City & Guilds Level 3 Certificate, Subsidiary Diploma, 90-Credit Diploma, Diploma and Extended Diploma in Animal Management (0074-03)

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Qualification handbook for centres
500/8320/X
500/8279/6
600/6112/1
500/8321/1
500/8280/2


ANIMAL CARE

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As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

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City & Guilds City & Guilds Level 3 Certificate, Subsidiary Diploma, 90-Credit Diploma, Diploma and Extended Diploma in Animal Management (0074-03)

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Qualification handbook for centres

Qualification title	Number	QAN
City & Guilds Level 3 Certificate in Animal Management	0074-03	500/8320/X
City & Guilds Level 3 Subsidiary Diploma in Animal Management	0074-03	500/8279/6
City & Guilds Level 3 90-Credit Diploma in Animal Management	0074-03	600/6112/1
City & Guilds Level 3 Diploma in Animal Management	0074-03	500/8321/1
City & Guilds Level 3 Extended Diploma in Animal Management	0074-03	500/8280/2

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Contents

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1 Introduction to the qualifications

This document contains the information that centres need to offer the following qualifications:

Qualification title and level	City & Guilds qualification number	Qualification accreditation number
City & Guilds Level 3 Certificate in Animal Management	0074-03	500/8320/X
City & Guilds Level 3 Subsidiary Diploma in Animal Management	0074-03	500/8279/6
City & Guilds Level 3 90-Credit Diploma in Animal Management	0074-03	600/6112/1
City & Guilds Level 3 Diploma in Animal Management	0074-03	500/8321/1
City & Guilds Level 3 Extended Diploma in Animal Management	0074-03	500/8280/2

Qualification summary

Qualification title and level	Credits	Guided Learning Hours (GLH)	Total Qualification Time (TQT)
City & Guilds Level 3 Certificate in Animal Management	30	180	300
City & Guilds Level 3 Subsidiary Diploma in Animal Management	60	360	600
City & Guilds Level 3 90-Credit Diploma in Animal Management	90	540	900
City & Guilds Level 3 Diploma in Animal Management	120	720	1200
City & Guilds Level 3 Extended Diploma in Animal Management	180	1080	1800

These qualifications meet the needs of learners in a centre-based environment who may wish to work within the animal management industry or progress to further learning and/or training. These qualifications allow learners to develop underpinning knowledge whilst practising skills that could be used within employment in the animal management industry. These qualifications replace the Level 3 Advanced National Certificate in Animal Management (0340-13) (QAN: 500/4107/1) and the Level 3 Advanced National Diploma in Animal Management (0341-14) (QAN: 500/41061/X) which expired on 31 August 2010.

These qualifications were developed in association with Lantra SSC, Landex and the industry.

Specialist Learning (SL)

Specialist Learning (SL) offers young people the opportunity to study a particular topic in more depth or broaden their studies through complementary learning. The Level 3 Certificate and Subsidiary Diploma in Animal Management have been approved as SL by the Environmental and Land-based Diploma DDP and Ofqual for the Advanced Diploma in Environmental and Land-based Studies. They have been designed to:

- complement principal learning within the Advanced Diploma in Environmental and Land-based studies

- provide a broad background understanding of the Advanced Diploma in Environmental and Land-based sector and an introduction to the practical skills and knowledge required
- provide an awareness of the range of jobs and work settings in the Animal Management sector
- enable learners to make an informed assessment of their own aptitude for work in this sector and to make informed decisions about careers
- encourage learners to reach a level of knowledge and skills that will facilitate progress into further vocational learning or to potential employment in the sector
- introduce learners to the discipline of the working environment and to encourage mature attitudes to the community in general
- encourage learners to value continued learning and remain in the learning process
- allow learners to learn, develop and practise selected skills required for progression in the sector
- provide opportunities for progression to the Advanced Diploma in Environmental and Land-based and other related qualifications in the sector.

1.1 Qualification structure

Level 3 Certificate

To achieve the **City & Guilds Level 3 Certificate in Animal Management,** learners are required to achieve 30 credits from any combination of the Optional units in the table below.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Optional units				
D6009365	Unit 301	Understand and Promote Animal Health	10	
H6009366	Unit 302	Manage Animal Accommodation	5	
K6009367	Unit 303	Understand Animal Anatomy and Physiology	10	
T6009372	Unit 304	Plan and Monitor Animal Feeding	5	
J6009389	Unit 305	Understand the Principles of Animal Biology	10	
F6009391	Unit 306	Undertake Animal Handling and Safe Working	10	
D6009401	Unit 310	Understand and Interpret Animal Behaviour and Communication	10	

M6009404	Unit 311	Understand the Principles of Animal Nursing	10	
F6009410	Unit 312	Understand Animal Welfare and Breed Development	10	
L6009412	Unit 313	Undertake Dog Grooming	10	
H6009416	Unit 314	Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry	10	
M6009418	Unit 315	Undertake Kennel and Cattery Management	10	
T6009422	Unit 316	Undertake Pet Store Design and Animal Management	10	
L6009426	Unit 317	Understand the Principles of Animal Breeding and Genetics	10	
Y6009428	Unit 318	Understand the Principles of Zoological Animal Health and Husbandry	10	
M6009810	Unit 319	Understand the Principles of Animal Nutrition	10	
J6009442	Unit 324	Understand the Principles of Aquatics Husbandry and Management	10	
H6009447	Unit 326	Understand and Undertake Wildlife Management and Rehabilitation	10	

City & Guilds Level 3 Subsidiary Diploma

To achieve the **City & Guilds Level 3 Subsidiary Diploma in Animal Management,** learners are required to achieve 10 credits from the Mandatory unit and a further 50 credits from the Optional units in the table below. A total of 60 credits are required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory unit				
D6009365	Unit 301	Understand and Promote Animal Health	10	
Optional units				
H6009366	Unit 302	Manage Animal Accommodation	5	
K6009367	Unit 303	Understand Animal Anatomy and Physiology	10	
T6009372	Unit 304	Plan and Monitor Animal Feeding	5	
J6009389	Unit 305	Understand the Principles of Animal Biology	10	
F6009391	Unit 306	Undertake Animal Handling and Safe Working	10	
M6010021	Unit 308	Undertake an Investigative Project in the Land-based Sector	10	
M6009709	Unit 309	Business Management in the Land-based Sector	10	
D6009401	Unit 310	Understand and Interpret Animal Behaviour and Communication	10	
M6009404	Unit 311	Understand the Principles of Animal Nursing	10	
F6009410	Unit 312	Understand Animal Welfare and Breed Development	10	

L6009412	Unit 313	Undertake Dog Grooming	10	
H6009416	Unit 314	Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry	10	
M6009418	Unit 315	Undertake Kennel and Cattery Management	10	
T6009422	Unit 316	Undertake Pet Store Design and Animal Management	10	
L6009426	Unit 317	Understand the Principles of Animal Breeding and Genetics	10	
Y6009428	Unit 318	Understand the Principles of Zoological Animal Health and Husbandry	10	
M6009810	Unit 319	Understand the Principles of Animal Nutrition	10	
H6009433	Unit 320	Undertake Animal Training	10	
M6009435	Unit 321	Understand the Principles and Carry Out the Practice of Avian Health and Management	10	
J6009439	Unit 322	Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology	10	
F6009701	Unit 323	Participate in Business Planning and Improvement in the Land-based Sector	10	
J6009442	Unit 324	Understand the Principles of Aquatics Husbandry and	10	

		Management		
R6009444	Unit 325	Understand the Principles and Carry Out the Practice of Wildlife Population Surveys, Ecology and Conservation	10	
H6009447	Unit 326	Understand and Undertake Wildlife Management and Rehabilitation	10	
K5025557	Unit 327	Chemistry for Biology Technicians	10	
A6009812	Unit 328	Undertake Retail Merchandising for the Land-based Sector	10	
F6009455	Unit 329	Undertake the Practices of Equine Health, Handling and Husbandry	10	
Y6009610	Unit 330	Undertake Estate Skills	10	
L6009457	Unit 331	Understand and Carry Out Farm Livestock Husbandry	10	
R5025536	Unit 332	Fundamentals of Science	10	
D6009463	Unit 333	Understand the Principles of Inheritance and Genetic Manipulation	10	
A6009714	Unit 334	Understand the Principles of Chemistry for Biological and Medical Science	10	

City & Guilds Level 3 90-Credit Diploma

To achieve the **City & Guilds Level 3 90-Credit Diploma in Animal Management**, learners are required to achieve 10 credits from the Mandatory unit and a further 80 credits from the Optional units in the table below. A total of 90 credits are required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory unit				
D6009365	Unit 301	Understand and Promote Animal Health	10	
Optional units				
H6009366	Unit 302	Manage Animal Accommodation	5	
K6009367	Unit 303	Understand Animal Anatomy and Physiology	10	
T6009372	Unit 304	Plan and Monitor Animal Feeding	5	
J6009389	Unit 305	Understand the Principles of Animal Biology	10	
F6009391	Unit 306	Undertake Animal Handling and Safe Working	10	
R6009394	Unit 307	Undertake and Review Work Related Experience in the Land-based Industries	10	
M6010021	Unit 308	Undertake an Investigative Project in the Land-based Sector	10	
M6009709	Unit 309	Business Management in the Land-based Sector	10	
D6009401	Unit 310	Understand and Interpret Animal Behaviour and Communication	10	

M6009404	Unit 311	Understand the Principles of Animal Nursing	10	
F6009410	Unit 312	Understand Animal Welfare and Breed Development	10	
L6009412	Unit 313	Undertake Dog Grooming	10	
H6009416	Unit 314	Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry	10	
M6009418	Unit 315	Undertake Kennel and Cattery Management	10	
T6009422	Unit 316	Undertake Pet Store Design and Animal Management	10	
L6009426	Unit 317	Understand the Principles of Animal Breeding and Genetics	10	
Y6009428	Unit 318	Understand the Principles of Zoological Animal Health and Husbandry	10	
M6009810	Unit 319	Understand the Principles of Animal Nutrition	10	
H6009433	Unit 320	Undertake Animal Training	10	
M6009435	Unit 321	Understand the Principles and Carry Out the Practice of Avian Health and Management	10	
J6009439	Unit 322	Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology	10	

F6009701	Unit 323	Participate in Business Planning and Improvement in the Land-based Sector	10	
J6009442	Unit 324	Understand the Principles of Aquatics Husbandry and Management	10	
R6009444	Unit 325	Understand the Principles and Carry Out the Practice of Wildlife Population Surveys, Ecology and Conservation	10	
H6009447	Unit 326	Understand and Undertake Wildlife Management and Rehabilitation	10	
K5025557	Unit 327	Chemistry for Biology Technicians	10	
A6009812	Unit 328	Undertake Retail Merchandising for the Land-based Sector	10	
F6009455	Unit 329	Undertake the Practices of Equine Health, Handling and Husbandry	10	
Y6009610	Unit 330	Undertake Estate Skills	10	
L6009457	Unit 331	Understand and Carry Out Farm Livestock Husbandry	10	
R5025536	Unit 332	Fundamentals of Science	10	
D6009463	Unit 333	Understand the Principles of Inheritance and Genetic Manipulation	10	
A6009714	Unit 334	Understand the Principles of Chemistry for Biological and Medical Science	10	

City & Guilds Level 3 Diploma

To achieve the **City & Guilds Level 3 Diploma in Animal Management,** learners are required to achieve 50 credits from the Mandatory units and a further 70 credits from the Optional units in the table below. A total of 120 credits is required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory units				
D6009365	Unit 301	Understand and Promote Animal Health	10	
H6009366	Unit 302	Manage Animal Accommodation	5	
T6009372	Unit 304	Plan and Monitor Animal Feeding	5	
J6009389	Unit 305	Understand the Principles of Animal Biology	10	
F6009391	Unit 306	Undertake Animal Handling and Safe Working	10	
R6009394	Unit 307	Undertake and Review Work Related Experience in the Land-based Industries	10	
Optional units				
K6009367	Unit 303	Understand Animal Anatomy and Physiology	10	
M6010021	Unit 308	Undertake an Investigative Project in the Land-based Sector	10	
M6009709	Unit 309	Business Management in the Land-based Sector	10	
D6009401	Unit 310	Understand and Interpret Animal Behaviour and Communication	10	

M6009404	Unit 311	Understand the Principles of Animal Nursing	10	
F6009410	Unit 312	Understand Animal Welfare and Breed Development	10	
L6009412	Unit 313	Undertake Dog Grooming	10	
H6009416	Unit 314	Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry	10	
M6009418	Unit 315	Undertake Kennel and Cattery Management	10	
T6009422	Unit 316	Undertake Pet Store Design and Animal Management	10	
L6009426	Unit 317	Understand the Principles of Animal Breeding and Genetics	10	
Y6009428	Unit 318	Understand the Principles of Zoological Animal Health and Husbandry	10	
M6009810	Unit 319	Understand the Principles of Animal Nutrition	10	
H6009433	Unit 320	Undertake Animal Training	10	
M6009435	Unit 321	Understand the Principles and Carry Out the Practice of Avian Health and Management	10	
J6009439	Unit 322	Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology	10	

F6009701	Unit 323	Participate in Business Planning and Improvement in the Land-based Sector	10	
J6009442	Unit 324	Understand the Principles of Aquatics Husbandry and Management	10	
R6009444	Unit 325	Understand the Principles and Carry Out the Practice of Wildlife Population Surveys, Ecology and Conservation	10	
H6009447	Unit 326	Understand and Undertake Wildlife Management and Rehabilitation	10	
K5025557	Unit 327	Chemistry for Biology Technicians	10	
A6009812	Unit 328	Undertake Retail Merchandising for the Land-based Sector	10	
F6009455	Unit 329	Undertake the Practices of Equine Health, Handling and Husbandry	10	
Y6009610	Unit 330	Undertake Estate Skills	10	
L6009457	Unit 331	Understand and Carry Out Farm Livestock Husbandry	10	
R5025536	Unit 332	Fundamentals of Science	10	
D6009463	Unit 333	Understand the Principles of Inheritance and Genetic Manipulation	10	
A6009714	Unit 334	Understand the Principles of Chemistry for Biological and Medical Science	10	

City & Guilds Level 3 Extended Diploma

To achieve the **City & Guilds Level 3 Extended Diploma in Animal Management,** learners are required to achieve 70 credits from the mandatory units and a further 110 credits from the optional units in the table below. A total of 180 credits is required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory units				
D6009365	Unit 301	Understand and Promote Animal Health	10	
H6009366	Unit 302	Manage Animal Accommodation	5	
K6009367	Unit 303	Understand Animal Anatomy and Physiology	10	
T6009372	Unit 304	Plan and Monitor Animal Feeding	5	
J6009389	Unit 305	Understand the Principles of Animal Biology	10	
F6009391	Unit 306	Undertake Animal Handling and Safe Working	10	
R6009394	Unit 307	Undertake and Review Work Related Experience in the Land-based Industries	10	
M6010021	Unit 308	Undertake an Investigative Project in the Land-based Sector	10	
Optional units				
M6009709	Unit 309	Business Management in the Land-based Sector	10	
D6009401	Unit 310	Understand and Interpret Animal Behaviour and Communication	10	

M6009404	Unit 311	Understand the Principles of Animal Nursing	10	
F6009410	Unit 312	Understand Animal Welfare and Breed Development	10	
L6009412	Unit 313	Undertake Dog Grooming	10	
H6009416	Unit 314	Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry	10	
M6009418	Unit 315	Undertake Kennel and Cattery Management	10	
T6009422	Unit 316	Undertake Pet Store Design and Animal Management	10	
L6009426	Unit 317	Understand the Principles of Animal Breeding and Genetics	10	
Y6009428	Unit 318	Understand the Principles of Zoological Animal Health and Husbandry	10	
M6009810	Unit 319	Understand the Principles of Animal Nutrition	10	
H6009433	Unit 320	Undertake Animal Training	10	
M6009435	Unit 321	Understand the Principles and Carry Out the Practice of Avian Health and Management	10	
J6009439	Unit 322	Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology	10	

F6009701	Unit 323	Participate in Business Planning and Improvement in the Land-based Sector	10	
J6009442	Unit 324	Understand the Principles of Aquatics Husbandry and Management	10	
R6009444	Unit 325	Understand the Principles and Carry Out the Practice of Wildlife Population Surveys, Ecology and Conservation	10	
H6009447	Unit 326	Understand and Undertake Wildlife Management and Rehabilitation	10	
K5025557	Unit 327	Chemistry for Biology Technicians	10	
A6009812	Unit 328	Undertake Retail Merchandising for the Land-based Sector	10	
F6009455	Unit 329	Undertake the Practices of Equine Health, Handling and Husbandry	10	
Y6009610	Unit 330	Undertake Estate Skills	10	
L6009457	Unit 331	Understand and Carry Out Farm Livestock Husbandry	10	
R5025536	Unit 332	Fundamentals of Science	10	
D6009463	Unit 333	Understand the Principles of Inheritance and Genetic Manipulation	10	
A6009714	Unit 334	Understand the Principles of Chemistry for Biological and Medical Science	10	

1.2 Opportunities for progression

On completion of these qualifications learners may progress into employment or to the following City & Guilds qualifications:

- Level 4 and above centre-based qualifications in Animal Management e.g. Foundation Degree, Higher National Diploma
- Level 3 or 4 qualifications in Work-based Animal Care
- Other related qualifications

1.3 Qualification support materials

City & Guilds also provides the following publications and resources specifically for these qualifications:

Description	How to access
Assignment guide	www.cityandguilds.com
Marking guide	information@cityandguilds.com
Information sheets	www.cityandguilds.com
Fast track approval forms/generic fast track approval form	www.cityandguilds.com

2 Centre requirements

This section outlines the approval processes for Centres to offer these qualifications and any resources that Centres will need in place to offer the qualifications including qualification-specific requirements for Centre staff.

Centres already offering the Level 3 Advanced National Certificate in Animal Management (0341-13) (QAN 500/4107/1) and/or the Level 3 Advanced National Diploma in Animal Management (0341-14) (QAN 500/4106/X

Centres approved to offer the qualification Level 3 Advanced National Certificate in Animal Management (0341-13) (QAN 500/4107/1) and/ the Level 3 Advanced National Diploma in Animal Management (0341-14) (QAN 500/4106/X may apply for approval for the new Level 3 Certificate, Subsidiary Diploma, Diploma and Extended Diploma in Animal Management using the **fast track approval form**, available from the City & Guilds website.

Centres may apply to offer the new qualifications using the fast track form

- providing there have been no changes to the way the qualifications are delivered, and
- if they meet all of the approval criteria specified in the fast track form guidance notes.

Fast track approval is available for 12 months from the launch of the qualification. After this time, the qualification is subject to the **standard** Qualification Approval Process. It is the centre's responsibility to check that fast track approval is still current at the time of application.

New centres must apply for centre and qualification approval. Further information on this process is available on the City & guilds website.

Existing City & Guilds centres that do not offer Level 3 Advanced National Certificate/Diploma in Animal Management will need to get specific qualification approval to run these qualifications (contact your City & Guilds Local Office).

2.1 Resource requirements

Human resources

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be technically competent in the areas for which they are delivering training and/or have experience of providing training. This knowledge must be at least to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- be occupationally knowledgeable in the area of animal management for which they are delivering training. This knowledge must be at least to the same level as the training being delivered
- have credible experience of providing training.

Centre staff may undertake more than one role, e.g. tutor and assessor or internal verifier, but must never internally verify their own assessments.

Assessors and internal verifiers

The centre must provide Assessor personnel who must be occupationally competent in the industry either qualified to at least level 3 and/or have current experience of working in the industry at this level.

The centre must provide Internal Quality Assurance personnel who must be occupationally competent in the land-based sector either qualified to at least level 3 and/or have current experience of working in the industry at this level.

Assessors/Internal Quality Assurance personnel may hold relevant qualifications such as D32/33/34 or A1/V1 or TAQA however they are not a mandatory requirement for this qualification. They should have had formal training in assessment/IQA, which may be the qualifications above, or other training that allows the assessor to demonstrate competence in the practice of assessment/IQA. This training may be carried out in-house or with an external agency.

TAQA qualifications are considered very appropriate as Continuing Professional Development (CPD) or as best practice standards for new centre staff to work towards.

Continuing professional development (CPD)

Centres are expected to support their staff in ensuring that their knowledge remains current of the occupational area and of best practice in delivery, mentoring, training, assessment and verification, and that it takes account of any national or legislative developments.

2.2 Learner entry requirements

There are no formal entry requirements for learners undertaking these qualifications. However, centres must ensure that learners have the potential and opportunity to gain the qualifications successfully.

As part of the assessment for the Level 2 Diploma qualification, learners must have access to a work setting/placement for the work experience unit.

2.3 Age restrictions

These qualifications have been approved and accredited for pre-16, 16-18, 18+ and 19+ learners. However, there are no age limits attached to learners undertaking the qualification unless this is a legal requirement of the process or the environment.

3 Course design and delivery

3.1 Initial assessment and induction

Centres will need to make an initial assessment of each learner prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment should identify:

- any specific training needs the learner has, and the support and guidance they may require when working towards their qualifications. This is sometimes referred to as diagnostic testing.
- any units the learner has already completed, or credit they have accumulated which is relevant to the qualifications they are about to begin.

City & Guilds recommends that centres provide an induction programme to ensure the learner fully understands the requirements of the qualifications they will work towards, their responsibilities as a learner, and the responsibilities of the centre. It may be helpful to record the information on a learning contract.

3.2 Recommended delivery strategies

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Centres may design course programmes of study in any way which:

- best meets the needs and capabilities of their learners
- satisfies the requirements of the qualifications.

When designing and delivering the course programme, centres might wish to incorporate other teaching and learning that is not assessed as part of the qualifications. This might include the following:

- Functional skills
- Personal learning and thinking skills (PLTS)

Where applicable, this could involve enabling the learner to access relevant qualifications covering these skills.

4 Assessment

4.1 Summary of assessment methods

For these qualifications, learners will be required to complete the following assessments:

- **one** assignment for **each** unit

City & Guilds provides the following assessments:

- Assignment guide containing assignments for each unit

Time constraints

The following time constraints must be applied to the assessment of these qualifications:

- All assignments must be completed and assessed within the learner's period of registration. Centres should advise learners of any internal timescales for the completion and marking of individual assignments.

4.2 Assignments

The assignment guide for these qualifications is available to download from **www.cityandguilds.com**.

4.3 Recognition of prior learning (RPL)

Recognition of Prior Learning (RPL) recognises the contribution a person's previous experience could contribute to a qualification. RPL is allowed and is also sector specific.

4.4 Resubmission of Assignments

Centres are advised to adopt the following policy on the re-submission of work:

Learners who fail an assignment on the formal (summative) submission, or who would like the opportunity to improve their grade, may re-submit once only and may then achieve either a Pass, Merit or Distinction as appropriate. An appropriate time period between formal submission and re-submission should be set by the centre. Multiple re-submissions are not permitted. Learners who fail to hand in work on the formal submission date, where there is no legitimate reason, should be capped to a maximum of a Pass grade only at the re-submission stage. It is at the discretion of the centre to set informal (formative) submission dates, if appropriate, and a formal submission date.

Units

Summary of units

City & Guilds unit number	Title	QCF unit number	Credits
301	Understand and Promote Animal Health	D6009365	10
302	Manage Animal Accommodation	H6009366	5
303	Understand Animal Anatomy and Physiology	K6009367	10
304	Plan and Monitor Animal Feeding	T6009372	5
305	Understand the Principles of Animal Biology	J6009389	10
306	Undertake Animal Handling and Safe Working	F6009391	10
307	Undertake and Review Work Related Experience in the Land-based Industries	R6009394	10
308	Undertake an Investigative Project in the Land-based Sector	M6010021	10
309	Business Management in the Land-based Sector	M6009709	10
310	Understand and Interpret Animal Behaviour and Communication	D6009401	10
311	Understand the Principles of Animal Nursing	M6009404	10
312	Understand Animal Welfare and Breed Development	F6009410	10
313	Undertake Dog Grooming	L6009412	10
314	Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry	H6009416	10
315	Undertake Kennel and Cattery Management	M6009418	10
316	Undertake Pet Store Design and Animal Management	T6009422	10
317	Understand the Principles of Animal Breeding and Genetics	L6009426	10
318	Understand the Principles of Zoological Animal Health and Husbandry	Y6009428	10
319	Understand the Principles of Animal Nutrition	M6009810	10
320	Undertake Animal Training	H6009433	10
321	Understand the Principles and Carry Out the Practice of Avian Health and Management	M6009435	10
322	Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology	J6009439	10
323	Participate in Business Planning and Improvement in the Land-based Sector	F6009701	10
324	Understand the Principles of Aquatics Husbandry and Management	J6009442	10
325	Understand the Principles and Carry Out the Practice of Wildlife Population Surveys, Ecology	R6009444	10

	and Conservation		
326	Understand and Undertake Wildlife Management and Rehabilitation	H6009447	10
327	Chemistry for Biology Technicians	K5025557	10
328	Undertake Retail Merchandising for the Land-based Sector	A6009812	10
329	Undertake the Practices of Equine Health, Handling and Husbandry	F6009455	10
330	Undertake Estate Skills	Y6009610	10
331	Understand and Carry Out Farm Livestock Husbandry	L6009457	10
332	Fundamentals of Science	R5025536	10
333	Understand the Principles of Inheritance and Genetic Manipulation	D6009463	10
334	Understand the Principles of Chemistry for Biological and Medical Science	A6009714	10

Certification/grading modules

City & Guilds unit number	Title
910	Certification module for Level 3 Certificate in Animal Management - pass grade
911	Certification module for Level 3 Certificate in Animal Management - merit grade
912	Certification module for Level 3 Certificate in Animal Management - distinction grade
913	Certification module for Level 3 Subsidiary Diploma in Animal Management - pass grade
914	Certification module for Level 3 Subsidiary Diploma in Animal Management - merit grade
915	Certification module for Level 3 Subsidiary Diploma in Animal Management - distinction grade
916	Certification module for Level 3 Diploma in Animal Management - pass grade
917	Certification module for Level 3 Diploma in Animal Management - merit grade
918	Certification module for Level 3 Diploma in Animal Management - distinction grade
919	Certification module for Level 3 Extended Diploma in Animal Management - pass grade
920	Certification module for Level 3 Extended Diploma in Animal Management - merit grade
921	Certification module for Level 3 Extended Diploma in Animal Management - distinction grade
925	Certification module for Level 3 Certificate in Animal Management – distinction * grade
926	Certification module for Level 3 Subsidiary Diploma in Animal Management – distinction * grade
927	Certification module for Level 3 Diploma in Animal Management – distinction * grade
928	Certification module for Level 3 Extended Diploma in Animal Management – distinction * grade

957	Certification module for Level 3 90-Credit Diploma in Animal Management – pass grade
958	Certification module for Level 3 90-Credit Diploma in Animal Management – merit grade
959	Certification module for Level 3 90-Credit Diploma in Animal Management – distinction grade
960	Certification module for Level 3 90-Credit Diploma in Animal Management – distinction * grade

5 Registration and Certification

The Level 3 Certificate, Subsidiary Diploma, 90-Credit Diploma, Diploma and Extended Diploma in Animal Management qualifications have been grouped into one programme for registration.

Tutors and Examination Officers should ensure that candidates are registered onto 0074-03 and that all 0074-03 documentation for teaching and administration with City & Guilds is used.

When candidates' results are submitted to City & Guilds, centres should also submit the relevant Certificate, Subsidiary Diploma, Diploma and Extended Diploma certification/grading component, according to which units the candidate has achieved, so that the appropriate certificate is generated. The overall grade can be calculated using the formula in the assignment guide.

Please note: There are four certification/grading modules for each of the qualifications which differentiates the four grades – pass, merit, distinction and distinction*. Once the overall grade for the assignments has been calculated, the correct certification/grading module needs to be indicated on the results entry.

For example, if a learner achieves the Level 3 Certificate in Animal Management at an overall merit grade, then the certification module 911 needs to be submitted. Please see the Rules of Combination below or the City & Guilds catalogue.

Level 3 Certificate in Animal Management QAN 500/8320/X	
Rules for achievement of qualification	30 credits from (301 – 306), (310 – 319), 324, 326 Plus 910 for certification at pass grade

Level 3 Certificate in Animal Management QAN 500/8320/X	
Rules for achievement of qualification	30 credits from (301 – 306), (310 – 319), 324, 326 Plus 911 for certification at merit grade

Level 3 Certificate in Animal Management QAN 500/8320/X	
Rules for achievement of qualification	30 credits from (301 – 306), (310 – 319), 324, 326 Plus 912 for certification at distinction grade

Level 3 Certificate in Animal Management QAN 500/8320/X	
Rules for achievement of qualification	30 credits from (301 – 306), (310 – 319), 324, 326 Plus 925 for certification at distinction* grade

Level 3 Subsidiary Diploma in Animal Management **QAN 500/8279/6**	
Rules for achievement of qualification	10 credits from 301, plus a minimum of 50 credits from (302 – 306), (308 – 334) Plus 913 for certification at pass grade

Level 3 Subsidiary Diploma in Animal Management **QAN 500/8279/6**	
Rules for achievement of qualification	10 credits from 301, plus a minimum of 50 credits from (302 – 306), (308 – 334) Plus 914 for certification at merit grade

Level 3 Subsidiary Diploma in Animal Management **QAN 500/8279/6**	
Rules for achievement of qualification	10 credits from 301, plus a minimum of 50 credits from (302 – 306), (308 – 334) Plus 915 for certification at distinction grade

Level 3 Subsidiary Diploma in Animal Management **QAN 500/8279/6**	
Rules for achievement of qualification	10 credits from 301, plus a minimum of 50 credits from (302 – 306), (308 – 334) Plus 926 for certification at distinction* grade

Level 3 90-Credit Diploma in Animal Management **QAN 600/6112/1**	
Rules for achievement of qualification	10 credits from 301, plus 80 credits from (302 – 334) Plus 957 for certification at pass grade

Level 3 90-Credit Diploma in Animal Management **QAN 600/6112/1**	
Rules for achievement of qualification	10 credits from 301, plus 80 credits from (302 – 334) Plus 958 for certification at merit grade

Level 3 90-Credit Diploma in Animal Management **QAN 600/6112/1**	
Rules for achievement of qualification	10 credits from 301, plus 80 credits from (302 – 334) Plus 959 for certification at distinction grade

Level 3 90-Credit Diploma in Animal Management **QAN 600/6112/1**	
Rules for achievement of qualification	10 credits from 301, plus 80 credits from (302 – 334) Plus 960 for certification at distinction* grade

Level 3 Diploma in Animal Management QAN 500/8321/1	
Rules for achievement of qualification	50 credits from (301 – 302), (304 – 307), plus a minimum of 70 credits from 303, (308 –334) Plus 916 for certification at pass grade

Level 3 Diploma in Animal Management QAN 500/8321/1	
Rules for achievement of qualification	50 credits from (301 – 302), (304 – 307), plus a minimum of 70 credits from 303, (308 –334) Plus 917 for certification at merit grade

Level 3 Diploma in Animal Management QAN 500/8321/1	
Rules for achievement of qualification	50 credits from (301 – 302), (304 – 307), plus a minimum of 70 credits from 303, (308 –334) Plus 918 for certification at distinction grade

Level 3 Diploma in Animal Management QAN 500/8321/1	
Rules for achievement of qualification	50 credits from (301 – 302), (304 – 307), plus a minimum of 70 credits from 303, (308 –334) Plus 927 for certification at distinction* grade

Level 3 Extended Diploma in Animal Management QAN 500/8280/2	
Rules for achievement of qualification	70 credits from (301 – 308) plus a minimum of 110 credits from (309 –334) Plus 919 for certification at pass grade

Level 3 Extended Diploma in Animal Management QAN 500/8280/2	
Rules for achievement of qualification	70 credits from (301 – 308) plus a minimum of 110 credits from (309 –334) Plus 920 for certification at merit grade

Level 3 Extended Diploma in Animal Management QAN 500/8280/2	
Rules for achievement of qualification	70 credits from (301 – 308) plus a minimum of110 credits from (309 –334)

	Plus 921 for certification at distinction grade

Level 3 Extended Diploma in Animal Management QAN 500/8280/2	
Rules for achievement of qualification	70 credits from (301 – 308) plus a minimum of110 credits from (309 –334) Plus 928 for certification at distinction* grade

- Learners must be registered at the beginning of their course. Centres should submit registrations using Walled Garden or Form S (Registration), under scheme/complex 0074-03.

- When assignments have been successfully completed results should be submitted on Walled Garden or Form S (Results submission). One of the certification/grading modules 910 to 921 or 925 to 932 need to be submitted to generate the appropriate certificate and grade. Centres should note that results will not be processed by City & Guilds until verification records are complete

- Learners achieving one or more assessment components will receive a Certificate of Unit Credit listing the assessment components achieved. Learners achieving the number and combination of assessment components required to meet a defined Rule of Combination will, in addition, be issued with a Full Certificate. Centres must submit a certification/grading component to allow this to happen.

Full details on the procedures for all City & Guilds qualifications registered and certificated through City & Guilds can be found on the City & Guilds on-line catalogue.

Unit 301 Understand and Promote Animal Health

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal health and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to recognise the signs of good and ill health in animals and evaluate these as indictors of health status. The learner will carry out health checks on animals and produce animal health plans. The structure and role of pathogenic organisms will be examined and prevention and treatment of a range of diseases and disorders covered. The learner will be able to carry out routine and non-routine treatments for animals.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to recognise indicators of health in animals
2. Understand common disease and disorders, their treatment and prevention
3. Be able to promote and maintain the health and wellbeing of animals
4. Know how to deliver and record basic animal treatments

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

AC10.1 Implement plans to maintain animal health and welfare

AC10.2 Monitor and evaluate the maintenance of animal health and welfare

AC14.1 Provide information on how to maintain the behaviour, health and welfare of animals

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 301 Understand and Promote Animal Health

Outcome 1 Be able to recognise indicators of health in animals

Assessment Criteria

The learner can:

1. Describe the **indicators** of good and ill health in animals
2. Carry out **health checks** on animals
3. **Handle animals** in a way that complies with **legislation**, **minimises stress and injury**

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Indicators

Physical signs e.g. behaviour, movement, posture, coat condition, weight, ears eyes mouth and nose, tail, toes/feet/hooves (as appropriate) clinical signs e.g. temperature, pulse, respiration

Health checks

Routine, non-routine, animals of different life stages (young, breeding/pregnant, lactating, adult, geriatric), recording requirements, reporting requirements, acting on findings of ill health or problems

Handle animals

Reasons and techniques for handling - grooming, health checking, transportation, sexing, administration of treatments, handle animals of different ages, sizes and temperaments

Legislation

Animal Welfare Act 2006 and Animal Health and Welfare Act (Scotland) 2006, Health and Safety Act 1974, Welfare of Animals (Transport) Order 2006, Control of Substances Hazardous to Health (COSHH) 2002, The Welfare of Animals at Market Order 1990 (as amended 1993), The Welfare of Farmed Animals Regulations 2000 (as amended 2003), The Veterinary Surgeons Act 1966 (as amended 1996), The Welfare of Animals Regulations (slaughter or killing) 1995 (England) (amended 2007), Horse Passports Regulations (England) 2004, Pet Travel Scheme (PETS)

Minimising stress and injury

Safe and correct handling techniques, handling and restraint equipment (as appropriate to the species) pet carriers, collars, halters, headcollars, bridles, leads, muzzles, crates, catchpole, cattle crush, chases/runs, gates, tethers, snake hooks, snake bags, gloves and bird bag

Unit 301 Understand and Promote Animal Health

Outcome 2 Understand common disease and disorders, their treatment and prevention

Assessment Criteria

The learner can:

1. Examine the **role of pathogenic organisms** in animal disease and the **immune system**
2. Explain **common diseases and disorders** in animals and their impact on health and welfare including **notifiable** and **zoonotic**
3. Explain the reasons and methods of **preventative care** and treatment measures used for animals

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit Content

Role of pathogenic organisms and the immune system

Bacteria, viruses, fungi, prions, protozoa, ecto and endo parasites, the methods of disease transmission, infection, the immune response, immunity (passive, natural, active and artificial)

Common diseases and disorders

Principle causes (bacterial, viral, fungal and parasitic) routes of transmission – and signs of commonly found diseases and disorders in the range of species

Notifiable diseases

A notifiable disease is a disease named in section 88 of the Animal Health Act 1981 or an Order made under that Act. Section 15(1) of the Act – cover diseases appropriate to animals from the range

Zoonotic diseases

Diseases and infections which are naturally transmitted between vertebrate animals and man – cover diseases appropriate to animals from the range

Preventative care

Vaccinations, endo-parasite prevention, ecto-parasite prevention, care of teeth, claws/hooves and coat, use of prophylactics, isolation and quarantine

Unit 301 Understand and Promote Animal Health

Outcome 3 Be able to promote and maintain the health and wellbeing of animals

Assessment Criteria

The learner can:

1. Develop **plans** to promote and maintain animal health and wellbeing throughout the year
2. Implement measures to **promote** and maintain **the health and wellbeing of animals**
3. **Monitor and report** on animal health and wellbeing

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Plans

Animal health management plans are to record individual details, day/time, and include the following assessments: behavioural, physical and clinical with records on diet and faeces, breeding and weight. Weekly, yearly and seasonal plans with recorded measures taken to maintain and promote health

Promote the health and wellbeing of animals

Five animal needs, animal health care routines with minimum guidelines as set out by Department for Environment, Food and Rural Affairs (Defra) (England), Welsh Assembly Government (Wales), Scottish Executive Environment and Rural Affairs Department (SEERAD) (Scotland), or Department of Agriculture and Rural Affairs (DARD) (Northern Ireland), or individual animal advisory bodies

Monitor and report

Monitor animal health and management plans, record keeping, and reporting procedures for disease control

Unit 301 Understand and Promote Animal Health

Outcome 4 Know how to deliver and record basic animal treatments

Assessment Criteria

The learner can:

1. Describe how to deliver a range of **basic routine** and **non-routine animal treatments** safely in line with codes of practice and legislation
2. Describe the importance of **monitoring animals** after treatment
3. Describe the methods for monitoring animals and the **records** required

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Basic routine treatments

Endo parasite prevention, ecto parasite prevention, care of teeth, claws/hooves, routes of administration (topical, enteral, and parenteral). Frequency of treatment, timing, sourcing treatments e.g. where to purchase, assessing animal for adverse reactions, limitations of treatment (effectiveness) and limitations of person providing treatment (Vet Surgeons Act 1966 and Veterinary Medicines Regulations 2009)

Non-routine animal treatments

Accidents and injuries: Shock, Road Traffic Accident (RTA), hypothermia, hyperthermia, convulsions, fractures, eye and ear wounds, hoof, paw or claw wounds, choking, poisoning, abscesses, burns and scalds, bites and stings

Bandaging techniques, cleaning and dressing wounds, administering first aid and medication, sick nursing, consideration of working with an unpredictable animal and precautions to take

Monitoring animals

Observation of physical signs and behaviour, frequency of monitoring, expected recovery times/rates, knowing when to seek assistance from the vet or supervisor

Records

Veterinary records, feeding and water intake records, monitoring of clinical signs against expected recovery, frequency of defecation and urination

Unit 301 Understand and Promote Animal Health

Notes for guidance

This unit is designed to provide the learner with sound knowledge and skills required to promote and maintain health in animals. Depending upon which qualification this unit is delivered through, the context of teaching will differ. The unit should cover a range of species as appropriate to the area of study:

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Throughout the unit, the emphasis should be on safe working. It is expected that learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working. Emphasis needs to be placed on the duty of care of learners to the animals with which they are working, and at no time should any of the activities have a negative impact upon animal welfare, as far as is possible.

In Outcome 1, the learner will be required to recognise signs of both good and ill health in animals. It is accepted that this outcome will require some formal delivery but it should also be delivered in practical situations where learners are visually assessing animals for health and undertaking health checks. Learners should be encouraged to handle a range of animals, with the emphasis on safe working and dealing with animals in a way which reduces stress and minimises injury to the learner, animals and others.

Outcome 2 covers a wide range of diseases and disorders that affect animals. It is anticipated that the delivery of this unit will be through formal lectures, but it would be beneficial to include learning within the wider context of animal health. For example, reference and links to control of diseases within EU Government guidelines (e.g. Department for Environment, Food and Rural Affairs (Defra) (England), Welsh Assembly Government (Wales), Scottish Executive Environment and Rural Affairs Department (SEERAD) (Scotland), or Department of Agriculture and Rural Affairs (DARD) (Northern Ireland)) and internationally could be explored. Current and topical issues regarding animal health should be highlighted.

In Outcome 3, the learner will be required to develop plans to promote and maintain the wellbeing of animals. The emphasis should be on improving animal health and welfare underpinned by knowledge on disease prevention and control (bio security). Health plans should evolve throughout the year, identifying the current situation, health and welfare targets within given time frames and allow for reassessments over time. Reference should be made to wider national strategies for health planning and management.

In Outcome 4, the learner will be able to deliver and record basic treatments to animals. Candidates should be allowed the opportunity to cover different types of treatments, including routine, such as those for internal and external parasites and non-routine, such as dealing with accidents and injuries.

Learners working towards level 3 are likely to have experience of animal health and welfare. This unit aims to extend the learners knowledge and skills involved with ensuring the health and welfare of animals. Emphasis should be placed not only on 'doing', but also upon the importance of planning and strategies to promote health and welfare for animals nationally in accordance with government regulations and not only for those situations within their charge. It is important that the learner understands current legislation and Codes of Practice in relation to animal health and welfare.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that formal lectures will be necessary at level 3 but for this unit it is recommended that they are they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

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Unit 302 Manage Animal Accommodation

Level: 3

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of animal accommodation and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to plan and select suitable accommodation for animals. They will be able to prepare animal housing and maintain it in a suitable condition. The learner will evaluate animal accommodation, report the findings and make recommendations.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Know how to plan the accommodation of animals.
2. Be able to prepare and maintain accommodation for animals.
3. Be able to monitor and evaluate accommodation for animals

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU39.1 Plan the accommodation of animals

CU39.2 Monitor and evaluate accommodation of animals

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 302 Manage Animal Accommodation

Outcome 1 Know how to plan the accommodation of animals

Assessment Criteria

The learner can:

1. Identify **animal** requirements in accordance with animal **welfare requirements** and the five animal needs
2. Prepare **plans** for animal **accommodation**
3. Describe the **environmental factors** to consider, and animal requirements, when planning accommodation for animals

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Animal and welfare requirements

Space and size, stocking densities, social needs of animals, life stage of animals, opportunities for movement and exercise, purpose for which the animal is kept, minimising stress, provision of food and water, enrichment

Accommodation plans

Prepare plans for animal accommodation to include: location taking into account predator/prey contact, location of services such as electricity and water, weather elements such as wind direction, direct sunlight, rain, extremes of temperature, ease of access, waste disposal and security, design and construction, fixtures and fittings, costs

Environmental factors

Humidity, ventilation, pollution, prevailing weather, temperature, sunlight

Unit 302 Manage Animal Accommodation

Outcome 2 Be able to prepare and maintain accommodation for animals

Assessment Criteria

The learner can:

1. **Prepare** suitable accommodation for animals
2. **Maintain** suitable accommodation for animals

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Prepare

Prepare suitable accommodation, standard and alternative fixtures and fittings and bedding materials for the animals, purpose, lifestyle, life stage (young, geriatric, ill, pregnant or gravid, lactating, weaning) and number of animals to minimise stress and promote animal welfare, suitable for long or short term use, enrichment

Maintain

Safety and security checks: safety of the animal, self and others, prevent escape.
Regular checks for: security, insecure fittings, broken fixtures, protrusions, faulty or damaged electrical and lighting sources, damage due to damp, oxidisation, accident, and wear and tear.
Cleaning routines: complete clean, skip out, when animal accommodation should not be cleaned
Use of safe working practices throughout the cleaning process in line with Health and Safety recommendations e.g. Health and safety at Work Act 1974, The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995, Control of Substances Hazardous to Health (COSHH) 2002 and centre risk assessments

Unit 302 Manage Animal Accommodation

Outcome 3 Be able to monitor and evaluate accommodation for animals

Assessment Criteria

The learner can:

1. Carry out **monitoring** appropriate to the accommodation, and animals
2. **Evaluate** the suitability of accommodation for animals including construction materials, fixtures, fitting and bedding
3. **Report** findings from monitoring and make recommendations

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Monitoring

Monitor accommodation for safety and security, environmental factors, sex and mix of animals, cleanliness and suitability of accommodation, reporting and recording procedures, health and well being of animals e.g. animals are exhibiting normal behaviour, weight, signs of stress, stereotypical behaviour

Evaluate

Evaluate the accommodation for suitability of construction materials, fixtures, fittings and bedding according to the needs of the animals, and the results from monitoring the animal accommodation

Report

Report the findings from the evaluation of accommodation and make recommendations for improvements, reporting requirements, who to report to

Unit 302 Manage Animal Accommodation

Notes for guidance

This unit aims to extend the learners knowledge and skills involved with planning, preparing, maintaining, monitoring and evaluating animal accommodation.

The range of animals for this unit should be from:

Animal care – companion (dog or cat) and either small mammal (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Emphasis for this unit should be safe working practises and safe disposal of waste in line with government policies, legislation and good environmental practise.

In Outcome 1, the learner will be required to identify animal requirements and prepare accommodation plans for animals accordingly. The emphasis should be on safe and secure accommodation which meets the needs of the animals in line with animal welfare requirements and the five animal needs. The learner should be given the opportunity to access various types of animal accommodation in preparation for the development of plans.

In Outcome 2, the learner will be able to prepare and maintain animal accommodation. It is expected that this outcome would be delivered as mainly practical sessions to allow the learner to experience as many different types of animal accommodation and furnishings as appropriate. The learner should make regular checks on the accommodation for safety and security. Discussions on the different types of animal accommodation and furnishings would be useful to assist the learners in understanding the needs of the animals and associated welfare implications.

In Outcome 3, the learner will carry out monitoring and evaluation of animal accommodation with the emphasis on improving animal welfare. It is anticipated that the learner will have several opportunities to monitor and evaluate different types of accommodation. It is expected that this outcome will be delivered primarily during practical sessions with the underpinning knowledge being taught in a more formal setting.

Visits to other establishments will aid learners in formulating opinions on the different types and structures of animal accommodation, fixtures, fittings and bedding available for use throughout the industry.

Learners should understand current legislation and codes of practise in line with animal health and welfare. Animals reared and kept for food or used for draught and riding, deserve the same health and welfare considerations as those kept for pleasure, and animal welfare should not be compromised at any time during the delivery of this unit.

It is accepted that formal lectures will be necessary at level 3, however for this unit it is recommended that they are linked directly with interactive lessons in a real environment.

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www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
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Unit 303 Understand Animal Anatomy and Physiology

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal anatomy and physiology. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The aim of this unit is to develop the learner's knowledge and understanding of the structure and function of the main body systems in animals. The learner will also know about the reproductive processes and the role of hormones. Neural and hormonal control mechanisms will also be investigated. The learner will develop an understanding of how the body systems and structures of animals have adapted to meet the needs of different environments.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the structure and functions of biological systems in animals
2. Know animal reproductive processes
3. Understand the biological control mechanisms in animals
4. Understand how an animal's body structure and systems are adapted to its environment

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/A

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 303 Understand Animal Anatomy and Physiology

Outcome 1 Know the structure and functions of biological systems in animals

Assessment Criteria

The learner can:

1. Identify the **major body systems in animals**
2. Describe the **structure of the major organs in the animal body**
3. Describe the **functions** of the major organs in the animal body

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate

Major body systems in animals

Skeletal system: bones, muscles, joints, tendons, ligaments
Respiratory systems: lungs, gills, skin, spiracles and tracheae
Circulatory systems: open and closed, single and double, composition of blood (plasma, erythrocytes, leukocytes, platelets), structure of blood vessels
Lymphatic systems: glands and vessels
Digestive system: dentition, tissue layers of the intestinal wall (lumen, mucosa, submucosa, ducts and submucosal glands, lymph nodes, blood vessels, nerves, circular muscle layer, longitudinal muscle layer, serosa), absorption of nutrients and water.
Excretory system: excretion of ammonia, urea, uric acid.
Nervous system: neurones, Autonomic NS, Central NS, Peripheral NS, sympathetic and parasympathetic, afferent and efferent neurones, reflex arcs
Endocrine system: hypothalamus, thymus, pituitary, thyroid, parathyroid, pancreas, adrenal glands, ovaries, testes,
Reproductive system: male and female systems, oestrus cycle, puberty, gestation and parturition.

Structure and function of the major organs in the animal body

Brain (limited to gross anatomy, optic chiasm and location of hypothalamus and pituitary), lungs, heart, stomach, liver and kidneys

Unit 303 Understand Animal Anatomy and Physiology

Outcome 2 Know animal reproductive processes

Assessment Criteria

The learner can:

1. Describe the structure of the **male and female reproductive system**
2. Describe the functions of the **male and female reproductive system**
3. State the **role of hormones in the mammalian reproductive process**

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate

Unit content

Male reproductive system

Location and functions of: penis (erectile tissue, comparison of penis structure in range of species), urethra, epididymis, vas deferens, testis, spermatogenesis

Female reproductive system

Location and functions of: vagina, cervix, uterus, oviduct, ovary
Comparison of arrangement of female reproductive systems in the range of species Oogenesis and ovulation, stages of oestrous cycle, copulation, fertilisation, gestation, parturition

Role of hormones in the mammalian reproductive process

Oestrogen, progesterone, luteinising hormone, follicle stimulating hormone, oxytocin, testosterone

Unit 303 Understand Animal Anatomy and Physiology

Outcome 3 Understand the biological control mechanisms in animals

Assessment Criteria

The learner can:

1. Examine the **hormonal control mechanisms** in animals
2. Examine **neural control mechanisms** in animals

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate

Control mechanisms

Homeostasis, positive and negative feedback loops. Thermoregulation in ectotherms and endotherms

Hormonal

Hypothalamus, pituitary gland, thyroid, thymus, adrenal gland, pancreas, ovary, testes

Requirement of receptors on cell surface, circulating hormones versus locally acting hormones, glucoregulation (insulin and glucagon), osmoregulation (ADH and aldosterone), fight-or-flight response to adrenaline (epinephrine)

Neural

Central Nervous System (brain and spinal cord), Peripheral Nervous System, afferent (conscious and unconscious stimuli, e.g. senses, limb position) and motor (efferent) output: voluntary reactions and autonomic system (sympathetic and parasympathetic actions)

Unit 303 Understand Animal Anatomy and Physiology

Outcome 4 Understand how an animal's body structure and systems are adapted to its environment

Assessment Criteria

The learner can:

1. Explain how the body structure of selected animals are **adapted** to their **environments**
2. Explain how the body systems of selected animals are **adapted** to their **environments**

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate

Environmental adaptations

Natural selection and evolution of at least two animals in contrasting environments (e.g. arid, aquatic, cold, hot, high altitudes/flight), adaptation of the following as appropriate: coat and/or skin, sensory organs, limbs and skeleton, digestive system, respiratory system and excretory system (including efficiency), circulatory system, thermoregulation, reproductive system

Unit 303 Understand Animal Anatomy and Physiology

Notes for guidance

This unit is designed to provide the learner with knowledge of the anatomical and physiological systems in animals. Depending on which qualification the unit is delivered through, the context of teaching will differ. The unit should cover a range of species as appropriate to the area of study, with reference to other species where indicated in the specification for purposes of comparison.

Tutors have many opportunities to deliver the unit using a wide range of learning approaches including lectures, discussions, seminar presentations, supervised dissections and live animal handling. Where dissections are used this should be in the context of the centres ethical policies. Tutors should consider integrating the delivery and private study of this unit with other relevant units.

It is expected that learners will be familiar with safe working practices around potentially hazardous equipment, materials and animals. The learner should be taught how to recognise hazards and risks and should also be able to use information to manage potential risks to themselves and others as appropriate.

Outcome 1 covers the main body systems of animals. Delivery of this outcome should cover the structure and functions of the main systems, but tutors should bear in mind that specific systems are covered in further depth in Outcomes 2, 3 and 4 and so should plan delivery/lecture to avoid any unnecessary repetition or duplication. (Note some of the other systems are covered in some depth in the unit Understand the Principles of Animal Biology).

Outcomes 1 and 2 cover the major body systems and reproductive processes in animals. It is expected that learners will observe the organs, through photographs, preserved specimens, or practical dissections. Veterinary operations could also be observed where opportunities allow. All practical work should be supervised and adequate Personal Protective Equipment (PPE) must be used after production of suitable risk assessments. Guest speakers such as veterinarians, veterinary nurses and meat inspectors would contextualise the relevance of the subject for learners. The use of case studies, comparing healthy organs with diseased or injured counterparts, is recommended to help learners understand and relate the organs and systems of the functioning animal body.

Outcome 3 covers the control mechanisms that contribute to homeostasis in the animal body. Independent research leading to group presentations could follow initial tutor input and case studies could be used to illustrate what happens when these tightly regulated systems are compromised by disease or injury.

Outcome 4 will allow the learner to appreciate that the animal body has evolved from selective pressures in the natural environment. These environments should be experienced through the use of audio-visual materials such as Attenborough's 'Life of Mammals'. Learners could carry out independent research using the internet, books and journals, putting together a project comparing and contrasting animals from varying habitats, while visits to zoos or wildlife parks to see more exotic animals would help to illustrate the theory.

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Books

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Attenborough, D., 2003. Life of Mammals London: BBC.

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www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.bbc.co.uk/nature/class/Mammal	The BBC nature section focussed on mammals

Unit 304 Plan and Monitor Animal Feeding

Level: 3

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of animal feeding and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to describe the requirements for a balanced animal diet. The learner will be able to provide the appropriate food to animals and monitor and record the effects of feeding and watering animals. The learner will be able to understand the effects of different feeding and watering regimes for animals.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Be able to plan diets and feeding regimes for animals
2. Be able to monitor the feeding of animals
3. Understand the planning and monitoring of animal feeding regimes

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU35.1 Specify diets and feeding regimes
CU35.2 Monitor and evaluate the feeding of animals

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 304 Plan and Monitor Animal Feeding

Outcome 1 Be able to plan diets and feeding regimes for animals

Assessment Criteria

The learner can:

1. Identify animal **nutritional requirements**
2. Develop **feeding plans** for animals
3. Carry out activities to **feed and water animals**.

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Nutritional requirements

Carbohydrates, fats, proteins, vitamins, minerals, water, fibre

Balanced diet, correct mix of nutrients to meet needs of animal for a variety of purposes

Feeding plans

Plans should include ingredients, quantities and frequency of feeding, timing, records of whether the animal has eaten, supplementation, alternatives to the plan, availability, display of individual animal feeding requirements

Feed and water animals

Assess quality of food, provide appropriate quantities of fresh and dried or pre-prepared food at appropriate frequencies (depending on species and age), provision of fresh water, providing food as an enrichment activity

Unit 304 Plan and Monitor Animal Feeding

Outcome 2 Be able to monitor the feeding of animals

Assessment Criteria

The learner can:

1. **Monitor** the **effectiveness** of the animal feeding plan
2. **Record results** of monitoring animal feeding.

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Monitor effectiveness

Monitor the effectiveness of the feeding plan e.g. whether the animal remains the same weight/gains or loses weight, stays healthy, is showing normal activity/behaviour, teeth and/or coat condition, feeding behaviour, faeces consistency, frequency of defecation and urination

Record results

Record the results of monitoring feeding plans either in a table or log/record book, information to be recorded, who to report findings to

Unit 304 Plan and Monitor Animal Feeding

Outcome 3 Understand the planning and monitoring of animal feeding regimes

Assessment Criteria

The learner can:

1. Analyse the **factors influencing** the development of animal feeding plans
2. **Evaluate** the **effectiveness** of the feeding plan:
    - animal behaviour and condition
    - quantities of food eaten
    - cost of feeding against budget.

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Factors influencing

Species, age of animal, work level, health status, life stage, breeding status, public perception (e.g. carnivores eating other animals)

Evaluate effectiveness

Animal behaviour (is the animal behaving normally) and condition (is the animal gaining or losing weight, is it's coat in good condition), quantities of food eaten (exactly how much is the animal consuming), costs of feeding against budget (how much does it cost to feed the animal and is the cost reasonable for the species), comparison of cost effectiveness of different feeding types

Unit 304 Plan and Monitor Animal Feeding

Notes for guidance

This unit is designed to provide the learner with sound knowledge and practical skills to be able to provide the appropriate food to animals and monitor and record the effects of feeding and watering animals. The unit should cover a range of species as appropriate to the area of study:

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

It is expected that learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working. In particular, health and safety issues relating to food preparation and feeding must be stressed to learners and regularly enforced. A wide range of delivery techniques should be possible for this unit. Lectures, discussions, seminar presentations, internet and/or library-based research and practical and interactive lessons can all be employed.

In Outcome 1, the learner is required to identify the nutritional requirements (carbohydrates, protein, fat, minerals, vitamins, fibre and water) for species within the range, plan the diet or feeding regime, including ingredients, quantities and frequency of feeding for each animal and present food and water to animals from the range. The food presented should be of different types (fresh, dried, pre-prepared). This outcome is likely to be delivered by independent learner research, practical activities and theory, classroom-based sessions.

In Outcome 2, the learner will monitor the effectiveness of their feeding regime by observing the animals' behaviour and condition and weighing the animal(s) that have been fed and record the results in a table or log/record book. This outcome is likely to be delivered by discussion, observation and practical activities.

In Outcome 3, the learner will study the factors influencing the development of animal feeding plans (species, age, life stage, health and work level) and evaluate the effectiveness of the feeding plan by analysing the animal's behaviour and condition against the amount of food eaten and cost of feeding the animal. This outcome is likely to be delivered by some formal input, but will provide the opportunities for discussion, observation and practical activities as well as independent learner research. The learner may compare the cost and effectiveness of feeding a particular species in two contrasting ways (e.g. dried or fresh food).

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Learners must be given the opportunity to deal with a range of animals in different situations which reflect current industry practice.

References

Books

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Kelly, N., & Willis, J., 1996. *BSAVA Manual of Companion Animal Nutrition and Feeding* (BSAVA,) ISBN 090521434X

McDonald, P., Edwards, R., Greenhalgh J and Morgan C 2002 *Animal Nutrition, 6th Edition* (Prentice Hall,) ISBN 0582419069

McNamara, J., 2005. *Principles of Companion Animal Nutrition* (Prentice Hall, 2005) ISBN 0131512587
Pond, W., Pond, K., Schoknecht, P., & Church, D., 2005. *Basic Animal Nutrition and Feeding* (John Wiley and Sons) ISBN 0471658936

Journals

Fur and Feather

Websites

www.hillspet.co.uk Hills Science Diets
www.iams.co.uk IAMS/EUKANUBA
www.waltham.com Waltham Centre for pet Nutrition

Unit 305 Understand the Principles of Animal Biology

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal biology. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The aim of this unit is to develop the learner's knowledge and understanding of the structure and function of cells and tissues and their relationship with body systems. This will be developed through an understanding of the structure and function of skeletal systems and sensory organs and how these have been adapted to meet the needs of animals living in different environments.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the functions of the main animal cell organelles
2. Understand the structure and function of the main animal tissue types
3. Know the structure and function of animal skeletal systems
4. Know the structure and function of sensory organs in animals

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/A

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 305 Understand the Principles of Animal Biology

Outcome 1 Know the functions of the main animal cell organelles

Assessment Criteria

The learner can:

1. Identify **cell components**
2. Describe the **functions** of cell **organelles**
3. Identify the stages of **mitosis and meiosis**

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate

Unit Content

Cell components and organelle function

Identification of the following cell components by appearance: nucleus (nucleolus, nuclear envelope, chromatin), mitochondria, microfilaments, Golgi apparatus, rough endoplasmic reticulum, smooth endoplasmic reticulum, ribosomes, centrioles, plasma/cell membrane, cilia, lysosomes, vacuoles
The main contribution each organelle makes to cellular function

Mitosis and meiosis

Role of chromosomes in passing on genetic information, purpose of cell division via mitosis and meiosis, description of each of the following stages:
Mitosis: interphase, prophase, prometaphase, metaphase, anaphase, telophase, cytokinesis
Meiosis: prophase I, prometaphase I, metaphase I, anaphase I, telophase I, (cytokinesis may or may not occur), interphase II, prophase II, metaphase II, anaphase II, telophase II, cytokinesis

Unit 305 Understand the Principles of Animal Biology

Outcome 2 Understand the structure and function of the main animal tissue types

Assessment Criteria

The learner can:

1. Categorise different tissue types
2. Explain the structure of **the main tissue types**
3. Explain the function of **the main tissue types**

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate.

Unit content

The main tissue types

Epithelial tissue

Structure and functions of simple epithelial tissue (squamous, columnar, ciliated columnar, cuboidal, glandular, transitional) and stratified epithelial tissue (e.g. skin)

Connective tissue

Basic structure of connective tissue (cells secrete extracellular protein fibres to form a matrix)
Structure and functions of the following: dense (binding), regular and irregular, loose (fibrous), supporting, fluid

Nervous tissue

Basic neurone structure: cell body, axon, dendrites, dendron, terminal knobs; myelin sheath, Schwann cells and nodes of Ranvier, saltatory conduction of the action potential, structure of the synapse, difference in structure between sensory and motor neurones, monosynaptic and polysynaptic reflex arcs

Muscle tissue

Location, structure and function of the following muscle tissues: skeletal, cardiac, smooth sliding filament theory of muscle contraction, fast and slow muscle

Unit 305 Understand the Principles of Animal Biology

Outcome 3 Know the structure and function of animal skeletal systems

Assessment Criteria

The learner can:

1. Identify the **component parts of the animal skeletal system**
2. Describe the **functions of the animal skeletal system**
3. Describe **adaptations** of selected **skeletal** systems of animals living in different environments

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate

Unit content

Component parts of the animal skeletal system

Axial and appendicular skeleton, divisions of the vertebral column, the limb bones, carpals and tarsals, metacarpals and metatarsals; phalanges
Jaws and dentition in carnivores, omnivores and herbivores
Joint types: fibrous (fixed), cartilaginous (e.g. between vertebrae), synovial (ball and socket, pivot, hinge, gliding)
Function of synovial fluid and capsule
Tendons (bone to muscle) and ligaments (bone to bone), limited to allowing locomotion of the skeleton and stabilising joints

Functions of the animal skeletal system

Locomotion, protection of internal organs, support, storage of calcium and phosphorous, blood cell formation

Skeletal adaptations

Evolution of skeletal adaptations in vertebrates: aquatic mammals (cetaceans), flying mammals (bats), hopping mammals (rabbits), running (horses)

Unit 305 Understand the Principles of Animal Biology

Outcome 4 Know the structure and function of sensory organs in animals

Assessment Criteria

The learner can:

1. Identify the **sense organs** in animals
2. Describe the **structure of sense organs** in selected animals
3. Describe the **function of sense organs** in selected animals

Range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate.

Unit content

Sense organs

Eyes, ears, nose, mouth, special sensory organs (e.g. electroreceptors in fish, lateral line system), tactile organs (e.g. platypus beak, vibrissae)

Structure and function of sense organs

Link between stimuli and sense organs (e.g. light and sight). Importance of sensory perception for predators and prey, including echolocation

Structure of the eye and ear as follows:

Eye: Cornea, pupil, iris, ciliary body, lens, sclera, retina (rod and cone cells), choroid, fovea, optic disc, optic nerve, medial and lateral rectus muscles

Ear: External: auricle (pinna), tympanic membrane. Middle: malleus, incus, stapes, auditory ossicles. Inner: oval window, round window, cochlea, organ of Corti, cochlear nerve

Comparison of sensory organs, including typical eye position and structure of external ears, between predator and prey species (e.g. rabbit and dog)

Unit 305 Understand the Principles of Animal Biology

Notes for guidance

This unit is designed to equip the learner with sound knowledge of the basis of how the animal body functions under normal conditions. Depending on what qualification the unit is delivered through, the context of teaching will differ. The unit should cover a range of species as appropriate to the area of study, with reference to other species where indicated in the specification for comparison purposes. Species should be broadly mammalian but reference to other living organisms to be made where appropriate.

Tutors have many opportunities to deliver the unit using a wide range of learning approaches: lectures, discussions, seminar presentations, supervised dissections and live animal handling. Tutors should consider integrating the delivery and private study of this unit with other relevant units.

It is expected that learners will be familiar with safe working practice around potentially hazardous equipment, materials and animals. The learner should be taught how to recognise hazards and risks and should also be able to use information to manage potential risks to themselves and others as appropriate.

Outcome 1 is the basis of cell biology. Electron micrographs of cells should be used to illustrate cell organelle structure, while learners can appreciate the 3-D nature of a cell by constructing models from modelling clay. There are many animations and other useful resources available on the internet that may be used either for independent study or whole-group teaching (see reference materials). Relationships between cell types and the functions of the associated tissue should be emphasised e.g. ciliated cells lining the respiratory tract are able to work together in order to waft mucus containing foreign particles away from the respiratory surface.

Outcome 2 involves categorising and investigating the properties of different tissue types Light microscopy to look at prepared histological samples is recommended, as is practical dissection if possible. Scientific drawing of samples is useful practice and the results could form part of a poster constructed by the learner during independent study of the outcome.

Outcome 3 requires access to real or model skeletons for a full appreciation of how the skeleton works and learners will be able to comment on the advantages and disadvantages of the skeletal adaptations (including dentition) within the range of species, as well as applying the basic theory to other animals, including fossils of extinct animals. The use of timelines is recommended to illustrate the great lengths of time involved in the process of evolution. Case studies comparing normal function of skeletal components against those that are diseased or injured can be useful to highlight the importance of the skeletal system.

Outcome 4 examines the interaction of the animal with its environment and high quality audio-visual resources (such as Attenborough's 'Life of Mammals) allow the learner access to the diversity of sensory development in animals across the world. Assigning groups or individuals with projects, presentations and independent research are potential methods of gaining a large amount of information on interesting species, hence motivating and enthusing the learner. Species analysed should include some with unusual sensory receptors, such as fish and their lateral line systems, the bill of the duck-billed platypus and the vibrissae of the star-nosed mole. A comparison between predator and prey species should be emphasised at each stage. Theory sessions on the structure and function of the mammalian eye and ear would be enhanced by dissections of eyes if facilities allow and simple experiments (e.g. the blind spot, pupil shape in different animal species, hearing sensitivity experiments).

References

Books

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http://www.zoology.ubc.ca/~bio310/121T_files/06S_celldivision.htm
http://www.purchon.com/biology/animal.htm

Unit 306 Undertake Animal Handling and Safe Working

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal handling and safe working and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will gain an understanding of the health and safety implications of handling, restraining and moving animals. The learner will display how to handle and restrain a number of animals. The learner will also carry out practical animal grooming for different animals.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to handle and restrain animals
2. Be able to move animals
3. Be able to groom animals
4. Understand how to work safely with animals

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU44.1 Plan the transportation of animals
CU44.2 Monitor and evaluate the transportation of animals
CU115.1 Plan the handling and restraint of animals
CU115.2 Plan, supervise and control the movement of animals

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 306 Undertake Animal Handling and Safe Working

Outcome 1 Be able to handle and restrain animals

Assessment Criteria

The learner can:

1. **Plan for the handling and restraint** of animals.
2. Assess the range of **equipment** used to handle and restrain animals.
3. Carry out activities to **handle and restrain** animals in a way that complies with relevant legislation, minimises stress and injury

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Plan for handling and restraint

Identify animal to be handled, assess temperament, identify equipment to be used, assess if assistance is required, location, purpose for handling and restraint and welfare

Equipment

Equipment to use (leads, collars, graspers, nets, muzzles, hooks, crush cage, goads, noose, crook) (species specific, correct size), Personal Protective Equipment (PPE) required by handler (steel toe caps, overalls, gloves, hard hat)

Handle and restrain

Reasons to handle and restrain e.g. exercise, health checking, weighing, sexing, capture, veterinary treatment (bandaging, examination), and correct techniques for species

Unit 306 Undertake Animal Handling and Safe Working

Outcome 2 Be able to move animals

Assessment Criteria

The learner can:

1. Plan the movement of animals:
    a. **Movement** (from one cage/pen to another)
    b. **Transport** (from one location to another)
2. Assess the equipment required to move animals.
3. Move animals in line with **welfare codes and legislation**.

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Movement

Reasons for movement (change enclosure, move location, veterinary treatment, exercise, competitions, exhibitions), methods of movement (carry cases, pillow cases, livestock crates, polystyrene boxes), planning (equipment available, time of day for move, size of animal being moved, weight of animal being moved, health status of the animals(s), safety of the area, available persons, knowledge)

Transport

EU Regulation 1/2005 – The Welfare of Animals (Transport) Order 2006

Welfare codes and Legislation

Dangerous Wild Animals Act (1976), PETS Travel Scheme, Animal Welfare Act 2006, Universities Federation for Animal Welfare regulations

Unit 306 Undertake Animal Handling and Safe Working

Outcome 3 Be able to groom animals

Assessment Criteria

The learner can:

1. **Check** animal **health** prior to grooming
2. Carry out appropriate **grooming** for animals safely and correctly

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit Content

Health checking

Areas to check (eyes, ears, anus, mouth, body condition, movement, posture, coat condition, mucous membranes, weight), gaining history from owners (previous history, medical conditions, allergies)

Grooming

Equipment (brushes, combs, scissors), method of grooming (depending on species), reasons for grooming (maintenance of coat, showing, aesthetic, parasite treatment/prevention, to meet breed standards)

Unit 306 Undertake Animal Handling and Safe Working

Outcome 4 Understand how to work safely with animals

Assessment Criteria

The learner can:

1. Examine the key responsibilities of employers and employees under current **Health and Safety** legislation
2. Evaluate **hazards and risks** within the workplace
3. Recommend **measures** to **control** hazards and risks in an animal care unit

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit Content

Health and Safety

The Health and Safety at Work etc Act 1974, who it covers (employers, employees, general public), main aims, penalties, presentation of the act

Hazards and risks

Define hazard/risks, identifying hazards and risks (observation, inspection) potential outcomes of hazards and risks (injuries, legal action) carry out risk assessments

Control measures

Personal Protective Equipment (PPE), safety signs (fire exits/extinguishers, no smoking, wash hands, corrosive chemicals, hazardous waste, wet floors

Unit 306 Undertake Animal Handling and Safe Working

Notes for guidance

This unit has been designed to look at the handling and restraint of a number of different animals. The learners will need access to a sufficient number of animals to gain handling and restraint experience.

These can include:

Animal care – companion (dog or cat) and either small mammal (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Throughout the unit, the emphasis should be on safe working. It is expected that the learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working.

In Outcome 1, the learner is required to plan for the handling and restraint of a number of animals, covering a variety of species from the range specified. The equipment used for handling and restraint will be assessed, and each piece should be evaluated by the learner for safety, suitability and welfare issues. The learners will also be required to practically demonstrate how to handle and restrain animals for a variety of situations. The animals chosen should firstly be ones that the learner feels comfortable with and, in time, this should ideally be increased to ones they do not feel so confident with so as to use the transferable skills of handling and restraining animals.

Outcome 2 looks at the movement of animals. To begin with the learner will need to plan for the movement of animals, to include the equipment needed, the process of movement and transport, health and welfare issues for the animal, health and safety issues for the handler and any related legislation. The learners will be expected to demonstrate safe movement and transport of animals and use of movement equipment, although simulation may be required in some instances so as not to cause unnecessary stress to any animals.

In Outcome 3, the learner will be required to groom and health check animals. This can include a variety of species from the range, and learners should have some theory input into this before embarking on grooming small animals to ensure their own health and safety and that of the animal. At level three, it is expected that the learner can pick out equipment fit for use on animals and demonstrate how to use it independently.

Outcome 4 focuses on the health and safety implications of working with animals. The learners are required to look at the responsibilities of both the employers. Within the work place the learners are to identify and control potential risks and hazards and measures to control such risks/hazards need to be put forward.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

References

Books

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www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.rspca.org.uk	RSPCA
www.ufaw.org.uk	UFAW
http://www.hse.gov.uk/	Health and Safety Executive

Unit 307 Undertake and Review Work Related Experience in the Land-based Industries

Level: 3

Credit value: 10

Unit aim:

The aim of this unit is to give learners the skills needed to identify, participate in and review work experience in the environmental and land-based sector. The unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the opportunities in the environmental and land-based industries
2. Be able to prepare for a work-based experience in the environmental and land-based industry
3. Be able to undertake a work-based experience in the environmental and land-based industry
4. Be able to review a work-based experience in the environmental and land-based sector

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a.

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 307 Undertake and Review Work Related Experience in the Land-based Industries

Outcome 1 Understand the opportunities in the environmental and land-based industries

Assessment Criteria

The learner can:

1. Evaluate **career and progression opportunities** within an environmental and land-based industry

Unit content

Career and progression opportunities

Job roles relevant to the sector: managerial, supervisory, team worker, trainee, volunteer, common job titles within the relevant sector, main duties and responsibilities

Skills needed to fulfil duties and responsibilities of appropriate jobs: job specific, vocational and personal

Progression pathways from trainee or team worker positions to supervisory and management posts. Skills, qualifications and experience required to achieve career progression

Evaluate career and progression opportunities: advantages and disadvantages of identified pathways, suitability to personal interests, skills and qualifications, role of work experience in preparing for a selected career

Unit 307 Undertake and Review Work Related Experience in the Land-based Industries

Outcome 2 Be able to prepare for a work-based experience in the environmental and land-based industry

Assessment Criteria

The learner can:

1. **Select** an appropriate work-based experience and complete the **application process**
2. Demonstrate **interview skills** as an interviewee
3. Prepare for a work-based experience, identifying **targets, aims and objectives**

Unit content

Select

Suitable work experience position based on existing skills, experience, qualifications, development of skills and experience to achieve future employment goals

Application process

Finding suitable job opportunities from e.g. trade magazines, websites, employer approaches to the centre, completion of an application form, curriculum vitae and letter of application

Interview skills

Interview preparation: Research the business and job role, suitable dress and personal presentation, information to find out and suitable questions to ask. Interview performance: attend punctually and dressed appropriately, answering questions, completion of other tests (e.g. practical, aptitude), and reflection on interview performance

Targets, aims and objectives

Aims: overall impact of work experience on skills, experience, future employability, targets / objectives, specific development of workplace skills and knowledge (e.g. technical, vocational, business, team working, communication and employability)

Unit 307 Undertake and Review Work Related Experience in the Land-based Industries

Outcome 3 Be able to undertake a work-based experience in the environmental and land-based industry

Assessment Criteria

The learner can:

1. **Undertake** a selected appropriate work-based experience
2. Maintain a **record of activities and achievements** during a work-based experience.

Unit content

Undertake

Completion of 300 hours of appropriate work experience, attend punctually and reliably, work competently and in line with job role requirements, health and safety, security, confidentiality, effective working relationships with colleagues, supervisors and customers.

Record of activities and achievements

Job description for work role, main duties and responsibilities, regular daily working routine, diary of additional tasks, duties, learning experiences portfolio of work experience (e.g. photographs, witness statements, work experience provider's or assessor's reports, progress reviews)

Unit 307 Undertake and Review Work Experience in the Land-based Industries

Outcome 4 Be able to review a work- based experience in the environmental and land-based sector

Assessment Criteria

The learner can:

1. **Present evidence** of activities and achievements during a work-based experience
2. **Review** a work-based experience, identifying strengths and areas for improvement

Unit content

Present evidence

Name of work experience provider, nature of the organisation (type of business, products or services, customers), organisation structure chart, job description for work role, main duties and responsibilities, regular daily working routine, health, safety and welfare of employees, customers, animals, diary of additional tasks, duties, learning experiences, portfolio of work experience (e.g. photographs, witness statements, work experience provider's or assessor's reports and progress reviews)

Review

Business effectiveness: products and services, physical resources (e.g. buildings, machinery, equipment), business procedures, staff management and supervision, employees' skills and development, marketing and customer relations, personal workplace effectiveness: work speed, work quality, punctuality, attendance, reliability, dress and personal presentation, working relationships with peers, working relationships with supervisor, work experience aims, objectives and targets, impact of work experience on future career ambitions

Unit 307 Undertake and Review Work Experience in the Land-based Industries

Notes for guidance

Learners on vocational courses should have experience of the type of work that they hope to do, and of the expectations of potential future employers. Many Level 3 learners are likely to have already had experience of working in the land-based and environmental industries, so this unit seeks to provide new experience opportunities for these learners.

Ideally this unit should be undertaken in a real business environment relevant to the subject interest of the learner, but actual work experience may be gained by a number of routes, e.g. as part of an industrial placement whilst within the programme, whilst working on a planned daily or weekly basis on the centre's commercial and/or educational facilities, whilst undertaking voluntary work within the industry, as previous relevant and current work experience in the industry or as a member of a group of learners invited to carry out practical work on a suitable business.

Throughout the unit, the emphasis should be on safe working. It is expected that learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working.

Learners should complete the equivalent of 8 weeks (or 300 hours) work experience to achieve this unit. If work experience is in the industry, centres should be mindful of their responsibilities for ensuring that work placements have appropriate supervision, insurance and health and safety policies in place.

In Outcome 1, learners will explore the different job roles and responsibilities, and the job titles commonly associated with them in their specialist sector. This background understanding is likely to require some formal classroom teaching, and may be closely linked to material in the unit "Business Management". Learners should be encouraged to explore the range of employment opportunities and career paths within their specialist sector. It would be appropriate for employers to be invited to outline to learners their expectations in the workplace. Learners will then consider the skills and qualifications that are required for appropriate jobs for themselves and should be encouraged to think about skills and qualifications that they may need to acquire to achieve their employment and careers ambitions. Evaluation of career and progression opportunities should include advantages and disadvantages of at least 3 possible career pathways within their specialist sector. This should help them to identify suitable work experience.

Outcome 2 involves learners going through the process of applying for work experience. They will need to locate suitable job adverts or work experience opportunities, but can be supported by centres suggesting suitable placements. When applying for work experience learners should produce, as a minimum, a detailed curriculum vitae and letter of application using a computer. Learners may need to be given supported workshop time on computers to develop these documents. Before attending for a work experience interview it would be appropriate for learners to role play an interview and be given feedback on their interview technique. After attending for an interview they should reflect on their performance and how they could improve their effectiveness. Before commencing work experience they should set overall aims to be achieved during the period and SMART (specific, measurable, achievable, realistic, timescaled) targets or objectives for learning and improvement in relation to future career aims.

Outcome 3 requires that learners effectively complete their period of work experience, meeting the requirements of the workplace appropriate for their position. It would be advisable for their progress to be reviewed at least once during the period and they should have access to tutor support in case of difficulties arising. During their work placement learners must produce the details of their job role and working routine, maintain a diary at least weekly and collate other relevant information on their work placement, performance

and achievements. It would be appropriate for tutors to complete a report in consultation with the work experience provider mid-way and at the end of the placement.

In Outcome 4, learners will use evidence from outcome 3 to present a report, oral and/or written, on their work experience business, job role, learning and achievements. They will then review the effectiveness of the workplace, making realistic and justified suggestions for improvement. Review of their own workplace performance and achievements should include all of the content identified, with reference to relevant evidence, e.g. reports, progress reviews, and the extent to which their aims, objectives/targets have been achieved. Learners should consider further training and experience that will help them to achieve their career ambitions.

Unit 308 Undertake an Investigative Project in the Land-based Sector

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of undertaking an investigative project and how this can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop project knowledge and skills by investigating a chosen topic area through a project. They will explore topic areas that interest them and select one topic for their investigative project. They will plan and carry out their investigative project working to meet deadlines and monitoring performance. The learner will prepare an evaluative report looking at how the project performed, if the schedule plan met the project aims and objectives and how improvements could be made in the future.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to identify and research a suitable topic for an investigative project in the environmental and land-based sector
2. Be able to plan for an investigative project in the environmental and land-based sector
3. Be able to carry out an investigative project in the environmental and land-based sector
4. Be able to report on an investigative project in the environmental and land-based sector

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 308 Undertake an Investigative Project in the Land-based Sector

Outcome 1 Be able to identify and research a suitable topic for an investigative project in the environmental and land-based sector

Assessment Criteria

The learner can:

1. List **information sources** relevant to the topic to be researched
2. Carry out **research** into potential topics
3. **Select and describe** a relevant investigative project topic in the environmental and land-based sector
4. **Prepare a proposal** for an investigative project

Range

The topics for the investigative project should reflect both learner interest and the qualification undertaken

Unit content

Information sources

For example textbooks, journals, magazines, internet, trade literature, television and radio, subject experts, validity and reliability

Research

Methods appropriate to the project, e.g. literature review, trials, experiments, practical activities, questionnaires, interviews, surveys

Select and describe

Suitable project topic (e.g. trial or experiment, investigation of an issue important to the sector, preparation of a plan, production of a structure or artefact, training programme, preparation for and participation in a competition, improving a process, investigation of a new product or service). Justify the selection of the project topic in relation to e.g. programme of study, interests and experience, future employment ambitions, comparison with alternative topics

Prepare a proposal

Title, aims/objectives, methodology, information sources, resources (e.g. people, computers, materials, etc. required for completion of the project), justification of proposed project

Unit 308 Undertake an Investigative Project in the Land-based Sector

Outcome 2 Be able to plan for an investigative project in the environmental and land-based sector

Assessment Criteria

The learner can:

1. **Plan operations and resources** required to carry out a selected investigative project in the environmental and land-based sector
2. Explain the **reasons** for resources selected

Range

The topics for the investigative project should reflect both learner interest and the qualification undertaken

Unit content

Plan operations

Project planning techniques (e.g. critical path analysis, Gantt charts), sequencing of activities, working to deadlines, allowing for other commitments, project action plan: aims, objectives, specific operations / tasks, start and completion dates, time required, resources required, possible disruptions to plan (e.g. illness, other commitments, resource problems, IT problems, research problems, lack of cooperation, cost), contingencies and remedial actions

Resources

People, time, buildings, equipment, animals, materials, literature and media (internet, trade magazine), IT applications and budget

Reasons

Suitability, availability and cost

Unit 308 Undertake an Investigative Project in the Land-based Sector

Outcome 3 Be able to carry out an investigative project in the environmental and land-based sector

Assessment Criteria

The learner can:

1. **Carry out a selected investigative project** in the environmental and land-based sector
2. **Monitor progress**, working to **deadlines**
3. Discuss the **health and safety implications** of the investigative project

Range

The topics for the investigative project should reflect both learner interest and the qualification undertaken

Unit content

Carry out a selected investigative project

Suitable project as proposed in outcome 1(trial or experiment, investigation of an issue important to the sector, preparation of a plan, production of a structure or artefact, training programme, preparation for and participation in a competition, improving a process, investigation of a new product or service). Implementation (set up, start), operations (tasks, duties), evidence of actions e.g. literature review, artefacts, plans, presentations, witness statements, photographs or videos

Monitor progress

Diary or log of actions, monitoring of performance against schedule plan e.g. daily, weekly, monthly progress, budget, other appropriate measures for each resource or task, reasons and remedial actions if falling behind schedule

Deadlines

Interim, key mileposts, final, all to be reviewed at regular intervals by tutor

Health and safety implications

Health and safety, risk assessment, Personal Protective Equipment (PPE), relevant regulations and legislation, animal welfare, codes of practice

Unit 308 Undertake an Investigative Project in the Land-based Sector

Outcome 4 Be able to report on an investigative project in the environmental and land-based sector

Assessment Criteria

The learner can:

1. **Report** on a selected investigative project in the environmental and land-based sector
2. **Evaluate achievements and areas for improvement** of a selected investigative project

Range

The topics for the investigative project should reflect both learner interest and the qualification undertaken.

Unit content

Report

Report on the project selected and completed in outcomes 1-3. Written report format, oral report presentation, title, aims/objectives, review of existing literature/information, methodology, results/findings (with appropriate evidence, e.g. charts and graphs, diagrams, photographs), conclusions, Harvard referencing

Evaluate achievements

Conduct and management of the project, action plan, keeping to deadlines, problems and remedial actions, project results/findings, strengths and weaknesses

Areas for improvement

Planning, implementation, methodology, results/findings, report, topics for further investigation

Unit 308 Undertake an Investigative Project in the Land-based Sector

Notes for guidance

This unit is designed to encourage and develop independent research skills in learners provides valuable skills development for all level 3 learners and especially those looking to progress onto Higher Education. The concept of the project is applicable across all of the vocational areas in the environmental and land-based sector, and learners should be guided and encouraged to select a project topic that is particularly relevant to their interests. This could integrate with other units in their programme of study. The emphasis of the unit should be on project management and working to deadlines, as well as producing a meaningful investigative project. Much of the work will be carried out independently by learners but they must have access to appropriate tutor guidance and support.

In Outcome 1, learners will need to identify a suitable topic for their investigative project. This should be relevant to their programme of study and have a particular interest for them, for example in relation to a special area of interest, experience or future employment of study ambitions. Ideal project topics could have a practical or theoretical focus, but all projects should include potential for research into existing literature and information sources as well as a practical investigation or application, so should be chosen in agreement with the tutor. Learners are likely to need guidance on suitable project topics and tutor support to ensure that selected topics are achievable in the timescale and with the resources available. The proposal should outline the aims and objectives, information sources, resource requirements, and the methodology by which the learner intends to complete the project, as well as their justification for topic selection. If appropriate to the investigation, a hypothesis should be included as part of the methodology.

In Outcome 2, learners will need to complete a detailed action plan for completion of the investigative project within the set timescale. This should include, as a minimum:

- a detailed breakdown of all actions from starting the project up to submission of the completed project report
- resources required at each stage (and reasons for their selection)
- time expected for completion and interim target completion dates.

They should also consider possible setbacks to their planned schedule and contingency plans to ensure timely completion of the project. Learners are likely to require guidance on project planning techniques and how to compile an appropriately detailed action plan. They could be provided with a suitable template.

In Outcome 3, learners will conduct and complete their investigative project, collecting supporting evidence as appropriate, for example literature review, artefacts, witness statements, photographs or videos, etc. Whilst doing this, they should maintain a log or diary of all actions, and regularly monitor their progress against their action plan. It would be appropriate for tutors to conduct progress reviews at key stages of the project. As part of conducting the project, learners should discuss any health and safety implications of their work to humans and, if appropriate, animals, and identify any relevant legislation or codes of practice. Risk assessments may contribute to evidence of this.

In Outcome 4, learners will produce a summary report of their project and the process of its completion. This should cover, as a minimum:

- title
- aims / objectives
- review of existing literature / information
- methodology
- results / findings

- conclusions
- references

All referencing should comply with academic conventions, and learners should be given appropriate guidance on this.

The project evaluation should consider the strengths and weaknesses of the finished project and the process of its completion, the usefulness and importance of project planning, and ways in which the project could have been improved.

Some parts of the project report could be presented orally rather than in written report format.

References

Books

Applegarth, M. 1998. *The Project Management Pocketbook*. Alresford: Management Pocketbooks.

Nokes, S., Kelly, S. 2007. *The Definitive Guide to Project Management: The Fast Track to Getting the Job Done on Time and on Budget.* 2nd ed. Harlow: Financial Times Prentice Hall.

Portney, S.E. 2001. *Project Management for Dummies*. Sussex: Wiley Publishing.

Unit 309 Business Management in the Land-based Sector

Level: 3

Credit value: 10

Unit aim

The learner will look at the business, the role and responsibilities of those employed in land-based businesses and resource requirements. They will develop their skills in business operations and produce a business plan.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the breadth and importance of an industry in the environmental and land-based sector
2. Understand business resources and structures
3. Understand the business marketplace
4. Understand how to use financial and physical record keeping systems

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 309 Business Management in the Land-based Sector

Outcome 1 Know the breadth and importance of an industry in the environmental and land-based sector

Assessment Criteria

The learner can:

1. Describe the **importance** of businesses within the industry **to the economy**
2. Outline the range of **associated businesses** allied to the industry

Unit content

Importance to the economy

Using measures available to the industry, e.g. value of output, contribution to Gross Domestic Product (GDP), employment, land use, economic and social benefits, trends in importance

Range of organisations: typical types of businesses and other organisations (e.g. representative, regulatory, not-for-profit) within the sector, regional variations, changes and developments in the last 50 years

Associated businesses

Relevant industries in primary, secondary and tertiary industrial sectors (e.g. suppliers of raw materials, processors, distributors, retailers, service providers)

Associated organisations: specific interrelationships between one business and other associated organisations e.g. suppliers of goods and services, representative organisations and professional bodies, regulatory bodies, competitors, customers, aims and roles of important organisations in the sector

Unit 309 Business Management in the Land-based Sector

Outcome 2 Understand business resources and structures

Assessment Criteria

The learner can:

1. Explain the **legal structure and organisation** of a land-based business
2. Explain the **physical resource requirements** of a selected land-based business
3. Describe different **job roles and responsibilities** in a selected land-based business

Unit content

Legal structure and organisation

Features of the main business types, e.g. sole trader, partnership, limited company, not-for-profit organization, charity, public sector organisations, organization staffing structure

Physical resource requirements

Property (forms of tenure, appraisal of business potential), vehicles and machinery, tools and equipment, stocks (stock control procedures), insurance of physical resources

Job roles and responsibilities

Job roles relevant to the sector, e.g. director, manager, supervisor, team worker, trainee, administrator, volunteer, sub contractor, job title, job description, responsibilities for financial, physical and human resources, staff motivation and performance management, person specification (typical skills, qualifications and experience required to fulfil the role), legal rights and responsibilities in work (e.g. pay, working hours, holidays, equal opportunities, health and safety, employment protection), relevant employment legislation

Unit 309 Business Management in the Land-based Sector

Outcome 3 Understand the business marketplace

Assessment Criteria

The learner can:

1. Describe the **marketplace, customers and competitors** for a land-based business
2. Explain features of an efficient **supply chain** in a land-based context
3. Review **quality management** systems and practices within a land-based business

Unit content

Marketplace, customers and competitors

Size of market (e.g. value of sales, number of customers), external influences on the market (political, economic, socio-cultural, technological), customer base (number, type, characteristics, market segments), direct and indirect competitors, competitor analysis, market share

Supply chain

Suppliers, distributors, customers, choosing suppliers, ensuring supplies of inputs, supply chain assurance (e.g. environmental, animal welfare)

Quality management

Important aspects of quality in the sector, formal quality standards or approval (e.g. Farm Assured, ISO 9000, BHS approval), informal systems and practices to achieve quality, problems arising if quality is not achieved

Unit 309 Business Management in the Land-based Sector

Outcome 4 Understand how to use financial and physical record keeping systems

Assessment Criteria

The learner can:

1. Review **financial records** for a selected land-based business
2. Examine **physical records** for a selected land-based business
3. Examine the use of financial and physical records in **monitoring business performance and progress**

Unit content

Financial records

Importance of keeping accurate records (legal requirements and management efficiency), purchasing and ordering procedures, order forms and orders, deliveries and receipts, invoices and sales records, credit control, payment methods, bookkeeping (cash analysis, petty cash, cash flow, budgets, computer accounts programmes), basic accounts (trading account, balance sheet, depreciation), taxation (VAT, income tax PAYE, national insurance contributions, corporation tax), wage calculation

Physical records

Records appropriate to the industry relating to e.g. production, inputs, staffing, customers, resource use, data protection, legal requirements to keep records, e.g. pesticide use, veterinary medicines, transport, animal movement, passports

Monitor business performance and progress

Use of financial and physical records to monitor business performance, e.g. production levels, costs of production, financial efficiency, monitoring against targets, budgets, previous periods, relevant review periods (e.g. weekly, monthly, annually), appropriate remedial actions, staff roles in recording and analysing information

Unit 309 Business Management in the Land-based Sector

Notes for guidance

This unit is designed to provide the learner with an understanding of the business aspects of their industry. It is applicable to all sectors of the environment and land-based sector and learners focus their study on the sector most relevant to their vocational interests.

In Outcome 1 they will investigate the size, scope and importance of their specialist sector within the environment and land-based industries, and how this has developed over the last 50 years or so. For some sectors this type of information is more readily available than other (e.g. agriculture), so learners should be supported in accessing whatever information is available relevant to their sector. They will also investigate the range of business types and other organisations that are represented in their sector, including important regulatory, professional or representative organisations. Wherever possible this should be related to specific businesses and organisations. This outcome is likely to require formal teaching, which should be supported by relevant information on businesses and organisations within the sector, and could include speakers representing these. Independent study and investigation should also be encouraged.

Outcome 2 focuses on the legal and resource implications of constituting a business. They will learn about the range of business organisations in the private and public sectors, and the legal and practical implications of different business types. This should be related to the types of business important in their sector. Learners will investigate the physical resource requirements of businesses, and how they are managed. It would be appropriate for learners to undertake a case study on a business premises in their sector and appraise its strengths and weaknesses for a given business use. The understanding that learners will gain on job roles and responsibilities has links with the requirements for Work Experience, and employers could be invited to explain their expectations in the workplace. The learners' investigations should focus on job roles within their specialist sector.

In Outcome 3 learners will analyse the market for a specific land-based business. This could involve a case study project and should identify, for that business, information on the content listed. External influences should be relevant and current to that business. Specific competitors should be identified and analysed to identify strengths and weaknesses to the case study business. When investigating the supply chain learners will need to identify the flow of resources from production of raw materials, through relevant manufacture and processing, to end consumers. Quality management will include reference to any formal standards or approvals that are relevant. It should also consider the quality standards required by the industry, any systems and practices that are used to achieve quality, and implications of failing to meet prescribed or assumed levels of quality. This should be related to specific businesses and teaching could again be supported by relevant visiting speakers from industry.

Outcome 4 focuses on the range of financial and physical records that are required to meet legal requirements as well as to ensure effective business operation. Learners will need to be able to complete simple examples of the range of financial records listed. They should be aware of paper-based and computerised systems for financial records but are not expected to become competent in the use of IT accounts software. The range of physical records investigated should be related to the needs of the learners' specialist sector, and should include important current examples of legally required records. This content could link with other specialist vocational units. In addition to completing a range of records, learners will investigate how specific examples can be used to aid decision making, monitor and control business performance.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that formal lectures will be necessary at level 3 but for this unit it is recommended that they are they are linked directly with interactive lessons in a real environment.

References

Books

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Unit 310 Understand and Interpret Animal Behaviour and Communication

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal behaviour and communication. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The aim of this unit is to provide the learner with the knowledge and skills to understand the principles of animal behaviour and communication. The learner will develop skills to interpret animal behaviour and understand the factors which influence such behaviour.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand behaviour patterns in animals
2. Be able to interpret animal behaviour
3. Understand the factors influencing behaviour
4. Understand animal communication

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

AC14.2 Provide information to individuals and groups on the reasons for, and meaning of, animal behaviour

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 310 Understand and Interpret Animal Behaviour and Communication

Outcome 1 Understand behaviour patterns in animals

Assessment Criteria

The learner can:

1. **Analyse** whether an animal is **behaving** normally or abnormally
2. Explain the possible **causes of abnormal behaviour** in animals
3. **Compare** the behaviour of a wild animal with its captive or domestic counterpart

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Analysis of behaviour

Observation of animals to identify normal behaviours (foraging, hunting, sleeping, social contact, grooming, courtship, territorial) and abnormal behaviours (hyperactivity, excessive inactivity, stereotypic behaviours, hyper-aggression)

Causes of abnormal behaviour

Causes of abnormal behaviours listed relevant species (e.g. confinement, impoverished environment)

Comparisons

Comparison of a range of behaviours exhibited by a species in the wild and its domestic or captive counterpart (e.g. wolf compared to domestic dog, wild wolf compared to a wolf in a zoo, wild cat compared to domestic cat)

Unit 310 Understand and Interpret Animal Behaviour and Communication

Outcome 2 Be able to interpret animal behaviour

Assessment Criteria

The learner can:

1. Identify visual **signs** that animal species would show for the following behaviours:
    - dominance
    - submission
    - fear
    - aggression
    - stress
2. **Monitor** behaviour in animals:
    - learned
    - instinctive
3. **Record** behaviour in animals:
    - learned
    - instinctive

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit Content

Signs

Visual signs of the following behaviours: dominance, submission, fear, aggression, stress

Monitoring

Observe one species of animal for a set period of time and note its behaviours. State whether the behaviours seen are instinctive (e.g. feeding) or learned (e.g. associating humans with food). No interaction with the animal should take place and animal welfare guidelines should be followed. Reasons for particular behaviour being seen

Recording

Record the behaviour observed using an ethogram, data sheets, graphs, photographs and diagrams. Choose to record either the frequency or duration of instinctive and learned behaviour

Unit 310 Understand and Interpret Animal Behaviour and Communication

Outcome 3 Understand the factors influencing behaviour

Assessment Criteria

The learner can:

1. Explain the **evolutionary development** of behaviour
2. Discuss how **internal and external factors** can influence behaviour

Range

Animal care – companion (dog or cat) and either small mammal (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit Content

Evolutionary development

How species-specific behaviour has evolved e.g. link between environment and behaviour (adaptation, competition for resources), heredity of behaviour, differences between development and evolution, Darwinian Theory

Internal and external factors

Internal stimuli (e.g. body homeostasis, fixed action patterns, effects of castration and spaying on animal behaviour) and external stimuli (e.g. other animals, seasons, food availability, daylight, weather, natural and operant conditioning) influence behaviour

Unit 310 Understand and Interpret Animal Behaviour and Communication

Outcome 4 Understand animal communication

Assessment Criteria

The learner can:

1. Discuss how the **senses** are involved in animal communication
2. **Compare bonding and imprinting** in animals
3. Explain how **effective communication** can reduce conflict between animals

Range

Animal care – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit Content

Senses

Senses used in communication: vision, hearing, smell, pheromones, taste, touch, body language, vocal/auditory, olfactory communication and methods, evolution of senses of species to allow for effective communication

Compare bonding and imprinting

Difference and similarities between bonding (mammals) and imprinting (birds) and how each mechanism helps survival, species with strong bonding and imprinting, social hierarchy, effects of bonding and imprinting on wild and domesticated species.

Effective communication

Communication methods used by animals to reduce conflict (e.g. facial expression, posture and vocalisations), inter and intra-species communication, sender and receiver, theories of Lorenz and von Frisch regarding evolution of communication, functions of communication e.g. contests and aggression, courtship, alarm calls, territory marking, feeding, predator/prey communication

Unit 310 Understand and Interpret Animal Behaviour and Communication

Notes for guidance

This unit is designed to help the learner to develop their understanding of the behaviour of animal species. They will appreciate how species-specific behaviour evolves and how to distinguish between normal and abnormal behaviours in animals. Learners will explore innate and learned behaviour patterns and the factors which influence such patterns.

Throughout the unit, the emphasis should be on safe working practices and follow animal welfare guidelines.

Outcome 1 requires learners to recognise and distinguish between normal and abnormal behaviour in animals. The underlying causes of abnormal behaviour will also be investigated. It is expected that some formal lectures will be required prior to the learner undertaking observations of any animal. Learners will also investigate the difference between the behaviour of an animal in the wild and its domestic or captive counterpart.

Outcome 2 involves learners observing the visual signs of the range of behaviours listed in the unit content. Delivery is likely to include formal lectures and relevant video footage of behaviour in a range of animals relevant to the course.

For Outcome 3 learners must investigate how species-specific behaviour has evolved. Again some formal lectures will aid delivery but learners should be encouraged to research the topic using relevant books.

Outcome 4 examines communication in animals. The learner will investigate how the senses listed in the unit content are involved in communication and how effective communication can reduce conflict between animals. The differences and similarities between bonding and imprinting and the importance of such mechanisms to survival will also be investigated.

It is expected that learners working towards level 3 will have some previous awareness of animal behaviour. This unit aims to enhance such knowledge. Where direct observation of animals is not possible, then video footage can be used.

Any direct observations of animals must follow health and safety and animal welfare guidelines.

References

Books

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Manning, A and Dawkins, M., 1998 *An Introduction to Animal Behaviour* . Cambridge University Press. ISBN 0521578914

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Animal behaviour
Applied animal behavioural science
Your Cat magazine
Your Dog magazine

Websites

www.apbc.org.uk	Association of Pet Behaviour Counsellors
www.apdt.co.uk	Association of Pet Dog Trainers
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.thekennelclub.org.uk	The Kennel Club
www.catsprotection.org.uk	Cats Protection

Unit 311 Understand the Principles of Animal Nursing

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal nursing and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The aim of this unit is to provide the learner with the knowledge and skills to carry out routine patient care and follow procedures within veterinary practice. The learner will also gain knowledge of relevant legislation and be able to advise practice clients regarding the use of dispensed medications.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to care for an in-patient
2. Understand veterinary practice procedures and equipment
3. Understand veterinary practice design and layout
4. Understand the principles of client care in veterinary practice

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 311 Understand the Principles of Animal Nursing

Outcome 1 Be able to care for an in-patient

Assessment Criteria

The learner can:

1. Carry out general **health checks** on an in-patient
2. Carry out in-patient **monitoring** techniques
3. **Handle and restrain** animals for veterinary procedures in a way that complies with relevant legislation, **minimises stress** and injury

Range

Dogs, cats, rabbits, guinea-pigs, exotics and rodents

Unit content

Health checks

Routine health checks (eating, drinking, movement, checking urine and faeces)

Monitoring

Observations of an in-patient with regard to health check criteria, expected reactions to medication, adverse reactions, signs of deterioration, what to do, who to report it to

Handling and restraint

Picking up, holding and restraining an animal for veterinary examination (checking ears, eyes and teeth) and/or basic procedure (e.g. worming, flea treatment and vaccination), correct equipment should be used as required for handling and restraint

Minimising stress

Observations should not involve handling the animal. Any handling required should follow health and safety and animal welfare guidelines. Simulations can be used for any procedures

Unit 311 Understand the Principles of Animal Nursing

Outcome 2 Understand veterinary practice procedures and equipment

Assessment Criteria

The learner can:

1. Evaluate the use of specific **equipment** for veterinary practice procedures
2. Explain the roles of **staff** in veterinary practice
3. Explain current relevant **legislation** for veterinary practices

Range

Dogs, cats, rabbits, guinea-pigs, exotics and rodents

Unit content

Equipment

Suitability and efficacy of specific equipment for veterinary procedures (e.g. pulse oxymeter, stethoscope, digital thermometer, drip-rate monitor and heart-rate monitor)

Staff

Job roles of practice members, receptionist, trainee nurse, qualified nurse, veterinary surgeon and practice manager

Legislation

Details of laws relating to veterinary practice:

Health and Safety at Work Act etc 1974, Control of Substances Hazardous to Health Regulations 2002 (COSHH), The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR), Veterinary Surgeons Act 1986 (in particular schedule 3), Animal Welfare Act 2006

Unit 311 Understand the Principles of Animal Nursing

Outcome 3 Understand veterinary practice design and layout

Assessment Criteria

The learner can:

1. **Design** a veterinary practice to include health and safety factors
2. Evaluate the **features** of veterinary practice design and layout with regard to patient care and recovery
3. Discuss any impact of veterinary practices on the **environment**

Range

Dogs, cats, rabbits, guinea-pigs, exotics and rodents

Unit content

Design and features

Location, car parking, access (including disabled), size, dimensions (waiting room, reception, office, consultation rooms, prep rooms, operating theatres, kitchen, food prep room for animals, storage (veterinary, data and equipment), staff areas, toilets, staff accommodation, animal accommodation, quiet room, access of the practice to facilities (water and electricity), fire exits, communications systems (telephone and internet)

Features: mix of species, accommodation size and positioning, ventilation, lighting, heating, noise, positioning of recovering animals, provision of bedding, litter trays, thoroughfare for recovering animals, storage of equipment (retraining and medication), sterile areas, room for large or bulky equipment

Environment

Use of inhalation gasses, disposal of waste (clinical, cadavers, special, hazardous, contaminated, general, medication), use of renewable energy, recycling, sustainable, recycling, increased human traffic, noise and smell

Unit 311 Understand the Principles of Animal Nursing

Outcome 4 Understand the principles of client care in veterinary practice

Assessment Criteria

The learner can:

1. Discuss the different **situations** which may occur between veterinary practice staff and clients
2. Evaluate how to **deal with different situations** involving veterinary practice clients and their pets

Range

Dogs, cats, rabbits, guinea-pigs, exotics and rodents

Unit content

Situations

The range of situations involving clients e.g. animal emergencies, euthanasia, animal escapes, complaints, advice and dispute over payment

Deal with different situations

Effective measures to deal with clients either face to face or on the telephone regarding a range of situations as listed above, diffusing the situation, making the client calm

Unit 311 Understand the Principles of Animal Nursing

Notes for guidance

This unit is valuable to those who are attracted to a career in animal nursing in a veterinary practice. It provides the learner with useful background knowledge regarding caring for in-patients and an understanding of procedures within veterinary practice. Learners will gain an appreciation of practice layout and design with regard to patient recovery and how to deal with a range of situations that can occur in practice. Outside speakers could enhance delivery, along with site visits to veterinary practices and hospitals.

Outcome 1 requires learners to monitor in-patients and carry out health checks against specific veterinary criteria such as improvement of a condition or deterioration, checking for reactions to medications etc. Learners will also be required to handle and restrain animals in a way that enables veterinary personnel to carry out necessary checks and procedures. These practical aspects of the unit can be simulated if either appropriate resources are not available or animal welfare would be compromised. All practical work involving animals must follow health and safety and animal welfare guidelines.

For Outcome 2, learners investigate practice equipment and its suitability and efficacy for veterinary procedures, introducing the learners to the different terminology and uses of veterinary specific equipment. They are not expected to use this equipment, but to gain knowledge and understanding of its functions and uses. They are also required to have an understanding of relevant legislation and the different roles of practice staff. Learners should be encouraged to research appropriate industry specific books and websites for information on staff roles and legislation. Outside speakers from veterinary practice would enhance delivery.

Outcome 3 encourages learners' creative skills by asking them to develop knowledge of the design of a veterinary practice, taking into account veterinary practice set ups, health and safety, legislation, client care, patient recovery and care amongst other factors. It is important that the learners are aware of all of the different areas and purposes of these areas contained within a veterinary practice to enable them to design a realistic practice. Site visits to different practices and relevant books will aid delivery.

Outcome 4 relates to veterinary practice client care and requires the learner be aware of the range of situations that may arise in practice involving clients and their pets and how to deal with such situations. This is a vital part of any veterinary nursing unit as the learners are often placed in front of house or on reception in practices, and will therefore come face to face with clients of all types, including potentially difficult or emotive situations.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that formal lectures will be necessary at level 3 but for this unit it is recommended that they are they are linked directly with interactive lessons in a real environment. Learners should be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

References

Books

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Veterinary Nursing
Veterinary Record
Veterinary Times

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www.bva.org.uk	British Veterinary Association
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.rcvs.org.uk	Royal College of Veterinary Surgeons
www.environment-agency.gov.uk	

Unit 312 Understand Animal Welfare and Breed Development

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal welfare and breed development. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The aim of this unit is to provide learners with knowledge of evolution, how animals evolved and the processes of domestication. Learners will investigate the uses of animals in human society and the welfare issues that can arise from this. The learner will have a working knowledge of the current United Kingdom animal welfare legislation and the organisations that aim to promote animal welfare.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand animal evolution and the development of domestic breeds
2. Understand the roles of animals in human society
3. Know current United Kingdom animal welfare legislation
4. Understand the roles and aims of animal welfare organisations

Guided learning hours

It is recommended that **60 h**ours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 312 Understand Animal Welfare and Breed Development

Outcome 1 Understand animal evolution and the development of domestic breeds

Assessment Criteria

The learner can:

1. Explain the principles of animal **evolution**
2. Explain the **development of a selected domesticated breed**
3. Evaluate the effect of domestication on the **welfare needs** of animals

Unit content

Evolution

Darwin's theories of evolution, natural selection, survival of the fittest, mutations, adaptations
Causes of species extinction: pollution, introduction of non-native species, habitat destruction and climate change and natural disasters (e.g. earthquakes, flooding)

Development of a selected domesticated breed

Processes involved in domestication (e.g. capturing, taming, selective breeding), selection of breed characteristics: appearance, conformation, behavioural traits, characteristics of working animals and companion animals

Welfare needs

Hereditary conditions in breeds (e.g. progressive retinal atrophy in cats and dogs, hip dysplasia, epilepsy and collie eye anomaly), roles of breed societies and breed improvement on the welfare needs of animals

Unit 312 Understand Animal Welfare and Breed Development

Outcome 2 Understand the roles of animals in human society

Assessment Criteria

The learner can:

1. Review the **commercial use** of animals and animal products in human society and how their welfare may be affected
2. Explain the role of **working animals** in human society and how their welfare may be affected
3. Assess the role of animals in **human cultures**:
    - **Media**
    - **Sport and leisure**
    - **As symbols**

    and how their welfare may be affected

Unit content

Commercial use

Agriculture: meat, wool, skin, eggs and milk
World trade: animal organs, meat, live animals, fur
Medical: testing of products and medical procedures on animals (for example household products, animal drugs, human drugs)

Working animals

Guide dogs, Pets as Therapy (PAT) dogs, sniffer dogs, search and rescue dogs, military and police dogs and horses, draught animals (equines, oxen, elephants), gun dogs

Human culture

Animals in the media: film, television, advertising, media portrayal
Animals in sport and leisure, legal rural pursuits, hunting and angling, racing, horse trekking, riding schools and eventing, zoos, aquaria, wildlife parks and circuses
Influence of culture and religion e.g. cats in Egypt, Christianity (dominion over animals), Judaism (forbidden to hunt animals), Islam (does not accept animal suffering), Hinduism (animals have souls, cows are very sacred and must not be eaten), dogs and other animals as fashion accessories and status symbols

Unit 312 Understand Animal Welfare and Breed Development

Outcome 3 Know current United Kingdom animal welfare legislation

Assessment Criteria

The learner can:

1. Identify current United Kingdom animal welfare **legislation**
2. Describe the **objectives** of selected current United Kingdom animal welfare legislation

Unit content

Legislation

Current relevant United Kingdom legislation: Animal Welfare Act 2006, Pet Animals Act 1951, Animal Boarding Establishments Act 1963, Riding Establishments Act 1970, The Breeding of Dogs Act 1973 (as amended 1991), The Breeding and Sale of Dogs (Welfare) Act 1999, the Performing Animals (Regulation) Act 1925

Objectives

Main aims and objectives of current relevant United Kingdom legislation, Duty of Care and carer's responsibilities, definitions, exceptions, licences and penalties

Unit 312 Understand Animal Welfare and Breed Development

Outcome 4 Understand the roles and aims of animal welfare organisations

Assessment Criteria

The learner can:

1. Explain the **roles and aims** of specified animal welfare organisations
2. Compare the effectiveness of specified **animal welfare** organisations in the promotion of animal welfare

Unit content

Roles and aims

Organisations: Royal Society for the Prevention of Cruelty to Animals (RSPCA), World Society for the Protection of Animals (WSPA), International Fund for Animal Welfare (IFAW), Countryside Alliance, The League Against Cruel Sports, British Horse Society (BHS), Royal Society for the Protection of Birds (RSPB), British Veterinary Association (BVA), the Animal Health Trust (AHT), Blue Cross, People's Dispensary for Sick Animals (PDSA), Universities Federation for Animal Welfare (UFAW), People for the Ethical treatment of Animals (PETA), Greenpeace, Rare Breeds Survival Trust and breed societies, roles in education and increasing public awareness

Animal welfare

Comparison of organisations' effectiveness: media attention, campaigns and role in amending legislation and influences through education e.g. the banning of cosmetic testing on animals

Unit 312 Understand Animal Welfare and Breed Development

Notes for guidance

Throughout the unit, the emphasis should be on safe working. It is expected that learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working. The unit should also emphasize animal welfare with due consideration to the Animal Welfare Act 2006 and the duty of care towards animals.

Outcome 1 covers the relationship between animal evolution and the development of a domesticated breed. Learners will need to have an appreciation of the effects of domestication of the welfare needs of animals. It is anticipated that this outcome will require formal delivery and discussion with learners. Emphasis should be placed on how the development of a selected breed has been influenced by humans (as opposed to evolution alone).

Outcome 2 is likely to be delivered by formal lectures and visits (for example to zoos, animal sanctuaries, city farms and racing stables). Learners should be allowed to explore areas, within the context of the outcome that they are particularly interested in.

Outcome 3 is likely to be delivered through formal lectures which could be enhanced by visiting speakers (for example RSPCA Inspectors and local Environmental Health Officers). Learners should have an overview of the range of legislation, though it is not expected, that all will be covered in great detail. Specific relevant examples of legislation (for example the Animal Welfare Act 2006) may be covered in more depth.

In Outcome 4, learners will research different organisations that aim to promote animal welfare, in order to identify their roles and aims and compare their effectiveness. It is anticipated that this outcome will require some formal delivery, visits (for example to animal rescue centres) and visiting speakers (for example from Guide Dogs, PAT dogs and Police/ Armed Forces Dog and Horse Units).

Learners working at level 3 are likely to have some experience in animal welfare. This unit aims to extend the learner knowledge and skills involved in promotion of welfare and management of animals.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

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Books

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www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.rspca.org.uk	Royal Society for the Prevention of Cruelty to Animals
www.bhs.org.uk	British Horse Society
www.greenpeace.org.uk	Greenpeace
www.rspb.org.uk	Royal Society for the Protection of Birds
www.countrside-alliance.org	The Countryside Alliance
www.pdsa.org.uk	People's Dispensary for Sick Animals
www.aht.org.uk	The Animal Health Trust
www.bluecross.org.uk	The Blue Cross
www.bva.org.uk	The British Veterinary Association
www.peta.org.uk	People for the Ethical Treatment of Animals
www.league.org.uk	League Against Cruel Sports
www.rbst.org.uk	Rare Breed Survival Trust
www.ufaw.org.uk	Universities Federation for Animal Welfare

Unit 313 Undertake Dog Grooming

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of dog grooming and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to show skill by assessing dogs for coat type, grooming styling requirements, condition and demonstrate safe and effective routines for health checks, grooming, bathing, drying, and ear and nail care. The learner will also will be able to clearly identify equipment, its uses and maintenance requirements. The learner will also be able to demonstrate the skills required to remove excess coat using clippers and other equipment and appropriately trim the paws and pads of a dog.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to prepare dogs for styling
2. Understand the use of grooming equipment and maintenance requirements
3. Be able to remove excess coat by electrical and non-electrical equipment
4. Be able to trim dog's paws and pads

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

AC16. Assessment and planning of grooming
AC28.1 Dry and prepare dogs and prepare their coats for styling
AC29.1 Carry out styling and finishing for dogs

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 313 Undertake Dog Grooming

Outcome 1 Be able to prepare dogs for styling

Assessment Criteria

The learner can:

1. Carry out animal **health and temperament** assessments on dogs in preparation for grooming
2. Carry out **preparation** of dog for styling by
   - **grooming**
   - **bathing**
   - **drying** the coat

   appropriate to breed coat, style and condition
3. Carry out **nail and ear care** for dogs.

Range

Work with two of the following coat types:
Wool, wire, silk, double, smooth, mixed

Unit content

Health

Appearance- eyes, ears, nose, mouth, skin, coat, nails, genital and anal area, signs of ecto-/endo- parasites, good health, poor health, posture and movement- obvious pain, limping, previous records/health assessment- neutered/entire/in season

Temperament

Known, unknown, how to undertake an assessment of temperament and recognise: nervous, friendly, excitable, aggressive, unpredictable animals (taking into account health status)

Preparation

Remove knots, tangles and dead hair using combs, brushes, scissors or thinning scissors, clippers, by hand and/or stripping tools and/or dematting tools

Grooming, bathing and drying

Bathe and clean dogs coat and skin using normal shampoos, anti- parasitic shampoos, conditioners. Dry coats using cabinet, blaster and hand or stand dryer

Nail and ear care

Nail: identify if they need trimming/condition, understand what and how to use a coagulant
Ear: clip, clean, remove visible debris using approved methods

Unit 313 Undertake Dog Grooming

Outcome 2 Understand the use of grooming equipment and maintenance requirements

Assessment Criteria

The learner can:

1. Examine different types of **equipment** and their uses
2. Explain the **methods** by which **equipment** can be **maintained**

Unit content

Equipment

Non electrical: brushes, combs, dematters, stripping tools, grooming mitts, scissors and thinning scissors

Electrical: electrical clippers and blades, cabinet dryers, blasters, hand held and stand dryers

Methods of maintenance

Non-electrical: How to remove hair, clean, wash, lubricate, disinfect, sterilise, check it is fit for use, sharpening, storage

Electrical: remove hair and grease from clipper blades, wash, oil, sterilize or treat with fungicide, check and clean air filter, check cable and plug fittings, check heat setting switches, remove hair from wheels of tables and mobile equipment, storage

Unit 313 Undertake Dog Grooming

Outcome 3 Be able to remove excess coat by electrical and non-electrical equipment

Assessment Criteria

The learner can:

1. Remove excess coat for:
   - **styling** needs
   - **condition**

   using electrical clippers
2. Remove areas of excess coat using **non-electrical equipment**

Range

Work with at least two of the following coat types:
Wool, wire, silk, double, smooth, mixed

Unit content

Styling
Clipped, parted, scissored, natural

Condition
Normal, healthy, matted, tangled, dread hair

Non-electrical equipment
Scissors, thinning scissors, stripping tools, dematting tools

Unit 313 Undertake Dog Grooming

Outcome 4 Be able to trim dogs paws and pads

Assessment Criteria

The learner can:

1. Identify different **paw and pad trimming requirements** for various breeds of dog
2. Trim paws and pads appropriate to **breed coat** style and condition

Range

Terriers, spaniels, gundogs, hounds, utility, working, pastoral, toy, crossbreeds

Unit content

Paw and pad trimming requirements

Neat and tidy, appropriate for the breed and purpose

Breed coat

Wool, wire, double, mixed, silk

Unit 313 Undertake Dog Grooming

Notes for guidance

Upon completion of this unit, the learner will be able to show skill by assessing dogs for coat type, grooming styling requirements, condition and demonstrate safe and effective routines for health checks, grooming, bathing, drying, and ear and nail care. The learner will also will be able to clearly identify equipment, its uses and maintenance requirements. The learner will also be able to demonstrate the skills required to remove excess coat using clippers and other equipment and appropriately trim the paws and pads.

Outcome 1 requires the learner to carry out health and temperament assessments and to groom, bath and prepare a range of coats for clipping and styling and to carry out nail and ear care. It is anticipated that the delivery of this unit will be mainly through practical demonstration, simulation, although formal learning regarding the approaching, handling and restraining of dogs using appropriate equipment and methods is essential to ensure the health, safety and welfare of the learner and the dog at all times. Learners should be encouraged to handle, restrain, groom, bath and dry a range of different sized dogs of various breeds and with various coat types to build up confidence and experience.

Outcome 2 requires the learner to understand how to use and maintain equipment found in a grooming establishment. This will include some formal learning. Learners should be encouraged to research using books, internet and other library resources, as new equipment is always being developed in line with Industry demands. It is recommended that this be delivered in conjunction with practical sessions and demonstrations on how to recognise different types of equipment and to understand how it should be maintained. This will include cleaning, oiling, sterilizing and storage of non- electrical equipment. Electrical equipment used should be PAT tested as per guidelines.

Outcome 3 requires the learners to remove excess coat both with electrical and non- electrical equipment. This unit is a very practical unit and should be delivered through practical demonstrations and simulated situations. It is important that the learner is shown how to hold equipment correctly. Given there will be both left and right handed learners it is important that there is suitable equipment for everyone. Learners should be under direct supervision when they start using clippers and it is important that tutors ensure that the blade is the correct one and that it is fitted correctly to avoid damage to the coat and injury and stress to the dog. Learners should be confident in handling and restraining dogs prior to using scissors or clippers.

Outcome 4 requires the learner to trim dogs' paws and pads. This can be delivered with some formal delivery but is generally deemed to be a very practical task and should be delivered through practical demonstrations and simulations on a range of different breeds and coat types. Paws and pads should be neat and tidy as applicable to the breed, owner's requirements and coat type. Trimming can be achieved through the use of scissors and clippers but should be under strict supervision to ensure the health and wellbeing of the dog and the groomer.

This is a very practical unit and is important that the health, safety and wellbeing of the dog are not compromised at any time. It is essential that the dogs used are of a temperament suitable for the learner but reflects those found in industry. Class size should be limited and learners should work individually or in pairs e.g. one handles, helps restrain and lift whilst the other carries out the health assessment. Learners will greatly benefit from visits to grooming demonstrations and dog shows such as Crufts. Delivery could be further enhanced by professional groomers' talks and demonstrations. Work experience for learner's wishing to pursue a career in dog grooming will give them further insight into this demanding but rewarding Industry.

References

Books

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Geeson E., Vetter, B., Whitmore, L., 2007 *Ultimate Dog Grooming*. Firefly books: UK
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Websites

www.groomerssupplies.com
www.the-kennel-club.org.uk The Kennel Club

Unit 314 Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of exotic animal health and husbandry and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The unit will provide learners with an understanding of the husbandry and management of exotic animals in captivity. It covers health, welfare, handling, restraint, nutrition and feeding. It is anticipated that on completion of the unit, learners could progress to more advanced study in the subject.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the health and welfare requirements and associated legislation of exotic animal species
2. Know the health and welfare requirements of exotic animal species
3. Be able to prepare accommodation and feeding regimes for exotic animal species
4. Be able to handle, restrain and transport exotic animal species

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

This unit has some links with Animal Management National Occupational Standards

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 314 Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry

Outcome 1 Understand the health and welfare requirements and associated legislation of exotic animal species

Assessment Criteria

The learner can:

1. Explain **ethical sourcing** of exotic animal species
2. Discuss the impact of the **five animal 'needs' on exotic animal welfare**
3. Discuss the **legislation** associated with keeping exotic animal species in captivity

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Range

Exotic animal species: invertebrates, amphibians, fish, reptiles, birds, mammals that are non-native to the UK

Unit content

Ethical sourcing

Potential sources of exotic animals (pet trade and dealers), distinguish between the sources and origins which are ethical (do not deplete wild populations and are thus from a sustainable and captive bred source), species which are protected by the Convention on International Trade in Endangered Species (CITES) legislation

Five animal 'needs' on exotic animal welfare

Five animal needs (protection from hunger and thirst, discomfort, pain, injury and disease, freedom to express normal behaviour and freedom from fear and distress), the impact on exemplar species that will result from failure to fulfil these needs. The relative needs of animals which are ecto and endothermic animals

Legislation

Relevant legislation: Dangerous Wild Animals Act (1976), CITES, Secretary of States Standards of Modern Zoo Practice

Unit 314 Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry

Outcome 2 Know the health and welfare requirements of exotic animal species

Assessment Criteria

The learner can:

1. Explain the causes of **ill health and poor welfare** in exotic animal species
2. Explain how **disease symptoms** in exotic animals are **recorded, monitored and treated**

Range

Exotic animal species: invertebrates, amphibians, fish, reptiles, birds, mammals that are non-native to the UK

Unit content

Ill health and poor welfare

The role of bacteria, viruses and fungi in causing diseases, examples of each e.g. chytrid fungus, pneumonia, dysentery, stomatitis and dermatitis, which organism type is attributable to each
Non pathogenic causes of ill health such as metabolic bone disease, dysecdysis and egg binding
Scenarios that lead to poor welfare in exotic species and how these can be rectified and prevented
Zoonotic disease e.g. *salmonellosis*

Disease symptoms

Loss of appetite, improper shedding, failure to breed, change in behaviour, lethargy, visual signs of illness (this list is not exhaustive)

Recorded, monitored and treated

Health records are maintained for exotic species, ways of monitoring e.g. charts, graphs, logbooks, progression and development of signs against expected signs, appropriate therapies for treatment dependant on species and disease

Unit 314 Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry

Outcome 3 Be able to prepare accommodation and feeding regimes for exotic animal species

Assessment Criteria

The learner can:

1. Prepare **accommodation** which incorporates features of natural habitat into enclosures for exotic animal species
2. Compare **maintenance of housing** for different exotic animal species:
   - bird
   - mammal
   - reptile
   - amphibian
   - fish
   - invertebrate
3. Report on the **nutritional requirements** of exotic animal species
4. **Prepare and feed** typical daily diets to selected exotic animal species

Range

Exotic animal species: invertebrates, amphibians, fish, reptiles, birds, mammals that are non-native to the UK

Unit content

Accommodation

Identify and assemble appropriate materials (rocks, substrates, vegetation and water) into an enclosure to simulate the natural habitat for a nominated range of exotic species, enrichment

Maintenance of housing

Maintenance requirements for exotic species (birds, mammals, reptiles, amphibians, fishes & invertebrates) from different habitats (tropical; high humidity, high temperature and dense vegetation to desert; low humidity, wide temperature range and sparse vegetation), daily, weekly and monthly maintenance schedules

Nutritional requirements

Protein and energy needs of nominated exotic species vary over their different life stages, appropriate feedstuffs to meet these changing requirements

Prepare and feed

Feed storage, assembly in the required ratios and quantities before presentation to nominated exotic species, the role of supplements in meeting mineral and vitamin requirements

Unit 314 Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry

Outcome 4 Be able to handle, restrain and transport exotic animal species

Assessment Criteria

The learner can:

1. **Handle and restrain** exotic animal species correctly using appropriate PPE and equipment
2. Plan activities and equipment to **move exotic animal species** according to current legislation and welfare codes
3. Identify the main **legislation regarding the transport** of exotic animal species

Range

Exotic animal species – invertebrates, amphibians, fish, reptiles, birds, mammals that are non-native to the UK

Unit content

Handle and restrain

The learner will identify suitable Personal Protective Equipment (PPE) and restraint equipment for nominated exotic species and correctly demonstrate its use to safely and effectively restrain them

Move exotic animal species

Suitable containers to transport exotic species between locations, current relevant statutory regulations, preparation of appropriate paperwork and records

Legislation regarding transport

Main legislative statutes, interpret their application to the transportation of exotic species. CITES and the Welfare of Animals (Transport) Act 2006

Unit 314 Understand the Principles and Carry Out the Practice of Exotic Animal Health and Husbandry

Notes for guidance

This unit is designed to provide the learner with the principles and underpinning knowledge of factors that contribute to an understanding of health and welfare in a range of exotic species. It is anticipated that this could be applied to animals in retail outlets, specialist collections or hobbyists who keep animals in a domestic environment.

The delivery of the unit will consist of a variety of forms including lectures, practicals, simulations and appropriate visits to premises where exotic species are maintained for education, conservation or acquisition.

It is important that the specific requirements of exotic species are considered in terms of housing and that reference is made to the range of habitats which form their natural range.

Outcome 1 is concerned with the development of responsible ownership and care of exotic species. Learners will be made aware of what constitutes an exotic species, how ethical sources of exotics can be identified and of the conflict between conservation of such animals in their native environment and the pet trade. Signs of normal health will be reviewed in context of body condition, behaviour, locomotion, posture, feeding, drinking, excretion/defecation and weight change. Relevant legislation will be summarised (CITES – Convention on International Trade in Endangered Species, Dangerous Wild Animals Act (1976), Animal Welfare Act 2006).

In Outcome 2, the learner will be able to apply the knowledge of health and welfare gained in outcome 1 to specific exotic species. Instances of ill health (lesions, discharges, swellings and anorexia) will be identified and the causes of ill health and inappropriate welfare (inadequate housing, malnutrition and poor restraint/handling) described. The use of recording systems to record ill health (symptoms and development, treatment protocol, product, dose rate, duration and outcome of treatment) will be reviewed.

In Outcome 3, the learner will be able to apply the knowledge and understanding of the requirements of exotic species and ensure that the housing and accommodation environment meets the needs of the animal in terms of space, substrates, temperature, humidity and light intensity and stocking density. Additionally, appropriate feedstuffs will be identified, selected, prepared and presented in suitable proportions to nominated exotic species at time intervals corresponding to their natural foraging routines. This will include live, dried, fresh and frozen sources plus supplements.

In Outcome 4, the learner will be able to demonstrate effective restraint of nominated exotic species for the purposes of examination, administration of medication and transportation. Suitable equipment will be selected for use, such as snake hooks, bagger, restraining tubes, forceps, capture cups, nets, jugs and Personal Protective Equipment (PPE). Transportation boxes and associated paperwork will be prepared and an understanding of legislation which impacts on animal transportation will be described. This includes CITES and the Welfare of Animals (Transport) Act 2006.

Learners working towards level 3 are likely to have experience of animal health and husbandry. This unit aims to extend the learners knowledge and skills involved with ensuring the health and welfare of exotic animals. It is important that the learner understands current legislation and Codes of Practice in relation to animal health and welfare.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that formal lectures will be necessary at level 3 but for this unit it is recommended that they are they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

References

Books

Adler, K. & Halliday, T. 2002 *New Encyclopedia of Reptiles and Amphibians*. Oxford. Oxford University Press. ISBN 0 1985 2507 9

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Unit 315 Undertake Kennel and Cattery Management

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of kennel and cattery management and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will have knowledge of animal husbandry and specialist animal management techniques, administration procedures, how to deal with an emergency and kennel and cattery design.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Understand different designs and facilities of kennels and catteries
2. Be able to admit animals to a kennel or cattery and follow administrative procedures
3. Be able to carry out animal husbandry and specialist animal management techniques in a kennel or cattery

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU7.2 Maintain and store records in the workplace

CU39.1 Plan the accommodation of animals

AC14.2 Provide information to individuals and groups on the reasons for, and meaning of, animal behaviour

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 315 Undertake Kennel and Cattery Management

Outcome 1 Understand different designs and facilities of kennels and catteries

Assessment Criteria

The learner can:

1. Evaluate **different designs** of kennels and catteries and make suggestions for improvement
2. Analyse the **layout of facilities** included in kennels and catteries and make suggestions for improvement

Range

Cats and dogs

Unit content

Different designs

Individual kennel/cat pen designs, designs of breeding/ rescue kennels and catteries, isolation and quarantine

Layout of facilities

Security, mixing of animals (cats/dogs, multiple animals), ease of cleaning, ease of access, client access, isolation, quarantine, suitability of site, ancillary services, layout for minimising stress, staff facilities

Unit 315 Undertake Kennel and Cattery Management

Outcome 2 Be able to admit animals to a kennel or cattery and follow administrative procedures

Assessment Criteria

The learner can:

1. Follow **policies and procedures** relating to kennels or catteries to include:
    - Administration
    - Health and safety
    - Animal welfare
    - Licensing requirements
    - Customer service
2. Carry out **admission and settling in procedures** for animals to a kennel or cattery
3. Follow guidelines for dealing with a **customer or animal emergency**

Range

Cats and dogs (as appropriate)

Unit content

Policies and procedures

Records for animals and finance/Health and Safety, Health and Safety at Work Act (1974), the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995, Animal Welfare Act 2006, animal welfare policy, fire procedures, telephone call procedures, booking policy, insurance, dealing with difficult/upset customers

Admission and settling in procedures

Taking information from owners, advising owners on the animals stay, making the animal comfortable, minimising stress, filling in necessary records, vaccination records, checking on the animal

Customer or animal emergency

Dealing with death of an animal and how to approach the owner, First Aid emergency to include fight, escape, cuts, broken bones, head injuries, severe illness such as fitting or unconsciousness, when and how to call the vet for advice on illness, dealing with a difficult or upset customer face to face or over the telephone

Unit 315 Undertake Kennel and Cattery Management

Outcome 3 Be able to carry out animal husbandry and specialist animal management techniques in a kennel or cattery

Assessment Criteria

The learner can:

1. Plan the **husbandry schedule** for animals in a kennel or cattery
2. Monitor the husbandry schedule for animals in a kennel or cattery
3. Monitor and record **normal and abnormal animal behaviour** in kennels or catteries
4. Demonstrate **specialist animal management techniques** in a kennel or cattery

Range

Cats and dogs (as appropriate)

Unit content

Husbandry schedule

Feeding, cleaning, exercise, health checks, medication, filling in necessary records, monitoring the schedule

Normal and abnormal behaviour

Signs of stress, aggression towards people and other animals, unusual vocalisation, timid animals, feeding behaviour, sexual behaviour

Specialist animal management techniques

Selection and use of equipment for handling and restraint such as catch poles, cat bags, muzzles, policy and procedure for home checks and re-homing animals by matching animal to potential owner, full health checks and recording, exercise regimes for animals in different situations such as nervous, aggressive or, stressed animals, providing suitable diets and making decisions and recommendations to change them if necessary

Unit 315 Undertake Kennel and Cattery Management

Notes for guidance

Upon successful completion of this unit, the learner will have been provided with an introduction to the skills and knowledge that could allow them to progress into further training in animal care employment.

The learner will have knowledge of animal husbandry and specialist animal management techniques, administration procedures, how to deal with an emergency and kennel and cattery design. Some of the unit will be classroom based, but the majority will be in a more practical situation. Links with employers will be vital to allow regular guided visits and tours, as well as by providing work experience for the learners.

Outcome 1 requires learners to understand a variety of different kennel/cattery designs, evaluate and analyse them. This could be done through small amounts of formal lectures, but should be based around impartial visits to at least two kennels and two catteries; ideally some used for rescue and some boarding or breeding. They should be able to make critical, valid and realistic suggestions for improvements and could be peer reviewed or scrutinised in small groups.

Outcome 2 allows the learner to admit animals into a cattery/kennels and follow all related administrative procedures. This could be done through role play and simulation of situations, but ideally learners should have some practical experience booking animals into a kennel/cattery. At this level, the learners should be able to follow procedures and policies and pinpoint how the animals are cared for according to individual welfare and licensing policy, as well as how health and safety, administration and customer service is provided. It could be delivered in a formal lecture situation, or through practical tasks.

Outcome 3 is a practical outcome that requires the learner to carry out husbandry and specialist animal management techniques in a kennel/cattery. This could be delivered through practical activities during volunteering visits in small groups to rescue kennels or catteries or as part of their work experience. The learners are required to plan for, monitor and record husbandry, so more than one visit to the kennels/cattery would be necessary to gain the sufficient information for this outcome. Specialist animal management techniques could be gained from practical work experience in a kennel or cattery and could be carried out by the learner on work experience. Specialist animal management techniques could also be researched and evaluated by the learners.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that formal lectures will be necessary at level 3 but for this unit it is recommended that they are they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

References

Books

Cavill, D., 2008. *Run Your Own Boarding Kennels: The Complete Guide to Kennel and Cattery Management.* 4th Ed. Kogan Page: UK

Key, D., 2006. *Cattery Design: The Essential Guide to Creating Your Perfect Cattery.* David Key Kennel and Cattery Design: UK

Bessant, C., 2002. *FAB Boarding Cattery Manual*: Feline Advisory Bureau: UK

Magazines/Journals

Kennel and Cattery Management magazine

Your Dog magazine

Your Cat magazine

Websites

www.the-kennel-club.org.uk	Kennel Club
www.gccfcats.org	Governing Council of the Cat Fancy
www.fabcats.org	Feline Advisory Bureau

Unit 316 Undertake Pet Store Design and Animal Management

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of pet store design and animal management and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to design a suitable pet store layout and discuss the husbandry requirements of animals being sold. The learner will be able to identify both livestock and non-livestock products and their sources. Marketing of pet stores will be evaluated along with the legal aspects relating to the subject area.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to design a pet store
2. Know the sources of livestock and non-livestock products found in a pet store
3. Understand the husbandry requirements of animals sold in pet stores
4. Understand the importance of marketing for a pet store

Guided learning hours

It is recommended that 60 hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering underpinning knowledge and skills

Unit 316 Undertake Pet Store Design and Animal Management

Outcome 1 Be able to design a pet store

Assessment Criteria

The learner can:

1. Design a **suitable layout** for a pet store
2. Evaluate the **needs of the livestock** in the pet store in regards to the store layout

Range

A realistic range of animals needs to be covered which would typically be sold in a pet store.

This can include, rabbits, guinea pigs, chinchillas, rats, mice, degus, hamsters (Dwarf, Syrian), gerbils, fish (cold water and tropical) exotics (corn snakes, bearded dragons, leopard geckos) birds (love birds, finches, parrots)

Unit content

Suitable layout

Entrance, exit, customer service area, store room, shelving areas, livestock housing areas, lighting, fire exits, customer facilities (toilets, drinks machine), disabled access, parking and delivery area

Livestock needs

Size of accommodation (must meet basic requirements), position of the accommodation (front/back of store), materials used for housing (plastic, stainless steel), water provision (water bowls, dishes, automatic), food (availability of food, regularity of feeding, suitability of food being fed), lighting (artificial, natural, meets the needs of the animals)

Unit 316 Undertake Pet Store Design and Animal Management

Outcome 2 Know the sources of livestock and non-livestock products found in a pet store

Assessment Criteria

The learner can:

1. Evaluate **the sources of livestock** and **non-livestock products**
2. Explain the methods of **stock control** used by pet stores

Range

A realistic range of animals needs to be covered which would typically be sold in a pet store.

This can include, rabbits, guinea pigs, chinchillas, rats, mice, degus, hamsters (Dwarf, Syrian), gerbils, fish (cold water and tropical), exotics (corn snakes, bearded dragons, leopard geckos), birds (love birds, finches, parrots)

Unit content

Livestock products

See animals listed above, ethics of livestock sourcing

Non-livestock products

Bedding (dog beds, cat beds, rodent, reptile), substrates (sawdust, shredded paper, cat litter, sand paper), handling equipment (leads and collars, harnesses, muzzles), DVD's, books, food, treats, toys (boredom breakers, gnawing blocks, mirrors), housing (rodent houses, hutches, vivariums, glass tanks, wire cages), fish equipment (tanks, filters, gravel, enrichments)

Sources of products

Livestock (specialist breeders, hobbyists, small pet stores, superstores, wholesalers, importers, farms), non-livestock (wholesalers, suppliers, superstores, importers)

Stock control

Stock taking, stock rotation, meeting demand, monitoring stock, monitoring animal temperament, re-homing older animals, surplus to demand

Unit 316 Undertake Pet Store Design and Animal Management

Outcome 3 Understand the husbandry requirements of animals sold in pet stores

Assessment Criteria

The learner can:

1. Explain the **housing requirements** of animals being sold in pet stores
2. Review a suitable **husbandry regime** for animals being kept in pet stores
3. Explain the **health and safety measures** required when animals are housed in store

Range

A realistic range of animals needs to be covered which would typically be sold in a pet store.
This can include, rabbits, guinea pigs, chinchillas, rats, mice, degus, hamsters (Dwarf, Syrian), gerbils, fish (cold water and tropical) exotics (corn snakes, bearded dragons, leopard geckos) birds (love birds, finches, parrots)

Unit content

Housing requirements

Type of accommodation, material used for the housing, substrate (wood shavings, hay, shredded paper, sand, bark), size requirement of species, feeding provision, water provision, enrichment (toys, company, exercise), heating, lighting (nocturnal/diurnal species), location of housing (away from noise, sunlight, crowded areas), security (locking systems, CCTV, constant supervision)

Husbandry regime

Feeding (time of day, how food is supplied e.g. bowls, scatter fed), watering, cleaning (frequency, equipment required), exercise, handling, regular health checking

Health and safety measures

Security of enclosures (supervision, locking systems) disease prevention (cleaning routines, Personal Protective Equipment (PPE)), correct waste disposal), safe manual handling (PPE, lifting procedures) licences for dangerous species, accommodation for dangerous species (enclosures within enclosures, locking systems, staff training), fire procedures (staff training, required equipment, evacuation plan)

Unit 316 Undertake Pet Store Design and Animal Management

Outcome 4 Understand the importance of marketing for a pet store

Assessment Criteria

The learner can:

1. Evaluate the current **methods of marketing** used by pet stores
2. Explain the **legislation** relating to the marketing of pet stores

Range

A realistic range of animals needs to be covered which would typically be sold in a pet store.

This can include, rabbits, guinea pigs, chinchillas, rats, mice, degus, hamsters (Dwarf, Syrian), gerbils, fish (cold water and tropical) exotics (corn snakes, bearded dragons, leopard geckos) birds (love birds, finches, parrots)

Unit content

Methods of marketing

Leaflets, posters, media (internet, television, newspapers, magazines), food packaging, target market (local, national, pet owners), time of marketing (seasonal, all year, bank holidays, weekends), offers (buy one get one free, two for one), company logo

Legislation

Reasons for legislation (compliance, requirements, punishments, responsibilities), The Trade Descriptions Act 1968, The Sale of Goods Act 1968 (as amended 1979 & 1994), Animal Welfare Act 2006

Unit 316 Undertake Pet Store Design and Animal Management

Notes for guidance

This unit is designed to provide the learner with sound knowledge and skills required to design a pet store and manage the animals within it. The unit must cover pet stores which sell both livestock, and non-livestock products.

Throughout the unit the emphasis must be put on safe working. It is expected that the learners will be aware of safe working practices and accepted practices and behaviours within the context in which they are working

In Outcome 1, the learner is required to design a pet store of their choice, and justify their plan. This must include the identified areas, and incorporated both livestock, and non-livestock products. A key will need to be produced which supports the plan. This is likely to be delivered through visits to different types/sizes of store, and some theoretical sessions. This outcome should be as practical and "hands on" as possible.

Outcome 2 focuses on the products which are sold in the pet store, and where they originated from. The learner is required to identify a number of livestock, and non-livestock products which are sold within a pet store. To go along side this, the sources of these products need to be evaluated. Finally the topic of stock control will be covered, including livestock control methods. the delivery of this outcome would benefit from visits to pet store establishments and talks/discussions with personnel involved with sourcing/acquiring stock.

In Outcome 3, the learner is required to explain the housing requirements of animals being sold in pet stores, both for the needs of the pet store and the animal. They will then need to review suitable housing for these animals. To complete the outcome the learner will need to explain the relevant health and safety measures involved when dealing with animals being sold in pet stores. This outcome could be delivered using a mixture of theory-based sessions and practical demonstration, observation of husbandry routines in a pet store establishment would be beneficial, or even as part of work experience.

Outcome 4 focuses on the marketing surrounding pet stores. A number of methods need to be identified and discussed and this could include incorporation of visits to pet stores, learners brining in any advertising or marketing they have seen for a pet store, including photographs and videos. The relevant legislation of marketing a pet store will also be covered and learners should evaluate the impact this has on the store. Delivery of this outcome could include the collection of marketing materials for a range of pet store and their products and group discussion around the effectiveness of the materials. Theory-based sessions could be used to deliver the aspects on legislation for this visit.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that the formal lectures will be necessary at level 3 but for this unit it is recommended that they are linked directly with interactive lessons in a real environment.

References

Books

Alderteron, D., 2001. The Ultimate Encylopedia for Small Pets and Petcare, Southwater
Alderton, D., 2002 Caring for Your Small Pets, London, Southwater
2005. Complete Pets Handbook. 2005 Kettering, Igloo Books Ltd

Journals

Pet Business World
Pet Product Marketing

Websites

www.petsathome.com Pets at Home
www.rspca.org.uk RSPCA

Unit 317 Understand the Principles of Animal Breeding and Genetics

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of animal breeding and genetics. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The aim of this unit is to develop the learner's knowledge and skills required for the successful breeding of animals. The learner will understand how characteristics are inherited and how genes can interact with each other. Learners will know how to manage and care for both breeding stock and young stock and the problems that might arise. They will also have an understanding of the advances in reproductive technology and how they can be utilised by the animal breeder.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the principles of inheritance
2. Know how to manage breeding stock
3. Know how to manage young animals
4. Understand the uses of reproductive technology

Guided learning hours

It is recommended that 60 hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU36.1 Enable animals to initiate pregnancy
CU36.3 Care for young animals

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 317 Understand the Principles of Animal Breeding and Genetics

Outcome 1 Understand the principles of inheritance

Assessment Criteria

The learner can:

1. Explain the process of **protein synthesis** from DNA
2. Explain the stages of **meiotic** cell division
3. Explain the principles of **Mendelian genetics** and the laws of inheritance
4. Analyse **breed data** using simple probability tests

Unit content

Protein synthesis

RNA, transcription, translation

Meiosis

Stages of meiosis: interphase, prophase I, metaphase I, anaphase I, telophase I, prophase II, metaphase II, anaphase II, telophase II. Reduction division, spermatogenesis, oogenesis, the importance of crossing with respect to genetic diversity

Mendelian genetics

Laws of inheritance, monohybrid and dihybrid crosses, dominance, recessive, sex determination, gene interaction (e.g. co-dominance, epistasis, sex-linked, multiple alleles, lethal genes)

Breed data

Chi-squared probability tests on simple animal breeding data with two pairs of alleles showing dominant and recessive characteristics

Unit 317 Understand the Principles of Animal Breeding and Genetics

Outcome 2 Know how to manage breeding stock

Assessment Criteria

The learner can:

1. Describe the **factors to consider** when selecting and managing breeding stock
2. Describe the **management of the female** from conception to birth
3. Identify **potential problems** that could occur in the management of the female from conception to birth

Unit content

Factors to consider

Reasons for breeding e.g. production, pet trade, animal shows, work, companion, endangered species and conservation

Selection of breeding stock e.g. breeding females, stud male, genotypes and phenotypes

Management of the breeding female

Stages of oestrus, mating, timing of mating, stages of, pregnancy, parturition, preparation for parturition, stages of labour, nutrition during pregnancy, through lactation and weaning, hygiene, health and safety

Potential problems

Infertility, problems with mating (e.g. non-compatible males and females), eclampsia, dystochia, post partum problems (e.g. retained placenta, uterine prolapse), pyometra

Unit 317 Understand the Principles of Animal Breeding and Genetics

Outcome 3 Know how to manage young animals

Assessment Criteria

The learner can:

1. Describe the **care** requirements **of offspring** from birth to weaning
2. Identify **problems** that could occur in the offspring from birth to weaning

Unit content

Care of offspring

Rearing, importance of colostrum, weaning, socialisation, early training, homing, regular checks e.g. weight gain, size, ears and eyes opening, eating normally and passing of urine and faecal waste

Problems

Congenital abnormalities and hereditary defects, orphans, hand-rearing, fostering, weaning, fading puppy/kitten syndrome, toxic milk syndrome, umbilical infection, swimmers, herpes, hernias, cleft palate, still births

Unit 317 Understand the Principles of Animal Breeding and Genetics

Outcome 4 Understand the uses of reproductive technology

Assessment Criteria

The learner can:

1. Explain the types of **breeding problems** that can occur
2. Discuss the types of **reproductive technologies** that are available for animal breeders
3. Explain how **reproductive technologies** can **be used by** animal breeders

Unit content

Breeding problems

Infertility, restricted gene pool, health problems in the female, e.g. hypothyroidism, pseudo-pregnancy, ovarian imbalance, adult acromegaly, ovarian tumours, Brucella canis, health problems in the male e.g. balanitis, phimosis, prostate problems, cryptorchidism, monorchidism, orchitis

Reproductive technologies

Biotechnology: infertility treatments, superovulation, synchronisation, ovulation indicators, artificial insemination, embryo transplants, cloning, genetic analysis, genetic engineering

Use of Reproductive technologies

Breed development and improvement, use of infertile animals for breeding (e.g. use of teaser animals, surrogate mothers), to increase productivity, to ensure timing of births enhances management of offspring

Unit 317 Understand the Principles of Animal Breeding and Genetics

Notes for guidance

This unit is designed to provide the learner with a sound knowledge and understand of the work required to with and care for breeding stock and young stock. The unit should cover a range of domestic animals. This unit should ideally be delivered in conjunction with a relevant work experience placement.

Throughout the unit, emphasis should be placed on safe working. It is expected that learners will be aware of safe working practices and be familiar with accepted practices and behaviours within the context in which they are working.

The delivery of this unit is expected to take a mainly formal approach, although there is opportunity to develop the learners' practical skills, particularly for outcomes 2 and 3. Centres are encouraged to allow the learners to have an involvement with breeding programmes and management of pregnant animals/young animals to enhance the delivery of this unit, although it should never be detrimental to the animals.

Outcome 1 is likely to be delivered through a series of formal lectures. Learners could research the different stages of meiosis and place them in the correct order, for example on a poster or information leaflet. Learners should be able to carry out simple monohybrid and dihybrid crosses and identify the different types of gene interaction and the effects they have on animals. Chi-squared analysis of simple breed data should be carried out.

Outcome 2 is likely to be delivered by formal lectures and discussion. Visits to animal breeding establishments (such as farms and rare breed centres) would enhance the delivery of this outcome. Visiting speakers (e.g. an animal breeder) would also be beneficial. Audio visual material will be useful.

Outcome 3 is likely to be delivered through formal lectures and discussion. Good quality audio-visual materials will be useful. Visits to animal breeding establishments (such as farms and rare breed centres) would enhance the delivery of this outcome. Visiting speakers (e.g. an animal breeder) would also be beneficial. The delivery of outcome 3 should be linked to the delivery of outcome 2.

In Outcome 4, learners are required to explain the types of breeding problems that can occur in animals. Learners will be required to research different types of reproductive technologies that can be used and identify appropriate uses for those technologies. Visits to animal breeding establishments (such as farms and rare breed centres) would enhance the delivery of this outcome. Visiting speakers (e.g. an animal breeder or someone who practices artificial insemination) would also be beneficial.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that some formal lectures will be necessary at level 3 but for this unit it is recommended that they are directly linked to interactive sessions in a real environment. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

References

Books

Dallas, S., 2006. Animal Biology & Care WileyBlackwell Publishing ISBN: 9781405137959
Evans, J.M., 2005 Breeding a Litter: The Complete Guide to Mating, Whelping and Puppy Rearing Ringpress Books. ISBN: 9781860542442
Hayes, K., 1993. Complete Book of Foaling Wiley & Sons. ISBN: 9780876059517
Lorch, J., 1998. From Foal to Full-Grown David & Charles PLC. ISBN: 9780715307229
Master, J., 2006. Martin C – Animal Nursing Assistants Textbook Butterworth-Heinmann . ISBN: 9780750688789
Rice, D., 2000. Complete Book of Cat Breeding Barron's Educational Series. ISBN: 9781405137959
Rice, D., 2008. Complete Book of Dog Breeding Barron's Educational Series. ISBN: 9780764138874
Towson, S., 1994. Breeding Reptiles & Amphibians British Herpetological Society. ISBN: 9780950737157

Journals

New Scientist

Websites

www.bbrc.ac.uk	Biotechnology and Biological Sciences Research Council
www.newscientist.com	New Scientist
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.lantra.co.uk	Lantra Sector Skills Council
www.bbc.co.uk/schools/gcsebitesize/biology	BBC Revision

Unit 318 Understand the Principles of Zoological Animal Health and Husbandry

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of zoo animal health and husbandry. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to investigate the husbandry and health of animals kept in Zoological and Safari Parks. This will involve an appreciation of the features which are appropriate in housing and enclosures.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the housing and accommodation requirements of zoo animals
2. Know the techniques and equipment required for competent restraint of zoo animals
3. Understand the importance of health and welfare of zoo animals
4. Understand the essential features of nutrition and feeding of zoo animals

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

This unit is linked to the some Animal Management National Occupational Standards

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 318 Understand the Principles of Zoological Animal Health and Husbandry

Outcome 1 Understand the housing and accommodation requirements of zoo animals

Assessment Criteria

The learner can:

1. Discuss **appropriate features** of enclosure design for zoo animals
2. Assess the suitability of **barriers to enclosures** for different zoo animals
3. Evaluate the **effectiveness of the environment** in zoo animal enclosures
4. Explain how **features of the natural environment and enrichment** can be incorporated into enclosures for zoo animals

Range

Invertebrates, fish, amphibians, reptiles, birds, primates, carnivorous mammals, aquatic mammals, ungulates and pachyderms

Unit content

Appropriate features

Dimensions, shape, balance between indoor and outdoor areas, landscaping, use of materials and substrates, mix of species, age profile of species, proximity of enclosure to other species and allowance for nocturnal and diurnal behaviours and hibernation, inclusion of natural habitat features into enclosures

Barriers to enclosures

Fences, moats, posts and bars, glass, netting, wire or water

Effectiveness of the environment

Size, height, use of substrates, incorporation of inside/outside exhibit areas and regulation of the atmosphere (temperature, humidity and light), animals able to demonstrate a repertoire of normal behaviours (territorial, hierarchical and social interaction and reproductive), use of sustainable resources (low energy light bulbs, biodegradable substrates and bio fuels)

Features of the natural environment and enrichment

Use of plants, trees (plus browse), water features (ponds and running water), shelter (rocks, caves, canopies, tunnels), platforms, raised areas, ropes, frames, swings, enrichment provided through nutrition

Unit 318 Understand the Principles of Zoological Animal Health and Husbandry

Outcome 2 Know the techniques and equipment required for competent restraint of zoo animals

Assessment Criteria

The learner can:

1. Describe the **range of equipment** which is **appropriate** for the restraint of different zoo animals
2. Evaluate the **effectiveness of restraint techniques** for different zoo animals
3. Explain how and why **records of restraint** activities are recorded.

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Range

Invertebrates, fish, amphibians, reptiles, birds, primates, carnivorous mammals, aquatic mammals, ungulates and pachyderms

Unit content

Appropriate range of equipment

Personal Protective Equipment (PPE) for operatives (gloves, goggles, gauntlets, masks, shields), tranquillisers, (sedation and anaesthesia), firearms for appropriately trained personnel. Crush cages, harnesses, races, muzzles and graspers

Effectiveness of restraint techniques

Equipment appropriate for particular species, features of techniques help to minimise stress and trauma to animals during physical or chemical restraint (timeliness, timing, adjustment of environmental lighting, co-ordination of resources, correct use of tranquillisers, regular training of personnel), importance of thorough and up to date risk assessments and procedures which conform to health and safety legislation and protocols throughout the procedure

Records of restraint

Recording systems are used, how animals are identified (natural markings, tags, bands, microchips or transponders), reasons for using records of restraint (monitoring of life stage and health events, movements and relocations)

Unit 318 Understand the Principles of Zoological Animal Health and Husbandry

Outcome 3 Understand the importance of health and welfare of zoo animals

Assessment Criteria

The learner can:

1. Describe **signs of good and poor health** in different zoo animals
2. Discuss the **causes of disease** in zoo animals
3. Assess **preventative and control strategies** for diseases of zoo animals
4. Discuss **activities which enhance the welfare** of animals in zoos.

Range

Invertebrates, fish, amphibians, reptiles, birds, primates, carnivorous mammals, aquatic mammals, ungulates and pachyderms

Unit content

Signs of good and poor health

Condition of coat/skin/feathers/scales, locomotion and gait, feeding, drinking and excreting patterns, weight change and normal behaviour behavioural changes (as individuals or within groups)

Causes of disease

Pathogenic causes (bacterial, viral, fungal or parasitic), physical trauma leading to secondary infection, malnutrition, deficiency or poisoning

Preventative and control strategies

Vaccination, quarantine, routine blood/faecal testing and screening, elimination/trapping of vectors, use of physical barriers to isolate/exclude and use of antibiotic, antiviral, anthelmintic, fungicidal treatment/therapy

Activities which enhance the welfare

Enrichment, socialisation and group structures, health monitoring and assessment, environmental assessment and appropriate enclosure design

Unit 318 Understand the Principles of Zoological Animal Health and Husbandry

Outcome 4 Understand the essential features of nutrition and feeding of zoo animals

Assessment Criteria

The learner can:

1. Explain what **factors affect the nutritional requirements** of different zoo animals
2. Discuss how a **balanced diet is produced** for different zoo animals
3. Discuss the role and inclusion of **dietary supplements** in feeding regimes for zoo animals
4. Explain how **enrichment** can be provided through nutrition and feeding.

Range

Invertebrates, fish, amphibians, reptiles, birds, primates, carnivorous mammals, aquatic mammals, ungulates and pachyderms

Unit content

Factors affecting the nutritional requirements

Life stage (juvenile, adult, pregnancy, lactation and geriatric), health status, size, climate and environment

Balanced diet is produced

Range of feeds available and assess the impact of seasonality on availability, appetite of the animal, frequency of feeding, nutritional requirement of animals and nutritional composition of feedstuffs

Dietary supplements

Reasons for supplementation e.g. correction of nutritional deficiencies (vitamins and minerals), promotion of breeding or behaviour

Enrichment

Hiding/disguising food, tongue puzzles, food scent trails, scatter feeding and provision of browse

Unit 318 Understand the Principles of Zoological Animal Health and Husbandry

Notes for guidance

This unit is designed to provide the learner with a knowledge and understanding of the principles of managing animals in captivity (zoos, safari parks and exotic animal collections).

The unit should cover a range of zoo animal species from the following range:

Invertebrates, fish, amphibians, reptiles, birds, primates, carnivorous mammals, aquatic mammals, ungulates and pachyderms

The delivery of the unit is expected to incorporate a mixture of lectures and visits to zoos where learners can benefit directly from the expertise of staff input.

It is expected that the particular aspects of health and safety when working with zoo animals will be stressed throughout the unit, particularly due to size, toxicity and disease transmission.

In Outcome 1, the learner will be required to discuss the importance of the environment and enclosure design for a range of species. This will require learners to have access to a range of specialist resources on site or in the vicinity. They will be expected to prepare plans of enclosures which contain relevant information and report on the effectiveness of enclosures for a range of species in terms of their ability to meet the behavioural needs of the animals within them. Learners will also be expected to describe how the enclosure mirrors the native habitat of the species kept within them and how enrichment is provided to underpin the effectiveness of enclosure design.

Outcome 2 covers the principles of animal restraint and the equipment which it appropriate to use when restraining a range of species. Learners should appreciate the importance of correct restraint as a prelude to transportation, which is subject to legislation. Health and Safety is of paramount importance when dealing with large, undomesticated species. The importance of preparing, presenting and storing transportation paperwork should also be understood by learners.

Outcome 3 covers a range of health diseases and disorders in zoo livestock. Learners will be able to recognise and report on common symptoms, identify appropriate treatments and describe how zoo practitioners can prevent or eliminate disease transfer. Strategies to improve animal welfare will also be discussed.

Outcome 4 covers the principles of animal nutrition in zoos. Learners will discuss how nutrition can make a contribution to health and well being of animals and how a balanced diet can be produced. The requirement for nutrients will be established and contribute to formulating a balanced ration where the role of vitamin and mineral supplementation is recognised. Learners will also be able to identify how the provision of feedstuffs can be part of an enrichment program.

Centres are encouraged to provide vocational relevance to the unit by visits to animal collections and hosting visits by professionals from animal collections to centres.

Delivery of unit content will involve formal lectures and linkage to visits by worksheets.

Learners will be provided with experiences involving a range of animal species in scenarios which reflect current industrial practice.

References

Books

Hossey, G. 2009. Zoo Animals: Behaviour, Management and Welfare OUP:Oxford
Kleiman, D. 1997. Wild Mammals in Captivity: Principles and Techniques Chicago University Press: USA
Dheeran, J.V. 2004.Textbook of Wild and Zoo Animals: Care and Management IBD: UK
Stocker, L. 2005. Practical Wildlife Care 2005) WileyBlackwell: UK
Godsen, C. 2004. Exotics and Wildlife: A Manual of Veterinary Nursing Care. Butterworth Heinmann: UK

Website

www.biaza.org.uk

Unit 319 Understand the Principles of Animal Nutrition

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of animal nutrition. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to describe the main components of an animal's diet and understand the requirements of a balanced diet. The learner will be able to explain how specialist feeders obtain their nutrition. The learner will be able to describe the effects of nutritional disorders and deficiencies.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the functions of the main components of an animal's diet
2. Understand the nutritional values and properties of different food types
3. Understand the feeding requirements of animals, to ensure they receive a balanced diet
4. Know common animal nutritional problems

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/A

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 319 Understand the Principles of Animal Nutrition

Outcome 1 Understand the functions of the main components of an animal's diet

Assessment Criteria

The learner can:

1. Review the contribution of the **major nutrients** of an animal's diet to maintain health and wellbeing
2. Evaluate the **functions** of the major nutrients within the animal's body
3. Describe where and how the major nutrients are digested and absorbed within the body:
   - **Single stomach**
   - **Ruminant**

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Horse Management – Horses, ponies or donkeys

Unit content

Major nutrients

Carbohydrates (monosaccharide, disaccharides and polysaccharides), proteins (amino acids, peptides and polypeptides), fats/lipids (fatty acids), vitamins (fat and water soluble forms), minerals (macro and micro classes), water

Functions

Energy, structure, storage, waterproofing, insulation, growth and repair, anabolism and catabolism

Single stomach

Digestive system organs, e.g. stomach, liver, use of teeth/dentition, role of enzymes, acidic and alkaline secretions, absorption of sugars, amino acids and fatty acids, storage/anabolism, hindgut fermenters, the role of microbes in digestion

Ruminant

Digestive system organs, e.g. compartments of the stomach, caecum, liver, use of teeth/dentition, role of microbial organisms in fibre fermentation, partition of protein in the rumen

Unit 319 Understand the Principles of Animal Nutrition

Outcome 2 Understand the nutritional values and properties of different food types

Assessment Criteria

The learner can:

1. Examine the **requirements for a balanced diet**:
    - nutrient content
    - digestibility
    - palatability
2. Analyse the **nutritional values of different foods and food types**
3. Compare the suitability of **different types of** fresh and prepared **foods** appropriate for feeding a range of animals

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Requirements for a balanced diet

Nutrient content, digestibility, food presentation and palatability, animal appetite, content of diet, suitability for animal, balanced of major nutrients, supplementation required, requirements of animals at different life stages and animals used for different purposes, changes in diet for these animals

Nutritional values of different foods and food types

Compare nutritional values of different foods for animals, e.g. compare nutrient content of wet and dry diets, forage and mixed compounds, comparisons should reflect animals at a variety of life stages

Different types of foods

As applicable to species
Fresh: e.g. fruit, vegetables, meat, forage
Prepared: e.g. dried, tinned, semi-moist, extruded, seeds, nuts

Unit 319 Understand the Principles of Animal Nutrition

Outcome 3 Understand the feeding requirements of animals, to ensure they receive a balanced diet

Assessment Criteria

The learner can:

1. Explain the **requirements for a balanced** animal **diet**
2. **Calculate rations** for a range of animal diets
3. Explain the dietary requirements for animals at **different life stages**

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Requirements for a balanced diet

Nutrients, assess energy and protein needs and work level, energy balance

Calculate the rations

Feed items and ingredients, calculate the amount and the content e.g. energy value (Kcal), gross energy (GE), digestible energy (DE) metabolisable energy (ME), resting energy requirements (RER), basal metabolic rate (BMR), calculate rations of different foods to meet requirements

Different life stages

Growth, breeding/pregnancy, lactation, young, adult and geriatric

Unit 319 Understand the Principles of Animal Nutrition

Outcome 4 Know common animal nutritional problems

Assessment Criteria

The learner can:

1. Describe the **causes and signs of animal nutritional deficiencies, excesses and disorders**
2. Explain how nutritional deficiencies, excesses and disorders can be **treated**

Range

Animal Management – companion (dog or cat) and either small mammals (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals)

Unit content

Causes and signs of animal nutritional deficiencies, excesses and disorders

Undereating (anorexia), loss of appetite, dysphagia, vitamins, minerals, protein, overeating (obesity), constipation, diarrhoea, diabetes, urolithiasis, water and dehydration

Treatments

Balanced intake, supplements, palatability, exercise, fluids, fibre, vitamin or hormone injections, antibiotics, insulin and surgery

Unit 319 Understand the Principles of Animal Nutrition

Notes for guidance

This unit is designed to provide the learner with a sound knowledge and understanding required to provide animals with a balanced diet specific to the animals' needs. The unit should cover a range of species as appropriate to the area of study.

It is expected that learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working. In particular, health and safety issues relating to food preparation and feeding must be stressed to learners and regularly enforced.

Use of a wide range of delivery techniques is possible in this unit. Lectures, discussions, seminar presentations, internet and/or library-based research and practical or interactive lessons can all be employed.

In Outcome 1, the learner will investigate the functions of the major nutrients in the diet and how they are used in the body of a single-stomached animal and a ruminant. The learner will be expected to describe the chemical structure of monosaccharide, disaccharides, fatty acids, amino acids and dipeptides. This outcome is likely to be delivered by formal lectures, presentations and independent learner research.

In Outcome 2, the learner will be able to compare different feeds with regard to the nutrient content, digestibility and palatability. This can be delivered by formal lectures, presentations, seminars, independent learner research or practical activities such as analysing feed bags/packets.

In Outcome 3, the learner will calculate rations for animals within the range and will explain how the ration may differ at different life stages. Some delivery will be by formal lectures, some independent learner research will be required and reference sources will be required for the students to derive energy and protein requirements. Calculations will be required, so access to calculators will be needed.

In Outcome 4, the learner will investigate the effects of nutrition on the health of the animal. This outcome is likely to be delivered by formal lectures, presentations and independent learner research, and would benefit from having guest speakers involved in the delivery, such as vets or vet nurses, representatives from feed companies and animal diet specialists.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

References

Books

Agar, S. 2001. *Small Animal Nutrition* Butterworth-Heinemann, ISBN 075064575X

Burger, I. 1993. *The Waltham Book of Companion Animal Nutrition, 2nd Edition* Butterworth-Heinemann, ISBN 0080408435

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Bishop, R. 2005. The Horse Nutrition Bible: The Comprehensive Guide to the Correct Feeding of your Horse. David & Charles PLC

Journals

Fur and Feather

Websites

www.hillspet.com Hills Science Diets
www.iams.co.uk IAMS/EUKANUBA
www.waltham.com Waltham Centre for Pet Nutrition

Unit 320 Undertake Animal Training

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of animal training and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to combine knowledge of animal learning and behaviour to assess an animal's suitability for training, design a suitable training programme, select appropriate training aids and then train an animal to achieve a desired result. The learner will then be able to assess the training programme and modify it to improve future results.

Learning outcomes
There are **four** learning outcomes to this unit. The learner will:
1. Be able to assess animal behaviour
2. Know how to apply training aids within a training programme
3. Be able to train an animal
4. Understand the success of animal training programmes.

Guided learning hours
It is recommended that 60 hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards
This unit is linked to the Lantra SSC Animal Care/Animal Management NOS:
AC5 Implement basic animal training programmes
AC5.1 Train animals in basic discipline and to achieve specific objectives
AC5.2 Contribute to the evaluation and improvement of animal training programmes
AC18 Design and implement basic discipline training programmes for animals
AC18.1 Design basic discipline training programmes for animals
AC18.2 Train animals in basic discipline
CU40 Train animals to achieve specific objectives
CU40.1 Select animals for training
CU40.2 Design individual training programmes for animals to achieve specific objectives
CU40.3 Implement training programmes to enable animals to achieve specific objectives
CU40.4 Evaluate and improve training programmes which enable animals to achieve specific objectives

Endorsement of the unit by a sector or other appropriate body
This unit is endorsed by Lantra SSC.

Assessment and grading
This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 320 Undertake Animal Training

Outcome 1 Be able to assess animal behaviour

Assessment Criteria

The learner can:

1. Carry out **behavioural assessment** on animals to assess for **suitability** for inclusion into a **training programme**
2. Design a training programme for an animal based on **learning theory** and behavioural assessment.

Unit content

Behavioural assessment

Types of behavioural assessment (e.g. stress scores), suitability for different species/breeds, designing recording sheets and recording results, equipment used (leads, muzzles, goads, kennels, crush cages, catch poles, cat graspers and toys)

Suitability for training

Species, breed, history, temperament, health and behaviour

Training programme

Type of training, duration, reinforcement method (e.g. positive reinforcement, food, social, praise rewards – the Premack principle), reinforcement schedule (how often to reward)

Learning theory

Conditioning (classical and operant), habituation, sensitisation, associative learning, stimulus response, social learning, latent learning and insight learning

Unit 320 Undertake Animal Training

Outcome 2 Know how to apply training aids within a training programme

Assessment Criteria

The learner can:

1. Identify **training aids** that can be used in training programmes for animals
2. Describe how to **correctly use** training aids
3. Evaluate the **effectiveness** of different animal training aids.

Unit content

Training aids

Leads, collars, harnesses, muzzles, rewards (food, toys, praise), chemicals and hormones, whistles

Correct use

Appropriate choice for species, breed, age, sex, appropriate application (fitting for species, breed, age, sex) and appropriate use (when to use and when not to use, considerations for animal health and behaviour)

Effectiveness

Measures of effectiveness (scoring levels, accurate scoring, behavioural testing), recoding effectiveness (recording techniques: filming, scoring, effect of observer)

Unit 320 Undertake Animal Training

Outcome 3 Be able to train an animal

Assessment Criteria

The learner can:

1. Implement **animal training programmes** to achieve **specific goals**
2. **Review** the **progress** of an animal as a result of training sessions.

Unit content

Animal training programmes

Selection of type of training (individual or group, training for work, obedience, trick etc) duration, use of the appropriate reinforcement method, use of a defined reinforcement schedule

Selection of appropriate equipment and correct use of this equipment

Specific goals

House training (e.g. urination and defecation, silence and jumping up), socialisation, trick training (e.g. fetch, jump, balance), obedience training (e.g. lead work, sit, stay, down, leave and come), agility (flyball, dog agility courses), working animals (e.g. following scents, hunting, retrieving, intimidation e.g. bark on command)

Review progress

Monitoring progress (e.g. goals reached, scoring progress), recording progress, (paper, video and computer database) setting goals (SMART targets).

Unit 320 Undertake Animal Training

Outcome 4 Understand the success of animal training programmes

Assessment Criteria

The learner can:

1. **Review the success** of the animal training programme
2. **Review** the **training programmes** for modifications
3. **Implement modifications** to the training programme to improve results.

Unit content

Review success

Review progress and goals (decide whether goals were met, evaluate whether goals were realistic or too easy), were the aims of the training programme met

Review training programme

What worked and what didn't work, type of training, duration, reinforcement method, reinforcement schedule.
Equipment used: leads, collars, harnesses, muzzles, rewards, chemicals and hormones, whistles

Implement modifications

Change the training based on reviews to improve results, further training, advanced training, justification for changing methods

Unit 320 Undertake Animal Training

Notes for guidance

This unit is designed to provide the learner with a sound knowledge and understanding of animal behaviour, learning and training. The leaner should also be able to demonstrate the ability to assess, plan training and implement an animal training programme, reviewing this for success. The unit should cover a range of species appropriate to the study of animal training.

In Outcome 1, the learner will be required to assess animal behaviour and based on this assessment and knowledge of learning theory, design a suitable training programme. It is expected that this will require some formal delivery but it should also be delivered through practical situations outside the classroom, with visits to kennels and catteries, dog training classes or establishments such as police dogs and guide dogs, zoos to see shows such as sea lion and parrot shows, bird of prey centres, equine centres etc.

Outcome 2 requires learners to demonstrate knowledge of training aids that can be used in training animals, their correct use and effectiveness. It is anticipated that the delivery of this unit will be through some formal lectures but mostly with practical demonstrations of the use of training aids as well as visits to kennels and catteries, dog training classes or establishments such as police dogs and guide dogs and possibly to zoos to see how training aids are used on more exotic animals.

In Outcome 3, the learner will be required to implement a training programme to meet a specific goal and review this for success. It is expected that this will require some formal delivery but mostly will consist of practical situations (usually outside the classroom) where learners can train animals. Any animals that are suitable can be used for the training programme. The training itself does not need to be complex, but should involve the setting of, and working towards, goals which are achievable given the type of learner and animal.

In Outcome 4, the learner will be required to demonstrate an understanding of reviewing their training programme, modifying it and implementing changes to improve success. It is expected that this will require some formal delivery but mostly will consist of practical situations (usually outside the classroom) where learners can train animals.

This unit aims to develop the learners' knowledge and understanding of animal training and gain the skills to successfully train animals.

Centres are encouraged to introduce specific employers, professionals and charitable organisations/volunteers from animal training organisations such as guide dogs, police dogs and other animal training centres, as well as take students on visits to training organisations, kennels and catteries. Lessons should be a mixture of formal lessons linked directly with interactive lessons in a real environment.

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Unit 321 Understand the Principles and Carry Out the Practice of Avian Health and Management

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of avian health and management and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

This unit is aimed to provide learners with knowledge of a variety of avian species and their general care and management. The unit includes feeding, accommodation, health, welfare and breeding and would ideally include practical experience with a variety of avian species.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to plan, prepare and monitor accommodation and diet for a variety of avian species
2. Understand the health and welfare requirements of avian species
3. Be able to handle, restrain and transport avian species
4. Know reproductive biology of avian species and breeding plans

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 321 Understand the Principles and Carry Out the Practice of Avian Health and Management

Outcome 1 Be able to plan, prepare and monitor accommodation and diet for a variety of avian species

Assessment Criteria

The learner can:

1. Design **suitable accommodation** for avian species
2. Demonstrate **preparation and presentation** of food, water and supplements for avian species
3. Report on **changes in diet and accommodation** for avian species
4. Create an **enrichment** programme for an avian species

Range

Avian species: two of parrots, parakeets, budgerigars, canaries, finches, fowl, waterfowl, doves, pigeons, lovebirds and birds of prey

Unit content

Suitable accommodation

Cages, cage size, location, substrate, flight, indoor, outdoor, aviaries, flights and height

Preparation and presentation

Seed, bottles, automatic feeders, scatter feeding and live food, water, supplements

Changes in diet and accommodation

Lack of feeding/drinking, change in diet and effects on bird, reporting accommodation problems e.g. hazards and nesting

Enrichment

Perches, branches, toys, use of mirrors and feeding strategies for enrichment

Unit 321 Understand the Principles and Carry Out the Practice of Avian Health and Management

Outcome 2 Understand the health and welfare requirements of avian species

Assessment Criteria

The learner can:

1. Examine the **five animal needs** and how they relate to avian species
2. Examine the **causal factors** and **signs of disease** in avian species, including **notifiable and zoonotic diseases**
3. Explain how disease in avian species are **treated, monitored and recorded**

Range

Avian species: two of parrots, parakeets, budgerigars, canaries, finches, fowl, waterfowl, doves, pigeons, lovebirds and birds of prey

Unit content

Five animal needs

Freedom from hunger, thirst and malnutrition, freedom to express normal behaviour, freedom from pain, injury and disease, freedom from discomfort, freedom from fear and distress

Causal factors

Bacteria, fungi, endo and ecto parasites, viruses

Signs of disease

Eyes, beak, feather condition, movement, interaction with others, lack of flight, visual parasites, skin condition

Notifiable disease

A notifiable disease is any disease that is required by law to be reported to government authorities

Zoonotic disease

An animal disease that can be transmitted to humans

Treatment, monitoring and recording

Types of medication, how to administer, dosage, monitoring an animal for vital signs and signs of improvement, and recording (date, time, signs of health, improvements, medication given)

Unit 321 Understand the Principles and Carry Out the Practice of Avian Health and Management

Outcome 3 Be able to handle, restrain and transport avian species

Assessment Criteria

The learner can:

1. Plan for **transport** of avian species to minimise stress and maintain welfare standards
2. Demonstrate safe use of **handling and restraining equipment** for avian species according to Animal Welfare and Health and Safety policy
3. Carry out **safe handling and restraint** of avian species

Range

Avian species used for handling should be of a robust nature and used to being handled

Unit content

Transport

Methods of transport: box, cage, towel, length of journey, minimising stress (noise, handling, distance, temperature), journey plan, welfare considerations and mode of vehicle

Handling and restraining equipment

Box, net, towel, bag, cage, carrier and gloves

Safe handling and restraint

Safety for self, others and the bird, minimising stress, minimising disruption to other birds and animals, health checking, administering medication (orally, topically), aggressive birds (equipment, assistance, Personal Protective Equipment (PPE)), zoonotic diseases

Unit 321 Understand the Principles and Carry Out the Practice of Avian Health and Management

Outcome 4 Know reproductive biology of avian species and breeding plans

Assessment Criteria

The learner can:

1. Describe the anatomy of the **avian reproductive system** and **breeding triggers**
2. Identify a suitable **breeding environment** for avian species
3. Describe a **breeding plan and monitoring system** for avian species

Range

Avian species: two of parrots, parakeets, budgerigars, canaries, finches, fowl, waterfowl, doves, pigeons, lovebirds and birds of prey

Unit content

Avian reproductive system

Egg and yolk formation and fertilisation, ovary, oviduct, cloaca, sperm ducts and testes

Breeding triggers and environment

Light, temperature, season and hormonal activity

Breeding programme

Pairing birds, introducing birds, timings, monitoring and past success rates

Breeding plan and monitoring system

Times, dates, expected outcomes, recording systems (to record eggs laid, timings, dates, hatch dates, fledging dates, feather appearance and mortality rates)

Unit 321 Understand the Principles and Carry Out the Practice of Avian Health and Management

Notes for guidance

This unit is aimed to provide learners with knowledge of a variety of avian species and their general care and management.

The unit includes feeding, accommodation, health, welfare and breeding and would ideally include practical experience with a variety of avian species.

For Outcome 1, learners are required to plan, prepare and monitor accommodation and diet for a range of bird species as described in the content. This is to include describing suitable accommodation types for individual species, preparing and presenting food, reporting on changes and suggesting enrichment.

For Outcome 2, learners are required to understand the health and welfare requirements of avian species. This is to include common diseases and their signs, how to treat avian species, including monitoring and recording and how the five animal needs relate to avian species.

For Outcome 3, learners are required to handle, restrain and transport avian species. This is to include planning for transport, minimising stress and carrying out the actual handling and restraining in a variety of different situations. The emphasis on this outcome should be practical and only robust species which are accustomed to being handled should be used. Simulation with a model bird could be used if robust species are not available, as the implications of stress and over handling birds are often fatal.

For Outcome 4, the learners are required to know the reproductive biology of avian species and breeding plans. Ideally, the learners could have access to a breeding stock of birds at the centre or on a work experience placement to get a 'real' view of breeding. If not, this could be done via high quality audio visual material. The learners are required to describe reproductive anatomy of birds. To identify a suitable breeding plan, the learners' must research a bird of their choice and plan for breeding. They should also include a monitoring system and a suitable environment for breeding.

The emphasis on the unit must be on safe working practices, as avian species are particularly prone to stress and are known to suddenly die if over handled or stressed. The emphasis throughout the unit should also be on safe working practices and Health and Safety.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

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www.rspca.org.uk	Royal Society for the Protection of Cruelty to Animals
www.bto.org	British Trust for Ornithology

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of biochemistry and microbiology and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

Learners will explore key processes that underpin life and investigate the lifecycle, hazards and benefits of a range of microorganisms.

Learning outcomes

There are **six** learning outcomes to this unit. The learner will:

1. Know the principles of biochemistry in relation to cellular structure and function
2. Understand the production of Adenosine Triphosphate (ATP) from glucose by aerobic and anaerobic respiration
3. Understand enzyme kinetics
4. Understand the growth and reproduction of bacteria, viruses and fungi
5. Know the hazards and uses of microorganisms
6. Be able to isolate and classify bacteria

Guided learning hours

It is recommended that 60 hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/A

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Outcome 1 Know the principles of biochemistry in relation to cellular structure and function

Assessment Criteria

The learner can:

1. Describe the **structure** of **carbohydrates, proteins and lipids**
2. Outline the **function** of **carbohydrates, proteins and lipids** within an animal.

Range

Carbohydrates – monosaccharides, disaccharides, polysaccharides
Protein – amino acids, peptides, proteins
Lipids – triacylglycerols, fatty acids, cholesterol, phopholipids, waxes

Unit content

Structure of carbohydrates

Straight chain and ring structure of monosaccharides and condensation reactions to form 1-4 and 1-6 glycosidic bonds, combination of monosaccharides to produce common dissaccharides, reducing and non-reducing sugars, structures of glycogen, amylase and amylopectin

Structure of proteins

Common structure of an amino acid and significance of the 'R' group, condensation to form a peptide bond. Primary, secondary, tertiary and quaternary structures and the use of hydrogen bonds and disulphide bridges in forming these structures. Fibrous and globular proteins and denaturation

Structure of lipids

Structure of glycerol and fatty acids. Formation of a triacylglycerol from glycerol and three fatty acids. Structure of saturated and unsaturated fatty acids. Naming of fatty acids based upon both 'n' and Omega. Formation of phospholipids and their hydrophilic and hydrophobic properties

Function carbohydrates

Function of carbohydrates as energy stores, respiratory substrates and as structural components of animal and plant cells and tissues

Function of proteins

Function of proteins as respiratory substrates, storage molecules, enzymes, transport molecules (within the cell, across membranes and between cells), cell signalling molecules (hormones, receptors and signal transduction) and as structural components of animal and plant cells and tissues

Function of lipids

Functions of lipids as storage molecules, respiratory substrates, structural components of animal and plant cells and tissues, insulation, protection (e.g. waterproofing), buoyancy (e.g. blubber), cell membranes, and intercellular messengers (e.g. lipid based hormones)

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Outcome 2 Understand the production of Adenosine Triphosphate (ATP) from glucose by aerobic and anaerobic respiration

Assessment Criteria

The learner can:

1. **Explain** the process of
    - **glycolysis**
    - **citric acid cycle**
    - **oxidative phosphorylation**
2. Compare **aerobic** and **anaerobic** respiration

Range

Cellular Glucose Metabolism: Glycolysis, Link Reaction, Citric Acid Cycle (Kreb's Cycle/Tricarboxylic Acid Cycle)
Oxidative Phosphorylation: Respiratory Chain/Electron Transport Chain, ATP Synthase, aerobic respiration, anaerobic respiration

Unit content

Glycolysis

The location of glycolysis in the cell, the principles of energy investment, Adenosine Triphosphate (ATP) use/production and final yield. The significance and production of NADH, pyruvate and water. The changes in chemical structure in terms of changes in the number of carbon atoms and the significance of changes in phosphorylation. The link reaction necessary to form acetyl-CoA from pyruvate

Citric Acid Cycle

The location of the cycle within the entry of acetyl-CoA into the cycle. The number of steps involved in each complete cycle and the changes in the number of carbon atoms as well as the steps that result in production of water, carbon dioxide, NADH, FADH2, and GTP

Oxidative phosphorylation

The location of the electron transport chain and ATP synthase within the cell. The number of protein complexes and the significance of redox reactions, the transport of electrons and the movement of protons. The entry points for NADH and FADH2 and the relative Adenosine Triphosphate (ATP) yields. The principle of proton motive force and the action of Adenosine Triphosphate (ATP) synthase

Aerobic and anaerobic respiration

Comparison of the ATP yield from each. Method of lactic acid production, energetic cost of lactic acid production and the conversion of lactic acid back to glucose, the principle of oxygen debt and the detrimental effects of excess lactic acid in animals

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Outcome 3 Understand enzyme kinetics

Assessment Criteria

The learner can:

Evaluate models of enzyme action

Compare types of enzyme inhibition

Review the effect of environmental changes on enzyme reaction rates

Range

Action, inhibition and control of enzyme catalysed reaction in eukaryotic and prokaryotic cells

Unit content

Action

Lock and Key and Induced Fit models with reference to catabolic and anabolic enzyme reactions

Inhibition

Competitive, non-competitive, reversible and irreversible inhibition and their effect on the velocity of enzyme catalysed reactions

Environmental changes

pH, temperature, substrate and product concentration, and their effect on the velocity of enzyme catalysed reactions. The effect of denaturation on enzyme activity and causes of denaturation

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Outcome 4 Understand the growth and reproduction of bacteria, viruses and fungi

Assessment Criteria

The learner can:

1. Compare the **reproduction** of microorganisms
2. Examine the **growth requirements** of microorganisms

Range

Bacteria, fungi and viruses

Unit content

Reproduction

Binary fission of bacteria, typical bacterial growth curve phases, sporulation (bacteria and fungi), transformation and transduction events, plasmids and their transfer by conjugation, budding. Viral adsorption, penetration, multiplication and release

Growth requirements

The effect of temperature, pH, osmotic variables, oxygen and nutrients. Use of growth requirements in bacterial selection and identification. Hyphae formation in fungi. Reliance of viruses on biochemistry of infected cell. The use of antiseptics, disinfectants, sterilisation (heat, radiation, filtration and chemical) and antibiotics to control microbial growth

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Outcome 5 Know the hazards and uses of microorganisms

Assessment Criteria

The learner can:

1. Describe key **uses** of microorganisms with reference to animal and human health
2. Outline the relevance of **COSHH** legislation with reference to working with microorganisms
3. Identify **hazards** associated with handling microorganisms

Range

Bacteria, fungi, protozoa and viruses

Unit content

Uses

The use of fungi and bacteria in food technology to produce alcohol, foods such as cheese and leavened bread as well as vitamin and amino acid production. Production of high fructose corn syrup, vinegar, citric acid, silage, haylage and the importance of nitrogen fixation. The potential of genetic modification of microorganisms, a current example being insulin derived from bacterial sources. The role of microorganisms in animal digestion in the reticulo-rumen, coecum and large intestine

Control of Substances Hazardous to Health (COSHH) 2002

The application of COSHH to microorganisms including the classification of microorganisms based upon hazard and risk. The application of COSHH to chemicals commonly used in microbiological identification such as disinfectants, stains and solvents

Hazards

Infection/zoonosis, toxin production, environmental contamination, spore formation, aerosols formation. Hazards posed by commonly used equipment and chemicals in microbiological examination and identification such as naked flames, disinfectants, stains and solvents

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Outcome 6 Be able to isolate and classify bacteria

Assessment Criteria

The learner can:

1. **Isolate** a monoculture from a mixed culture of bacteria under aseptic conditions
2. Use microbiological **tests to classify** a bacteria using a key

Range

Bacteria

Unit content

Isolate

Obtain a pure monoculture from a mixed culture of two or more species

Tests to classify

Use of a key to identify a monoculture of bacteria based upon the media composition, cellular metabolism, oxygen availability, colony morphology, motility, cell morphology and chemical staining properties

Unit 322 Understand the Principles and Carry Out the Practice of Biochemistry and Microbiology

Notes for guidance

This unit is designed to provide learners with an understanding of cell metabolism and microbiology as well as the importance of these to the life and well being of all animals.

Throughout the unit, the emphasis should be on safe working and the use of investigative methods. It is expected that learners will be aware of and familiar with safe laboratory working practices within the context in which they are working. This unit provides an opportunity for learners to develop not only general laboratory training but also to learn specific and valuable microbiological techniques currently used in industry and research.

In Outcome 1, the learner will be required to describe the structure-function relationships of a range of carbohydrates, proteins and lipids. Although it is accepted that formal lectures will play a role in delivering this outcome, it is recommended that an investigative practical laboratory approached is used where possible. Learners should be able to see and handle examples of different molecules and where possible compare and contrast their properties. For example learners might explore the physical properties of oils, fats and waxes and relate these to their chemical structure.

Outcome 2 is principally concerned with glucose metabolism by aerobic and anaerobic methods. This central pathway also provides an opportunity to explore the metabolism of both proteins and lipids as well as the role played by a range of vitamins and minerals in cell metabolism. Again it is accepted that formal lectures will be used during the delivery of this outcome, however there is scope for a more investigative approach. Yeast provides excellent models for aerobic and anaerobic respiration and learners themselves can be used to demonstrate the physiological effects of anaerobic respiration, which may then be related to the underlying biochemistry.

Outcome 3 explores the role of enzymes in cell metabolism and provides an excellent opportunity for learners to perform a practical investigation into enzyme kinetics. A range of plant and animal derived enzymes are available and a wide range of investigations may be derived from these. There are also a number of commercially available kits that may be used to investigate enzyme kinetics.

The delivery of Outcomes 4, 5 and 6 will involve a degree of formal lectures, though there is the opportunity to combine bacteriological aspects of Outcomes 4 and 5 into a practical microbiological investigation used to deliver Outcome 6. Learners should also have the opportunity to investigate the use of micro organisms in food production, which also provides an opportunity to learn about the reproduction and growth of fungi, for example in the production of wine, vinegar or blue cheese. The inhibition of bacterial growth may also be incorporated into the investigation involved in Outcome 6, for example through the use of disinfectant washes or antibiotic sensitivity testing discs.

Outcome 6 is designed to be delivered through a practical microbiological investigation whereby learners start with a mixed bacterial culture and are able to isolate and identify a monoculture using a simple bacterial key. CLEAPSS provides guidelines for working with micro organisms within education and many of the associated hazards can be avoided by purchasing ‘known’ non-pathogenic cultures. These may then be combined to produce a mixed culture that learners can work from. This investigation provides an opportunity for learners to gain experience of current industry techniques and acquire valuable practical skills.

Centres are encouraged to engage employers and other institutions wherever possible and this unit would benefit from any such engagement. Possible activities may include visits to research labs, food processing facilities and diagnostic facilities. It is worth noting that many publicly funded research grants specify an

obligation for public engagement and that it is envisaged that this unit may be particularly useful to learners wishing to progress to higher education.

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www.sgm.ac.uk	Society for General Microbiology
www.sfam.org.uk	Society for Applied Microbiology
www.royalsociety.org	The Royal Society
www.biochemistry.org	The Biochemical Society

Unit 323 Participate in Business Planning and Improvement in the Land-based Sector

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of business planning and improvement in the land-based industries and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will explore business improvement, including opportunities for diversification, how it can give a competitive advantage and reduce environmental impact. They will learn the skills necessary for developing a business idea, and preparing a business plan.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand business improvement in land-based industries
2. Be able to identify and plan opportunities for practical business improvement
3. Be able to develop a land-based business idea
4. Be able to prepare a business plan

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 323 Participate in Business Planning and Improvement in the Land-based Sector

Outcome 1 Understand business improvement in land-based industries

Assessment Criteria

The learner can:

1. Describe **strategies** that a land-based business can adopt to **improve performance**
2. Describe ways that a land-based business can achieve **competitive advantage**
3. Describe how a land-based business can improve its **environmental impact**

Unit content

Strategies

Consolidation, expand market share, product development, market development, diversification, (opportunities and risks) and Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis

Improve performance

Improved effectiveness and efficiency in key business functional areas, e.g. products, services, marketing, customer relations, staffing, staff management, working practices, production efficiency, financing, financial control, internal factors impacting on business performance (e.g. resources and management), external factors impacting on performance (e.g. political, economic, socio-cultural and technological)

Competitive advantage

Price, differentiation (e.g. quality, location, customer service and perceived added value), use of marketing mix (product, price, place and promotion)

Environmental impact

Resource use, waste, recycling, pollution (chemical, biological, visual, audible, light), road traffic, carbon footprint, enhancement of the environment (e.g. preservation or creation of habitats, conservation of structures), principles of sustainability, relevant environmental legislation (e.g. Wildlife and Countryside Act 1981 (as amended 1991), Environmental Protection Act 1990 (as amended 1995), Control of Substances Hazardous to Health (COSHH) 2002, The Control of Pollution Regulations (Oil Storage) (England) Regulations 2001, Water Framework Directive (WFD), Cross Compliance, Nitrates Directive, Waste Management (England and Wales) Regulations 2006

Unit 323 Participate in Business Planning and Improvement in the Land-based Sector

Outcome 2 Be able to identify and plan opportunities for practical business improvement

Assessment Criteria

The learner can:

1. Identify **potential improvements** in a business within a land-based context
2. Prepare a **plan for achieving business improvements** or **diversification** within a land-based context

Unit content

Potential improvements

Improvements in key business functional areas, e.g. products, services, marketing, customer relations, staffing, staff management, working practices, production efficiency, financing, financial control, importance of continuous improvement

Plan for achieving business improvements

Specific actions, rationale, timescale, resource implications, financial implications (costs, likely returns), key factors for success and risks

Diversification

Opportunities for diversification (e.g. forward, backward, horizontal), related, unrelated, evaluation of opportunities in relation to resources, skills and finance needed

Unit 323 Participate in Business Planning and Improvement in the Land-based Sector

Outcome 3 Be able to develop a land-based business idea

Assessment Criteria

The learner can:

1. Develop a land-based **business idea**
2. **Research the market** for a land-based business idea

Unit content

Business idea

Establishment of a new business, diversification or development of new enterprise and implement improvements to an existing business

Research the market

Market analysis (size, trends, competition, segmentation, target market), primary and secondary research

Unit 323 Participate in Business Planning and Improvement in the Land-based Sector

Outcome 4 Be able to prepare a business plan

Assessment Criteria

The learner can:

1. Produce a **business plan** to meet given specifications
2. **Present** a land-based business plan

Unit content

Business plan

Purposes of the business plan, business products or services, aims and objectives, market analysis (size, trends, competition, segmentation, target market), physical resources (e.g. property, machinery, vehicles, equipment and stock), human resources (staffing structure, management and key personnel, job descriptions and person specifications), promotion (media and cost), financial forecasts (setting up costs, pricing, income, costs, profit and monthly cash flow forecast), finance needs, sources of finance (equity, borrowing and grants), legal issues e.g. legal status (sole trader, partnership, company, franchise and co-operative), trading terms and conditions, trading standards, licences, relevant current legislation, planning permission, health and safety, fire regulations, regulatory bodies, sources of advice (solicitor, accountant)

Present

Different audiences (e.g. bank, investors and business management), written report format, oral presentation

Unit 323 Participate in Business Planning and Improvement in the Land-based Sector

Notes for guidance

This unit allows learns to explore the importance of improvement and planning for future business development. It should be related to the types of business relevant to the learners' vocational area and can include all forms of business, including not-for-profit organisations, not just commercial private sector businesses.

In Outcome 1, learners will investigate how business improvement should be sought in all of the key functional areas. They will discover that a sound business strategy derives from an understanding of current strengths, weaknesses, opportunities and threats and provides a focus for future improvements and development. They will also learn about the importance of sustainability and the need for businesses to reduce their environmental impact. The use of case studies and business visits would enhance the learning about these issues.

Outcome 2 progresses from the learning about business improvement in outcome 1. Learners will identify specific improvements that could be made in a selected business from some of the key functional areas listed. These improvements could involve opportunities for business diversification, but learners should be cautioned that diversification is often a high risk strategy and opportunities need to be carefully evaluated. They will need to prepare a detailed plan for implementation of proposed improvements.

Outcomes 3 and 4 include a broad range of content and delivery of the module should allow for this. In outcome 3 learners need to propose a land-based business development. This could be based on business improvements or developments identified in outcome 2, a diversification proposal or for a new business start-up.

In Outcome 4, learners need to prepare a business plan for the business idea developed in Outcome 3. The completed business plan should be addressed to a specific audience and include business products or services, aims and objectives, market analysis, physical resources, human resources, promotion, financial forecasts, finance needs, sources of finance, legal issues. It would help learners if they can be provided with a suitable template for construction of the business plan.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

References

Books

Gillespie, A. 2002. *Business in Action* Hodder Arnold,

Jones, R. Raffo, C. and Hall, D. 2004. *Business Studies*, 3rd Edition Causeway Press

Nix, J. Farm Management Pocketbook

Warren, M. 1997. *Financial Management for Farmers and Rural Managers* Blackwell

Lewis, R. & Trevitt, R. 1997. *BTEC National Business* Nelson Thornes

Dooley, D. Dransfield, R. 2007 Goymer, J. & Guy, P. *BTEC National Business* Heinemann

Barrow, C. Tiffany P & Peterson S 2004*Business Plans for Dummies* (John Wiley & Sons)

Finch, B. 2006. *How to Write a Business Plan* Kogan Page

Unit 324 Understand the Principles of Aquatics Husbandry and Management

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of aquatics husbandry and management. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The aim of this unit is to develop learner skills and knowledge of aquatics to improve welfare of aquatics animals in captivity. This will be achieved by looking at the biology of aquatic creatures, feeding methods and foods, maintenance of aquatic systems and recognition of diseases and health.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand commonly kept fish species and aspects of their biology
2. Understand foods and feeding techniques for aquatic species
3. Understand how to develop and maintain aquatic systems
4. Know the main fish diseases and causes of ill health

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 324 Understand the Principles of Aquatics Husbandry and Management

Outcome 1 Understand commonly kept fish species and aspects of their biology

Assessment Criteria

The learner can:

1. Explain the functions of the **physical features** of given fish species
2. Evaluate the **breeding strategies** of given species of fish

Range

Tropical, marine, coldwater, freshwater, brackish

Unit content

Physical features

Dorsal fin, anal fin, caudal fin, adipose fin, pelvic fin, pectoral fin, lateral line, gills, eyes, mouth, dentition, scales, mucous, swim bladder, heart, digestive tract, stomach, lack of stomach, gonads, kidney, liver, gall bladder, genital opening, anus

Breeding strategies

K and R strategies, egg scattering, substrate brooding, nest building, live bearing, and parental care (pre and post natal)

Unit 324 Understand the Principles of Aquatics Husbandry and Management

Outcome 2 Understand foods and feeding techniques for aquatic species

Assessment Criteria

The learner can:

1. Evaluate the **feeding strategies** of given fish species
2. Discuss **methods** of presenting **foods** to fish in an aquarium
3. Explain how **incorrect feeding** of fish can impact on **water quality**

Range

Tropical, marine, coldwater, freshwater, brackish

Unit content

Feeding strategies

Top water feeders, mid water feeders, substrate feeders, filter feeders, carnivores, herbivores, omnivores, insectivores, browsers

Methods

Scatter feeding, automatic feeding, hand feeding, drip feeding, frequency of feeding

Foods

Flake food, pellets, live food, frozen food, fresh food, freeze dried, vitamins, proteins, lipids, carbohydrates, minerals, fibre, colour enhancers, water soluble vitamins

Incorrect feeding

Overfeeding, starvation, incorrect food type, bite size

Water quality

Oxygen levels, ammonia levels, turbidity, pH

Unit 324 Understand the Principles of Aquatics Husbandry and Management

Outcome 3 Understand how to develop and maintain aquatic systems

Assessment Criteria

The learner can:

1. Explain the **equipment** requirements for a selected **aquarium**
2. Evaluate given **locations** for **suitability** for an aquarium
3. Explain the **health and safety** requirements of a given aquarium
4. Discuss how a given aquarium system complies with relevant current **legislation**

Range

Tropical, marine, coldwater, freshwater, brackish

Unit content

Equipment

Light: incandescent, fluorescent tube, metal halide, light spectrum
Filter: under gravel filter, foam filter, power filter, mechanical filter, chemical filter, biological filter, UV steriliser, foam fractionation, activated charcoal/carbon and ozonation
Substrate: gravel, sand, no substrate
Heating: heater and thermostat

Aquarium

Tropical freshwater, temperate freshwater, tropical marine, planted

Locations

Home (kitchen, bedroom, bathroom, living room, window), workplace, waiting room

Suitability

Proximity to power, proximity to water and waste disposal, floor loading, passing traffic, air quality

Health and Safety

Circuit breakers, damaged equipment, hygiene, Control Of Substances Hazardous To Health Regulation 1988 (COSSH), Reporting of Injuries, Diseases and Dangerous Occurrences Regulations1995 (RIDDOR), risk assessments, dangerous animals e.g. piranhas, stingrays

Legislation

Health and Safety at Work Act (1974), Zoo Licence Act (1981), Animal Welfare Act (2006), Convention on International Trade in Endangered Species (CITES), Import of Live Fish Act (1980), Pet Shops Act (1951).

Unit 324 Understand the Principles of Aquatics Husbandry and Management

Outcome 4 Know the main fish diseases and causes of ill health

Assessment Criteria

The learner can:

1. Describe the **common causes** of **disease** in fish
2. Describe the **records** which should be kept for a given aquarium

Range

Tropical, marine, coldwater, freshwater, brackish

Unit content

Common causes

Water quality: pH, hardness, temperature, ammonia, nitrite, nitrate

Pathogens: bacteria, protozoa, fungi, nematode, digenea, monogenea

Disease

White spot, Velvet, Costia, Trichodina, Camellanus, Mouth fungus, Mycobacteria sp, dropsy, exophthalmia, Zoonoses

Records

Species, age, sex, births, deaths, numbers, arrival date, removal date, destination, source of new livestock, treatments, water change date, temperature, water test readings and date taken- nitrite, nitrate, ammonia, pH, disease

Unit 324 Understand the Principles of Aquatics Husbandry and Management

Notes for guidance

This unit is designed to provide the learner with sound knowledge and understanding required to improve the welfare of aquatic animals. It should cover both marine and freshwater aquaria. The range of species covered should reflect both types of water.

Throughout the unit, emphasis should be on safe working. It is expected the learner will be aware of safe working practice and be familiar with accepted practices and behaviours.

In Outcome 1, the learner will become familiar with the physiology of a fish, both internal and external anatomy. The learner will also become familiar with a range of reproductive strategies employed by fish species. This outcome will require formal delivery and assessment criteria 1.1 could involve practical dissection of a fish. For the breeding, species showing contrasting strategies should be selected e.g. egg scattering (*zebra danio)* and a live bearing (*ameca spendens*).

In Outcome 2, it is anticipated the learner will become familiar with the types of food available to feed to fish and the methods of feeding fish. This could be delivered formally but equally could be done as practical exercises. There is a direct link with learning Outcome 4 (causes of fish disease) and Outcome 1 (internal structure of digestive tract). Learners should be aware of digestive system of fish (stomach size), and relate this to frequency of feeding. The effects of poor feeding should be delivered formally. Emphasis should be placed on feed/fast strategy normally used with fish, and its effects on waste products.

In Outcome 3, it is anticipated that learners will become familiar with the different life support equipment available for use in aquaria. This could be delivered as a practical workshop and/or visits to various aquatic establishments. It will require some formal delivery to ensure all contents are covered. Health and safety is an important aspect of this outcome and learners will be expected to be aware of risks and how to reduce them. Legislation is also part of this outcome and learners should be aware of how it affects different aquaria and aquatic establishments. This could be covered with visits to different aquatic establishments. Safe working practice should be emphasized throughout the unit.

In Outcome 4, learners should become familiar with the common diseases of fish. They should learn about the life cycles of the common disease organisms and their impact on human health. There are links to Outcome 2 as water quality is common to both outcomes.

Whilst this unit could be delivered entirely formally, it is expected that visits to aquatic establishments will be carried out. These should provide interest, experience and add depth to the learner knowledge. Suitable guest speakers could further enhance delivery. Some aspects of the learning outcomes could be acquired from industry placements, learners could be encouraged to add their experiences to the delivery.

It is accepted that formal lectures will be necessary at level 3 but for this unit, it is recommended that they are they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

References

Books

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Bailey, M. & Burgess, P. 2000.*Tropical Fishlopaedia: A complete Guide to Fish Care* Howell Books. ISBN 152451554

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Spotte, S. 1993. *Marine Aquarium Keeping: The Science, Animals and Art*, 2nd Ed. John Wiley and Sons. ISBN 047159489X

Appropriate journals

Practical Fishkeeping Magazine
Todays Aquarist

Websites:

www.cefas.co.uk	The Centre for Environment, Fisheries and Aquaculture
www.defra.gov.uk	Department of Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.ornamentalfish.org	Ornamental Aquatic Trade Association
www.lantra.co.uk	Lantra Sector Skills Council
www.hse.gov.uk	Health and Safety Executive

Unit 325 Understand the Principles and Carry out the Practice of Wildlife Population Surveys, Ecology and Conservation

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of wildlife populations, ecology and conservation and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The unit aims to enable the learner to be able to identify and conduct surveys of wildlife habitats and ecosystems. It will consider fluctuations in ecosystems and the reasons for these fluctuations, both natural and human influenced. Learners will also understand the wildlife populations within ecosystems, the interactions between these and the conservation strategies used to preserve ecosystems.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand changes in global ecosystems
2. Understand national and international conservation strategies for wildlife and their habitats
3. Understand population dynamics
4. Be able to conduct a field study of habitats and wildlife populations

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

EC2 Survey and report on the condition of the environment
EC6 Communicate environmental information
EC23 Prepare, conduct and report on field surveys

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 325 Understand the Principles and Carry out the Practice of Wildlife Population Surveys, Ecology and Conservation

Outcome 1 Understand changes in global ecosystems

Assessment Criteria

The learner can:

1. Explain **global changes** in ecosystems
2. Illustrate **wildlife population changes** in ecosystems
3. Assess **reasons for global wildlife population fluctuations**

Unit content

Global changes

Population shifts, trends, speciation, scales, individuals, species, communities, ecological niches, demes, climate change, drought, famine

Wildlife population changes

Metapopulations, seasonality, growth, dissolution, dispersal, genetic variability, continuity in time, fecundity, natality, mortality

Reasons for global wildlife population fluctuation

Seasonality, migration, emerging diseases, climate change, habitat destruction, influence of man

Unit 325 Understand the Principles and Carry out the Practice of Wildlife Population Surveys, Ecology and Conservation

Outcome 2 Understand national and international conservation strategies for wildlife and their habitats

Assessment Criteria

The learner can:

1. Review **national conservation strategies** for wildlife and their habitats
2. Discuss **international conservation strategies** for wildlife and their habitats

Range

Conservation strategies: in situ and ex situ conservation

Unit content

National conservation strategies

Current applicable conservation strategies: biodiversity action plans, Wildlife Trust, National Wildlife Federation, Royal Society for the Protection of Birds (RSPB), application of relevant legislation (Environment Act (1995), Wildlife and Countryside Act 1981 (as amended 1991))

International conservation strategies

Current applicable conservation strategies: charity strategies, International Union Conservation of Nature (IUCN), endangered species international, Worldwide Fund for Nature (WWF), International Wildlife Conservation Society, application of the Convention on International Trade in Endangered Species (CITES), UN Convention on Biodiversity, Conservation (Natural Habitats etc) Regulations 1994

Unit 325 Understand the Principles and Carry out the Practice of Wildlife Population Surveys, Ecology and Conservation

Outcome 3 Understand population dynamics

Assessment Criteria

The learner can:

1. Explain **predator prey interactions** within wildlife populations
2. Discuss **types of evolution** within animal populations

Unit content

Principles of population dynamics

Growth, dispersion, genetic variability, continuity in time, factors that influence population, size, form, resources, demes, fluctuations, fecundity, natality, mortality, immigration, emigration, breeding strategies (r and K)

Predator prey interactions

Positive and negative interactions, primary consumers, secondary consumers, parasite: host, natural selection, hunting strategies, predation theories, predator density and prey density, prey defences

Types of evolution

Divergent, convergent, parallel

Unit 325 Understand the Principles and Carry out the Practice of Wildlife Population Surveys, Ecology and Conservation

Outcome 4 Be able to conduct a field study of habitats and wildlife populations

Assessment Criteria

The learner can:

1. **Plan an ecological survey** of habitats
2. Carry out an **ecological survey** of habitats
3. Carry out a **wildlife population survey**

Unit content

Plan an ecological survey

Objective setting and planning, risk assessment, health and safety, legislation, codes of practice

Ecological survey

Sampling (quadrat, kick, transect), data analysis methods

Wildlife population survey

Phase 1 surveys, habitat surveys, species surveys

Unit 325 Understand the Principles and Carry out the Practice of Wildlife Population Surveys, Ecology and Conservation

Notes for guidance

This unit is designed to provide an overview of the principles of ecology and conservation that influence wildlife populations at a National and International level.

The unit should consider a range of wildlife populations in a variety of habitats (mammals, reptiles, amphibians, invertebrates, birds) within the British Isles and on the International stage. It should aim to incorporate historic, current and emerging issues in wildlife population dynamics and conservation to enable the learner to fully develop a worldwide perspective on conservation issues and strategies developed to counteract them.

Throughout the unit the emphasis should be on the contextualisation of the principles of population dynamics discussed into real world examples to enable the learner to fully engage with the concepts discussed and current issues. Safe working practices and compliance with relevant legislation, codes of practice and health and safety should be emphasised before and during practical surveying.

Outcome 1 encourages the identification and exploration of global and national ecosystems and to identify how these have and are currently evolving. Specific emphasis should be given to changes in wildlife population changes and the potential abiotic and biotic factors that produce these fluctuations. Delivery is expected to be formal but should be complimented by the inclusion of interactive resources including videos and case studies to encourage the learner to contextualise.

In Outcome 2, the learner will develop an understanding of both National and International conservation strategies. Delivery should provide an overview of historic and current strategies and how these interlink. Learners should be encouraged to apply conservation strategies to biodiversity action plans and conservation objectives, and should be able to discuss their potential impact. Delivery is envisaged to be a combination of formal and interactive sessions, and the inclusion of guest speakers or case studies which can contextualise conservation strategies is to be encouraged.

Outcome 3 encourages the exploration of the principles of population dynamics and should be discussed with reference to a range of examples, and should include consideration of the interrelationship of plant and animal (mammals, birds, invertebrate, amphibian and reptile) species. The learner will explore evolutionary strategies to propose how current population dynamics have formed. Delivery is expected to be formal but should be complimented by practical activities, videos and case studies to encourage the learner to contextualise the factors covered. Current and topical issues in population dynamics and conservation should be highlighted.

Outcome 4 continues with the development of practical ecological surveying skills. Practical field study opportunities to develop core skills are necessary to compliment formal delivery. A range of habitats that incorporate access to numerous wildlife species should be available for study and a variety of sampling methods practically undertaken. Learners should be encouraged to plan, undertake and reflect on sampling in reference to method, sources of error, results, conclusions drawn, legislation and health and safety.

Learners working towards Level 3 are expected to have underpinning knowledge in British wildlife and plant identification and should be able to relate this to ecological surveying: Personal interest in current and emerging issues in conservation is envisaged. The unit aims to build upon foundation knowledge to discover the complex relationships that exist within global ecosystems in the natural world and how these influence population dynamics. Learners are required to be able to review ecosystems and to formulate possible

explanations for current population dynamics and trends within these. The learner will develop knowledge of the application of conservation strategies for wildlife and habitat preservation at both a national and International level. It is expected that delivery will be formal but emphasis should be placed on the development of practical surveying skills and ability to interpret the results of surveys and contextualise these into short and long term impacts on populations and ecosystems. It is important that the learner understands the influence of legislation, codes of practice and health and safety in respect of ecological surveying.

Centres are encouraged to introduce case studies from real environments and guest speakers from relevant industries e.g. Wildlife Trust to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of habitats to add depth to the learner experience. It is accepted that formal lectures will be necessary at Level 3 but for this unit it is necessary to compliment this with practical opportunities and recommended to introduce interactive sessions in a real environment and integrate the appraisal of population case studies with respect to conservation at both national and international levels.

References

Books

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Danchin, E., Giraldeua, L.A., Cezilly, F.,2008. *Behavioural Ecology, An Evolutionary Perspective on Behaviour*. OUP Oxford: Oxford ISBN: 0199206295
Krebs, JR Davies, B 1997. *Behavioural Ecology: An evolutionary approach.* Wiley Blackwell: UK ISBN: 0632035463

Journals

Journal of Ecology
Ecology
Behavioural Ecology
Ecologist
BBC Wildlife
Birds
Forest Life
Shooting and conservation

Websites

www.ecology.com
www.nhm.ac.uk/research-curation/projects/worldmap
www.globalissues.org.uk
www.ukbap.org.uk

Unit 326 Understand and Undertake Wildlife Management and Rehabilitation

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of wildlife management and rehabilitation and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to survey, monitor and manage wildlife populations in situ as well as assessing wildlife casualties and planning for their successful rehabilitation and release back into the wild. The learner will also be able to understand the issues between humans and wildlife that often lead to conflict between the two.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to carry out wildlife population monitoring
2. Be able to rehabilitate wildlife
3. Understand wildlife and human interaction
4. Know how to manage wild animal populations

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

AC 20.1 Release animals
CU 34.1 Promote and maintain the health and well-being of animals
CU 34.2 Deliver basic treatments to animals

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 326 Understand and Undertake Wildlife Management and Rehabilitation

Outcome 1 Be able to carry out wildlife population monitoring

Assessment Criteria

The learner can:

1. **Plan** a wildlife population survey
2. Carry out a wildlife **population survey**

Unit content

Plan

Type of animal (terrestrial or aquatic: invertebrate, reptile, amphibian, bird or mammal), type of survey (mark - recapture, mark - resight), wildlife signs survey, entire population counts, distance sampling, harvest models, capture techniques (traps, bomas, drugs, nets), habitat type (woodlands, freshwater, estuary and coastal, hedgerows and verges, marshes, grasslands, heathlands, uplands), season (effect of foliage on viewing, temperature, rainfall, breeding and mating seasons), time of day, (nocturnal, diurnal and crepuscular species), equipment to be used, (traps, markers, viewing equipment, Personal Protective Equipment (PPE))

Population survey

Type of survey: (mark - recapture, mark - re-sight), wildlife signs survey, entire population counts, distance sampling, harvest models

Unit 326 Understand and Undertake Wildlife Management and Rehabilitation

Outcome 2 Be able to rehabilitate wildlife

Assessment Criteria

The learner can:

1. Carry out **initial assessment** of wildlife casualties
2. Create a **rehabilitation plan** for a wildlife casualty

Unit content

Initial assessment

Physical signs (e.g. bleeding, loss of fur/feathers, limping, vomiting, heavy breathing), temperature, pulse, respiration and behaviour

Diagnosis: clinical tests (blood tests for viruses, bacteria, parasites and health e.g. mineral levels, urine analysis for hormone levels and faecal analysis for parasites), equipment used (crush cage, noose, catch pole, towel, gloves/gauntlets, muzzles, goads, nets, bags, hoods and PPE)

Rehabilitation plan

Diagnosis and treatment, general husbandry (feeding, water, disease prevention and hygiene, enrichment and behaviour), assessment and preparation for release, barrier nursing to prevent imprinting and habituation to humans

Unit 326 Understand and Undertake Wildlife Management and Rehabilitation

Outcome 3 Understand wildlife and human interaction

Assessment Criteria

The learner can:

1. Explain **human threats** to wildlife populations and individuals
2. Examine the **ethical implications** of wildlife intervention strategies.

Unit content

Human threats

Habitat fragmentation, human encroachment, climate change, pollution, introduced species, competition, disease, Road Traffic Accidents (RTA), hunting, illegal trade and habitat destruction

Ethical implications

Unfair advantages such as overfeeding, vaccinations, feeding after release, animals taken into captivity in order to save them, should they be left in the wild, captivity versus habitat conservation, hybrids created in captivity and through habitat fragmentation and human encroachment on territories that would not normally overlap, research issues (gene banks, genetic engineering, selective breeding and animals used in research)

Unit 326 Understand and Undertake Wildlife Management and Rehabilitation

Outcome 4 Know how to manage wild animal populations

Assessment Criteria

The learner can:

1. **Identify wild animal species** and **behaviour patterns**
2. Describe species **habitat requirements**
3. Outline a **population management** plan for a wildlife species

Unit content

Identifying wild animal species

Common and Latin names, binomial nomenclature, identifying characteristics and Linnaean classification

Behaviour patterns

Diurnal, nocturnal or crepuscular, feeding behaviour, mating behaviour, territoriality, dominance and migration

Habitat requirements

Environment, (flora, shelter, soil), proximity to predators, other territories and human populations

Population management

Food availability, population control (culling, cropping, sterilisation), surveying (aerial surveys, mark recapture, identifying animals), recording (paper based, computer based), disease control (vaccinating, prophylactic treatments, isolation of populations to prevent disease spread and culling), capture, holding (accommodating captured animals), predator prey relationships, migration and emigration

Unit 326 Understand and Undertake Wildlife Management and Rehabilitation

Notes for guidance

This unit is designed to provide the learner with the skills to carry out population surveys and rehabilitate wildlife, an understanding of wildlife and human interaction and knowledge of how to manage wild animal populations.

The unit should cover a range of species appropriate to the study of wildlife.

In Outcome 1, the learner will be required to plan and carry out a wildlife population survey. It is expected that this will require some formal delivery but it should also be delivered through practical situations outside of the classroom, with visits to habitats to plan and complete the population survey.

Outcome 2 requires learners to carry out an initial assessment of a wildlife casualty and then create a rehabilitation plan. It is anticipated that the delivery of this outcome will be through formal lectures, with the use of relevant and up to date case studies to demonstrate wildlife casualties or visits to rehabilitation centres.

In Outcome 3, the learner will be required to demonstrate an understanding of wildlife and human interaction. It is expected that this will require mainly formal delivery through examinations of case studies of human intervention such as setting up of National Parks, breeding programmes and educational campaigns.

In Outcome 4, the learner will be required to demonstrate knowledge of how to manage wildlife populations. It is expected that this will require formal delivery but it should also be delivered through practical situations outside of the classroom, with visits to wildlife release reserves where the populations are managed. Case studies can be used to show successful management.

This unit aims to develop the learners knowledge and understanding of wildlife species, the issues currently faced by wildlife, human impact on wildlife and how to manage wildlife populations. Emphasis should be placed on a variety of species. Use should be made of local areas for the population survey, wildlife reserves and rehabilitations centres. Great care should be taken not to impact on the population surveyed.

Centres are encouraged to introduce specific employers, professionals and charitable organisations/volunteers from wildlife monitoring and rehabilitation organisations, as well as take students on visits to specific habitats, wildlife rehabilitation centres and wildlife reserves, to provide interesting and relevant information to the learner and add to the learner experience. Lessons should be a mixture of formal lessons linked directly with interactive lessons in a real environment.

References

Books

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Jordan, W. & Hughes, J. 1991. C*are for the Wild: First Aid for All Wild Creatures* University of Wisconsin Press.ISBN 029913184X

McDonald, D. & Barrett, P. 1993. *Mammals of Britain and Europe* (HarperCollins Publishers. ISBN 0002197790

Mullineaux, E., Best, D. & Cooper, J., 2003. *BSAVA Manual of Wildlife Casualties* Blackwell Publishers ISBN 0905214633

Peterson, R., Mountfort, G. & Hollom, P. 2004. *Birds of Britain and Europe, 5th Edition* HarperCollins Publishers ISBN 0007192347

Porter, V. 1989. *Animal Rescue* Ashford, Buchan and Enright ISBN 1852531967

Sinclair, A., Fryxell, J. & Caughley, G. 2006 *Wildlife Ecology, Conservation, and Management* Blackwell Publishing Professional. ISBN 1405107375

Journals and CD ROMs

Proceedings of Symposia of The British Wildlife Rehabilitation Council (1988, 1990 and 2000) available via BWRC website (www.bwrc.org.uk)

Wildlife Rehabilitation and Animal Welfare journal

Wildpro CD ROM '*UK Wildlife: First-aid and Care*'

Journals

Zoology journal

Websites

www.bwrc.org.uk	British Wildlife Rehabilitation Council
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.field-studies-council.org	Field Studies
www.iwrc-online.org	International Wildlife Rehabilitation Council
www.rspca.org.uk	The Royal Society for the Prevention of Cruelty to Animals
www.wildlifeinformation.org	Wildlife Information Network

Unit 327 Chemistry for Biology Technicians

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of chemistry for biology technicians and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to relate enthalpy changes to the bonding of a range of substances
2. Be able to show how rates of reaction are affected by varying the reaction conditions
3. Be able to interpret key features of equilibrium processes
4. Be able to demonstrate the structure and properties of simple organic molecules

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed SEMTA.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 327 Chemistry for Biology Technicians

Outcome 1 Be able to relate enthalpy changes to the bonding in a range of substances

Assessment Criteria

The learner can:

1. Carry out experiments to illustrate the relative magnitudes of the **enthalpy changes** associated with the formation and breakage of chemical **bonds**

Unit content

Enthalpy changes

First, second and third laws of thermodynamics. Enthalpy as an extensive property and a function of state. Enthalpy change diagrams and calculation, change in enthalpy for simple chemical reactions, stoichiometric calculations, measurement of heat capacity and specific heats. Hess's Law and standard enthalpies of formation. Enthalpy changes in ionic reactions, combustion and cellular respiration. Standard free energy change

Bonds

The formation and breakage of ionic, covalent and hydrogen bonds and the relevance of Van de Waals forces. Use of the periodic table to determine the structure of simple ionic and covalent compounds. Balancing of chemical equations

Unit 327 Chemistry for Biology Technicians

Outcome 2 Be able to show how rates of reaction are affected by varying the reaction conditions

Assessment Criteria

The learner can:

1. Carry out experiments to show the effect on the **rates of reactions** of changes in concentration, particle size, temperature and presence of a catalyst

Unit content

Rates of reactions

Measuring the rate of reaction: the instantaneous, initial, general and average rate of reaction. The rate law of reactions, rate constant and the method of initial rates. First, zero and second order reactions and their identification. Collision and transition state theories. Reaction profiles and calculation of enthalpy changes. Reaction mechanisms (elementary reactions, slow, fast and reversible steps). Homogenous and heterogeneous catalysts. Enzymes and the effect of temperature. pH, substrate/product concentrations and inhibition

Unit 327 Chemistry for Biology Technicians

Outcome 3 Be able to interpret key features of equilibrium processes

Assessment Criteria

The learner can:

1. Carry out an experiment on osmosis to demonstrate the drive towards the establishment of **equilibrium**
2. Outline how the acid dissociation constant , Ka, provides information about the extent to which **acids and bases** dissociate in aqueous solution
3. Construct half equations and redox equations for simple **redox reactions**

Unit content

Equilibrium

Dynamic nature of equilibrium, the equilibrium constant expression, and reaction quotient, kinetic and thermodynamic views of equilibrium. Le Châtelier's Principle. Calculation of the Equilibrium constant. Relationship of free energy change to the equilibrium constant. The effect of temperature and catalysts on the establishment of equilibrium

Acids and bases

Brønsted-Lowry theory, conjugate acid-base pairing, amphiprotic substances (including water), ionisation/dissociation constants, variation in strength of binary acids, oxoacids and carboxylic acids. Self ionisation of water and the pH scale, calculation of pH. Calculation of equilibrium in solutions of weak acids and weak bases, Buffers, capacity and range. Neutralisation and titration of a strong acid with a strong base and weak acid with a strong base. Effect of pH on amino acids and zwitter ion formation

Redox reactions

Principle of transfer of electrons in oxidation and reduction. Half reaction method of balancing redox equations, standard electrode potentials, spontaneous change and equilibrium in a voltaic cell. Criteria for spontaneous change in redox reactions. Balancing redox reactions.

Unit 327 Chemistry for Biology Technicians

Outcome 4 Be able to demonstrate the structure and properties of simple organic molecules

Assessment Criteria

The learner can:

1. Construct structural formulae for named examples of **simple organic compounds**, identifying structural, geometric, and optical isomers where appropriate
2. List typical properties of **simple organic compounds**

Unit content

Simple organic compounds

Short chain alkanes, alkenes, alcohols, alkyl halides, carboxylic acids, aldehydes, ketones, ethers, esters, amines, amides. Recognition of functional groups in organic molecules. Linear and ring structure of sugars and differentiation between aldehyde and keto sugars

Unit 327 Chemistry for Biology Technicians

Notes for guidance

This unit aims to provide learners with a grounding in key elements of organic, inorganic and physical chemistry that underpin the life sciences. It is envisaged that although the contents of this unit are necessarily broad they the outcomes will, wherever possible, be contextualised to the final qualification being undertaken.

Practical laboratory investigations are an important feature of this unit and as such learners will be aware and familiar with relevant safe working practices before any investigation is undertaken. It is imperative that learners gain practical experience in relevant calculations, drawing and identifying chemical structures and the process of scientific investigation including formulating hypotheses/performing a calculation, reporting results and evaluating their findings.

In Outcomes 1 and 2, learners will explore the energy changes associated with making and breaking chemical bonds and the effect of a series of variables on reaction rate. Although the delivery of underpinning theories will necessitate a degree of formal lecturing, practical investigative approached are strongly encouraged. Learners can measure enthalpy changes in exothermic and endothermic reactions using simple calorimetric apparatus and compare these to calculations that they have made. Simple calorimeters can be made using polystyrene cups or laboratory glassware. More accurate copper vessels are inexpensive and bomb calorimeters maybe purchased from educational suppliers at a further cost but are not required. Learners should become practiced at the required calculations and are encouraged to explore the opportunities for scientific discovery, reporting and evaluation provided throughout this unit.

Outcome 3 allows learners to explore the dynamics and significance of equilibrium equations. Again it is recognised that an element of formal lecturing will be required to deliver the underpinning theory involved in this. However, outcome 3 also allows the practical investigation in terms of the osmotic potential of the cell, a simple model of which may be created using semi-permeable tubing. Learners are encouraged to gain practical experience of calculating the equilibrium constant as well as those required when working with acids and bases. Titration experiments provide an excellent opportunity for learners to test their calculations as well as allowing them to produce their own titration curves and investigate the range and capacity of buffers.

In Outcome 4, learners will be required to identify and produce structural formulae for a range of simple organic molecules and identify different types of isomerism. Where possible, the content should be contextualised so that learners are aware of the industrial and commercial uses of key examples of each family of molecules. Ideally learners should, through the course of this unit, handle and explore the properties of selected examples, an example of which may be the effect of increasing length of the carbon chain on boiling point (and intermolecular forces) on alkanes and alcohols. Learners should have the opportunity to gain practice in drawing and identifying organic molecules and predicting the properties of simple examples based upon experimental findings.

Centres are encouraged to engage with employers and other institutions wherever possible and where possible these should be contextualised to the final qualification. The use and production of chemicals is so widespread within the life sciences that a wide range of engagement opportunities are available. These may include visits to farms, food processing and production industries, analytical and research laboratories, chemical and pharmaceutical industries and the petrochemical industry.

References

Books

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Hill J.W. Petrucci R.H. 1996. *General Chemistry: An Integrated Approach*. New Jersey. Prentice Hall. ISBN 0023544811
Jones A. Reed B. Weyers J. 2007. *Practical Skills in Biology.* Benjamin Cummings. ISBN 0131755093
Kent M. 2000. *Advanced Biology.* OUP Oxford. ISBN 0199141951
Purves B. Sadava D. Orians G. Heller C H. 2009. *Life: The Science of Biology*. W. H. Freeman. ISBN 0716799016
Toole G. and Toole S. 1999. *Understanding Biology for Advanced Level.* Nelson Thornes. ISBN 0748739578
Williams G. 2000. *Advanced Biology for You.* Nelson Thornes. ISBN 0748752980

Journals

Biological Sciences Review, Phillip Allen Publishing
Bioscience Education, Higher Education Academy (e-journal www.bioscience.heacademy.ac.uk/journal**)**
Biochemistry and Molecular Biology Education – John Wiley and Sons
Biochemical Education – Elsevier Science
Journal of Biological Education – Institute of Biology
Journal of Microbiology and Biology Education – American Society for Microbiology
New Scientist, Reed Business Information

Websites

www.cleapss.org.uk	Consortium of Local Education Authorities for the Provision of Science Services
www.ase.org.uk	The Association for Science Education
www.ncbe.reading.ac.uk	National Centre for Biotechnology Education
www.royalsociety.org	The Royal Society

Unit 328 Undertake Retail Merchandising for the Land-based Sector

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of retail merchandising in the land-based sector and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training. This unit has been specifically developed for 14-19 year old learners in full-time education acquiring additional knowledge of retailing.

The learner will develop their customer service skills. The learner will understand how items are effectively displayed, along with how they are promoted and marketed. They will consider the principles of stock control and storage.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to deliver effective customer service
2. Understand how to display items for sale
3. Understand methods of promotion and marketing
4. Understand the principles of ordering, pricing and controlling retail stock

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

Skillsmart Retail has approved this unit to be used within Edexcel BTEC and City & Guilds qualifications only

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 328 Unit 328 Undertake Retail Merchandising for the Land-based Sector

Outcome 1 Be able to deliver effective customer service

Assessment Criteria

The learner can:

1. Review the needs of different **customer groups**
2. Demonstrate effective **customer service skills**
3. Evaluate **customer service** in a given land-based outlet

Unit content

Customer groups

Individuals, businesses, customer classification e.g. age, sex, socio-economic group

Customer service skills

Effective communication (e.g. addressing customers face to face, appropriate telephone manner, effective written communication), courtesy, appropriate dress and body language, helpfulness, product knowledge

Customer service

Customer expectations, service standards, approach to customers, policies (e.g. refunds, complaints), after sales service, advice and assistance, compliance with Data Protection Act 1998

Unit 328 Undertake Retail Merchandising for the Land-based Sector

Outcome 2 Understand how to display items for sale

Assessment Criteria

The learner can:

1. Analyse the **customer flow** and **space layout** of a given land-based outlet
2. Evaluate **display systems**
3. Discuss the influence of **legislation** on goods displayed

Unit content

Customer flow

Direction of customer movements, clarity of store layout aiding customer flow, e.g. store plans, signage location and clarity, location of promotional offers

Space layout

Store design and plan including position of entrance and exit, location of tills, aisle widths, access for customers including those with disabilities

Display systems

Product groupings (e.g. by category of product, by species, according to perishability, seasonality, special promotions) types of display, location of displays

Legislation

Relevant legislation e.g. Sale of Goods Act 1968 (as amended 1979 & 1994), Trades Description Act 1968, Weights and Measures Act 1985, Consumer Protection Act 1987 (as amended 1994), Price Marking Order 2004

Unit 328 Undertake Retail Merchandising for the Land-based Sector

Outcome 3 Understand methods of promotion and marketing

Assessment Criteria

The learner can:

1. Compare **methods of promotion**
2. Evaluate **marketing strategies** for given land-based outlets
3. Recommend **improvements** to a given marketing strategy

Unit content

Methods of promotion

Advertising in different media, (e.g. radio, newspaper, internet, television), public relations and sponsorship, special offers and discounts, direct mailing

Marketing strategies

Strategies relating to the product (e.g. product design, product range, packaging), price, promotion (e.g. advertising, Public Relations and sponsorship, special offers and discounts, direct mailing), place (e.g. location, transportation, home delivery)

Improvements

Recommendations to support a given objective, e.g. increase market share, increase sales, increase customer base

Unit 328 Undertake Retail Merchandising for the Land-based Sector

Outcome 4 Understand the principles of ordering, pricing and controlling retail stock

Assessment Criteria

The learner can:

1. Explain **buying** and ordering processes
2. Evaluate **stock control** and **storage methods**
3. Review **pricing methods**

Unit content

Buying

Methods of payment, credit arrangements, methods of ordering, documentation, locating suppliers, stock delivery

Stock control

Stock rotation, planning to meet demand, monitoring stock

Storage methods

Perishable and non perishable items, security, storage of animal health products, minimising wastage, compliance with relevant legislation and guidelines, e.g. Veterinary Medicines Regulations 2009, DEFRA Code of Practice for Suitably Qualified Persons and Guidance for the Registration of Retail Premises 2008, Pet Animals Act 1951 (as amended in 1983)

Pricing methods

Cost based, competitor based and offers and discounts

Unit 328 Undertake Retail Merchandising for the Land-based Sector

Notes for guidance

This unit is designed to provide learners with an understanding of the important skills for those working in and managing land-based retail outlets. Centres are encouraged to find a selection of appropriate outlets which could be used for comparison and case study material. Examples may include pet shops, farm retail shops, equine suppliers and shops selling pet care products, but could equally include other outlets such as a shop within a zoo, cattery or animal health charity.

As learners will be visiting other businesses and organisations, there should be an emphasis on safe working practices and appropriate risk assessments should be undertaken.

In Outcome 1, the focus is on customer service skills. It is anticipated that delivery of this unit will be through a mix of formal lectures, visits to appropriate outlets, and the opportunity to practise customer service skills in a real or simulated situation. Work placement in an appropriate setting would also help learners to develop effective customer service skills. It will be important to explore the potential impact of good and poor customer service on the business's current and future customers, and thus on the success of the business.

In Outcome 2, after appropriate classroom based activity, the learner will need access to land-based retail outlets to enable them to carry out the required analysis and evaluation of customer flow, space layout and display systems. It may be helpful to visit a larger outlet, possibly one that is part of a national chain, and a smaller independently owned one for comparison and to stimulate debate about the key factors. The study of relevant legislation may be assisted by considering case study examples of where this has been breached and the consequences of this to the business.

Outcome 3 requires learners to review promotional methods and marketing strategies for a selected land-based outlet. This could be the same outlet or a different one to those studied for outcomes 1 and 2. It may be helpful to study a larger outlet where there is often more evidence of formal strategies. The evaluation of and recommendation of improvements to, a marketing strategy should be carried out in the context of a specific business objective.

Outcome 4 could be delivered through more formal classroom based activity but it would be beneficial if this is supplemented with real work examples, through visits or guest speakers. It is important that learners develop an understanding of the different storage, legislative and security considerations for the varied types of stock which may be sold through a land-based outlet. Specific examples that are of relevance include animal health products, feedstuffs and in the case of a pet shop, live animals. This outcome also looks at buying, ordering and pricing methods and case study material would be useful to explore an appropriate range of methods.

At level 3 learners will have significant experience as customers of retail outlets. This perspective and experience will be helpful in developing their understanding of customer service and marketing methods in the land-based sector. It will be important that teaching and delivery focuses on the application of knowledge and skills to outlets in the land-based sector that are as relevant as possible to learners' interests.

References

Books

Leland, K., Bailey, A. 2006. *Customer Service for Dummies*. Sussex: Wiley Publishing.

Bradley, S., Hebron, L and Woods, A. 2001. *S/NVQ 3 Customer Service Candidate Handbook.* Oxford: Butterworth Heinemann.

Ferrel, O.C. et al. 2005. *Marketing: Concepts and Strategies.* 5th ed. Geneva: Houghton Mifflin.

Hall, D. et al. 2008. *Business studies.* 4th ed. St Albans: Causeway Press Ltd.

Needham, D., Dransfield, R. 1994. *Business Studies Second Edition. 2nd ed.* Cheltenham: Nelson Thornes.

Websites:

www.bized.co.uk	Business education website
www.businesslink.gov.uk	Business Link website
www.marketingteacher.com	Marketing resources
www.thetimes100.co.uk	Case study materials and resources

Unit 329 Undertake the Practice of Equine Health, Handling and Husbandry

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of horse health, handling and husbandry and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to carry out routine equine husbandry practices. Each learner will demonstrate how to use a variety of equipment used for horses. The learner will be able to recognise the signs of health and illness and how to manage them. Also the learner will demonstrate how to present a horse for a variety of disciplines.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to carry out routine husbandry practices
2. Be able to use tack and equipment
3. Be able to maintain horse health
4. Be able to present a horse

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

This unit is linked to Horse Management NOS.

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 329 Undertake the Practice of Equine Health, Handling and Husbandry

Outcome 1 Be able to carry out routine husbandry practices

Assessment Criteria

The learner can:

1. **Plan a husbandry routine** for a group of horses
2. Carry out **routine husbandry practices** for horses
3. Plan a **diet** for horses which meets its nutritional needs
    - Grass kept
    - Stable kept

Unit content

Plan a husbandry routine

Number of horses (stable kept and/or grass kept) routine tasks required: mucking out, feeding, grooming, exercising, turn out, maintaining the yard, daily plan (timings, allocation of horses and tasks to staff), display rota, weekly and monthly requirements

Routine husbandry practices

Accommodation e.g. stable, lose box, field shelter, mucking out, skipping out, deep litter, bedding materials e.g. straw, wood shavings, peat, rubber matting and shredded paper

Grazing: fence checks, poisonous plants checks and water supply checks

Grooming: body brush, dandy brush, curry comb, metal curry comb, rubber curry comb, mane comb, tail brush, sponges and hoof pick

Yard maintenance: cleaning, muck heap, feed room, tack room, rubbish removal and safety checks

Diet

Forage, concentrates, types of food required, amounts of food required, times of feeding, equipment required to feed, life stage of the horse e.g. young, adult, pregnant, geriatric, injured

Stable kept/grass kept

Horses which are kept in a stable full/part time or in a field full time

Unit 329 Undertake the Practice of Equine Health, Handling and Husbandry

Outcome 2 Be able to use tack and equipment

Assessment Criteria

The learner can:

1. Select **tack and equipment** required for a variety of situations
2. **Fit and use tack** and equipment:
    - Exercising
    - Handling
    - Turning out
3. **Maintain equipment** to include:
    - Tack
    - Boots and bandages
    - Rugs

Unit content

Tack and equipment

Head collar, lead rope, bridle, saddle, numnah, girth, martingales, breastplates/breast girths, lunge line, brushing boots, tendon boots, fetlock boots, overreach boots, turn out rugs (light weight, medium weight, heavy weight, rain sheets and fly rugs), twitch

Fit and use tack

Equipment used needs to fit the horse correctly and be fit for purpose e.g. exercising, handling and turning out, evaluate fit of equipment and alter if required

Maintain equipment

Saddle soap, leather conditioner, taking bridles and saddles apart, re-assembling tack, safety checks, storing tack not in use, cleaning bandages and boots, storing bandages and boots, check boots and bandages for damage, cleaning rugs, storing rugs and checking for damage

Unit 329 Undertake the Practice of Equine Health, Handling and Husbandry

Outcome 3 Be able to maintain horse health

Assessment Criteria

The learner can:

1. Carry out a full **health check** on individual horses
2. **Monitor** a group of horses for **health**
3. Perform appropriate **care procedures** to maintain health including:
    - Worming
    - First aid
    - Bandaging

Unit content

Health checks

Eyes, ears, mouth, mucous membranes, teeth, coat condition, body condition, hooves, anal area and conformation

Monitoring health

Weight, behaviour, appetite, defecation/urination, visual health checks, leaner observation and monitoring, recording via CCTV/video camera, written records, information required and who to report to

Care procedures

Worming: types of wormer, when to worm, types of worms and methods of administration
Wound care: wound dressing, using the correct equipment e.g. sterilisers, wound powder, first aid kit contents (disposable gloves, saline solution, gauze swabs, self adhesive bandage, wound dressings, thick non-stick bandage, elastic bandage, cotton adhesive bandage, cold pack, vet wrap scissors, thermometer, foil blanket) types of bandages (cohesive, adhesive, conforming, vet wrap), dressing wounds.
Bandaging: leg (dressing, support and stable), hoof and knee

Unit 329 Undertake the Practice of Equine Health, Handling and Husbandry

Outcome 4 Be able to present a horse

Assessment Criteria

The learner can:

1. Carry out **presentation techniques** for horses
2. Present a horse for a variety of **disciplines**

Unit content

Presentation techniques

Grooming techniques, bathing techniques, plaiting (thread, bands or tape), knowledge of clipping (full, blanket, trace, hunter, chaser, Irish, apron, bib and neck and belly), pulling (mane and tail), trimming

Disciplines

Equipment required; saddles (general purpose, close contact, dressage, eventing, hunting, show jumping, cross country), bits (requires changes where necessary), boots (brushing, fetlock, tendon, knee pads, dressage bandages)

Unit 329 Undertake the Practice of Equine Health, Handling and Husbandry

Notes for guidance

This unit is designed to provide the leaner with an introduction to the practical skills and knowledge required to provide care to horses. Throughout the unit, there is great emphasis on working safely. Before the learners begin the unit it is expected that they are aware of how to work safely around equine animals.

In learning outcome 1, the learner is required to plan and carry out a husbandry routine for a number of horses. Included in this is the provision of a balanced diet. The unit is practically based but will require a certain level of formal teaching.

Outcome 2 focuses on the tack and equipment required for exercising, handling and turning out. It would be beneficial to the learners to teach this unit practically with some theory lessons where required.

In Outcome 3, the learner needs to be able to maintain the health of horses. This concentrates on; health checking, monitoring health and how to carry out a number of care procedures. Basic first aid treatments are included along with worming and bandaging. Although practically based, theory lessons on each are essential.

Outcome 4 looks at the learners presenting horses for a variety of disciplines. Not only do they need to know how to carry out a number of presentation techniques but also know when to apply them. This is a practical learning outcome, limited theory sessions are required.

The emphasis of this unit should be on practical work on the yard. Learners should have access to animals of a suitable temperament for the units. Learners working at Level 3 are likely to have experience working with horses. This unit aims to extend what they currently know and develop skills to apply in the equine industry.

Were relevant, centres and establishments are encouraged to introduce employees and professionals from industry to support the teaching. Learners would also benefit from visits to related establishments to facilitate the learning experience.

References

Books

Auty, I 2008 *BHS Complete Manual of Horse and Stable Management* Kenilworth Press Ltd; 2Rev Ed edition ISBN-13: 978-1905693184

Vogel, C 2003 *Complete Horse Care Manual* Dorling Kindersley; 2 Re-issue edition Pocklington A 2004 *The Essential Guide to Professional Horse Care* J A Allen & Co. ISBN 0851318681

Unit 330 Undertake Estate Skills

Level: 3

Credit value: 10

Unit aim

This unit aims to introduce learners to the estate skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or into further/higher education.

The learner will look at constructing, repairing and maintaining boundaries, structures and surfaces. They will build their experience and confidence in using practical skills in a range of situations. The learner will be able to contextualise practical management work to a particular habitat that lies within their primary area of learning.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to construct, repair or maintain boundaries
2. Be able to construct, repair or maintain structures
3. Be able to construct, repair or maintain surfaces
4. Be able to carry out practical habitat management work

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU22.1 Construct maintain and repair boundaries
CU20.1 Maintain structures and surfaces

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SCC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 330 Undertake Estate Skills

Outcome 1 Be able to construct, repair or maintain boundaries

Assessment Criteria

The learner can:

1. **Prepare the site** appropriately
2. Select appropriate **equipment and materials**
3. Carry out the **construction, repair or maintenance** of selected **boundaries** to meet given specifications

Range

Boundaries

Living boundaries (hedge, bank, ditch), constructed boundaries: fence (post and rail, post and wire, electric, netting), wall (stone, brick)

Unit content

Prepare the site

Plan activity, clear debris, ensure livestock safety, location (power supply, waste disposal, equipment and materials storage)

Equipment and materials

Materials selected relevant to task, health and safety, sustainable practice, cost implications

Construction, repair or maintenance

Undertaken safely (use of risk assessment, appropriate Personal Protective Equipment (PPE)) and to the required standards

Unit 330 Undertake Estate Skills

Outcome 2 Be able to construct, repair or maintain structures

Assessment Criteria

The learner can:

1. **Prepare the structure** appropriately
2. Prepare and ready appropriate **equipment and materials**
3. Carry out the **construction, repair or maintenance** of selected **structures** to meet given specifications.

Range

Structures

Wooden structures (gate, stile, horse jump, bird box, table, bench, door), other structures requiring repair or maintenance (animal house or pen, machinery or feed store)

Unit content

Prepare the structure

Cut required sizes, wood preparation (sanding, planing, filling), check design specification, plan activity

Equipment and materials

Equipment and materials prepared based on manufacturer instructions, health and safety, sustainable practice, cost implications

Construction, repair or maintenance

Undertaken safely (use of risk assessment, appropriate Personal Protective Equipment (PPE)) and to the required standards

Unit 330 Undertake Estate Skills

Outcome 3 Be able to construct, repair or maintain surfaces

Assessment Criteria

The learner can:

1. **Prepare the surface** appropriately
2. Prepare and ready appropriate **equipment and materials**
3. Carry out the **construction, repair or maintenance** of a selected **surface** to meet given specifications.

Range

Surface

Solid (decking, concrete, paving), Loose (gravel, wood chippings, sand)

Unit content

Prepare the surface

Plan activity, clear debris, ensure livestock safety, location (power supply, waste disposal, equipment and materials storage)

Equipment and materials

Equipment and materials prepared based on manufacturer guidelines, health and safety, sustainable practice, cost implications, timeliness for example preparing concrete at the right time for construction

Construction, repair or maintenance

Undertaken safely (use of risk assessment, appropriate Personal Protective Equipment (PPE)) and to the required standards

Unit 330 Undertake Estate Skills

Outcome 4 Be able to carry out practical habitat management work

Assessment Criteria

The learner can:

1. Carry out appropriate **risk assessments**
2. Safely carry out appropriate **practical habitat management** to given specifications
3. Recommend **improvements** for future work

Unit content

Risk assessments

Risk assessments completed and used, use of Personal Protective Equipment (PPE) appropriate to the tasks (safety boots, overalls, gloves, and eye protection), and safe methods of working
Relevant legislation and codes of practice: Health and Safety at Work etc Act 1974, Control of Substances Hazardous to Health (COSHH) 2002, Waste Management (England and Wales) Regulations 2006, Construction (Design and Management) Regulations 2007

Practical habitat management

Mowing, renovation, planting and staking as applicable, clearing (path, fence line), coppicing, uprooting, hedge maintenance, pruning, thinning, cutting or mowing and mulching, pond, stream and ditch clearance
Good practice: composting, materials that can be composted, re-used and/or recycled, finding alternative uses, methods of recycling, avoid wastage
Reduce environmental damage - Pollution (water courses, through litter or debris, noise), damage to habitats, and wastage of resources
Disposal of waste: organic waste (recycling, composting, chipping, burning), inorganic waste (recycling, landfill, discarding safely)

Improvements

Setting habitat management objectives, planning activities and resources, monitoring activities and resources, reviewing outcomes against objectives, recommendations and improvements

Notes for guidance

This unit has a very practical focus, and aims to enable learners to develop estate skills which can be applied to a range of situations and circumstances. The unit has been written such that naturally occurring and locally relevant opportunities can be used in selecting sites, structures and surfaces to construct, repair or maintain.

As learners will be engaged in practical activity there should be an emphasis on safe working practices, including the use of appropriate personal protective equipment (PPE), and appropriate risk assessments should be undertaken. At Level 3 it is expected that learners will take an active part in completing risk assessments, so that this becomes an integral part of all practical activity. Learners should also be made aware of the impact on the environment, and sustainability concepts should also be demonstrated where possible.

Learners should have the opportunity to undertake estate skills activity in a land-based setting wherever possible to maximise the vocational relevance. It will be most beneficial if the structures, boundaries and surface selected are for a clear purpose above and beyond delivery of this unit. It is recognised that there will not be opportunities to carry out construction, repair *and* maintenance in each of the categories, but it would be appropriate for the skills of construction, repair and maintenance to each be developed in one aspect of the unit.

In Outcome 1, learners will develop the practical skills needed to construct, repair or maintain at least two different boundaries, including a living boundary and a constructed one.

In Outcome 2, learners will construct, repair or maintain at least two different structures. It is anticipated that learners will develop an understanding of how to construct a wooden structure, but are not expected to be able to construct larger structures such as animal or machinery housing. It is anticipated that delivery will include repair and maintenance of such larger structures as would be found in an estate setting.

In Outcome 3, learners are required to construct, repair or maintain one surface from the range shown. Delivery may include visits to see a range of surfaces and their properties and maintenance requirements.

In Outcome 4 it is anticipated that delivery of this outcome will be embedded in the practical skills development within the other three outcomes. These outcomes could also be developed in conjunction with learners' work experience at an appropriate placement.

It is anticipated that most delivery of this unit will take place in a practical setting, with supervised practice of skills. Delivery will also include some classroom based activity in ensuring learners have a good understanding of planning, materials selection and preparation, and underpinning knowledge.

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www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
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www.lantra.co.uk	Lantra Sector Skills Council

Unit 331 Understand and Carry Out Farm Livestock Husbandry

Level: 3

Credit value: 10

Unit aim:

This unit aims to provide learners with an understanding of the principles of farm livestock husbandry and how these can be put into practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The aim of this unit is to develop the learner's knowledge and skills required for the successful care and management of farm livestock. The learner will be able to handle farm livestock in order to carry out specific husbandry techniques. The learner will understand the accommodation and environmental requirements of farm livestock and how to prepare suitable rations according to need.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the production systems for farm livestock
2. Be able to carry out handling techniques for farm livestock
3. Understand the environmental conditions required for farm livestock
4. Understand the feed and water requirements for farm livestock

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

LP24 Establish, monitor and maintain appropriate conditions for livestock

LP25.2 Deliver routine husbandry procedures

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 331 Understand and Carry Out Farm Livestock Husbandry

Outcome 1 Understand the production systems for farm livestock

Assessment Criteria

The learner can:

1. Explain the use of different **breeds** of common farm livestock in production systems
2. Evaluate **production systems** for common farm livestock.

Range

This unit can cover any suitable livestock, for example farm animals, such as pigs, cattle, poultry, pigs and sheep or large mammals such as goat, camelids, donkeys, or other available large mammals

Unit content

Breeds

Commercial breeds, native and imported breeds of dairy and beef cattle, native and imported breeds of pure breed and cross breed sheep, pigs (hybrids and pure bred), poultry (hybrids and pure breeds), rare breeds, uses of (e.g. milk, meat and egg production systems)

Production systems

Cattle (beef and dairy), sheep (meat and wool), pigs (meat and breeding stock), poultry (meat and eggs), type of production system (indoor, outdoor), intensive, organic, free range length of time animal is in system, slaughter age

Unit 331 Understand and Carry Out Farm Livestock Husbandry

Outcome 2 Be able to carry out handling techniques for farm livestock

Assessment Criteria

The learner can:

1. Carry out animal **health checks** prior to handling farm livestock
2. Select appropriate **equipment** to be used when carrying out **handling** techniques for farm livestock
3. **Handle farm livestock safely** in a way that complies with relevant legislation, minimises stress and injury
4. Complete animal **movement records** appropriately

Range

This unit can cover any suitable livestock, for example farm animals, such as pigs, cattle, poultry, pigs and sheep or large mammals such as goat, camelids, donkeys, or other available large mammals

Unit content

Health checks

Visual signs: condition of coat/feathers, eyes, ears, skin, mucous membranes, appetite, water intake, faeces and urine output, lameness and limb movement, coughing and choking, discharges and weight changes, behaviour (restlessness, posture, movements, relation to other animals)

Handling equipment

Handling equipment (head collars, ropes and halters, races, crush and bull rings),
choice of equipment according to situation

Handling farm livestock safely

Reasons for handling, restraint and movement of farm livestock (moving from one field to another, bringing indoors, turning out into field, health checks, administering treatments and preventative care, foot trimming, tagging, shearing, weighing), handle and move livestock safely, risk assessments, Personal Protective Equipment (PPE) (overalls, boots and gloves), the importance of moving large animals without handling and in all cases the avoidance of stress

Movement records

Documentation: correct completion, role of the Department for Environment, Food and Rural Affairs DEFRA (England), Welsh Assembly Government (Wales), Scottish Executive Environment and Rural Affairs Department SEERAD (Scotland) Department of Agriculture and Rural Affairs (DARD) NI, in keeping and maintenance of livestock movement records

Unit 331 Understand and Carry Out Farm Livestock Husbandry

Outcome 3 Understand the environmental conditions required for farm livestock

Assessment Criteria

The learner can:

1. Explain the accommodation requirements of **indoor reared** farm livestock
2. Explain the accommodation requirements of **outdoor reared** farm livestock
3. Discuss the **routine maintenance** of farm livestock accommodation

Range

This unit can cover any suitable livestock, for example farm animals, such as pigs, cattle, poultry, pigs and sheep or large mammals such as goat, camelids, donkeys, or other available large mammals

Unit content

Indoor reared

Ventilation, insulation, flooring, drainage, lighting, temperature, space allowance
Relevant current codes of practice, Animal Welfare Act 2006, Health and Safety at Work 1974

Outdoor reared

Shelters, boundaries, hedges, management of grassland
Relevant current codes of practice, Animal Welfare Act 2006, Health and Safety at Work 1974

Routine maintenance

Maintenance of accommodation: bedding, disinfection and cleaning routines, safety and security of livestock, Personal Protective Equipment (PPE), safe handling and disposal of waste (hazardous and non-hazardous)
Legal requirements e.g. Environmental Protection Act 1990 (as amended 1995), disposal of fallen stock

Outcome 4 Understand the feed and water requirements of farm livestock

Assessment Criteria

The learner can:

1. Explain the suitability of **feed rations** according to purpose and life stage of common farm livestock
2. Explain the correct storage and **preparation** of **feed and water** for common farm livestock

Range

This unit can cover any suitable livestock, for example farm animals, such as pigs, cattle, poultry, pigs and sheep or large mammals such as goat, camelids, donkeys, or other available large mammals

Unit content

Feed rations

Type: (dry/wet, concentrates, crops, silage, hay, supplements), quantity of feed according to production, life stage and health status (e.g. weaning, pregnant, lactating, adult, ill, purpose of animal), quality of feed (best before dates, stock rotation). Nutrient content of ration e.g. protein, carbohydrate, fats, vitamins and minerals

Feed and water preparation

Storage of feed: containers, insect and rodent infestations and mould, prepare food according to instructions, checking water is fresh and clean

Notes for guidance

This unit is designed to provide the learner with the knowledge and skills required to work with and manage farm livestock. The unit should cover a range of animals from the list below. This unit should be delivered in conjunction with a working farm or relevant work experience placement, which would ensure that the learner experienced routine farm activities on a regular basis and would experience the 'farming year' (e.g. mating, lambing).

This unit can cover any suitable livestock, for example farm animals, such as pigs, cattle, poultry, pigs and sheep or large mammals such as goat, camelids, donkeys, or other available large mammals.

Throughout the unit emphasis should be placed on safe working. It is expected that learners will be aware of safe working practices and be familiar with accepted practices and behaviours within the context in which they are working.

Outcome 1 is likely to be delivered by formal lectures and visits to animal farms, particularly those with rare breeds. Learners will be expected to research different breeds of farm livestock and the systems used to produce them.

In Outcome 2, learners are required to handle, restrain and move farm livestock. Through practical activities, learners will develop skills in assessing the visual and behavioural signs of health in animals and select, use and maintain equipment appropriately. Learners should be encouraged to handle a range of farm livestock, with the emphasis on safe working and dealing with animals in a way which reduces stress and minimises injury to the learner, animals and others. Learners will also be required to complete animal movement records.

Outcome 3 is likely to be delivered by formal lectures and practical activities. Learners will be required to explain the different environmental conditions that should be provided for indoor and outdoor reared livestock. Learners are required to discuss the hygiene and maintenance needs of farm livestock. The delivery of this unit will be enhanced by appropriate practical activities, for example the preparation and routine maintenance of livestock accommodation.

In Outcome 4, learners will be required to provide feed and water for farm livestock. The delivery of this outcome will involve formal lectures and practical activities.

Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is accepted that some formal lectures will be necessary at level 3 but for this unit it is recommended that they are directly linked to interactive sessions in a real environment. Learners must be given the opportunity to deal with a range of animals in different situations which reflects current industry practice.

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www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)

Unit 332 Fundamentals of Science

Level: 3

Credit value: 10

Unit aim:

The aim of this unit is to enable learners to develop the practical techniques necessary to pursue a potential career in science. Learners will investigate the quantities necessary in chemical reactions, structure and functions of cells, calorific value of different fuels and develop skills in communicating scientific information.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to use the necessary skills to measure quantities for chemical reactions
2. Be able to use the correct equipment to identify structures and functions in different cell types
3. Be able to investigate different types of energy and their transfers
4. Be able to communicate scientific information

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by SEMTA.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 332 Fundamentals of Science

Outcome 1 Be able to use the necessary skills to measure quantities for chemical reactions

Assessment Criteria

The learner can:

1. Outline the key **features** of the periodic table, **atomic structure** and chemical **bonding**
2. Demonstrate practically the ability to **prepare chemical solutions** and **test their accuracy**

Unit content

Features

Metals and non-metals including transition metals, halides, noble gasses, significance of atomic mass, atomic number and changes in group and period

Atomic structure

Elements, mixtures and compounds. Mass and charge of protons, neutrons and electrons and how that structure can derive from the periodic table. Principle of electron shells and how these are filled. Structure and uses of isotopes

Bonding

The formation of ionic, covalent and hydrogen bonds and the relevance of Van de Waals forces. Use of the periodic table to determine the structure of simple ionic and covalent compounds. Balancing chemical equation

Prepare chemical solutions

Difference between precision and accuracy. Handling and measurement of solids and liquids including both weight and volume measurements with an emphasis on safe working practice. Preparation of solutions based upon w/w, w/v and v/v measurements. Serial dilution of solutions and mixing of solutions of different molarities to obtain the required concentrations. Preparation, dilution and mixing of molar solutions. Preparation of acid and alkali solutions, calculation and measurement of pH

Test their accuracy

Measurement of the concentration of solutions by a common industrial assay such as by a titration, colourimetric or spectrophotometic technique

Unit 332 Fundamentals of Science

Outcome 2 Be able to use the correct equipment to identify structures and functions in different cell types

Assessment Criteria

The learner can:

1. Accurately record observations of different **types of tissues** from a light microscope
2. Interpret electron micrographs of different **types of tissues**
3. Describe the key **structures and functions** of a eukaryotic and prokaryotic cell

Range

Cell types: eukaryotic, prokaryotic
Tissue types: epithelial, connective, nervous, muscle

Unit content

Tissue types

Dense, loose, regular, irregular and fluid connective tissues. Simple and stratified epithelial tissues. Skeletal, cardiac and smooth muscle types. Nervous tissue

Structures and functions

Structure and function of cell walls (prokaryotic and eukaryotic), nucleoid, cytosol, flagella, pili, plasmids, cytoskeleton, cell membrane, chloroplasts, centrioles nucleus, rough and smooth endoplasmic reticulum, ribosomes, Golgi apparatus, mitochondria, endosymbiosis theory, peroxisomes and lysosomes

Unit 332 Fundamentals of Science

Outcome 3 Be able to investigate different types of energy and their transfers

Assessment Criteria

The learner can:

1. Describe different types of **energy transfer**
2. Carry out a practical investigation into the calorific value of **different fuels**

Range

Thermodynamics, photosynthesis and cellular respiration in eukaryotes, calorimetric determination

Unit content

Energy transfer

First, second and third laws of thermodynamics. Enthalpy calculation and measurement. Photosynthesis in plant cells and the production of ATP in both animal and plant cells including an outline of glycolysis, citric acid cycle and oxidative phosphorylation. Formation of electrochemical gradients and potential difference across membranes

Different fuels

Calorimetric determination of carbohydrate, lipid based food products and a hydrocarbon fuel fraction and an organic solvent

Unit 332 Fundamentals of Science

Outcome 4 Be able to communicate scientific information

Assessment Criteria

The learner can:

1. Outline the **methods** by which scientific information is communicated
2. Report on a **scientific investigation** that has been carried out

Range

Peer reviewed and non-peer reviewed methods in a range of media

Unit content

Methods

Peer reviewed and non-peer reviewed sources. Journals, books (academic texts, fiction and non-fiction), newspaper and magazine articles, television and radio documentaries and advertising, academic and industry conferences, poster presentation, electronic distribution, websites and educational resources

Scientific investigation

Sourced from published primary sources or from learners own investigation which may be from this unit or another suitable investigation

Unit 332 Fundamentals of Science

Notes for guidance

This unit aims to provide learners with a grounding in a range of both theoretical and practical scientific skills that underpin the life sciences. It is envisaged that although the content of this unit is necessarily general it should, wherever possible, be contextualised to the final qualification being undertaken.

Practical laboratory investigations are an important feature of this unit and as such learners will be aware and familiar with relevant safe working practices before any investigation is undertaken.

Outcome 1 introduces learners to the periodic table and although formal lectures will form an element of delivery this outcome provides an opportunity for learners to practice the skills required in chemical calculations. The practical element enables learners to produce a range of solutions and test their accuracy using methods should be derived from those used in industry or research laboratories. This practical activity also allows learners to gain knowledge about potential chemical hazards such as the preparation and mixing of alkali and acidic solutions. CLEAPSS produce a range of resources that may help in preparing for this element of outcome 1.

Outcome 2 introduces learners to eukaryotic and prokaryotic life including the structure and function of cellular organelles. Electron micrographs provide sufficient magnification for learners to practice the identification of cell organelles. This outcome also allows learners to study the organisation of cells into tissue types and the role of these tissue types in a variety of organs and organ systems. Example slide sets are available from a range of educational suppliers. Although standard light microscopy is sufficient some tissue types may benefit from examination under oil immersion microscopy. If possible learners should be given the opportunity to measure cells using an eye piece graticule.

In Outcome 3, learners will gain a working knowledge of energy transfer and the laws of thermodynamics which should be contextualised to animal examples. However physical examples may help learner grasp concepts before being applied to biological systems. Calorimetric determination forms the investigative element of this outcome and may be carried out inexpensively with standard laboratory glassware, a more accurate and inexpensive alternative is copper calorimetric apparatus and if funds allow bomb calorimeters may now be purchased from educational suppliers. Learners should be encouraged to not only compare the fuels but to relate these to contextualise their finding to industrial examples and to evaluate the methods used.

In Outcome 4, learners will review a variety of methods used to communicate scientific finding to academia, industry and the general public. Learners have the opportunity to evaluate each of these methods in terms of their reliability, impact, accuracy and bias. Learners should explore examples of good and poor practice in the reporting of scientific results especially where scientific results have been misinterpreted. Learners should explore how poor study design and interpretation can have serious implications, such as the debate over the MMR vaccine. Learners should also explore the impact of popular science television and radio documentaries which reach large numbers of the public and be able critically evaluate these sources. This outcome also allows learners to report on a scientific finding and should take the form of one of the form studied. Learners may use one of their own investigations for this unit or another suitable unit. Alternatively learners may take an existing publication, such as a journal paper, and produce a report in an alternative media such as a webpage, popular press article, podcast or broadcast.

Centres are encouraged to engage employers and other institutions where possible and this unit would benefit from such engagements. Possible activities may involve visits to analytical laboratories, food processing facilities, local and national media organisations.

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www.ase.org.uk	The Association for Science Education
www.ncbe.reading.ac.uk	National Centre for Biotechnology Education
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Unit 333 Understand the Principles of Inheritance and Genetic Manipulation

Level: 3

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of inheritance and genetic manipulation. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The aim of this unit is to develop knowledge and understanding of the principles of inheritance and the applications of genetic manipulation in animals.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will be able to:

1. Understand the molecular basis of inheritance
2. Understand the principles of Mendelian genetics
3. Understand the principles of population genetics
4. Know the principles of genetic manipulation

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 333 Understand the Principles of Inheritance and Genetic Manipulation

Outcome 1 Understand the molecular basis of inheritance

Assessment Criteria

The learner can:

1. Describe the **structure of DNA**
2. Describe **DNA replication**
3. Describe **chromosomal structure**

Range

Eukaryotic cells

Unit content

Structure of DNA

DNA, RNA (including tRNA, mRNA and rRNA)

DNA replication

Semi-conservative replication (Meselson-Stahl experiment), enzymatic involvement, importance and mechanisms of proof-reading and repair, replication forks, Okazaki fragments

Chromosomal structure

Euchromatin, heterochromatin, nucleosomes, genes, alleles, telomeres, chromatids, karyotypes

Unit 333 Understand the Principles of Inheritance and Genetic Manipulation

Outcome 2 Understand the principles of Mendelian genetics

Assessment Criteria

The learner can:

1. Explain how the **behaviour of chromosomes during meiosis** leads to variation
2. Explain **monohybrid and dihybrid inheritance ratios**

Range

Diploid species of animal

Unit content

Behaviour of chromosomes during meiosis

Homologous pairs, crossing over (effect of distance on linked genes), independent assortment

Monohybrid and dihybrid inheritance ratios

Continuous and discontinuous variation, dominance (complete and incomplete), heterozygous and homozygous genotypes, genetic diagrams for both monohybrid and dihybrid crosses to F2 generation, including phenotypic ratios and probability calculations

Unit 333 Understand the Principles of Inheritance and Genetic Manipulation

Outcome 3 Understand the principles of population genetics

Assessment Criteria

The learner can:

1. Describe the process of **evolution through natural selection**
2. Describe the **effect of mutations on variation**
3. Explain evolution in terms of the **Hardy-Weinberg Principle**

Unit content

Evolution through natural selection

Adaptations, stabilising, directional and disruptive selection

Mutations

Harmful, beneficial and neutral mutations

Spontaneous and induced mutations and their effects: point, insertion, deletion, translocation, duplication, frameshift, nonsense, missense, neutral and silent

Hardy-Weinberg Principle

Gene pools, genetic drift, gene flow, conditions for Hardy-Weinberg equilibrium, use of $p^2+2pq+q^2 = 1$ to illustrate evolution of populations

Unit 333 Understand the Principles of Inheritance and Genetic Manipulation

Outcome 4 Know the principles of genetic manipulation

Assessment Criteria

The learner can:

1. Describe **techniques used in genetic manipulation**
2. Identify **applications of genetic manipulation**
3. Evaluate the **advantages and disadvantages of genetic manipulation techniques**

Range

Genetic manipulation in animals, reference to prokaryotic genetic manipulation as necessary to cover the specification

Unit content

Genetic manipulation techniques

Extraction of DNA, gel electrophoresis, use of restriction enzymes, polymerase chain reaction, recombinant DNA technology, use of marker genes, knockout mice (gene targeting), use of vectors in transfection and transduction

Applications of genetic manipulation

Genetic testing, DNA fingerprinting, gene targeting, analysis of gene function and regulation, animal cloning, production of pharmaceuticals from animals (e.g. insulin, alpha-1 antitrypsin)

Advantages and disadvantages of genetic manipulation techniques

Practical limitations of techniques, how limitations might be overcome, commercial, social and ethical considerations of genetic manipulation in animals

Unit 333 Understand the Principles of Inheritance and Genetic Manipulation

Notes for guidance

The context of this unit should be animal-based, though clearly some elements (such as DNA structure) are common to many animals and as such do not require species-specific illustration. The tutor must cover as broad a range as possible in order to for the learner to find the unit relevant and engaging.

The world of genetics is moving at an ever-increasing rate and learners need to be aware of both the basis of inheritance and the applications of genetic manipulation in order to keep pace for further study. It is recommended that up to date journals are used in order to enhance the delivery of this unit for that reason. Wherever possible, the theory should be delivered with practical illustration. First-hand experience of genetic techniques such as DNA extraction can be rewarding and motivating for students without an excessive equipment burden on the tutor. Protocols for this can be found within the reading list. Access to an industrial laboratory would be invaluable experience where possible. It is expected that learners will be familiar with safe working practice, be aware of risk assessments and be equipped with personal protective equipment as necessary throughout all practical work.

Genetics is an area in which great controversy is often provoked. Exploration of the techniques used in genetic manipulation and the potential applications in both domestic and wild animals allows learners to formulate their own, informed views on contemporary issues and may open up avenues of further study for many.

Many links to other scientific units (such as Animal Biology) can be made throughout this unit. Where possible and practical it is recommended that delivery is integrated and these links are emphasised to the learner.

Outcome 1 explores the molecular basis of inheritance. Learners must be aware of the link between structure and function of nucleic acids. Making jigsaw models or using modelling clay can help to make learners aware of the 3D nature of the structures. The sequence of events during DNA replication, including proof-reading and repair, must be covered with the names and roles of enzymes at each stage. Knowledge of chromosomal structure must not be 'stand-alone' but linked to how the structure enables characteristics to be inherited and expressed.

Outcome 2 follows on from outcome 1 and explores the contribution of chromosomal behaviour during meiotic divisions to variation of potential offspring. Knowledge of the stages of meiosis is assumed and hence the requirement here is for a detailed examination of the chromosome behaviour during prophase I and metaphase I, linked to the resultant formation of gametes. Diploid species must be used though learners should be aware of the existence of polyploidy in other species. Learners must be able to construct diagrams of both monohybrid and dihybrid inheritance through to the F2 generation, as well as being able to explain differences between expected and observed phenotypic ratios.

Outcome 3 requires learners to study the principles of population genetics and evolution through natural selection. They must be able to describe and identify the specified mutations, linking them to their relative effects on variation between individuals. They must show an understanding of variation within populations and how species may evolve as a result of alterations to the gene pool. The Hardy –Weinberg principle must be explored in full, with its relevance to evolution. The ability to use the Hardy-Weinberg equation is required.

Outcome 4 requires the learner to be able to describe genetic manipulation techniques. Where possible they should be given the opportunity to carry out techniques or at least observe them being carried out, directly or via video. Learners must be able to describe the equipment, materials and stages in the technique (including timescales). This should lead logically onto examination of practical limitations and how they may be

overcome. Applications of genetic manipulation techniques must be individually considered in terms of commercial, social and ethical considerations rather than simply 'genetic manipulation', though this may be a useful starting point from which discussions may begin. Prokaryotes and viruses often play a part in genetic manipulation techniques and as such learners are required to understand how their replication methods allow this to occur.

There are many high quality resources available online that may be used to deliver this unit. Many of these offer simulations of genetic experiments that learners can carry out as well as animations to demonstrate and clarify genetic concepts. It is important that learners are guided through the vast quantity of internet resources available: many resources are aimed at genetic study at too high a level while others are simply not rigorously reviewed.

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Books

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Thomas A. 2003. *Introducing Genetics*. Taylor & Francis Ltd

Journals

Annual Review of Genetics
Biological Sciences Review
Biotechnology and Bioengineering
Gene Analysis Techniques
Genetics Selection and Evolution
Genetics
Journal of Animal Breeding and Genetics
Journal of Zoological Systematics and Evolutionary Research
Mammalian Genome
New Scientist
Theoretical Population Biology

Websites

www.jbpub.com/genetics/essentials4e/	Essential Genetics companion website
www.hhmi.org/biointeractive/index.html	Howard Hughes Medical Institute
www.johnkyrk.com	Cell biology animations by John Kyrk
www.learn.genetics.utah.edu	University of Utah Genetic Science Learning Centre
www.molecularstation.com/science-videos	Molecular Station science videos and lectures
www.ncbe.reading.ac.uk	National Centre for Biotechnology Education
www.thenakedscientists.com	The Naked Scientists – science radio, podcasts and practical techniques

Unit 334 Understand the Principles of Chemistry for Biological and Medical Science

Level: 3

Credit value: 10

Unit aim

The aim of this unit is to enable learners to be familiar with basic chemical concepts which underpin biology and biomedical professions.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to use the necessary skills to safely measure quantities for chemical reactions
2. Understand the effect of environmental conditions on rates of reaction
3. Understand the relationship between molecular bonding and enthalpy changes
4. Be able to interpret key features of equilibrium processes in fluid states

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

N/A

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 334 Understand the Principles of Chemistry for Biological and Medical Science

Outcome 1 Be able to use the necessary skills to safely measure quantities for chemical reactions

Assessment Criteria

The learner can:

1. Perform **volumetric calculations** leading to accurate chemical quantities required for reactions
2. Identify **hazards and controls associated with chemical reactions**
3. **Measure accurately** quantities of solid, liquid and gaseous chemicals

Unit content

Volumetric calculations

Avogadro's constant, calculations involving mass, moles, concentrations and volumes (e.g. M=CV, $M_aV_a = M_bV_b$), titration curves, units and interconversions (e.g. mol, dm^3, cm^3, mol dm^{-3}, g, $gmol^{-1}$)

Hazards and controls associated with chemical reactions

Laboratory safety symbol interpretation, Personal Protective Equipment (PPE), hazard identification and risk assessment

Measurement of solids, liquids and gases

Use of balances, measuring cylinders, burettes and gas syringes

Unit 334 Understand the Principles of Chemistry for Biological and Medical Science

Outcome 2 Understand the effect of environmental conditions on rates of reaction

Assessment Criteria

The learner can:

1. Summarise properties of elements, groups and rows in the Periodic Table, in terms of:
    - **structure**
    - **physical properties**
    - **chemical properties**
2. Describe **reaction mechanisms** and profiles
3. Identify **environmental conditions** that affect **rates of reactions**
4. Analyse the effect of environmental conditions on rates of reaction

Unit content

Structure, physical and chemical properties of chemicals

Atomic structure (neutrons, protons, electrons), electronic configuration and place in the Periodic Table, patterns in atomic radii, first ionisation energies, electronegativity, reactions of group 1, 2 and 4 elements with water, oxygen and chlorine, reactions of period 3 elements with water, oxygen and chlorine

Rates and mechanisms of reactions

Units of rate (mol $dm^{-3}s^{-1}$), collision theory, activation energy, reaction profiles, Maxwell-Boltzmann Distribution, simple reaction mechanisms (e.g. halogenalkanes and hydroxide ions), reactions with orders 0, 1 and 2, rate determining steps

Environmental conditions

Effect of concentration, temperature, pressure and addition of a catalyst to reactions, effect of pH, temperature and concentration of substrates on enzyme-catalysed reactions

Unit 334 Understand the Principles of Chemistry for Biological and Medical Science

Outcome 3 Understand the relationship between molecular bonding and enthalpy changes

Assessment Criteria

The learner can:

1. Explain ionic and covalent **bonding**
2. Analyse the **bonding** properties of **carbon**
3. Analyse **enthalpy changes** for endothermic and exothermic reactions
4. Apply Hess's Law to determine enthalpy changes in reactions

Unit content

Bonding

Ionic, covalent, hydrophilic/hydrophobic interactions, hydrogen bonds, Van der Waals forces

Bonding in carbon

Valences of carbon, structures of carbon compounds (straight, branched, ring), importance of carbon compounds in organisms (e.g. carbon dioxide, carbonate ions etc)

Enthalpy changes

Entropy, units (ΔH), standard enthalpy changes (combustion, formation, neutralisation and reaction) linked to bond formation and bond breakage, theory and application of Hess's law

Unit 334 Understand the Principles of Chemistry for Biological and Medical Science

Outcome 4 Be able to interpret key features of equilibrium processes in fluid states

Assessment Criteria

The learner can:

1. **Calculate pH values** from proton concentrations and vice versa
2. Analyse **equilibria of liquids and gases** across membranes
3. Predict **shifts in equilibrium** due to:
    a. concentration
    b. temperature
    c. pressure
4. Describe **reduction and oxidation** processes in biological systems

Unit content

pH calculations

Hydrogen ion concentration in aqueous solutions, K_w, Henderson-Hasselbalch equation, $pH = {}_{log10}[H+]$, $[H+]=10^{-pH}$

Equilibria of liquids and gases

Diffusion, osmosis, water potential, membrane potential, oxygen-haemoglobin dissociation curve, blood serum analysis and indicators of common disorders in one relevant species

Shifts in equilibrium

Reversible reactions, Le Chatelier's Principle, calculation of equilibrium constant, effects of changing concentration, temperature and pressure on the position of equilibrium

Reduction and oxidation

Oxidation, reduction, oxidising and reducing agents, oxidation numbers for organic compounds, redox reactions of ATP in respiration, action of oxidoreductases, redox processes in digestion

Unit 334 Understand the Principles of Chemistry for Biological and Medical Science

Notes for guidance

This unit should be delivered in a varied fashion, using tutorials, problem solving and practical investigations alongside formal lectures and practice. Animations and games are available on the internet for use by learners or within teaching sessions. Learners should be given vocationally relevant contexts wherever possible and biological examples should be used to illustrate the relevance of the chemistry throughout.

Tutors must ensure that learners are aware of hazards involved in laboratory work, and that learners have appropriate personal protective equipment before commencing any practical investigations. Learners could begin practical work with putting together risk assessments specific to the laboratory in which the investigations are taking place, and would benefit from being able to see risk assessments produced by working laboratories. If possible, learners should be able to visit diagnostic laboratories and guest lectures by biomedical scientists are encouraged.

The preclinical curriculum for veterinary and biomedical sciences has biochemistry and physiology as core components. It is important that learners understand basic chemical concepts in order to go on to study these subjects at a higher level, as well as understanding the importance of chemical understanding within a biological context.

One of the most useful diagnostic tools available to biomedical practitioners is blood analysis. Though part of this will involve the study of blood cells (haematology) a significant proportion involves analysis of substances in the blood serum, such as sodium, potassium and chloride levels, and blood urea, nitrogen and ammonia. The values of these results can be presented in different units and therefore an understanding of the units, and the ability to convert to different units, is essential.

Accurate interpretation of blood serum analysis requires chemical knowledge in areas such as behaviour of elements / molecules and the periodic table, chemical reactions and kinetics, quantitative chemistry and disassociation of acids and bases.
The unit contains practical mathematics and tutors are strongly encouraged to build learners' confidence in more basic mathematical techniques prior to introducing the more advanced mathematics.

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Clark J. 2000. *Calculations in AS/A Level Chemistry.* Longman

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Lobban C. 1992. *Successful Lab Reports: A Manual for Science Students*. Cambridge University Press

Parsons R. 2008. *Head Start to AS Level Chemistry*. Coordination Group Publications

Sackheim G. 2007. *An Introduction to Chemistry for Biology Students (9th Edition)*. Pearson Education

Winter M. 1994. *Chemical Bonding*. Oxford University Press

Journals

Biological Sciences Review
Journal of Biological Chemistry
New Scientist
Pure and Applied Chemistry

Websites

www.bbc.co.uk	BBC, particularly the 16+ science section
chemistry-react.org	Nuffield Advanced Chemistry
www.chemguide.co.uk	Chemguide (Jim Clark)
www.cleapps.org.uk	CLEAPPS
www.practicalbiology.org	Practical Biology (Nuffield Foundation Curriculum Programme / Society of Biology
www.practicalchemistry.org	Practical Chemistry (Nuffield Foundation Curriculum Programme / Royal Society of Chemistry / CLEAPPS)
www.rsc.org	Royal Society of Chemistry
www.wellcome.ac.uk	Wellcome Trust

Appendix 1 Relationships to other qualifications

Literacy, language, numeracy and ICT skills development

These qualifications include opportunities to develop and practise many of the skills and techniques required for success in the following qualifications:

- Functional Skills (England) – see **www.cityandguilds.com/functionalskills**
- Essential Skills (Northern Ireland) – see **www.cityandguilds.com/essentialskillsni**
- Essential Skills Wales (from September 2010).

There might also be opportunities to develop skills and/or portfolio evidence if learners are completing any Key Skills alongside these qualifications.

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Providing City & Guilds qualifications – a guide to centre and qualification approval contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of learners
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Ensuring quality contains updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document contains information on:

- Management systems
- Maintaining records
- Assessment
- Internal verification and quality assurance
- External verification.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for learners who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- ***Walled Garden***
  Find out how to register and certificate learners on line
- ***Events***
  Contains dates and information on the latest Centre events

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Useful contacts

Type	Contact	Query
UK learners	T: +44 (0)84 4543 0033 E: learnersupport@cityandguilds.com	• General qualification information
Centres	T: +44 (0)84 4543 0000 F: +44 (0)20 7294 2413 E: centresupport@cityandguilds.com	• Exam entries • Registrations/enrolment • Certificates • Invoices • Missing or late exam materials • Nominal roll reports • Results
Walled Garden	T: +44 (0)84 4543 0000 F: +44 (0)20 7294 2405 E: walledgarden@cityandguilds.com	• Re-issue of password or username • Technical problems • Entries • Results • GOLA • Navigation • User/menu option problems
Employer	T: +44 (0)121 503 8993 E: business_unit@cityandguilds.com	• Employer solutions • Mapping • Accreditation • Development Skills • Consultancy

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