point). The student finds the apparent molar concentration of the potato core cells from the line on the graph (1 point). Three points were earned in part (b) for defining water potential as solute potential plus pressure potential (1 point) and for relating the movement of water into the root (1 point) and up the trunk of a tree (1 point) due to differences in water potential. Four points were earned in part (c). The response indicates that the cell would lyse (1 point) as water moves into the cell in the 0.0 *M* solution because water would diffuse from the hypotonic solution into the cell until the water potentials were equal (1 point). The response further indicates that the animal cell would shrivel in the 1.0 *M* solution (1 point) because the solution would be hypertonic to the cell (1 point).

Sample: 4B

Score: 8

Three points were earned in part (a). The graph is drawn correctly (1 point); the data points are correct and the line drawn (1 point). The student finds the apparent molar concentration of the potato core cells from the line on the graph (1 point). In part (b) the response correctly defines the components of water potential (1 point). Four points were earned in part (c). The response indicates that water would move from the solution (0.0 *M* solution) into the cell (1 point) because the water potential would be higher in the solution than in the cell (1 point) and that the cell in the 1.0 *M* solution would lose water (1 point) because the cell's water potential would be higher than that of the solution (1 point).

Sample: 4C

Score: 5

Three points were earned in part (a). The graph is drawn correctly (1 point); the data points are correct and the line drawn (1 point). The student finds the apparent molar concentration of the potato core cells from the line on the graph (1 point). No points were awarded in part (b). In part (c) the student indicates that water would move out of the cytoplasm into the 1.0 *M* solution (1 point) and that there would be a positive percent change in the cell mass when placed in the 0.0 *M* solution (1 point).