Mark Scheme

Jan 2022

Pearson BTEC Level 3 – Animal Management

Unit 1: Animal Breeding and Genetics 31644H

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Unit 1: Animal Breeding and Genetics

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do, rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The marking grids have been designed to assess learner work holistically. Rows in the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer, in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band, depending on how they have evidenced each of the descriptor bullet points.

Question Number	Answer	Mark
1a	Award **one** mark for any of the following up to a maximum of **two** marks. • Camouflage • Hiding • Venomous/constriction • Arboreal/tree dwelling • Fast moving • Hibernation/brumation • Hissing/rattling Accept any other appropriate response.	2

Question Number	Answer	Mark
1b	Award **one** mark for identification and **one** additional mark for appropriate expansion. Courtship ritual (1) to identify available mate (1). Smell/olfactory (1) to detect pheromones (1). Accept any other relevant phrasing/wording.	2

Question Number	Answer	Mark
1c	Award **one** mark for the identification and **one** additional mark for the appropriate expansion, up to a maximum of **four** marks. Bag (1) to transport the snake / move safely / calm the snake (1). Scales (1) to weigh the snake (1). Gloves / boots / PPE (1) to minimise effect of biting (1) Snake hook (1) to catch moving snake / hold safely (1) Restraining tube (1) to allow safe examination (1) Tongs (1) to reduce risk of bites (1). Accept any other valid response.	4

Q**uestion Number**	**Answer**	**Mark**
2a	Award **one** mark for any of the following up to a maximum of **four** marks. • Skin colour • Cloaca • Duration of incubation • Requirements of incubation • Age of animal • Behaviour / Temperament • General health / body condition score / correct body weight • History of genetic disorders in pedigree / offspring Do not accept answers not relevant to snakes.	4

Question number	Indicative content
2b	Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. Answers should consider all the factors that need to be covered when assessing snakes. • Colour and skin pattern, especially unusual appearance for sale to collectors • Ease of care for new/inexperienced owners • Temperament/sociability for the pet market • Size • Safety aspects, e.g. venomous or not and how dangerous the venom is • Ease of breeding or not and how this relates to value/economic benefits • Difficulty of handling Recommendations on suitability

Mark scheme (award up to 12 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–4	• Demonstrates isolated elements of knowledge and understanding. • Presented in an unstructured format. • Limited reference to relevant evidence linked to the assessment. • A recommendation may be presented, but will lack focus and be superficial and underdeveloped.
Level	**Mark**	**Descriptor**
Level 2	5–8	• Demonstrates mostly accurate knowledge and understanding. • There is some structure to the response. • The answer is mostly supported through the application of relevant evidence drawn from the assessment and wider research. • Recommendation will be mostly focused and developed and show some linkages and lines of reasoning.
Level 3	9–12	• Demonstrates accurate and thorough knowledge and understanding. • Presented in a clear and logical format. • Answer is fully supported throughout by sustained application of relevant evidence drawn directly from the assessment and wider independent research. • Recommendation will be clear, concise and well developed showing comprehensive linkages and lines of reasoning.

<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>3a</td><td>1 mark for correct male genotype/gamete (1)

1 mark for correct female genotype/gamete (1)

1 mark for each correct line (4)
1 mark for correct probability (1)
1 mark for correct identification of potential phenotypic probability (1)

For a total of 8 marks.

<table>
<tr><td></td><td colspan="5">Female gametes Ppcc</td></tr>
<tr><td rowspan="5">Male Gametes PpCc</td><td></td><td>Pc</td><td>pc</td><td>Pc</td><td>pc</td></tr>
<tr><td>PC</td><td>PPCc</td><td>PpCc</td><td>PPCc</td><td>PpCc</td></tr>
<tr><td>pC</td><td>pPCc</td><td>ppCc</td><td>pPCc</td><td>ppCc</td></tr>
<tr><td>Pc</td><td>PPcc</td><td>Ppcc</td><td>PPcc</td><td>Ppcc</td></tr>
<tr><td>pc</td><td>pPcc</td><td>ppcc</td><td>pPcc</td><td>ppcc</td></tr>
</table>

(male/female labels may be swapped around)

6 wild type / normal brown
2 pinstripe brown
6 normal albino
2 (pinstripe) albino

Probability 6.6.2.2(3.3.1.1)</td><td>8</td></tr>
</table>

Question Number	Answer	Mark
3b	Award **one** mark for the identification and **one** additional mark for the appropriate expansion, up to a maximum of **four** marks. Increase variation (1) as the mutation cause new characteristics / alleles (genes) (1). Decrease variation (1) as the mutation is lethal/negative effect on health (1). No change (1) as the mutation is not expressed/ passed on. (1). Accept any other appropriate wording.	4

Question Number	Answer	Mark
4a	Award **one** mark for the identification and **one** additional mark for the appropriate expansion, up to a maximum of **six** marks. Identification (1) to ensure you breed the correct parents (1). Record of previous offspring (1) to increase likelihood of desirable characteristics (1). Feeding (1) to check health of parents (1). Disease/treatment/veterinary intervention (1) to identify potential problems (1). Financial records (1) to ensure viability of the business (1). Temperature (1) to predict changes to hatching date (1) Egg laying date (1) to predict hatching date (1) Fertilisation date (1) to predict birth date (1) Pedigrees/European stud book (1) to record interrelationships/reduce unwanted inbreeding/prevent undesirable genetic disorders (1) Size of the female (1) to see if she is big enough to carry eggs (1) Accept any other valid response.	6

Question Number	Answer	Mark
4b	Award **one** mark for identification and **one** additional mark for appropriate expansion. Prolapse (1) due to rough / excessive mating (1) Dystocia/egg binding (1) due to malformed eggs / small pelvis / can be fatal / serious health problems (1) Egg stasis (1) as some eggs retained/ovulation does not occur (1) Genetic disorders (1) head wobble / kinking / scoliosis (1) Anorexia (1) when egg bearing / pregnant (1) Accept any appropriate examples of disorders Accept any other relevant phrasing/wording.	4

Question Number	Answer	Mark
4c	Award **one** mark for identification and **one** additional mark for appropriate expansion. Feed on the yolk (1) that provides sufficient nutrition. (1). Accept any other relevant phrasing/wording.	2

Question Number	Answer	Mark
4d	Award *one* mark for the identification and **one** additional mark for the appropriate expansion, up to a maximum of **four** marks. Constipation (1) due to lack of lubrication / hard consistency of the faeces (1). Cloacal blockage (1) due to crystallisation of urea (1). Problems shedding (1) as skin is too dry / stiff (1). Stuck eye caps (1) as eye is not lubricated (1). Accept any other valid response.	4

Question Number	Answer	Mark
5a	Award **one** mark for each identification/descriptive comment. up to a maximum of **two** for each technique to an overall maximum of **six** marks. DNA extraction (1) from a tissue/blood sample / to isolate / replicate the DNA (1) Gel electrophoresis (1) to separate the DNA (1). Recombinant DNA technology (1) to join together DNA molecules/to create new combinations / insert new genes (1) Restriction enzymes (1) to cut/cleave DNA (1). Use of vectors (1) in transduction/transfection/to introduce DNA into cells (1) Marker genes (1) known length of DNA/identify the new DNA has been inserted (1) Polymerase chain reaction (PCR) (1) to make multiple copies of DNA/to have enough to use / amplification of the gene (1) Cloning (1) creating a new identical organism (1) Knockout mice (1) where genes are inactivated (1) Accept any other appropriate wording.	6

Question Number	Answer	Mark
5b	Award **one** mark for the identification and **one** additional mark for the appropriate expansion, up to a maximum of **four** marks. **Positive** Animals with similar characteristics are mated (1) to increase the chance of desirable characteristics. Closely related animals are mated (1) increasing the chance of inbreeding depression (1). **Negative** Animals with dissimilar characteristics are mated (1) to increase variation/new combinations of characteristics (1). Unrelated animals are mated (1) to increase hybrid vigour/reduce chance of inbreeding depression (1). Accept any other valid response and specific examples.	4

<table>
<tr><th>Question number</th><th colspan="2">Indicative content</th></tr>
<tr><td>6a</td><td colspan="2">Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive.
Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.

• Inbreeding is the mating of closely related animals
• This can lead to an increased chance of homozygous, recessive genes that are not normally expressed, for example different colours and patterns are seen
• These recessive genes can be for deleterious characteristics
• This leads to inbreeding depression
• Unusual disorders and deformities become more common
• Their general health is affected</td></tr>
<tr><td colspan="3">Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.</td></tr>
<tr><td>Level</td><td>Mark</td><td>Descriptor</td></tr>
<tr><td>Level 0</td><td>0</td><td>No rewardable material.</td></tr>
<tr><td>Level 1</td><td>1–2</td><td>• Demonstrates isolated elements of knowledge and understanding presented in an unstructured format.
• Generic statements may be presented rather than linkages being made so that lines of reasoning are unclear or rarely supported through the application of relevant evidence from the context.
• Displays a limited awareness of benefits or drawbacks leading to an evaluation that is superficial, focuses on only one element and therefore judgement is limited.</td></tr>
<tr><td>Level</td><td>Mark</td><td>Descriptor</td></tr>
<tr><td>Level 2</td><td>3–4</td><td>• Demonstrates mostly accurate knowledge and understanding. There is some structure to the response.
• Some occasional linkages present so that lines of reasoning are mostly clear and partially supported through the application of relevant evidence from the context.
• Displays an awareness of both benefits and drawbacks leading to an evaluation although there is an imbalance with one element more heavily present therefore judgement is partially developed.</td></tr>
<tr><td>Level 3</td><td>5–6</td><td>• Demonstrates accurate and thorough knowledge and understanding presented in a clear and logical format.
• Comprehensive linkages evidenced so that lines of reasoning are clear and concise and well supported throughout by sustained application of relevant evidence from the context.
• Displays a thorough awareness of both benefits and drawbacks leading to a well-balanced evaluation therefore judgement is well developed.</td></tr>
</table>

Question number	Indicative content
6b	Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. • The most common reason that people breed snakes is for the pet trade • Snakes need specialist knowledge and equipment so potentially the pet trade could be providing animals for situations where they are not looked after properly • If the breeding is done commercially the trade is regulated and there is less chance of welfare issues at the breeding stage • It is difficult to vet potential owners • Venomous snakes require a licence under The Dangerous Wild Animals Act 1976 • All animals come under the Animal Welfare Act • Answers may refer to the five needs • Where there is a commercial motive there is pressure to 'take short cuts' with welfare. • Commercial breeders can supply the specialist knowledge and equipment required • Breeding endangered species can ensure the survival of the species • Breeding for conservation reasons can allow restocking in the wild and prevent animals disappearing from an area • Captive breeding may reduce the pressure to deal with the issues that have endangered the species in the first place • Releasing captive bred animals can be cruel and ineffective if the animals do not have the skills/abilities to survive in the wild • Production of anti-venom and venom genetic manipulation

Mark scheme (award up to 12 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–4	• Demonstrates isolated elements of knowledge and understanding presented in an unstructured format. • Generic statements may be presented rather than linkages being made so that lines of reasoning are unclear. • Discussion is superficial rarely supported through the application of relevant evidence from the context.
Level 2	5–8	• Demonstrates mostly accurate knowledge and understanding. There is some structure to the response. • Some occasional linkages present so that lines of reasoning are partially supported and mostly clear. • Discussion is partially developed occasionally supported through the application of relevant evidence from the context.
Level 3	9–12	• Demonstrates accurate and thorough knowledge and understanding presented in a clear and logical format. • Comprehensive linkages evidenced so that lines of reasoning are well supported, clear and concise. • Displays a well-developed and logical discussion supported throughout by sustained application of relevant evidence from the context.

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