



Mark Scheme (Results)

January 2019

Pearson BTEC Level 3 – Animal
Management

Unit 1: Animal Breeding and Genetics

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Unit 1: Animal Breeding and Genetics – marking grid

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	<ul style="list-style-type: none"> • Ribs (1) • Waist/stomach (1) • Hips/pelvis (1) • Spine (1) 	2
Question Number	Answer	Mark
1b	<p>Award one mark for each descriptive point to a maximum of two marks.</p> <ul style="list-style-type: none"> • Temperament may be inherited (of either parent) (1) so prevents bad tempered offspring / easy to train (1) • Bitch may have difficult temperament (1) making care of pups difficult for the breeder (1) • Bitch may not accept the dog (1) so preventing mounting (1) • Dog may be timid (1) hindering the mating (1) <p>Accept reverse arguments. Accept any other appropriate response.</p>	2

Question Number	Answer	Mark
<ul style="list-style-type: none"> • 1c 	<p>Award one mark for identification to a maximum of two and one mark for each linked expansion to a maximum of four marks.</p> <ul style="list-style-type: none"> • Calm reaction to people/strangers (1) so safe with new owner (1) • Reaction to unexpected noises (1) so can be trained to react appropriately (1) • Reaction to other dogs (1) so no problems with aggression (1) • Reaction to other animals (1) so not likely to show aggression (1) • Easy to train (1) so learn appropriate tasks (1) • Adaptable (1) to be able to cope with situation changes quickly (1) • Bonds well (1) so works well with owner (1) <p>Accept any other appropriate response</p>	4

Question Number	Answer	Mark
2a	<p>Award one mark for each correct point to a maximum of four.</p> <ul style="list-style-type: none">• It is easily digestible (1)• The amount should be increased in the last three weeks (1)• Meals should be small (1)• Meals should be more often (1)• The diet should include a lot of protein (1)• The diet should include a lot of calcium (1)• Energy content should be increased• Carbohydrate content should be increased <p style="text-align: center;">Do not accept fibre</p>	4

Question number	Indicative content	
2b	<p>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.</p> <p>Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.</p> <p>Answers will consider all the factors that need to be covered when assessing livestock for their suitability, including animal’s purpose, effectiveness in breeding, breed standards and meeting the aim of purchase.</p> <ul style="list-style-type: none"> • Factors affecting breeding considerations, e.g. size of litters, ease of whelping • Breed standards • Desirable characteristics, especially temperament, biddability and size/strength to carry out role • Assessment of breeding stock for suitability • Recommendations on suitability 	
<p>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*.</p>		
Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–4	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

Question Number	Answer	Mark																																				
3a	<p>One mark each to a total of eight</p> <p>Identify parental genotypes Male A^yakk (1) Female A^yaK^{br}k (1)</p> <p>Male allele combinations A^yk, ak (1)</p> <p>Female allele combinations, A^yk, A^yK, aK, ak (1)</p> <table border="1"> <tr> <td></td> <td>A^yakk</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>A^yaKk</td> <td></td> <td>A^yk</td> <td>A^yk</td> <td>ak</td> <td>ak</td> </tr> <tr> <td></td> <td>A^yK^{br}</td> <td>A^yA^yK^{br}k</td> <td>A^yA^yK^{br}k</td> <td>A^yaK^{br}k</td> <td>A^yaK^{br}k</td> </tr> <tr> <td></td> <td>A^yk</td> <td>A^yA^ykK</td> <td>A^yA^ykK</td> <td>A^yakk</td> <td>A^yakk</td> </tr> <tr> <td></td> <td>aK^{br}</td> <td>aA^yK^{br}k</td> <td>aA^yK^{br}k</td> <td>aak^{br}k</td> <td>aak^{br}k</td> </tr> <tr> <td></td> <td>ak</td> <td>aA^ykK</td> <td>aA^ykK</td> <td>aakk</td> <td>aakk</td> </tr> </table> <p>Correct crosses in the punnet square (1)</p> <p>Correct proportions four black (1) : six sable (1): six sable brindle (1)</p>		A ^y akk					A ^y aKk		A ^y k	A ^y k	ak	ak		A ^y K ^{br}	A ^y A ^y K ^{br} k	A ^y A ^y K ^{br} k	A ^y aK ^{br} k	A ^y aK ^{br} k		A ^y k	A ^y A ^y kK	A ^y A ^y kK	A ^y akk	A ^y akk		aK ^{br}	aA ^y K ^{br} k	aA ^y K ^{br} k	aak ^{br} k	aak ^{br} k		ak	aA ^y kK	aA ^y kK	aakk	aakk	8
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	ak	aA ^y kK	aA ^y kK	aakk	aakk																																	
Question Number	Answer	Mark																																				
3b	<p>One mark for each descriptive point to a maximum, of two for each condition of four.</p> <ul style="list-style-type: none"> • Cryptorchidism (1) where one or both testicles stay in the body cavity (1) • Atresia (1) uncontrolled weeping of the eye (1) • Glycogen storage disease (1) cannot store/metabolise carbohydrates (1) • Hip dysplasia (1) causing an unstable hip joint (1) • Cataracts (1) causing reduced vision (1) • Luxating patella (1) affecting mobility (1) • Entropia /ectropia (1) affecting vision (1) • Degenerative myelopathy (1) causing mobility issues (1) <p>Both points must relate to the same condition. Accept any other appropriate response.</p>	4																																				

Question Number	Answer	Mark
4a	<p>One mark for each identification to a total of three, one for each expansion to a maximum of three, giving a total of six .</p> <ul style="list-style-type: none"> • A whelping box with space for the pups (1) to reduce the chances of crushing (1) • A heat source (1) to prevent hypothermia/reduce infections (1) • Absorbent bedding (1) to reduce dampness/prevent infections (1) • Bottles (1) in case mother doesn't produce milk (1) • PPE (1) to reduce cross infection (1) <p>Accept any other appropriate response.</p>	6

Question Number	Answer	Mark
4b	<p>Award one mark for identification to a maximum of two and one for each linked expansion to a maximum of two, giving a total of four.</p> <ul style="list-style-type: none"> • The animals are provided with suitable accommodation (1) to prevent hypothermia (1) • The animals are provided with suitable food (1) to ensure healthy pregnancies (1) • The animals are provided with enough clean water (1) to prevent dehydration (1) • The animals are provided with suitable bedding material (1) to prevent cross contamination (1) • They are adequately visited at suitable intervals (1) to prevent boredom (1) • That all reasonable precautions are taken to prevent and control the spread of diseases (1) to keep them healthy (1) • They are exercised regularly (1) to maintain muscle tone (1) • Number of litters is limited (1) to protect the bitch (1) <p>Accept any other appropriate response.</p>	4

Question Number	Answer	Mark
4c	<p>Award one mark for identification and one for expansion to a maximum of two.</p> <p>Identification</p> <ul style="list-style-type: none"> Measures how related the parent are (1) <p>Expansion</p> <ul style="list-style-type: none"> Indicates the number of homozygous genes (1) Shows the likelihood of genetic disorders (1) An example is hip dysplasia/von Willebrand 	2

Question Number	Answer	Mark
4d	<p>Award one mark for identification and one for each expansion to a maximum of , giving a total of four.</p> <ul style="list-style-type: none"> DNA screening (1) identifies animals with the 'faulty' gene (1) so they are not used in breeding programmes (1) so the gene is removed from the population/is not passed down (1). Genetic analysis (1) identifies the sequence of DNA in the faulty gene (1) so the faulty gene can be identified (1) allowing measures to remove it from the gene pool (1). Gene therapy (1) remove the faulty DNA (1) and replace with 'normal' DNA (1) to prevent the effects of the faulty gene (1). <p>Accept any other appropriate wording.</p>	4

Question Number	Answer	Mark
5a	<p>One mark for each identification and, one for the linked expansion (accept up to three identifications with one expansion each), giving a total of six.</p> <ul style="list-style-type: none"> • Identification of the gene (1) so it can be isolated (1) • Amplification of the gene (1) to provide many copies (1) • Associate the gene with a promoter (1) to insert into plasmids (1) • Multiply the plasmid (1) recover the cloned construct (1) • Transfer the construct (1) into the recipient tissue/eggs (1) • Integrate the gene (1) into the recipient genome (1) 	6

Question Number	Answer	Mark
5b	<p>Award one mark for identification and one for each expansion to a maximum of three, giving a total of four.</p> <p>The gene is removed (1) and replaced with artificial DNA (1) the mouse is observed (1) and any changes (1) from normal identify the action of the gene (1)</p> <p>Black mouse embryonic stem cells are altered (1) with artificial DNA / DNA from vector (1) stem cells inserted into a white mouse embryo (1) resulting spotted / chimera mice bred from (1)</p>	4

Question number	Indicative content	
6a	<p>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.</p> <p>Answers will consider all the factors that need to be covered when evaluating the use of artificial insemination to improve production in livestock breeds.</p> <p>Improve inbreeding coefficient/reduce inbreeding Introduce desirable characteristics- identified characteristics appropriate to the breed Reduce genetic conditions</p> <p>Characteristics that improve productivity but reduce welfare might be introduced (e.g. increased milk production) More likely to result in positive PD through lack of mating stresses, Ability to time introduction of semen for most fertile days of cycle</p>	
<p>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*.</p>		
Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	<ul style="list-style-type: none"> • Demonstrates isolated elements of knowledge and understanding. • Generic statements may be presented, rather than linked factors/components being identified and explored. Limited attempt to address the question. • Response is likely to lack clarity, organisation and the required technical language.
Level	Mark	Descriptor
Level 2	3–4	<ul style="list-style-type: none"> • Demonstrates accurate knowledge and understanding. • Learners will identify linked factors/components, with some development in the form of mostly accurate and relevant factual material, the accuracy in the detail on the factors identified is likely to vary. • The response may contain parts that lack clarity or proper organisation. Evidence of correct technical language being used.
Level 3	5–6	<ul style="list-style-type: none"> • Demonstrates accurate knowledge and understanding. • A contextualised analysis is developed using mostly coherent chains of reasoning, leading to a range of factors/components being present. Learners will demonstrate understanding of linkages and relationships between/within systems. • Response demonstrates good organisation, clarity and use of technical language.

Question number	Indicative content	
6b	<ul style="list-style-type: none"> • Leads to inbreeding • Increases the number of deleterious alleles • Genetic bottleneck • Increase in health problems such as: <ul style="list-style-type: none"> ○ Breathing difficulties ○ Prolapsed eyes ○ Spinal problems ○ Hip dysplasia • Loss of viability • Need to increase the genetic diversity, e.g. outbreeding • Use of genetic screening • pressure of meeting breed standards 	
<p>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*.</p>		
Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–4	<ul style="list-style-type: none"> • Demonstrates isolated elements of knowledge and understanding • Presented in an unstructured format. • Limited reference to relevant evidence • A conclusion may be presented, but will lack focus and be superficial and underdeveloped.
Level 2	5–8	<ul style="list-style-type: none"> • Demonstrates mostly accurate knowledge and understanding. There is some structure to the response. • The answer is mostly supported through the application of relevant evidence. • Conclusion will be mostly focused and developed and show some linkages and lines of reasoning.
Level 3	9–12	<ul style="list-style-type: none"> • Demonstrates accurate and thorough knowledge and understanding • Presented in a clear and logical format. • Answer is fully supported throughout by sustained application of relevant. • Conclusion will be clear, concise and well developed showing comprehensive linkages and lines of reasoning.

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