

A Level AQA Biology

14 Species biodiversity – answers

Question	Answers	Extra information	Mark	AO Spec reference
01.1	the number of different species; in a habitat;		2	AO1 3.4.6
01.2	(over the years), the total number of species of moths increases until 10 years and then it decreases; (over the years), the total number of plant species continues to increase;		2	AO2 3.4.6
01.3	positive correlation between the total number of species of moths and total number of plant species up to 10 years; increases due to more food sources; decreases between 10 and 12 years due to interspecific competition;	Allow a description of interspecific	3	AO3 3.4.6 3.7.3
01.4	Any two from: increased farmer labour input; higher non-labour production costs; supply limited compared to the demand;		2 max	AO2 3.4.6
02.1	Any two from: can be addition / deletion / substitution / inversion / duplication / translocation; they are spontaneous / random; change in the DNA base sequence;		2 max	AO1 3.8.1
02.2	species recognition; precursor for successful mating;		2	AO2 3.4.5
02.3	correct gametes GL, gL, Gl, gl; 9:3:3:1 ratio correctly determined; $\frac{1}{16}$;	Allow correct percentage	3	AO2 3.7.1 MS 2.3
02.4	environment;	Allow any environmental factors	1	AO1 3.7.1

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03.1	$25 - 6 = 19;$ $\left(\frac{19}{6}\right) \times 100 = 317\%;$		2	AO2 3.4.6 MS 3.1
03.2	$108 \times 107 = 11556;$ $\frac{11556}{2956};$ 3.91;		3	AO2 3.4.6 MS 3.2
03.3	both areas have the same total number of butterflies; both areas have the same number of butterfly species; number of butterflies is more evenly spread in Area Y; area Y has a higher index of diversity; area Y is more biodiverse for butterflies;		5	AO3 3.4.6
04.1	number of different species; in a community;		2	AO1 3.4.6
04.2	Any three from: adds pollutants; pesticides; removes natural habitats; removes food sources for animals;		3 max	AO1 3.4.6
04.3	conservation; description of a conservation technique;	A credible example, such as limiting the percentage of land that could be taken up for farming	2	AO2 3.4.6
05.1	Left column: Kingdom, phylum, class, order, family, genus Right column: Anthus, <i>Anthus nilghiriensis</i>	7–8 correct = 4 marks 5–6 correct = 3 marks 3–4 correct = 2 marks 1–2 correct = 1 mark	4 max	AO2 3.4.5

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Question	Answers	Extra information	Mark	AO Spec reference
05.2	the number of different alleles; of each gene;		2	AO1 3.4.7
05.3	The scientist is not correct; Proportion of Sharpbill is 71%; (whereas) proportion of Superb Lyrebird is 87%;	allow other correct representations of proportion	3	AO3 3.4.7
06.1	the base sequence of DNA; the base sequence of mRNA; the amino acid sequence of proteins; observable characteristics;		4	AO1 3.4.7
06.2	(genetic) mutation;		1	AO1 3.7.3
06.3	species 1 and 3 ; they have the same amino acid sequence;		2	AO3 3.4.7
06.4	plasmid and isolated gene cut; using the same restriction endonuclease; joined with ligase;		3	AO1 3.8.4.1

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07	<p>The following are suitable topic areas from the specification that could be used to explain the different types of relationships and interactions between organisms.</p> <p>In order to fully address the question and reach the highest mark bands, students must also include at least five topics in their answer, to demonstrate a synoptic approach to the essay.</p> <table border="1"> <thead> <tr> <th>Specification reference</th> <th>Topic area</th> </tr> </thead> <tbody> <tr> <td>3.2.4</td> <td>Cell recognition and the immune system</td> </tr> <tr> <td>3.4.4</td> <td>Genetic diversity and adaptation</td> </tr> <tr> <td>3.4.5</td> <td>Species and taxonomy</td> </tr> <tr> <td>3.4.7</td> <td>Investigating diversity</td> </tr> <tr> <td>3.5.3</td> <td>Energy and ecosystems</td> </tr> <tr> <td>3.5.4</td> <td>Nutrient cycles</td> </tr> <tr> <td>3.7.1</td> <td>Inheritance</td> </tr> <tr> <td>3.7.4</td> <td>Populations in ecosystems</td> </tr> </tbody> </table> <p>Students may be able to show the relevance of other topics from the specification.</p> <p>Note: other topics from beyond the specification can be used, providing they relate to the title and contain factually correct material of at least an A-level standard. Credit should not be given for topics beyond the specification which are below A-level standard.</p>	Specification reference	Topic area	3.2.4	Cell recognition and the immune system	3.4.4	Genetic diversity and adaptation	3.4.5	Species and taxonomy	3.4.7	Investigating diversity	3.5.3	Energy and ecosystems	3.5.4	Nutrient cycles	3.7.1	Inheritance	3.7.4	Populations in ecosystems		25	AO1 3.2.4 3.4.4 3.4.5 3.4.7 3.5.3 3.5.4 3.7.1 3.7.4
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Skills box answers

Question	Answer
1	diversity index for habitat Y = 1.62
2	Habitat X
3	Habitat X is most likely to be the meadow. Habitat Y is most likely to be the farmers field because it has the highest number of wheat individuals and the lowest species evenness